HEALING BY DESIGN: Interior Architecture and Interior Design of Public Spaces for Children's Hospitals

Rawa Abu Lawi-Sawalha

BA & MA (An-Najah National University)

A thesis submitted for the degree of Doctor of Philosophy
Lancaster Institute for the Contemporary Arts, Lancaster University

June 20/2017

ABSTRACT

This research focuses on four main topics: **Children's' Cognitive Development** as it relates to age-appropriate interior design; **Children's Hospital Design** and healing environments; **Public Spaces in Hospitals** – interior architecture and interior design; **Contextual Issues** – specifically, the religious, ethnic and national context of Palestine. Literature indicates that research is needed in the design of healing environments for children in order to create spaces that are child-friendly and meet their cognitive development needs. There is little research available about the design of the public areas of children's hospital including the main entrance, atrium and thoroughfares. Also, most empirical research uses traditional social science methods to understand the requirements for healing environments for children (e.g. interviews, observations). Few studies use design- or arts-based approaches. Furthermore, most research has been conducted in the West, with little research from other countries, like Palestine, where few hospitals are devoted only to children.

This research aimed to determine: (1) key design factors, functions, constraints and programme requirements for designing the public spaces of children's hospitals in an age-appropriate way to promote healing; (2) how context-specific issues relating to Palestine play a role in determining the key design factors.

From a critical analysis of the literature, specific research questions and the development of a primary research plan were developed. The main research question is: ***For a new children's hospital in Palestine, how should the public areas (i.e.,* main entrance, atrium, and throughfares) *be designed so that they are suitable for all age ranges and promote healing?***

In Palestine, qualitative data were collected during nine *co-design and co-creation workshops* that included arts-based activities and semi-structured interviews. Participants included children from 3-18 years, parents, doctors, nurses, reception and admissions staff, and four groups of designers. All participants, excluding the designers, participated in drawing and modeling activities. The use of drawings with children is an indispensable tool because their verbal expression is often not highly developed, and because preferences and ideas can be expressed more intuitively. Similarly, models can be effective tools because children can express ideas and preferences about form, materials and size through them in a way that words alone cannot describe.

This study uses a *thematic analysis* approach to analysing the qualitative data. The results of data analysis were sorted into main themes and sub-themes. The key findings of this study are: ***context-specific issues*** (i.e. culture, gender, separation and religion issues); ***physical environments: interior architecture and interior design*** – *medical spaces* (e.g. emergency, outpatients, triage room and others)*; non-medical spaces (e.g.* play areas, indoor and outdoor green areas, entertainment activities, spaces for eating, reception, waiting areas and admissions); *interior design elements* (e.g. image design, art, form and shape, wayfinding signage, and colours); *and* ***environmental considerations*** (e.g. noise,

hygiene, smell, and light)**.** These findings will inform ***guidelines and recommendations*** and will be supported by ***visual models*** for the design of children's hospitals, particularly public spaces in the particular context of Palestine. The guidelines will contribute to the creation of supportive healing environments for all stakeholders, but particularly for children.
This study demonstrates that *practical design methods in the research process* can be very effective in fostering creativity and in drawing out ideas and preferences from young children and other stakeholders. Such methods provide a novel approach to the design of healing environments for children.

ACKNOWLEDGEMENTS

First and foremost, thanks are to Allah who helped me to accomplish this work.

I consider myself privileged to have the supervision of Professor Stuart Walker and Doctor Christopher Boyko, who made this research possible. My deepest thanks for their encouragement, their constant feedback, and their support and confidence in me. They provided a counter perspective that helped me successfully manage this research.

I would like to express my thanks for Professor Nick Dunn from Imagination Lancaster Research Centre at Lancaster University for his positivity and interest in my work, and for his useful suggestions for this research methodology. Also, my deep appreciation to my proof-reader Helen Walker for her support, patience, and corrections that helped me improve my academic writing as an international student.

I would like to express my appreciation to the staff at FASS and other faculties at Lancaster University for offering several PhD support modules. The seventeen modules I have taken expanded my knowledge and supported me during my research. Also, my deepest thanks to Imagination Lancaster, who provided PhD students with support seminars that helped me develop my research and to discuss and share my research with other students and teachers.

Very special thanks for the conferences organisers, who gave me a chance to present and disseminate my research, particularly the Postgraduate Research conference in 2016, which awarded me the prize for best long presentation.

I am deeply grateful to all the research participants – designers, medical staff, parents and children – who made the time and space for me to interview them. They provided insight into practice-based design that was invaluable to this thesis, which would not been possible without their participation.

My sincere thanks are extended to An-Najah National University, particularly Professor *Rami Hamdalla,* the Prime Minister of the Palestinian National Authority and President of An-Najah National University, and to the Vice President Prof. *Maher Natsheh* (acting President of An-Najah National University) for providing me with a scholarship that covered three years of my PhD journey. Also, cannot forget to thank the scholarship committee at An-Najah University, particularly Dr. Saed Al koni, Dr, Kharieh Rassas, Dr. Maher Natsheh, and Dr. Abdel- Khareem Daraghmeh for their trust and support in my continuation of my PhD at Lancaster University. Also, my deep thanks for my previous Dean, Dr. Hassan- Nerat for his encouragement to continue my PhD.

Additional thanks go out to all my friends at Lancaster University, and on my Facebook account, who always encourage and empower me. Also, my deepest

thanks to the Graduate Colleague at Lancaster University who provided me with a welcoming and home-like environment for more than four years.

Very special thanks for my colleagues at Lancaster University, particularly Dr. Ahmed Qabaha, Dr. Rami Quariq, and Dr. Aded Kareem Zawai for their support during my PhD Journey.

Finally, I would like to express my heartfelt appreciation to my family, parents, brothers and sisters, sisters in law, my husband Saher Abu Lawi, and my son Yanal, to whom I will forever be indebted. To my family, I offer my sincerest thanks for their unending support. For my husband, I provide my deepest love and gratitude for his patience and sacrifice, support, encouragement, taking care of our son, and for his acceptance for me to be away from him for more than four years.

Thank you one and all.

STATEMENT OF ORIGINALITY

I declare that this thesis is my own work and has not been submitted in substantially the same form for the award of a higher degree elsewhere. To the best of my knowledge it does not contain any materials previously published or written by another person except where due reference is made in the text.

_____

Rawa Abu Lawi

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ABBREVIATIONS AND ACRONYMS:

CHOP: Children's Hospital of Philadelphia

DCS: Day Care Service

EMS: Emergency Medical Department

HSC: Hospital for Sick Children

ICU: Intensive Care Unit

IMU: Intermediate Care Unit

MMS: Military Medical Services

MOH: Ministry of Health

NHS: National Health Service

NGO: Non-Governmental Organisation

OPD: Outpatient Department

OT: Operating Unit

OHE: Optimal Healing Environment

PCBS: Palestinian Central Bureau of Statistics

PMOH: Palestinian Ministry of Health

RVH: Royal Victoria Hospital

RSO: Research Support Office (Ethics Committee at Lancaster University).

UNFPA: United Nations Population Fund

UNICEF: United Nations Children's Fund

UNRWA: United Nations Relief and Works Agency

USAID: United States Agency for International Development

GLOSSARY OF TERMS

Adolescence: refers to the second decade of life, and seen as a transition between childhood and adults (Hutton, 2005, p.537).

Aesthetics: The study of human minds and emotions in relation to the sense of beauty (Palmer et al., 2013, p. 79). Also, it is generally considered to be the branch of philosophy that deals with art, its creative sources, and its effectiveness. An aesthetic is an expression of visual quality. The term "aesthetic" is a Germanic form of the Greek term "aisthesis". The Latin term "aesthetica" can be translated as perception, sense, feeling, awareness, knowledge of the fine arts, and the standards used to understand them. It is the application of design principles and the orchestration of the individual components of colour, light, finish, and texture that when used in effective combination provide the viewer with a cohesive visual story (McCullough, 2009, p.20; Caspari et al., 2006, p.852).

Architectural features: These are relatively permanent aspects of the hospital environment, which include the physical plan, layout, size and shape of the units (Karlin & Zeiss, 2006, p.1377).

Architectural style: is the product of the design process. It is not a concept based on classifying features of design. It is a consistent way of doing results in a consistent style. In a broader sense, style is consistent with a collective adoption of organising principles (Konigk, 2011, p.13). Also, it is a definite type of architecture, distinguished by special characteristics of structure and ornament (Poppeliers et al, 2003, p.viii).

Atria: They are spaces characterised by high ceiling, large architectural footprint, wide entrances with open concepts, multi-use areas, and large glass windows that allow natural light into the space (Kollar & McLaren, 2012, p.4).

Cognitive processes: involve changes in the child's thinking, intelligence and language. Cognitive developmental processes enable a growing child to memorise a poem, figure out how to solve a math problem, come up with a creative strategy, or speak meaningfully in connected sentences (Santrock, 2010, p.29).

Co-creation: It is the art act of collective creativity, i.e. creativity that is shared by two or more people and it is a very broad term with applications ranging from the physical to the metaphysical and from the material to the spiritual (Santrock, 2010, p.6).

Co-design*:* It is a specific instance of co-creation, also, it refers to collective creativity of collaborative designers, and it refers to the creativity of

designers and people not trained in design working together in the design development process (Santrock, 2010, p.29).

Deductive method: Experimental approach that uses a priori questions or hypotheses that the research will test (Gray, 2004, p.397).

Evidence-based Design (EBD). This base of knowledge provides the project team with a wealth of knowledge that can help make the new facility a safe and healing environment (Komiske, 2013, p.13). Also, it is a deliberate attempt to base building decisions on the best available evidence with the goal of achieving the best possible outcomes for patients, families and staff while improving utilisation of resources (Sadler, 2008, p.2)

Epistemology: A qualitative approach that seeks out the perspectives about the culture of individuals, groups or systems occurring in settings or 'fields'. Originally associated with anthropology and sociology (Gray, 2004, p. 389).

Fathom: A company uses a lot of research techniques rooted in psychology, neuroscience, anthropology and architecture to transform needs of stakeholders that cannot express verbally (Powers, 2009, pp.26-27).

Flag Project: The Flagship Project is a five-year initiative funded by the U.S. Agency for International Development (USAID), designed, and implemented in close collaboration with the Palestinian Ministry of Health (PMOH). The Project's main objective is to support the PMOH, selected non-governmental organisations, and selected educational and professional institutions in strengthening their institutional capacities and performance to support a functional and democratic Palestinian health sector able to meet its priority public health needs (Gunkel, 2010, P.8).

Generalisability: The extent to which the results of a study based upon evidence drawn from a sample can be applied to a population as a whole. Often referred to as external validity (Gray, 2004, p.399).

Hard landscape: The man-made features designed to complement the soft landscape (i.e., paving, walls, railings, fences, retaining structures and street furniture such as lighting, seats, bollards, adverts and signs) (Ja'afar et al., 2012, p.651).

Induction approach: The establishment of facts on which theories or concepts are later built, moving from specifics to generalisations (Gray, 2004, p. 400).

Interior design: Used to describe all types of interior projects, encompassing everything from decoration to remodelling… [and it] is an interdisciplinary practice that is concerned with the creation of a range of interior environments that articulate identity and atmosphere through the manipulation of spatial volume, placement of specific elements and furniture, and treatment of surfaces (Booker & Stone, 2010, p.11,12).

Interior architecture: Concerned with the remodelling of existing spaces and structures, building reuse, and organisational principles. It bridges the practices of interior design and architecture, often dealing with complex structural, environmental, and servicing problems (Booker & Stone, 2010, p.12).

Internal validity: The extent to which changes in the dependent variable can be attributed to the independent variable, rather than to an extraneous variable (Gray, 2004, p.400).

Mixed method research: An approach to inquiry that combines both qualitative and quantitative forms of research. It involves philosophical assumptions, the use of qualitative and quantitative approaches, and the mixing or integrating of both approaches in a study (Creswell, 2013, p. 244).

Mosaic approach*:* Considered as a multi-method approach that enables young children and adults to be involved in the process of design to reflect young children's experience of places related to architecture. Moreover, it is regarded as a potential approach with flexible tools that is suitable for all children around the world (Clark & Moss, 2011, p.3)

Optimal healing environment: An environment in which the social, psychological, physical, spiritual, and behavioural components of healthcare support and stimulate the body's innate capacity to heal itself (Samueli Institute as cited in Ananth, 2008, p.273).

Participatory design: Collective creativity in design (Macaulay et al., 1999, p.77).

Participatory research: It is the process of producing new knowledge by systematic inquiry, with the collaboration of these affected by the issue being studied, for the purpose of education and taking action or affecting social change (Macaulay et al., 1999, p.77).

Participatory action research: Collaborative research, education and action used to gather information to use for change in social or environmental issues. It involves people who are concerned about or affected by an issue

taking a leading role in producing and using knowledge about it (Pain et al., 2012, p.2)

"Pebble project": A group of facilities around the world that meets twice a year to share their progress and add to the EBD knowledge base (Komiske, 2013, p.13).

Postmodern designs: They are often modern buildings in structure, organisation, and planning, but decorated with playful features, such as colourful quotations of historical details. While many tout postmodernisms as a return to traditional urban design principles, others deride the superficial application of glittery ornament and the embracing of the vacuous glitz of popular culture (Adams & Theodore, 2005, p.229).

Post-positivists: Reflect a deterministic philosophy about research in which causes probably determine effects or outcomes. Thus, the problems studied by post-positivists reflect issues that need to identify and assess the causes that influence the outcomes, such as found in experiments (Creswell, 2013, p.245).

Physical environment: Denotes both built and natural environments. In this review, the term "built environment" will refer to structures, their configuration, and amenities. The term "nature" in this review encompasses both pristine, un-impacted environments (e.g. forests) as well as landscaped outdoor spaces e.g., parks and gardens (Sherman et al., 2005, p.188).

Psychosocially supportive design: A framework developed by Alan Dilani comprises the properties of both 'healing environment' and 'optimal healing environment': psychosocially supportive design stimulates and engages people, both mentally and socially, and supports an individual's sense of coherence. The basic function of psychosocially supportive design is to start a mental process by attracting human attention, which may reduce anxiety and promote positive psychological emotions (Dilani, 2008 as cited in Freimane, 2015, p.17).

Qualitative reliability: Indicates that a particular approach is consistent across different researchers and different projects (Creswell, 2013, p. 246).

Qualitative validity: Means that the researcher checks for the accuracy of the findings by employing certain procedures (Creswell, 2013, p.247).

Research designs: Types of inquiry within qualitative, quantitative and mixed method approaches that provide specific direction for procedures in a research study (Creswell, 2013, p.247).

Research methodology: Approaches to systematic inquiry developed within a particular paradigm with associated epistemological assumptions (e.g. experimental research, survey research, grounded theory, action research) (Gray, 2004, p.405).

Research question: A specific formulation of the issues that a research project will address, often describing general relationships between and among variables that are to be tested (Gray, 2004, p.405).

Riwaq: An architectural element of larger houses or buildings. It is constructed usually in the corner of the house or at the ends or between two (or three) rooms with two (or three) of its sides closed and the fourth, the front side, left open, the open side is usually constructed with arches (Hadid, 2002, p. 23)

Salutogenic: An approach used to promote health and well-being by creating a built environment that includes wellness factors, contributing to the sense of well-being for staff and strengthening the healing process. It provides a basic theoretical framework for psychosocially supportive design (Dilani, 2014, p.12; Dilani, 2001, p.21).

Sample: A set of objects, occurrences or individuals selected from a parent population for a research study (Gray, 2004, p.405).

Segregation in Islam: It states that a man and a woman cannot stay together in private (Khalwa) if they are not married to each other, and sexual relations between them is possible. But men and women can meet in public as individuals and groups (Osman,1992, p.21).

Soft landscape: Soft landscape features are the landscape elements that represent nature such as plants, water and topography (Ja'afar et al., 2012, p.651).

Triangulation: The use of a variety of methods or data sources to examine a specific phenomenon either simultaneously or sequentially in order to improve the reliability of data (Gray, 2004, p.406).

Toolkit: A collection of tools that are used in combination to serve a specific purpose (Sanders et al., 2010, p.2).

Technique: How the tools and toolkits are put into action. For example, many different techniques can be used with a deck of image cards. They can be sorted, categorised, prioritised, used to make a collage, tell a story and/or used to spark conversations (Sanders et al., 2010, p.2).

Thematic analysis: A method for identifying, analysing, and reporting patterns (themes) within data. It minimally organises and describes your data set in (rich) detail (Braun & Clarke, 2006, p.6).

Wayfinding signs: The features that enable "the formation of cognitive maps through interpretation of key elements by patients" (Bjorngaard, 2010, p.3).

Chapter 01

Introduction: Thesis Aims and Scope of the Study

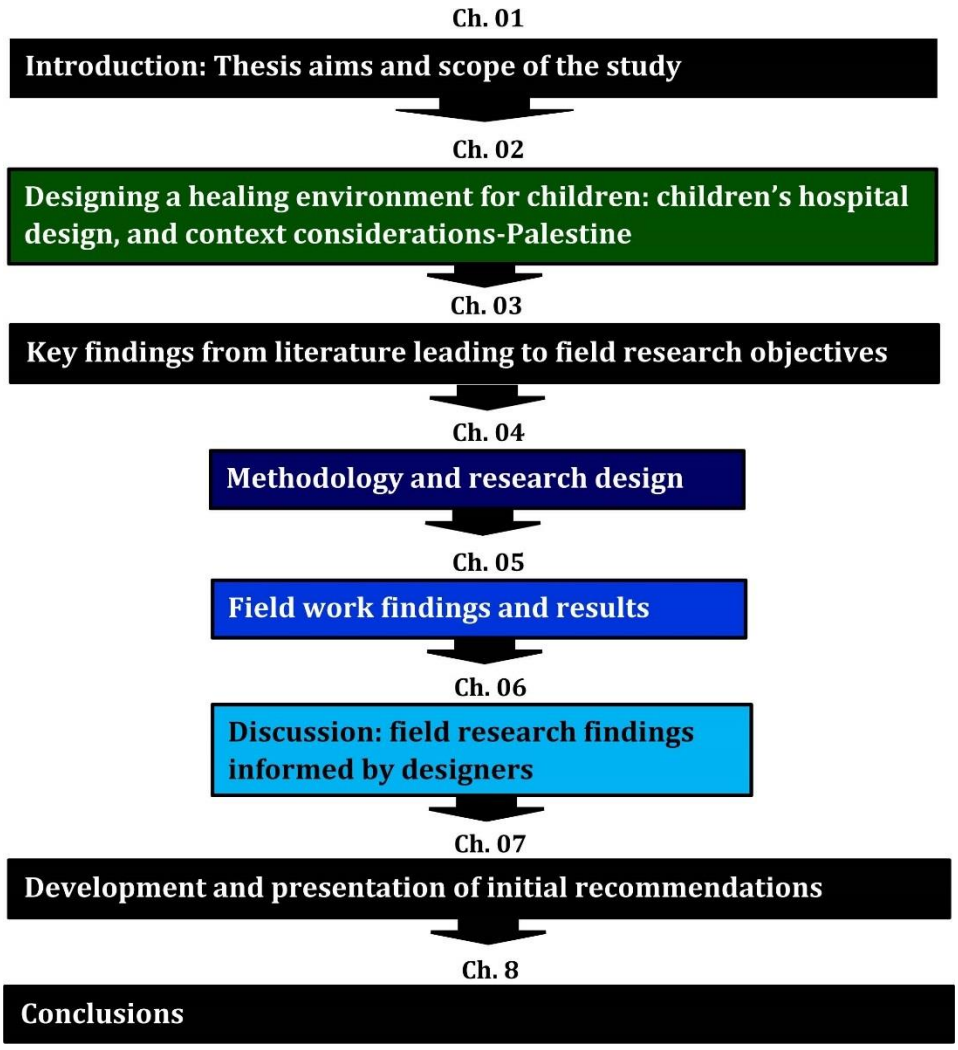


Fig 1.1: The structure map of the thesis

1.0 Introduction

This chapter outlines the research aims and scope of my thesis (Fig. 1.1) and sets out the background for my research. It includes the following topics (Fig. 1.2).

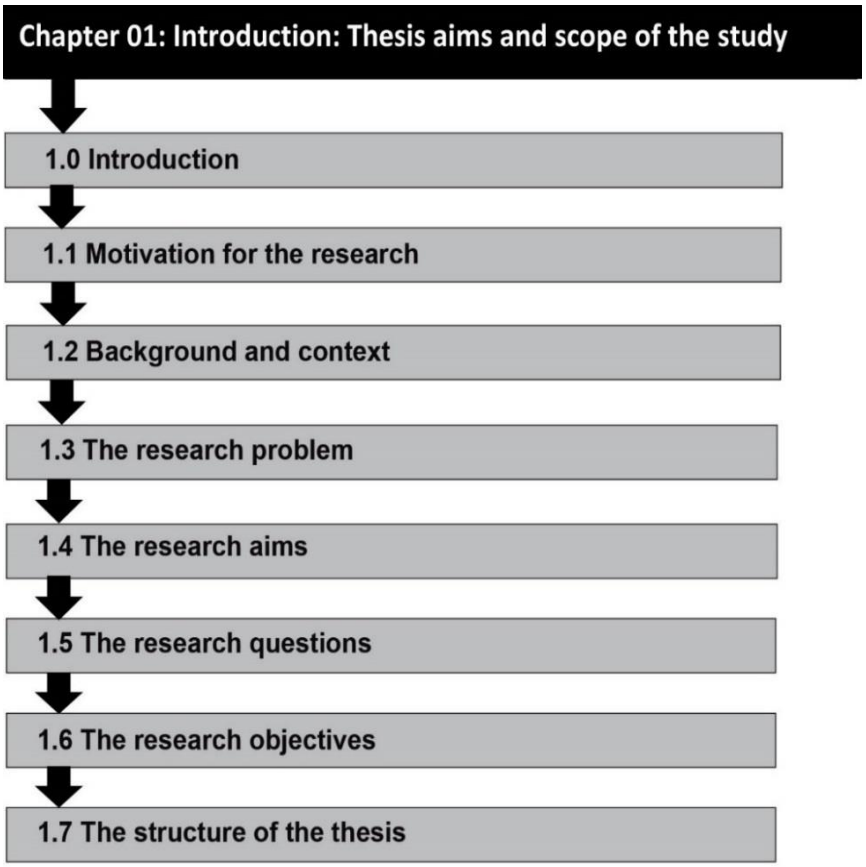


Figure 1.2: The structure map of the chapter

1.1 Motivation for the research

In 2004, I gave birth to a child who suffered from an illness that was impossible to diagnose until he was one year old. Diagnosing the problem required visits to several hospitals in Palestine. He had to be hospitalised for several days, which allowed me to see first-hand the poor conditions of primary care, especially for children. For example, there was no place for a parent or primary carer to sleep; only a small chair beside the bed, and the room was shared with eight other children, along with their mothers and other visitors. In addition, there were no public spaces set aside for children to play and no consideration of the aesthetics of the environment that might help children forget their illness. In other words,

the environment was not conducive to supportive healing. As an architect and interior designer, these images and memories stimulated me to ask: *how can we provide a supportive environment for all age ranges of children in hospitals, especially in the context of Palestine?*

By answering this question, this research can contribute to the literature on the design of children's hospitals and our understanding of environments that are conducive to supportive healing across the full range of children's ages and stages of cognitive development. Ultimately, I decided to focus on children's hospitals because there is limited research available that takes into account the perspectives of children and associated stakeholders in this context. An additional motivation for this thesis was the lack of academic research on designing public spaces in children's hospitals in ways that are suitable to all age ranges of children. Furthermore, most of the research has been conducted in the West, with little research being done in other countries, like Palestine. Given the importance of the motivations discussed above, it is desirable to develop recommendations that inform design practice for such contexts.

Knowing the needs of all stakeholders will assist designers in understanding how to provide supportive, physical environments. To understand children's needs, it is important to include them in the research process.

1.2 Background and context

As will become evident in the literature review in the next chapter (Ch. 2), it is clear that children's hospitals should offer spaces and provide welcoming

interior environments for children as well as facilities that will accommodate children of all ages, and allow them to feel comfortable and at ease. Generally, however, children's hospital structures, particularly interior design spaces are still not designed to meet the specific cognitive needs of children. For instance, many Palestinian children are treated in adult hospitals that do not have a comfortable or child-oriented environment.

Also, there is a lack of empirical evidence that focuses on environmental considerations related to children. For example, there is only limited research that focuses on the interior architecture and design of children's hospitals, especially in public spaces, such as atriums; and there are still gaps in the empirical evidence that designers should understand the importance of creating appropriate and comfortable environments that are conducive to supportive healing. Few studies include the preferences of children in the environmental design of the public spaces. Furthermore, there are very few studies that have discussed in detail how the medical functions in hospitals affect the interior design and interior architecture of the main entrance and atrium of children's hospitals, or the potential relationship of such designs in providing supportive healing environments for children requiring healthcare.

From the evidence in literature, there tends to be a lack of clarity and consistency with respect to the functions and requirements of the interior spaces, including the specific functions and supportive activities that should or could be accommodated within the public spaces of children's hospitals. For example,

some hospitals provide a play area for smaller children in the main entrance, whereas others do not.

This research focuses *on the interior architecture and interior design of the public spaces of children's hospital*s, which comprise the main entrance, atrium areas and thoroughfares, in the *context of* Palestine (Fig. 1.3). These specific areas can serve as organising elements and can help people to orient themselves, to socialise and to way-find. Potentially, the atrium can be regarded as the heart of the hospital, provide an uplifting first impression, and offer a joyful environment for children. The reception areas are particularly important because they are the areas the children see first on entering the hospital. They may already be distressed and anxious because they require medical attention, and they are entering a strange environment, so it is particularly important for children to feel comfortable from the point of entry.

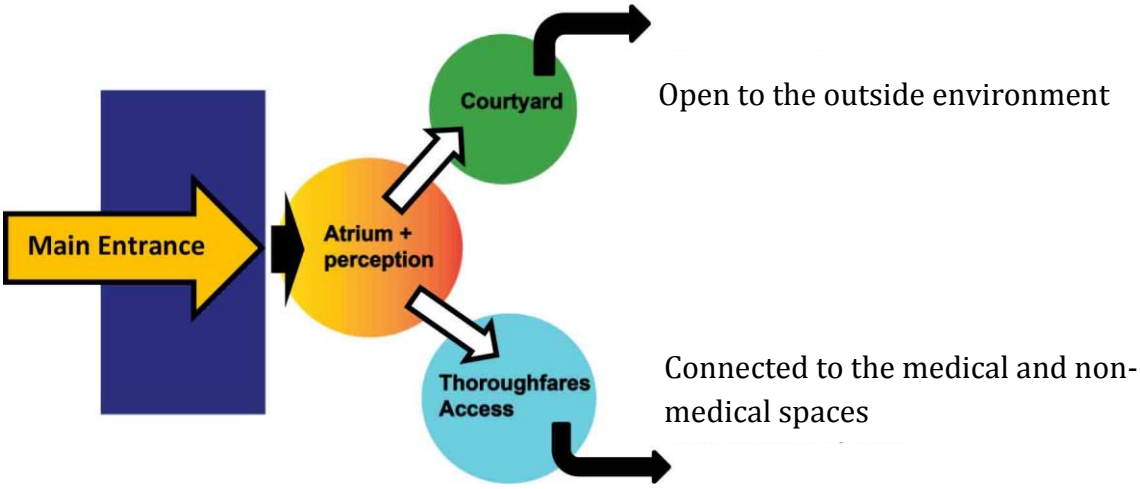


Figure 1.3: The public spaces of children's hospitals that are the focus of this study.

Based on evidence in literature, design for children should be distinct from design for adults because the spaces will be for children of different ages, and

thus the interior design for children needs to be flexible and adaptable. Such needs can be translated into supportive healing spaces. Despite this understanding, we still find interior spaces such as healthcare spaces and interior design of the atriums of children's hospitals that do not address the needs of children across all ages; rather, they tend to support the views of adults or they may encompass themes that are appropriate for younger children but not for adolescents. Hence, it is important to include the views of children of all ages in the design, as well parents' views, in order to develop best practice.

In this present study, children were included as significant participants in the field research. As such, their participation influences the development of appropriate data collection tools, the types of data collected, the data analysis, and the data verification. Hence, the inclusion of children's perspectives in the data collection stage of the research holds the potential to lead to innovative methodology and strategies for new children's hospitals that meet the needs of children and young people (see Ch. 4).

While recognising the importance of researching *with* children rather than *on* children, there is still uncertainty about *how to involve* children in the design process. Designers need to understand the ways in which children engage with and respond to design, and how they express themselves. Also, there is a lack of research that includes other stakeholders, such as parents and medical staff, in the development of healing environments. Only a few studies highlighted the importance of including children, parents and medical staff as participants in the design of children's hospitals. Such studies tend to use traditional social science

methods to understand the requirements for supportive healing environments for children, employing such methods as interviews and observational studies. Few studies use design- or arts-based approaches that encompass more child-friendly techniques. For example, one can use task-based activities that are more creative and more 'play-like' so as to engage the chidren's interest and allow them to express their preferences in non-verbal ways. Such approaches can support children's experiences and competencies, empower them to more fully participate in society, and support them to become decision-makers with respect to those things that directly affect them. In addition, participatory research can provide insight for challenging adults' assumptions about children's preferences and lives. All these elements can contribute to the development of appropriate and supportive healthcare environments for children.

For the above reasons, qualitative methods can be considered more appropriate for this type of research, particularly when conducting research with children. They can provide more complex social insights and nuances than quantitative methods; they are flexible and offer more room to deploy innovative and creative methods; and they are considered valuable because they can fulfil several aspects of this type of research including exploration, explanation and discovery. This research used *qualitative research that uses an innovative workshop format*, which employed co-creation, co-design and focus group methods. It also used innovative methods such as drawings, charts and model-making. In addition, three individual interviews were conducted in Palestine (see Ch. 4, Table 4.1).

1.3 The research problem

The research problem addressed in this study is that there is not enough evidence or clear understanding about how to design the public spaces of children's hospitals. There are no clear guidelines that help to create interior design and interior architecture in ways that are appropriate to all age ranges of children, particularly in the context of Palestine. The core of this problem is the requirement to understand those factors that can inform best practice and identification of context-appropriate data for creating evidence-based design guidelines for healthcare spaces. This present research goes some way to achieving such guidelines by developing an initial set of recommendations for the design of public spaces for children's hospitals in general and specifically for the context of Palestine. To achieve this, it is important to review the extant literature related to children's development, children's hospital design and supportive healing environments and the context and cultural norms of Palestine.

1.4 The research aims

There are two aims for this thesis:

1. To develop initial recommendations:
    - General recommendations for the interior architecture and the interior design development of the public spaces, and
    - Palestine-specific recommendations.
2. To develop appropriate methods for designing with and for children.

1.5 Research question

This study has one primary research question and five research objectives. These provide a mechanism for structuring and conceptualising the research findings.

Research question: *For a new children's hospital in Palestine— 'how should the public spaces of children's hospitals (i.e. main entrance, atrium and thoroughfares) be designed so that they are conducive to healing and are suitable for all age ranges of children (i.e. 0-18 years)?'.*

1.6 Research objectives

This study has five research objectives:

- Identify the most important considerations for interior design and interior architecture related to the public spaces of children's hospitals.
- Identify the functions of the public spaces in children's hospitals that affect interior design and interior architecture decisions.
- Identify the key factors in the design of public spaces within children's hospitals that can help create an appropriate interior environment for all stages of children's development.
- Identify the context-specific issues to be taken into consideration for a children's hospital in Palestine.
- Identify the factors pertaining to 'healing environments' that should be brought to bear in the design of the public spaces.

These specific research objectives provide a structure for data collection and the thesis itself.

1.7 The structure of the thesis

The thesis has eight chapters (see Fig.1.1):

Chapter 01 Introduction: **Aims and Scope of the Study**; sets out background and context to the research; explains why this area of study was chosen, what the study aims to achieve; and provides an overview of the thesis contents.

Chapter 02: Designing A Healing Environment for Children: Children's Hospital Design, and Context Considerations – Palestine; discusses literature review information**.** Presents findings that can help designers with the development of children's spaces, including hospital design environments and children's cognitive development, and how these connect to creating spaces that meet children's needs. Discusses age-appropriate interior architecture and interior design and their roles in creating supportive healing. It also describes the key design considerations for children's hospitals to create healing environments for children's hospitals. Moreover, the chapter identifies the gaps in literature regarding how to create healing and comfortable environments from the perspectives of all age ranges of children (i.e. 0-18 years).

In addition, it discusses the role of designers in creating a supportive healing environment; the supportive healing and physical environment and its effect on patients; the importance of involving children in the design process to create their supportive healing environments, particularly in the design of healthcare spaces; the importance of appropriate interior architecture and interior design in creating a supportive healing environment for children in hospitals; and, more

specifically, public spaces (i.e. main entance, the atrium, and throughfares). All these elements help to establish a specific level of significant concepts, recommendations and considerations that can help in creating a supportive healing environment. Also, it describes several aspects related to *the context of Palestine* and the important factors that may have an influence on the design process of hospitals in this location. These aspects are related to geographic information including climate; history; special considerations related to culture, architecture, interior design, factors affecting the architecture, and environmental factors; and the health system in Palestine.

Chapter 03 Key Findings from Literature Leading to Field Research Objectives: Discusses the various conclusions and factors of the previous literature chapters. The conclusions from this chapter inform the focus of this research and the nature and focus of field research.

Chapter 04 Methodology and Research Design: Presents a detailed discussion of the research methods available, the theoretical basis behind these approaches, and a justification of the methods employed. This chapter also presents the data analysis method (i.e. thematic analysis).

Chapter 05 Field Research Findings and Results: Presents findings and analysis of eight co-design and co-creation workshops in Palestine, which included arts-based activities and semi-structured recorded interviews.

Chapter 06 Discussion: Field Research Findings Informed by Designers: This chapter considers the findings of the field research along with the findings from the literature review and designers' workshops to draw out final conclusions and recommendations. The chapter ends with eight categorisations and classifications of the findings.

Chapter 07 Development and Presentation of Initial Design Recommendations: Presents development and initial design recommendations, a synthesis of critical aspects of the findings that can inform the creation of evidence-based design guidelines for healthcare facilities.

Chapter 08 Conclusions: Presents conclusions, discusses the contribution to knowledge and interpretations of the findings regarding the research question and objectives, strengths and limitations of the adopted research design, and presents an agenda for further research

Chapter 02

Designing A Healing Environment for Children: Children's Hospital Design, and Context Considerations – Palestine

2.0 Introduction

This chapter discusses four main topics (see chapter map 2.1). The conclusions of these topics from the literature review will be discussed together in Chapter 03 to identify gaps in the literature review and to identify aims that inform the fieldwork research.

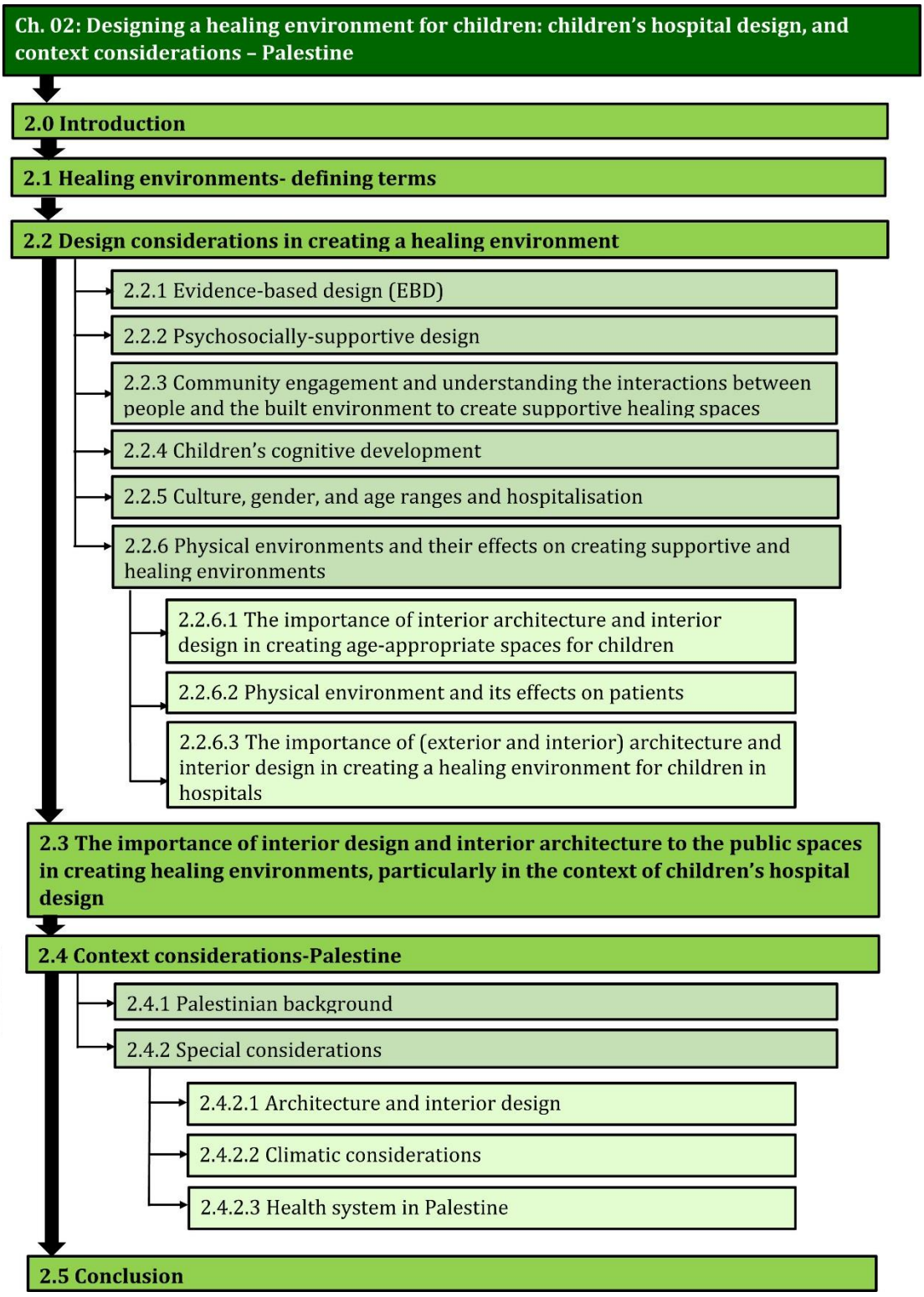


Figure 2.1: The structure map related to designing healing environments for children: children's hospital design and context considerations – Palestine

2.1 Healing environments- defining terms

This thesis will use the term *healing environment* rather than other terms. Based on a critical literature review, there is little agreement on the use of terms and on the definition of 'healing environment'. For instance, Dilani (2014, p.121) used the term of '*Salutogenic',* which refers:

> "to [the promotion] of *health and well-being by creating a built environment that includes wellness factors, contributing to the sense of well-being for staff and strengthening the healing process*"… [Such an approach provides] " *innovation through the interdisciplinary application of sciences such as architecture, medicine, public health, psychology, design, and engineering with culture, art, and music*"(ibid).

However, Ulrich (2000, p.8) used the term '*supportive healthcare design'* to refer to three key aspects of creating supportive designs and environments:

1) to enhance patient control and privacy,

2) to improve social support, and

3) to increase access to nature (including landscape design).

Finally, the term *'optimal healing environments'* is used by other scholars. It refers to:

> "*one where the social, psychological, physical, spiritual, and behavioural components of healthcare support and stimulate the body's innate capacity to heal itself*" (as cited in Abbas & Gazali, 2012, p.29).

Taking the essential elements from the above definitions (e.g. The supportive nature of the environment, and wellness factors of reducing stress i.e. art, music, etc.), a broad description of healing environments may be found: the physical and cultural atmosphere that can be designed to support patients, families and staff during hospitalisation and treatment (Hill, 2008, p.3; Friedow, 2012, p.38). It is this description that will be referred to throughout this thesis.

2.2 Design considerations in creating a healing environment

Designers should create healing spaces and structures that can aid people's emotional, physiological, and physical needs (Zetterquist, 2009, pp.4-11), thus providing a healing environment (Rice, 2010, pp.2-3; Ghazali & Abbas, 2011, p.67). This may be achieved through addressing six main issues, which will be discussed in detail below:

- Evidence-based design (EBD),
- psychosocially-supportive design;
- community engagement and understanding the interactions between people and the built environment to create supportive healing spaces;
- children's cognitive development;
- culture, gender, and age ranges and hospitalisation; and
- physical environment and its effects on creating a supportive and healing environment

2.2.1 Evidence-based design (EBD). The implementation of evidence-based design has been demonstrated to improve patient well-being (Salonen et al., 2013, p.2) because it is considered to be the best way of making decisions because they will be based the best available information from existing research and project evaluations and therefore can lead to the best outcome (Hill, 2008, p.2). Evidence-based design can include people's reactions to surrounding environments and can refer to environmental aspects (Van den Berg & Wagenaar, 2006, p.1). Scholars believe that, through EBD, designers can make hospitals less stressful, can promote faster healing for patients and create a comfortable environment for families and staff (Ulrich et al., 2008, p.26; Adams

et al., 2010, p.659). Six conceptual sub-categories contribute to 'evidence-based design', which can help in providing healing: 1) access to nature; 2) options and choices (control); 3) positive distractions; 4) social support; 5) environmental stressors; and 6) a set of well-defined guidelines to be incorporated in healthcare environments in order to reduce stress levels in patients and enhance recovery (Freimane, 2013, p.16).

2.2.2 Psychosocially-supportive design. It is a framework developed by Alan Dilani. It comprises the properties of both 'healing environment' and 'optimal healing environment' (Dilani, 2008 as cited in Freimane, 2015, p.17) that will "*stimulate the mind in order to create pleasure, creativity, satisfaction and enjoymen*t" (Dilani, 2008, p.55). Psychosocially supportive environments are also to be seen as important in the design process because this framework is based on many empirical studies and can guide healthcare planners and designers who regard the effect of physical environment impacts on wellness factors in promoting health (Dilani, 2001, p.13, 21). Clinical practice in hospitals is concentrated mainly on treating patients: as a result, the environmental qualities of hospitals that support psychosocial behaviours are often neglected (Dilani, 2008, p.55). For example, in the past, architects and designers created hospitals as if they were 'healing factories' (ibid). Including psychosocially-supportive design criteria as a design objective for a new facility can provide several advantages: ensuring that people feel comfortable and at ease within the physical environment of the hospital; reducing stress/anxiety for patients; reducing pain; improving sleep; improving medical outcomes e.g. reduced infection and cost

savings (Ulrich, 2000, p.8). In developing a design framework, Dilani (2008, p.65), suggests the following factors can be taken into account:

> *"Psychosocially supportive design should incorporate and consider factors such as access to symbolic and spiritual elements; access to art; good lighting; attractive space for social interactions; private spaces; and an interior environment that provides positive experiences. Other factors include visual and physical access to nature, and personal control over, for example, lighting, daylight, sound, indoor sense of coherence, thereby enhancing his or her coping strategies and health. Psychosocially supportive design is not only the task for one person, but requires that the entire organisation understands the meaning of salutary management".*

This research focuses on how to provide a healing environment from the perspective of interior architecture and interior design in the public spaces of children's hospitals. Given the importance of this, Dilani's supportive factors study as well as those of evidence-based design will be taken into account. Such factors will be compared with the results of field research (Chapter 6) to address the key factors in the design of public spaces in children's hospitals that can help create an appropriate interior environment for all stages of children's development.

2.2.3 Community engagement and understanding the interactions between people and the built environment to create supportive healing spaces.

Komiske (2005, p.132) states that: *"A hospital is unlike any other building in the community. It touches everyone in many ways at very emotional times in the lives of individuals and families"*. Thus, designing children's hospitals needs the participation of the whole community, including parents, physicians, clubs, schools, the art community, fire and police departments, museums, and philanthropic and other organisations. Eriksen (2000) pointed out the

importance of architects and interior designers considering the physical, emotional, intellectual and special needs of children to provide an environment that can support and encourage the process of caring and treatment of patients, most particulary, children. To achieve this, she strongly recommends including the participation of many groups: including children, parents, medical staff, psychologists, people with disabilities, administrators, sociologists, educators, and chronically ill people (p.141). All these can help identify what is most important for comfort and satisfaction (ibid, pp.147-148), which in turn can create a unique healing environment for children's hospitals (Clark, 2010, pp.137-150). A recent study concluded that, when consulted about the design of the hospital, adults - parents and clinical staff - are far more focused on physical aspects than on symbolic aspects, even though the latter are critically important for the emotional well-being of patients. For instance, Ulrich et al. (2012, p.3) state that a *"ward's physical environment strongly influences patient stress"*, especially if there is a high level of overcrowding. Children and adolescents tend to be more focused on the symbolic aspects of the hospital setting (Ullan et al., 2012, p.689). For this reason, children can play an important role in designing their environments and they should be invited to contribute to the design process; their preferences and needs can raise the quality of healthcare (ibid, pp.669-670).

Koller & McLaren (2012) state that *"paediatric hospitals are called to not only designate places for children but to cultivate environments that promote children's places"* (p.11). It is important to involve children and young people in the process of designing children's hospitals because *"they are social and cultural actors*

within public settings" (de Coninck-Smith & Gutman, 2004, p.134). As such, their participation can be instrumental in developing data collection tools, contributing to data analysis, verifying findings and creating innovative approaches and strategies for new children's hospitals that meet the needs of children and young people (Coad & Coad, 2008, p.45).

Bishop (2008, p.263-264) explains what constitutes a paediatric environment in order to examine the role of the physical environment in patients' feeling of well-being by using participatory research techniques with twenty-five patients aged 9-18 years at the Children's Hospital at Westmead in Sydney, Australia, who completed semi-structured interviews. Bishop's research identifies three main components that constitute the paediatric environment:

- An environment that supports children's feeling of well-being by addressing their need to feel comfortable in the environment, maintain a positive frame of mind, and remain positively engaged.
- An environment that facilitates children's sense of 'fit' by supporting individual choice, control, and self-help, and by minimising unwanted distractions.
- An environment that provides children and young people with the perception of environmental congruence by maximising the opportunities to include features that indicate child-friendliness. These contain age-appropriate activities in the environment, providing a bright and colourful environment by including art, aesthetics, colours, etc., and a welcoming and friendly social environment.

Bishop's research (2008) builds on the children's verbal descriptions through semi-structured interviews and their experience of hospitalisation to examine the role of the physical environment for children. However, the literature review identified that children may have limited verbal language due to their different levels of age and cognitive development (Tonkin, 2015, p.560). Furthermore, he does not include children between 0-9 years old; thus, my research will cover these gaps.

In a study by Blumberg and Devlin (2006, pp.293, 298, 305) young children and adolescents aged 12-14 years participated in a qualitative study to determine their preferences related to the physical design of hospital spaces. The participants compared colour photos of hallways and atriums for units with adult-oriented decoration versus child-oriented decoration. The results revealed that both adolescents and young children require their own form of age-appropriate design.

According to the literature, children have rarely been asked to participate in decisions regarding the various aspects of their healthcare in order to create more appropriate healing environments. It is especially important to include children's views in the design of children's hospitals as well as their parents' views in order to identify the best practice in the built environment (NHS Estates, 2004c, p.15). One example of children's participation was found – at Alberta Children's Hospital in Calgary – which involved plan drawings and was unrelated to interior design (Figure 2.2).

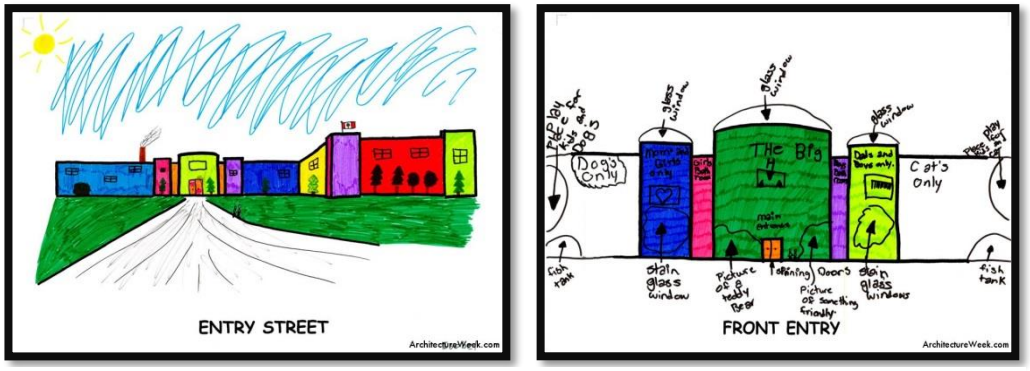


Figure 2.2: Children's drawings – Alberta Children's Hospital – notice the elevations are related to exterior architecture (Logan, 2007, online).

Adams et al. (2010, pp.660-661) point to the lack of children and young adults as consultants in the design of paediatric hospitals, especially in the evaluation and design of the atrium. Also, Coad and Coad (2008) reported that in the UK in the children's departments within general hospitals, children do not fully participate in choosing their preferred décor, thematic design (i.e. art, images, design, and textures) and colours (ibid, p.36). The absence of child participation can lead to the assumption that adults know best and/or that children are unable or unwilling to identify their own needs and preferences, especially in children's hospital design (Koller & Meclaren, p.1).

Dudek recommends using deeper processes and methods to explore the architectural needs of users (Dudek, 2005, p.1). A *'framework for listening'* to all ages of children to understand and gain in-depth understanding of children's important details of their daily life (Loveridge, 2010, p.19) enables children to be involved in using different participatory tools (i.e. observations, child conferencing, the use of cameras, bookmaking, tours, mapmaking, and interviews) to offer a framework that reflects the complexity in their everyday life that is not easily captured using standard measures (ibid). According to

literature, using multi-method approaches can increase validation and reduces the possibility of bias due to a particular methodology (Eisen, 2007, p.43).

A study by Lambert et al. (2014a) is the only study that included information about the engagement of young children. They used *'exploratory qualitative participatory methods'*. The authors collected their data from fifty-five young children aged 5 to 8 years old through semi-structured interviews (one-to-one and group workshops) that incorporated art-based activities. Such a method helps adults to listen to young children; consider an active, interactive process; interpret and construct meaning; and make things more stimulating, fun and interesting. Although this study by Lambert et al. included innovative research in which children participated in a workshop format, it did not address all age ranges of children (i.e. 0-18 years); it used only drawing techniques to evaluate an existing hospital; and the child participants were patients in a hospital, which might limit their interpretation of their artwork due to their illness. My thesis will fill these gaps.

Successful environmental design requires an understanding of how people interact with and perceive their environment; that is, how people affect the built environment around them and how the built environment shapes human behaviour (Bjorngaard, 2010, p.12).

One study (Barbour, 1999, pp.75-97) used a qualitative method to examine the impact of playground design on the play behaviours of children with different levels of physical competence. One of the playground structures had fewer activity options, fewer routes through which children could travel, and was less accessible for children with limited motor skills than was the other playground

structure (ibid). The results of the study showed that playground design potentially influences children's physical competence, development, play behaviours, and ultimately their peer relationships. The playground with fewer structures and activities enabled children to interact with peers, possessing diverse skill levels, and helped children in increasing their opportunities to acquire social skills. Thus, playgrounds should be carefully constructed, maintained and modified (ibid).

Bjorngaard (2010) argues that architecture, interior design elements and graphic design are elements that contribute to modify patient behaviours, they can create privacy for patients and help in building a link between the built environment and human consciousness of such spaces. This awareness can have a direct impact on the perception of space. This perception has an implication in the field of healthcare design and can affect the environment's ability to determine an individual's feelings of privacy and interactions with the environmental design (ibid, pp.1-2).

According to Carpman and Grant (2016, pp.5-12), creating a positive experience within healthcare environments needs to employ four factors of environmental design for patients' interactions: physical comfort; regulation of social contact for privacy; wayfinding; and symbolic meaning. Factors such as colour, shape, size, symmetry and density are all related to one's perception of the object and to the limitations of its use. Including objects that have a variety of surfaces and textures can improve the visual organisation of environments through patterning. The materials used, with regard to colour, pattern and lighting can

create contrast. These elements are the features of environments that patients can organise into recognisable patterns known as *'cognitive affordances'* or functions that are quickly recognised by the users (ibid, pp.12-14).

Koller and Mclaren (2012) point out that designers still need to understand the ways in which children engage with and respond to design, and how they can express themselves (ibid, p.10). To achieve that, it is important to understand children's cognitive development (see Section 2.2.4), which is essential when teaching and working with children (Singer & Revenson, 1997, p.12). Children interact and perceive their surrounding environment differently from adults. Their physical, cognitive, social and emotional skills are different, depending on their stage of cognitive development. Consequently, special attention needs to be given to the understanding of stages of children's development and factors that influence the cognitive development of children and connect that with the environment (Guerin & Bunker-Hellmich, 2004, p.1).

2.2.4 Children's cognitive development: Cognitive development is the process of acquiring intelligence and the increasing development of thought, memory, learning, reasoning, language, concepts, and problem-solving from infancy to childhood (Moore, 1987, p.63; Goswami, 2008, p. foreword). Santrock (2010, p.30) states that:

> *"Cognitive processes involve changes in the child's thinking, intelligence, and language. Cognitive developmental processes enable a growing child to memorise a poem, figure out how to solve a math problem, come up with a creative strategy, or speak meaningfully connected sentences".*

Among the significant number of theories about cognitive development (Lindenberger, 2001, pp. 8848-8854), Vygotsky's and Piaget's are of major

importance (Santrock, 2010, p.34). In Vygotsky's theory, children's cognitive development is shaped by the cultural context in which they live (ibid, p.50) and children can construct their knowledge through social interaction (Tappan, 1997, pp.78-100). Vygotsky points to the role of cultural context in children's cognitive development and formulates the general law of cultural development:

> *"Every function in the child's cultural development appears on the stage twice, on two planes, first on the social plane and then on the psychological, first among people as an intermental category and then within the child as an intramental category* (Vygotsky, 1966, p.44).

Bodrova (1997, p.16) discusses Vygotosky's theory and finds that the *cultural* and *age differences* of children help to define the dynamic relationship between them and their environment. Another study supports the importance of language, dialogue and tools of culture in shaping children's thought, helping them to solve problems, guiding them, enhancing their behaviour and improving their learning (Santrock, 2010, pp.50-56).

Sociability (which is regarded as the basis for children's social interactions with people around them) has an important role in constructing a theory of child's development (Ivic, 2000, p.3). Vygotsky interprets children's social interaction:

> *"Everything in the behaviour of the child is merged and rooted in social relations. Thus, the child's relations with reality are from the start social relations, so that the new born baby could be said to be in the highest degree a social being"* (Vygotsky, 1982, p.281).

He also says that social interaction plays *"a formative role, a constructive function, in the child's development"* (Ivic, 2000, p.3):

> *"…each instance of semiotic behaviour by the child originated as a form of social collaboration, which is why semiotic behaviour, even in the more advanced stages of development, remains a social mode of functioning. The history of the*

development of higher mental functions is thus seen to be the history of the process by which the tools of social behaviour are transformed into instruments of individual psychological organisation" (Vygotsky, 1982, p.56).

In his theory of cognitive development of the child, Vygotsky pointed to a child's ability to think logically as the child developing in stages. He identified four stages that connect to *"conceptual development"* (The NSW Office of Child Care, 2002, p.6) (see Table 2.1).

Table 2.1: Vygotsky's four stages of cognitive development (The NSW Office of Child Care, 2002, p.6)

No	Stage	Characteristics
1	**Thinking in unordered heaps**	• Preschool stage of development • Beginnings of conceptual thought • Children use trial and error • Children use problem-solving techniques • Three sub-phases
2	**Thinking in complex stage**	• Children begin to make connections between objects, but not in a consistent manner • Five sub-phases
3	**Thinking in concepts stage**	• Children are able to think in more abstract concepts and make associations • Cannot see two associations simultaneously
4	**Thinking in true concepts stage**	• Mature thinking • Children can manipulate a number of abstract concepts

A second theory, and perhaps the one that has had the most powerful impact on understanding cognitive development in children (Eisen, 2007, p.13), comes from Jean Piaget. Piaget concentrates *"on cognitive development— mental processes such as perceiving, remembering, believing, and reasoning"* (Singer & Revenson, 1997, p.12). Singer and Revenson (ibid., pp.12-13) discuss the mental processes of cognitive development from the perspective of Piaget:

"*The intellectual abilities that a child possesses at a given age permit certain types of emotional behaviours. For example, a child who has no understanding of what death is or what it means when Grandma dies will not react emotionally in the same way as older siblings or parents. Thus, the capacity to become an emotional being who is equipped to interact with people depends upon the ability to think, communicate, and understand what's going on … the mental process of perception, recognition, and memory are all involved in forming the emotional attachment. Thus, emotion and cognition are constantly intertwined in development".*

Piaget explains that children are not less intelligent than adults; they simply think differently (Lueder & Rice, 2007, p.14), and they can learn by doing and perceiving the world only as they have experienced it (Singer & Revenson 1997, p.13). In Piaget's theory, *"all children must be able to understand the world in concrete terms before they can begin to think in the abstract. For example, toddlers will call all four-legged animals doggies before they learn that some are cows, horses, or cats"* (ibid, p.19). In addition, the mental structures (including the nervous system and sensory organs) can limit intellectual functioning at specific ages. However, these structures can be developed through maturation in which children use them more effectively to deal with their surrounding environment (ibid, p.12). Thus, Piaget's theory of cognitive development can be explained as *"cumulative; understanding a new experience grows out of what was learned during a previous [age]"* (ibid, p.15).

The notion of stages of child's development has played an important role in Piaget's theory of cognitive development. In each stage, there are several developmental changes in the areas of language, play, mortality, space, time and number (Singer & Revenson, 1997, p.20). Piaget pointed out that the child develops in four stages (Figure 2.3) and each stage differs along with the amount

of information, knowledge and understanding gained by the child (Eisen, 2007, p.13):

- **Sensorimotor**: applies particularly to the i*nfant* stage i.e. between 0-2 years. At this stage, children construct, understand, practise and interact with the surrounding environment by using words and pictures, and by coordinating their sensory experience (e.g. seeing, hearing) with their motor action (e.g. reaching, touching); however, infants only have perceptions of the individuals and items surrounding them that they see at a specific time (Singer & Revenson, 1997, pp.20-2; Lueder & Rice, 2007, p.14).

- **Pre-operational**: this stage applies especially to children between 2-7 years. Children have the ability to express their feelings and imagination by using images and symbols coherently. The child also develops his/her dialogue and communication with other people (Oakley, 2004, pp.18-19; Eisen, 2007, p.14; Lueder & Rice, 2007, pp.22-23). This stage can be divided into two sub-stages:

  (1) Symbolic function: occurs between 2 and 4 years of age. At this stage, the child begins to use indecipherable designs to represent people, houses, cars and so forth. They do not have the ability to portray reality in their drawings. Rather, their drawings are fanciful and inventive (Santrock, 2010, p.41).

  (2) Intuitive thought: develops in the child between 4 and 7 years. At this stage, children become intuitive and feel confident about knowledge and understanding, but without being aware of how they know what they

know. For example, they can say something without reasoning and giving rational thought to it (ibid, p.42).

- **Concrete operational**: this stage spans between 7 and 11 years of age. In this stage, children can use logical reasoning instead of intuitive reasoning, and classification (i.e. they can reason that a person simultaneously can be father, brother, and grandfather). Children behave consistently and they can deal with and control their behaviour in the *"pre-operational stage"* (Eisen, 2007, p.14, 16), but with some limitations in terms of abstract and intellectual things (Piaget, 1964, p.177). They can focus on several characteristics rather than on single elements (Singer & Revenson, 1997, p.22).

- **Formal operational:** this stage ranges from 11 years through to adulthood. It can be described as the process of moving from generalisation to specification. Production at this stage is the creation of abstract formal and logical thinking. Children can use theory and rationality to deal with the difficulties they face in their immediate environment. Santrock (2010, p.45) termed it as the *"formal or hypothetic-deductive operation"* which is important in addressing ambiguous issues (Piaget, 1964, p.177).

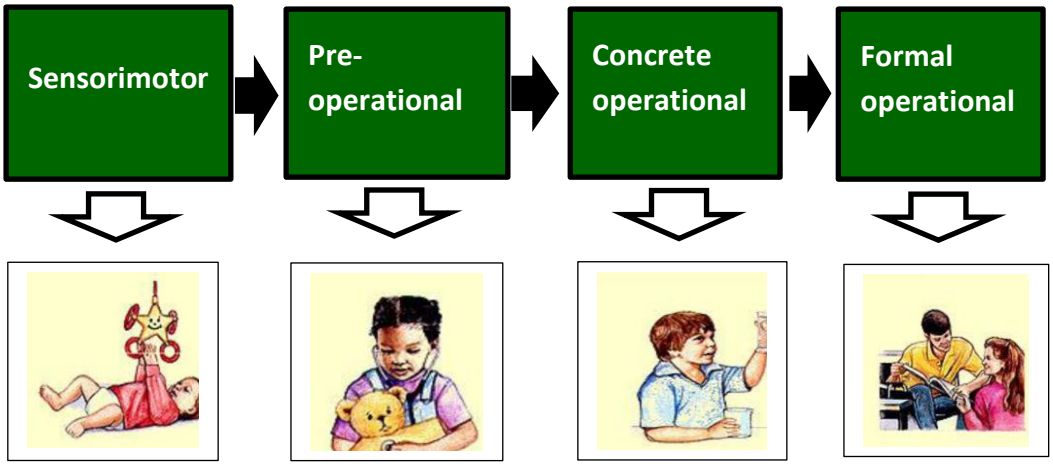


Figure 2.3: This visualisation figure shows Piaget's four stages of cognitive development (adapted from Doidge, 2016, online).

Besides the importance of the four stages of cognitive development for children, Singer & Revenson (1997, pp.18, 26 & others) identify four important factors that guide children's development:

(1) **Emotion**: creating feelings that can stimulate and enthuse learning (ibid).

(2) **Maturation**: the physical growth process in which the child becomes capable of greater understanding through differentiation of the nervous system and mental processes (ibid).

(3) **Experience**: the most important element in a child's development as the more a child experiences and discovers, the more he/she develops and learns (ibid).

(4) **Social interaction**: interaction with other people, especially parents, (Boeree, 2006, p.7) teachers and other children, supports and creates experiences as well as reactions (Oakley, 2004, pp.30-32).

These factors should work together to guide development and maintain balance to motivate learning. For example, as the mental structure of a child develops

sufficiently, the better the child can understand and perceive information he/she is given (Piaget, 1964, p.178; Singer & Revenson, 1997, p.18).

Other factors include culture; teaching; language; parents, teachers and peers; knowledge and play:

- **Culture**: children are considered significant cultural participants living in a community at a specific time in history. Thus, it is important to understand the cultural aspects in which children are living in order to resolve the pressing practical problems and to develop the understanding of the nature of children's development worldwide (Rogoff, 2003). For instance, to understand the development from a sociocultural-historical perspective require an examination of the nature of culture in a child's life. To achieve this involves studying how people use and transform cultural tools, technologies, cultural traditions in different structures (e.g. education). institutions of family life, and communities' practices (pp.7,10).

- **Teaching style**: appropriate teaching is an indispensable element in developing children's cognition. Teachers must be aware of, and challenge, the differences in the levels of skills and abilities of the children that occur within an age range of several years (Berk & Winsler, 1995; p.33; Santrock, 2010, p.29). Accordingly, Waldorf education (or Rudolf Steiner education) is based on education that mirrors the basic stages of a child's development from childhood to adulthood (Barens, 2001, p.1). It classifies childhood into three stages, each lasting seven years. During this time, the child's body will

be changed and formed by different tools of education that can address his/her development and learning via diverse approaches e.g. in the first stage, the child can learn through imitation, imagination, and independence (Finn, 2003, p.2).

- **Language**: Vygotsky emphasises the role of language in the development of the thinking process (Santrock, 2010, p.56). He argues that children do not only use *"speech for social communication"*, but also to help them in guiding, communicating, planning, solving problems, and controlling behaviours (Berk & Winsler, 1995, p. 52). Piaget supports Vygotsky and emphasises the importance of *"language development, learning and teaching"* in the child's cognitive development. Vygotsky states that thoughts are impossible in the absence of *"verbal thinking"*. Therefore, thought and language develop independently and they can merge only when *"language is creating verbal thought"* (The NSW Office of Child Care, 2002, pp.5-6).

- **Physical environmental features:** They have a strong effect on the cognitive behaviour and development of children (Moore, 1987, p.46). More details will be discussed in section 2.2.6.

- **Parents, teachers and peers**: Vygotsky argues that children's cognitive understanding is prepared and developed when they are supported by people around them such as teachers, peers and parents. As an analogy, if we think of a child's development like the construction of a building – there will be many 'contractors' who contribute to its construction – parents, teachers etc. – but the child will also inform the construction process,

through his or her own *internal* development. Thus, children can be involved in building their own development and changing the level of support (Berk & Winsler, 1995, p.52). Lamb (2004, pp.1-2) points out that parents have a strong effect on factors that influence their children's development – they can affect their interaction, learning, language, functions, roles and their achievements (Wallerstein, 1996, p.7).

- **knowledge**: refers to *"the refined information, in which human cognition has added value. In other words, information becomes knowledge through cognitive effort. Based on this definition, … knowledge can only result from human cognitive process that includes perceiving, recognising, conceiving, judging, reasoning, and imagining"* (Jeong et al., 2008, p.2). Gaining knowledge affects the cognitive development of children. Knowledge can be gained from the development of several elements such as: reading, listening and practising; relationships with objects, their size, shape and colour; the development of numbers and quantity, less, more, equal; and philosophies about space and time (Berk & Winsler, 1995, p.110).

- **Play**: Piaget suggests that play is one of the important factors that improves children's mental and social abilities (Singer & Revenson, 1997, pp.53-55): play leads the child's psychological development. Lee (1985, p.90) pointed to the importance of play for children cognitive development:

> *"Play becomes the "leading edge" of the child's psychological development because it allows the child a 'zone of proximal development' through which both new motivations and a new kind of attitude toward reality are created. The critical point is that in play, the child creates an imaginary situation to guide his actions-a world of meaning is created that then has*

motivational force. These meanings, however, are not random, but have both a social and a linguistic origin".

Diversity of play is essential for children and their families, especially in healthcare, because it can help in providing family members with psychological relief and in reducing pain and stress in children (Del Nord, 2006, p.320). Piaget and others categorise play into three stages:

(1) **Sensory motor play**: children aged between 0-2 years can explore objects and their surrounding environments by using various senses and motor skills (Del Nord, 2006, p.320).

(2) **Symbolic play**: In this type of play, children aged between 2-7 years are able to concentrate on symbols. They believe that an object can be something else i.e. a playhouse becomes a rocket (Centre for Learning Education, 2006, p.10).

(3) **Games with rules**: In this stage, children aged between 8-11 years are able to apply and follow rules of games. As they grow up, they can change and understand the aims of the rules (ibid).

Further, *"play is a natural part of childhood, and a vital factor in the mental, social, and emotional growth of children"* (NHS Estates, 2004c, p.37). Thus, designers should take into consideration age-appropriate design for children when they design play spaces for stimulating children's growth, creating a sense of magic that encourages their imagination (Dudek, 2005, p.17). More details will be discussed in section 2.2.6.

Taking into consideration the differences in children's cognitive development, in particular, that of age, allows designers to regard children as active learners through several stages of development. In turn, this allows designers to optimise the design of healing environments for children (The NSW Office of Child Care, 2002, p.3).

2.2.5 Culture, gender, and age ranges and hospitalisation

The effect of culture: In developing countries, most aspects of life are strongly influenced by cultural beliefs and social habits, and these factors shape the choices of users (Del Nord, 2009, pp.141-142). Related to this, equipping hospitals with furniture depends on the preferences and decisions of the designers, whose behaviours and actions are influenced by their own culture (ibid). Additionally, religious beliefs can be important factors that have a strong influence on colour choices for children's hospitals (Malkin, 1992, p.165). Stoecklin (1999, p.60, 63) pointed to Islamic culture and religion as having a strong influence on the design of physical environment (e.g. including a prayer room in a childcare facility in Doha, Qatar. Moreover, Kenney (1994, p.17) states that: *"Architecture is a manifestation of the cultural context in which it resides*". However, there is no evidence in the literature suggesting where specific interior architectural spaces should be located in children's hospitals. Another cross-cultural study illustrated how culture can influence the design of hospitals. Using symbols, colours and materials with optimistic cultural meanings, the author found that these features can achieve an integration between social custom and tradition (Malkin, 1992, p.173; Dilani, 2014, p.12). For discussion of how Palestinian culture can influence the design of hospitals, see Section 2.4.2.1.

The effect of gender: According to the literature (e.g. Del Nord, 2009, pp.141-142; Malkin, 1992, p.165), gender can have a potential influence on preferences and choices of children, and can affect the types of interior spaces. In a descriptive survey, researchers aimed to design a therapeutic environment and to investigate the effects of gender, age and nationality among Iranian and German children and adolescents on their personal preferences in hospital rooms with or without a physical barrier (e.g. curtains, walls) separating children's beds (Litkouhi et al., 2012, p.460). The results showed a remarkable difference between the groups in relation to the kinds of barriers they wanted. Iranian children preferred a space without a barrier, while German children preferred it with a barrier. Additionally, the results showed that there was a difference between genders, i.e. girls preferred private, closed spaces more than boys (ibid).

Other studies supported the need for gender separation in terms of activities in the children's play area. For instance, in the literature review (e.g. Lambert et al., 2014a, p.199), children preferred having mixed gender space for play areas, but they also appreciated the separation of play areas when boys and girls were interested in different activities. However, additional literature review identified differences about separation between genders, even in the interpretations of the Islamic religion. The meaning of gender separation or segregation for this study is the *"prohibition of free-mixing in Islam"* to provide individual and societal protection (Buisson, 2013, p.100). However, Al-Munajjid (2000. online) demonstrated separation as a requirement by the prophet, and that separation between men and women exists in the Law of Islam (Sharia). In addition, Reda (2004, p.1) identified some differences regarding the provision of separation

between genders. For example, the Prophetic period (using Qur'an literature as the main textual source) does not suggest any evidence for separation or segregation; all the evidence indicates that *"women had full access to the Mosque".* In the Calipha Umar Ibn-Khattab period (using Hadith literature as a minor source of the demise of the Prophet) there was separation of women from men. However, in non-Islamic studies, Tonkin (2015, p.95) reported that at Birmingham Children's Hospital *"segregation by age is considered more important than by gender"*.

Age and hospitalisation in children's hospitals. According to the World Health Organisation, the 'paediatric age' ranges from 0 to 18 years. However, it should be noted that the age range for hospitalisation and admission to children's hospitals in recent times differs from one hospital to another (Del Nord, 2006, p.279), which can affect the interior design and interior architecture of the hospital. The hospitals that admit children from age 0-21 need additional interior spaces and interior design requirements compared with hospitals that admit children from 0-16. Table 2.2 explains the age of children for hospitalisation in different hospitals.

Table 2.2: The range of ages for hospitalisation in different hospitals

Name of the hospital	Age of hospitalisation	Reference
Mattel Children's Hospital, Los Angeles	Newborn to 17 years	(Yee, 2010, p.198)
Children's Hospital of Pittsburgh	0-3, 3-6, 7-12 years, and teenagers	(see online Children's Hospital of Pittsburgh, 2013) http://www.chp.edu/news/060512-best-childrens-hospitals-us-news-world-report
Philadelphia Children's Hospital	0-21 years	(see online The Children's Hospital of Philadelphia, 2013) http://www.chp.edu/CHP/during+your+childs+hospitalization#
Evelina London Children's Hospital	0-16 years	(see online Guy's and St Thomas' NHS. Foundation Trust. Levels of the Evelina, 2012) http://www.evelinalondon.nhs.uk/parents-and-visitors/wards/b-forest.aspx

From the body of literature it becomes clear that it is important to provide age-appropriate design and to develop an effective hospitalisation programme that is suitable for young children (Coyne & Conlon, 2007, p.16). Hospitalisation may have negative effects on children: it may cause pain, fatigue, anxiety and fear (SilvaUtkan, 2012, pp.110-111). Children need environments that provide them with a comfortable, interesting, relaxed, cheerful and optimistic atmosphere. For instance, providing attractive bedrooms may decrease their stress and anxiety (ibid). Adolescents' hospitalisation should receive close attention as they mature and change rapidly (Del Nord, 2006, p.300). They need to be cared for in separate facilities from young children, and provided with privacy, contact with peers, and access to appropriate recreational and educational support (Clift et al., 2007, p.196). Although some hospitals aim to provide a healing environment for hospitalised children, in some studies there were problems related to child-friendly design (Coyne, 2006, p.326). For example, overcrowded spaces, inadequate physical and social spaces, no recreational spaces for children, no

accommodation for parents, no separation from adults' bedrooms, and the absence of aesthetics suitable for all ages of children/adolescents (Gunkel, 2010, pp 8-12; Brich, 2007, p.408).

Based on Piaget's four satges of children's cognitive development (see Section 2.2.4), Eisen (2007, p.83) concludes that there is no difference between all age ranges of children in terms of choosing art. However, Sadler (2008) pointed out that adolescent patients require social needs that are different from younger children. Adolescents prefer a balance between social interaction and privacy and intimacy (p.3). See Coad and Coad (2008, p.40) for another example related to age and cognitive development of children and its effect on design study in Section 2.2.4. For the above reasons, this research will consider and examine four stages of cognitive development of children and the effect on designing age-appropriate healing spaces.

The following section will review the effect of interior design and architecture in children's hospitals, particularly on public spaces, to ascertain more information and establish significant concepts, recommendations and considerations that can help in creating a healing environment with emphasis on the public areas of children's hospitals.

2.2.6 Physical environments and their effects on creating supportive and healing environments

This section will discuss four main issues (see Figure 2.1).

2.2.6.1 The importance of interior architecture and interior design in creating age-appropriate spaces for children

Physical environmental features have a strong effect on the cognitive behaviour and development of children (Moore, 1987, p.46), which includes aspects of interior architecture and interior design. For the purposes of this study, they will be defined as follows:

Interior architecture is:

> *"concerned with the remodelling of existing spaces and structures, building reuse, and organisational principles. It bridges the practices of interior design and architecture, often dealing with complex structural, environmental, and servicing problems"* (Brooker & stone, 2010, p.14).

Interior design is:

> *"used to describe all types of interior projects, encompassing everything from decoration to remodelling… [and it] is an interdisciplinary practice that is concerned with the creation of a range of interior environments that articulate identity and atmosphere through the manipulation of spatial volume, placement of specific elements and furniture, and treatment of surfaces"* (ibid., pp.11-12).

Interior architecture and interior design can provide a sense of comfort and pleasure for the users of the spaces if they are well designed (Eisen, 2007, p.32; Wilks, 2010, p.13). Some researchers suggest that the design of the built environment should support children's spirits and souls and has a strong effect on children's development (Day, 2004, p.191; Day & Midbjer, 2007, p.3-6). Piaget concludes that understanding children's immediate environments depends on the balance between emotion, intellect, and understanding (Day & Midbjer, 2007,

pp.3-8). Prominent research explain the features and *environmental factors* that affect the cognitive development of children:

Architecture: has a strong effect on the cognitive development and behaviour of children (Dael et al., 2011, p.4). Hymas (2008, p.28) attests to the effect of architecture on individuals' physical and spiritual needs, but states that not all types of architecture affect people in the same way. For instance, Moore (2002, pp.4-5) describes the effect of appropriate architecture on kindergarten children. He demonstrates that the planned and designed physical environment has a significant impact on social, cognitive and perceptual learning of children. Some researchers advocate using free plan design (Moore, 1987, pp.50-67) which utilises small movable partition walls. Such design can help children create places by and for themselves with the help of adults, who in turn can encourage the learning and creativity of the children. However, other designers prefer more enclosed spaces because an open plan design can be noisy and cause distraction (Faizi et al., 2012, p.474). The quality of the interior architecture of buildings such as heating, painting, maintenance, ventilation, walls, floor, temperature, arrangements and lighting also can affect children's concentration and levels of achievement (Evans, 2006, p.436). For example, the physical arrangements (e.g. interior architecture) of the play setting may directly influence children's play, learning and behaviours (Petrakos & Howe, 1996, p.66). Such spaces need to be designed to be appropriate to the children's level of cognitive development (Blades & Spencer, 2006, p.93; Evan 2006, pp.436-437).

Style of building: is related to a specific period, place or culture (Poppeliers et al., 2003, p.viii). It is sometimes designed for "fashion" purposes without taking into consideration the effect these buildings have on our soul (Day & Midbjer, 2007, p.140). Such designs may lack care and inspiration, and the ability to act as a source of nourishment for "children's souls".

Form and space: are related to the solids and voids, and the exterior and interior in three dimensional characteristics of substance, shape, size, colour and texture (Ching, 2014, p.xi, 2). Form and space may have a strong impact on the individual (Day, 2004, pp. 84-131), and bring groups together and to create social interactions and relationships. For example, a circular table encourages socialisation, but a rectangular one can cause a split in the conversation. Straight lines can cause tension and curved ones can aid visibility, motivate people to be more engaged and produce harmony in a building. Providing a variety of shapes can increase the ability of children to understand, discover and improve their cognitive development (ibid).

Noise levels: a high level of interior noise impacts negatively on children's cognitive development and affects the quality of education (Moore, 2002, p.4). It also causes disruption for adults, which in turn affects children's cognitive development. Schools that have a high level of noise tend to have interruptions in teaching, causing teachers to lose time and effectiveness. In quieter schools, teachers can be more productive and this can have a positive effect on children (Evans, 2006, p.427).

Overcrowding: Overcrowding in hospitals can cause mental health problems among children and decrease their motivation (Bailey, 2002, p.19). Higher densities of people in a room and perceptions of overcrowding can lead to more aggression, destructive behaviour and stress (Ulrich et al., 2012, p.3) Another study found that providing few resources and equipment for children to play in a very crowded space can increase aggression among them; however, if there are adequate resources and equipment for the same space, there is much less aggression (Moore, 2002, p.4; Evans, 2006, pp.430-433).

The number of children compared to the size of the facility and space also has a strong effect on the variety and quality of children's developmental experience (Weinstein & David, 1987, p.48). For example, having sixty children in a child care centre can cause several problems, such as monotony, over regulation, difficulties in organising and arranging play areas, and insufficient observation of children to be able to encourage and stimulate them (ibid). Also, the size of the space has a strong effect on children's behaviour. In large spaces, children are encouraged to move and to discover the space around them, whereas in small, contained spaces their actions will be more focused (White, 2004, online). Building on White's study, children become more interactive and can engage well with their interior environment if it is scaled to their requirements (ibid).

Children interact and perceive their surrounding environment differently from adults. Their physical, cognitive, social and emotional skills are different according to their stage of cognitive development. Consequently, special attention needs to be given to the understanding of stages of children's

development and for that to be connected with the environment (Guerin & Bunker-Hellmich, 2004, p.1).

A recent study argued that the way a child experiences an interior space has a strong influence on the way that child learns. Designing the interior space of schools for children needs special considerations to encourage and improve children's knowledge and development (Whitehouse, 2009, p.94, 107). This may be done by improving and providing social learning spaces (Birdwell et al., 2008, p.19). Rice (2010, p.4) points out that the goal of interior design features should be to provide a supportive healing environment by reducing stress, enhancing social and interaction support, as well as protecting privacy.

According to a growing body of literature, young children can learn through interaction with their physical, social and cultural environments; thus, poorly designed, poorly organised and restricted spaces can negatively affect young children (Moore, 2002, p.1; Blumberg & Devlin, 2006, p.295).

Appropriate interior design requires the integration of function, materials, structures and visual expression to provide an imaginative, creative environment that can engage the minds of children, decrease their fears, promote well-being, and be appropriate to different age levels (Del Nord, 2006, p.323; Meyer, 2007, pp.8-9; Bjorngaard, 2010, pp.14-15). To ensure children's spaces are suitable and age-appropriate, the size and shape of the furniture and of all aspects of design must be taken into consideration (for more details see Table 2.3).

Designers should also include children's perspectives by having them actively participate in the process of design (see also Section 2.2.3), and giving them the freedom to create and design their own spaces (Dudek, 2005, p.1, 43, 114; Coyne & Kirwan, 2012, pp.294-301). Children can then investigate, experience, and

experiment with the surrounding environment in their own way (Weinstein & David, 1987, p.217, 226).

Table 2.3: Important considerations and challenges for designing interior spaces for children

No	Principles	Examples
1	**Having age-appropriate interior design**	Providing a suitable, coloured map, art and thematic interior design for walls, receptions, corridors, atriums, and wards (Coad & Coad, 2008, pp.33-45).
2	**Designing an environment that can stimulate and encourage children's imagination**	Shaping the environment for play spaces that can support the important role of play, help children to test, explore, and learn, encourage open spaces, and develop a discourse of personal play (Weinstein and David 1987, p.46; Moore, 2002, pp.7-8; White, 2004, online).
3	**Designing equipment that is anthropometrically and ergonomically suited to children's physical size and scale**	Including chairs that allow children's feet to touch the ground (Lueder & Rice, 2007, p.890).
4	**Designing an environment that can stimulate children and decrease boredom**	Providing school spaces that have variation of floors and ceiling, textures, and using more complex materials that hold children's attention (Weinstein & David, 1987, p.165, 178).
5	**Providing an environment that is comfortable, rich in decoration & aesthetics**	Providing different types of colours, lighting, acoustics, and elements from nature to increase amusement and play, decrease stress, and enhance comfort (White, 2004, online).
6	**Preventing and decreasing children's unsafe behaviour**	Providing separate play equipment and different zones for playing, and suitable for all children's ages (White, 2004, online)
7	**Using durable and sustainable materials with features that are easy to clean**	Using materials and finishes (e.g. tiles) that are easy to clean, especially for horizontal surfaces and elevations that get a lot of use by children (Lueder & Rice, 2007, P.902).
8	**Providing visible and easy directions and routes, especially for disabled children**	Providing a suitable signage and easy access especially for disabled adults and children. Therefore, the solution is to follow the universal design specifications (White, 2004, online).
9	**Designing environments that assist children's development**	Creating environments that can nourish child's sensory and aesthetic sensibilities. For example, design of an environment for children under 3 years (i.e. in the sensorimotor stage) should be rich, varied and encourage mobility (Weinstein & David, 1987, p.119).

Examples of interior architecture and interior spaces designed for the needs of children

In this section, three examples of interior design spaces for children will be discussed:

For learning: Steiner and Montessori schools. Steiner schools' pedagogy focuses on children developing academically and physically, as well as emotionally and spiritually (Ulrich, 2000, pp.1-2; Finn, 2003, p.2). These schools distinguish themselves from other schools by their warm, congenial interior design and the flexibility to adapt the interior environment, which in turn can optimise the opportunity to create a suitable environment for the children to learn (Finn, 2003, pp.4-5). For example, the interior architecture and the interior design of Steiner schools incorporate rounded corners, organic lines, welcoming elements and variation in the interior design elements (i.e. colours, walls, and pictures) according to the age of the children (Adams, 2005, p.6; Kraftl, 2006, p.932). Similarly, in Montessori schools, physical attributes and design are very important factors in supporting the learning of children (Al et al., 2012). The design of the interior environment is appropriate for the age level of the children especially through furniture and colour choice. According to Al et al. (ibid.), the interior design can be described as "simple and graceful" and is flexible, which gives students and teachers the ability to rearrange the classes to adapt for a variety of activities (ibid, pp.1868-1870).

Steiner education takes into consideration the cognitive differences between school children according to their age. Such differences can affect the design of spaces in schools and the process of learning. The Steiner system reports that children have different abilities according to their level of age (Day & Midbjer, 2007, pp.12-13):

- children aged 3-5 years have the ability to discriminate between place, mood and their own interpretation;

- children aged 4-7 years have the ability to understand how places can be used;
- children aged 8-9 have the ability to accept and interact with place while understanding its rules; and
- children aged 7-11 years are connected to their environment by their senses, and
- children aged 13-15 have the ability to distinguish the aesthetics of their environment.

For individual health behaviour within schools: According to literature, limited research has been focused on the intersection between architecture and design and individual health behaviour in schools (Gorman et al., 2007, p.2521). A recent study (Huang et al., 2013, p.1) pointed to the strong effect of school design (i.e. architecture, interior design, landscape, and interior architecture) on children's academic performance, subsequent eating behaviours, development, and learning. The study used innovative research through iterative collaboration between the disciplines of public health and architecture to develop Healthy Eating Design Guidelines (ibid, pp.8-12). These guidelines helped in re-designing some spaces and environmental elements in a school in Virginia to enhance the practices of eating (ibid, pp.4-5):

- The open floor plan of the kitchen (Figure 2.4) and cafeteria promotes engagement between food service staff and students, which increased the potential for educational opportunities about fresh food sourcing and preparation.

- The higher visibility of the kitchen process helps highlight the connection between seasonally fresh food from local farms and school gardens and the local economy.
- The physical transparency of the kitchen facilitates passive supervision of food processing and waste management by kitchen staff and community.
- Connecting indoor and outdoor eating spaces and food preparation promotes flexibility in using spaces for educational, dining and physical activities.

Figure 2.4: Artist rendering of open kitchen and co-located teaching kitchen for upper and lower elementary schools, Virginia, US. Notice the direct view of the commercial kitchen that opens out onto the large seating and green area. The overall design incorporates attractive lights and colours (Huang et al., 2013, p.4).

For creativity: Children's museums. These are considered institutions with a regular schedule to serve the needs of children by providing programmes and exhibits that stimulate curiosity and motivate learning (Puchner et al., 2001, p.238). Museums are not only designed for children, but also for

parents, teachers and families who like to go with the children to have fun, learn and socialise with other people (Grove, 2013, p.15). Therefore, the interior design and the interior architecture of museums must satisfy the needs of all ages (ibid). Children's museums are natural places for children's development (Cohen & McMurty, 1985, p.2), and support their physical needs, exploration, imagination, and contextual understanding (Din, 1998, p.173, 175). Some architects have applied modern architectural concepts and interpretive learning through art (e.g. pictures and sculptures that tell different stories) that requires making and doing, and encourages creative thinking and skills (ibid, p.179, 181, 185). For instance, the Minnesota Children's Museum in St. Paul has been designed based on the philosophy of how children experience the physical environment frames their world (ibid, p.159). Some museums provide equivalent activities for boys and girls, acknowledging that they interact with exhibitions differently, particularly at play areas (Grove, 2013, p.17). In a study about gender differences in the choice of games, boys preferred to use exhibitions for immediate play (e.g. automobile exhibit) and they choose competence, fun and power games. However, girls are more interested in understanding the meaning of the items and they prefer to become proficient in working with the items in detail (e.g. playing in the grocery store exhibit) (ibid, p.18).

Regnier (1987), a professor in architecture, conducted a survey of eight children's museums by using focus groups and interviews to find out which features made the museums successful (ibid, pp.55-59). He suggests several approaches to be considered:

1. **Providing diverse activities.** Children's museums that provide different activities help in creating innovative programmes. The Science Spectrum Gallery at the Indianapolis Children's Museum provides over forty different exhibitions dealing with issues of applied physical science. Providing activities that can help children explore objects is also important (i.e. climbing, hiding places) as well as emulating activities of adults/parents.
2. **Art and crafts.** Providing opportunities for children to "make and take" something from the museums can help children practise and learn. For instance, at the Capital Children's Museum in Washington, a workshop space allows children to experiment with various art and craft materials.
3. **Including technology.** Using computers can help children's museums facilitate the delivery of sophisticated educational programming to children and adults. For instance, in the Indianapolis Children's Museum, computers are included in creative ways to simulate an eighteenth-century Conestoga Wagon Trip from New York City to Indianapolis.

Maxwell and Evans (2002) pointed to the important effect of the physical environment of children's museums in supporting and stimulating learning if they are well designed (ibid, p.7). They suggested several approaches to stimulate the process of learning for children (ibid, pp.3-6):

1. Providing an open floor plan with few partitioned spaces and barriers can create the potential for regular eye contact, especially important for parents to observe their children.

2. Providing clear signage to decrease the anxiety and the "cognitive fatigue" that may result from the physical environment spaces not having wayfinding signs.
3. Decreasing distractions that emerge from noise, over-crowding and from over-stimulating exhibits and places of play by using sound reduction materials.
4. Providing a positive emotional element that can improve the potential for learning. The physical environment can create positive emotional spaces that have enough light, bright colours and comfortable spaces (e.g. avoid long, enclosed corridors) and provide interesting surroundings (e.g. using moving water, natural scenes) (Lueder & Rice, 2007, pp.888-889).

2.2.6.2 Physical environment and its effects on patients

Scholars agreed that interior physical environments (i.e. interior design and interior architecture) can affect the well-being and the stress level of patients in a positive or a negative way (Caspari et al., 2006, p.823-858; Salonen at el., 2013, p.1). Del Nord (2006) argued that psychological issues and stress levels are the result of problematic interaction between individuals and the specific physical characteristics of their built environment (p.295). For instance, children perceive the physical environment of the hospital as stressful if it is designed in a complicated way and is not similar to their everyday surroundings (Pinson, 2011, p.8). Ulrich et al. (2012, p.1-2) suggested that physical environments have a strong effect on decreasing or increasing stress levels and aggression in psychiatric patients. Aggression and stress can be reduced if the environment is designed to minimise factors such as overcrowding, noise and access to privacy.

The built environment of hospitals can affect mood, stress level and the sense of well-being of patients and their families (Karakurt, 2003, p.11; Lambert et al., 2014a, pp.195-196). Poor design can cause psychological stress; lead to a sense of hopelessness; cause anxiety and frustration; cause blood pressure to increase; and increase the intake of pain medication (Ulrich, 1984, pp.420-421; ibid, 1991, p.97).

Del Nord (2006, pp.291-292) discusses the effect of the hospital environment on users. He found that hospital spaces affect children's emotions and well-being. Each space can provoke different emotions that cause a variety of images in the child's mind. In order to address and provide healing spaces that support the psychological well-being of patients, he suggested the following (ibid, p.292):

- To organise and structure the spaces and take into consideration: function, users, physical dimension and social system.
- To address the effect of the actual environment, its limitation and boundaries on young patients. For example, furniture and lighting need to be organised and designed according to theraputic requirements.

Codinhoto et al. (2009) indicated three aspects of physical environment that might positively or negatively affect mental well-being (pp. 3-5):

(1) The quality of the fabric of the built environment (e.g. children living in lower-income houses versus more substantial houses with a garden).

(2) The quality of the ambient environment (e.g. acoustics, lighting, air quality, colour, ventilation, humidity and access to nature and natural sunlight).

(3) The psychological impacts of the physical and ambient environment (e.g. density and overcrowding, sense of safety and wayfinding).

Ulrich et al. (2012, p.3) proposed a conceptual model (see Figure 2.5) related to psychopathology, which includes a great number of evidence-based design features that help to reduce stress and aggression that can be caused by involuntary admission and by patient characteristics in psychiatric wards.

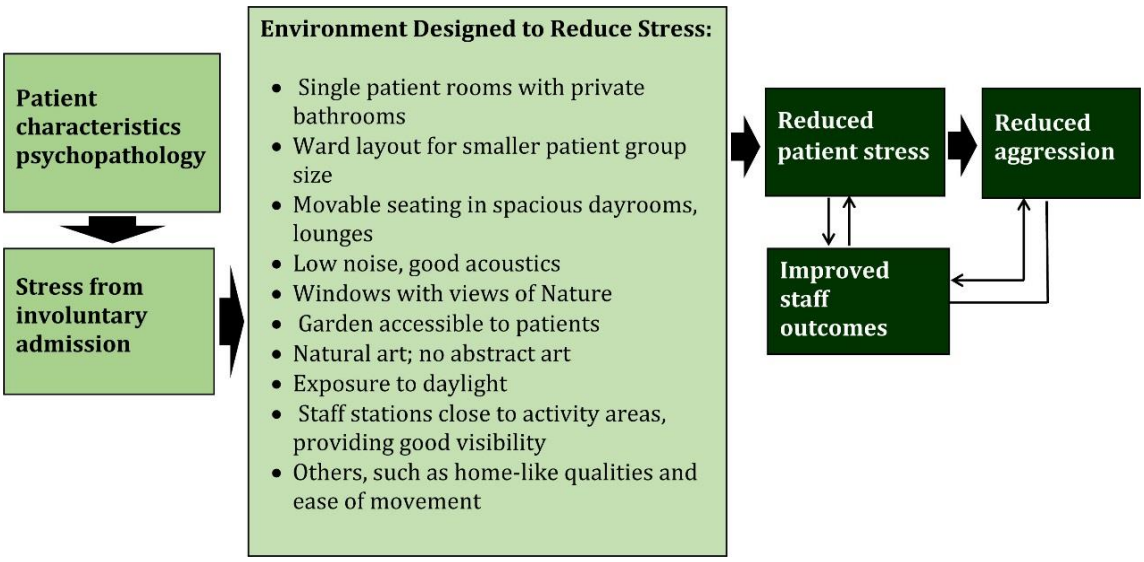


Figure 2.5: Conceptual model proposed by Ulrich - notice factors for reducing aggression in psychiatric facilities (adapted from Ulrich et al., 2012, p.3).

Exterior and interior architecture are considered important components of the physical environment and both should be considered when creating a healing environment. Ghazali and Abbas (2011, p.66) describe a modified version of Ananth's model that helps to create the optimal healing environment (see Figure 2.6). The various features identified in this model can cause or reduce stress levels, fears and depression (Harris, 2002, p.1294; Salonen, 2013, p.3). For example, a patient may recover from their illness more quickly if they are treated

in an environment that has natural light, good ventilation, hygiene and basic sanitation (Del Nord, 2006, p.293; Ulrich et al., 2012, p.55). Furthermore, light, elements of nature, soothing colours, calming music, pleasant views and odours, and beauty of the interior environment can affect patients in a positive or negative way (Rubin et al., 1998, pp.19-20; Rubert et al., 2007, p.28; Del Nord, 2006, pp.297-298). These features may increase staff, family and patient comfort (Rubert et al., 2007), and influence their feelings of satisfaction, which may cause reductions in patient falls and medical errors, improve patient recovery (Blumberg & Devlin, 2006, p.295; Altimier, 2004, p.89), and can optimise the effect of the healing environment.

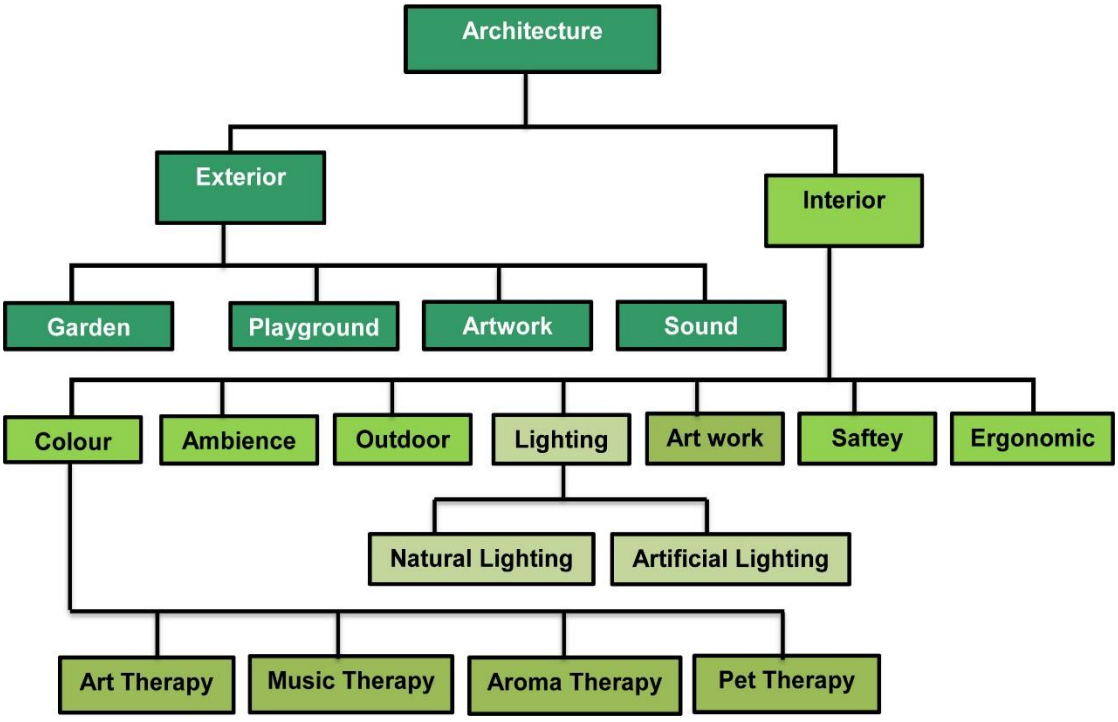


Figure 2.6: Features to be considered when creating an optimal healing environment (modification of Ananth's (2008) model, adapted from Ghazali & Abbas, 2011).

The ideas and elements expressed in these conceptual models are relevant to my research and, therefore, will be considered in the methodology .

Although most researchers conclude that it is not a good idea to hospitalise and treat children in adult hospitals, we still find children having to use adult clinics, wards or hospitals (Malkin, 1992, p.300; Healthcare Commission, 2007, pp.4, 34). When this happens, there are some considerations that designers should follow to provide a healing environment for children, including:

(1) Diagnosing and treatment: children should be treated and diagnosed at a different time from adults (Malkin, 1992, p.300).
(2) Architectural design: regular hospitals should provide separate entrances for children and adolescents (ibid).
(3) Interior design: interior decoration should be suitable for all age groups. For instance, adolescents may react negatively to decoration that may be perceived as childish (ibid).
(4) In exceptional cases, when children and adolescents are admitted to adult mental health wards, there are some special considerations. For example, children must have easy access to education and appropriate activities (Care Quality Commission, 2008, pp.1-5). Also, it is important to provide wards that are single sex, have separate bathrooms, accommodate family visits, offer informal environments, and separate children from adults, especially those with violent behaviour (ibid)

2.2.6.3 The importance of (exterior and interior) architecture and interior design in creating a healing environment for children in hospitals

It is essential to design both the architecture and interior design of the physical environment of healthcare spaces in a cohesive way because they have a significant impact on human health and behaviour (Caspari et al., 2011, p.134; Karakurt, 2003, p.11). Both are important in the case of children's hospitals because they can create a comfortable environment for the young users (Wilks, 2010, p.13). The architecture of children's hospitals should be simple, easily understood, cheerful, beautiful to look at and unlike a hospital in order to create an appropriate healing environment (Bromley, 2012, pp.1060-1061). Several studies state the importance of integration between architecture, interior design, landscape and artwork in the design of children's hospitals to help patients and their visitors connect with life inside and outside the hospital (Wilks, 2010, p.30). The literature review indicated the importance of connecting waiting areas with outdoor green areas to access fresh air, to relax and to be comfortable (NHS, 2007, p.2,3 & 4; NHS, Estates, 2004, p.23, 24). Integrating architecture with art can help to distinguish places and aid in mobility (Lawson, 2010, p.99). In the Evelina Children's Hospital, London, the problem of visitors and patients finding their way around the hospital was solved by integrating architecture with art. The different floors were each given an ecological theme: Ocean, Arctic, Forest, Savannah, Mountain and Sky, with drawings and signs to identify them (ibid). The interior architectural spaces and elevations were integrated with artwork and colours to provide way-finding signs that promote healing environments (Figure 2.7).

Figure 2.7: Evelina Children's Hospital, London – The creative integration of art and architecture i.e. the drawings on the ground and use of colour for the interior walls to give identity to the space and to help people find their way (Lawson, 2010a, p.101).

Adams et al. (2010, p.658) argue that very little is known about how hospital architecture may improve and relieve the stress of hospitalisation. However, those involved in recently built paediatric hospitals advocate that well-designed architecture can increase a sense of child-friendliness and can improve children's health (Bailey, 2002, p.18; Van den Berg and Wagenaar, 2006, p.5).

The exterior and the interior design of the hospital is very important to children and should be welcoming because, *"the first impressions are everything, and what children experience at the front door of a hospital will colour the impression of their entire stay"* (Komiske, 2005, p.8). For instance, Pittsburgh Children's Hospital is considered to be one of America's best children's hospitals (Children's Hospital of Pittsburgh of UPMC, 2012, online): the characteristics of its interior

design spaces will be outlined in Table 2.4 to illustrate the most important considerations in children's hospitals from the perspective of interior design, and to discuss how children's hospitals differ from other healthcare environments.

Table 2.4: The description of the interior design spaces at Pittsburgh Children's Hospital.

Key features	The characteristics
Connecting with nature	The designer addresses the innovative interior environment of the Pittsburgh Children's Hospital by using "fathom" tools (uses a lot of research techniques rooted in psychology, neuroscience, anthropology, and architecture) to transform stakeholders needs that cannot be expressed verbally. This method helps to transform themes related to the aesthetics that support the users. For instance, the designer used impressive themes entitled as "changing seasons" (Figure 2.8) which was represented in floor patterns and impressive murals with beautiful butterflies (Powers, 2009, pp.26-27).
Using positive distraction	In the waiting room, the designer provides movable furniture (Figure 2.9) with brightly-coloured artwork (Powers, 2009, pp.27-29; Eagle, 2009. p.17).
Making emotional connections with space	Children's emotional connections have been empowered by using "homelike" environments with a colourful atmosphere and semi-private rooms for parents (Figure 2.10). Moreover, the designer addresses the patients' room entrance by using different colours (Figure 2.11) to guide the visitors (Powers, 2009, pp.28-29).
Participating in conceptual design	The designers worked with a nine-year-old girl who was asked how she would improve her hospital environment. The girl created a collage (Figure 2.12 & 2.13) using photos from magazines to express her thoughts about the interior environment (Powers, 2009, p.27).

These characteristics illustrate the most important considerations in children's hospitals from the perspective of interior design, showing how children's hospitals differ from other healthcare environments (i.e. provide child-friendly environments).

Based on the above information (Table 2.4), it is essential to include children in the design process. However, there is still uncertainty about how to achieve this (e.g. designers of Pittsburgh Children's Hospital only included a nine-year-old girl

to express her thoughts about interior environments, which are not appropriate to all age ranges of children. Thus, my research will cover this gap.

These key factors will be discussed in more detail in section 2.2.6.3

Fig. 2.8: The theme of "changing seasons" is represented by butterflies on the wall (Powers, 2009, P.28).

Fig. 2.9: Using bright colours to provide distraction - notice the design of the atrium, particularly the ceiling and main reception area that include bright colours to distract the children's attention from their clinical surroundings (Miller, no date)

Fig. 2.10: Home-like interior design of a patient's bedroom - notice the furniture resembles what the children would have at home (Astorino, no date, p.31)

Fig. 2.11: Patient entrance rooms are designed to be friendly by using different colours for each entrance, which also gives ease of access (Astorino, no date, p.31)

Fig. 2.12: The collage inspired the designers in their choice of colours and textures (Astorino, no date, p.14)

Fig. 2.13: A nine-year-old girl created a collage to express her thoughts as to how to develop the interior environment (Astorino, no date, p.27).

From the literature, it was found that children's hospitals are still not being designed in ways that meet the specific psychological needs of children (Coyne & Kirwan, 2012, p.296; Lambert et al., 2014b, p.195). Coad and Coad (2008, p.35) found that many studies between 1990 and 2006 recommended the improvement of hospital design for children. This makes sense, given the shortage of empirical evidence that focuses on environmental considerations related to children's hospitals (Harris et al., 2002, pp.1295). Therefore, this study will concentrate on the interior design and interior architecture of children's hospitals to develop initial recommendations for designing supportive healing interior environments.

The role of interior architecture in creating supportive healing environments

"We shape our buildings, then they shape us" (Winston Churchill, cited in Dilani, 2008, p.65). Appropriate architecture helps create an effective and positive place for healing by creating comfortable and active spaces (Wilks, 2010, p.13; Gupta & Gupta, 2007, p.14). In doing so, it also should be beautiful, stylish and sustainable (Lawson, 2010, pp.97-98). Horsburgh (1995) suggests that interior architecture in hospitals should be modulated to provide *"variety, to accent changes in function and ambience, and to help define progression from public to private spaces"* (p.738).

In a recent study (Gupta & Gupta, 2007, p.10), it was found that it is difficult for large hospitals to provide a balance between the human scale and the community scale, which can negatively affect patients' recovery. Malkin (1992) explained that interior architecture in mental hospitals has a strong effect on the behaviour of patients. The shape, size and scale of the room can foster *"antisocial and destructive behaviour"* and may also affect patients and visitors (ibid, p.148).

There are a great number of guidelines that architects, on behalf of and in consultation with their clients, should consider when creating a supportive and healing environment in the design of children's hospitals:

- **Providing a comfortable environment** and creating places that are easy to move around and help people in finding their way. This can be achieved by providing clear signs, images, and graphic guides with specific categories of colours and artwork (Del Nord, 2009, p.43; Lawson, 2010, p.103).

- **Providing views that opens onto nature** can help patients recover more quickly (Gupta & Gupta, 2007, p.14; Del Nord, 2009, p.43). Establishing access to nature and outdoor play areas is a priority design principle for children because it can facilitate recovery and reduce stress (Baily, 2002, p.24; Karlin and Zeiss, 2006, p.1377).
- **Creating humanising architecture**. This can be achieved by providing a balance between human-scale and architectural-sized elements. Tonkin (2015) states that *"creating intimate spaces … [reflecting] the 'human scale' while developing 'a sense of smallness' in large complex buildings"* (p.35).
- **Designing social places**. Design should include spaces for families and groups to socialise and share their experiences (Karlin & Zeiss, 2006, p.1377). Social interaction can also positively influence children's healing during hospitalisation (Hutton, 2003, pp. 312-319; Rollins, 2009, p.341). These spaces are important to allow patients and visiting families and friends to socialise. These spaces should include spaces for children that are separated from spaces for teenagers (Schneider, 2010, online). There is a need to develop interactive communication networks that can connect children who are in different locations within the hospital (i.e. playroom, school and atrium) with children who are on the wards, and with other children, parents and siblings who are outside the hospital environment.
- **Including privacy.** Privacy can help families enjoy a calm and comfortable environment (Rice, 2010, p.20). Recent evidence highlighted that interior architectural design for public spaces in hospitals (i.e. waiting rooms, thoroughfares, shops) still causes stress for patients and their families because they lack privacy (Del Nord, 2006, p.305). Harris et al. (2006)

argue that having a private room in a children's hospital can remove stress and enhance patients' well-being (p. S38). However, ensuring adequate privacy should not preclude being with others when they so wish (Bailey, 2002, p.20).

- **Ensuring safety**. The architecture of the hospital should provide a safe environment that is clean, physically comfortable and prevents disease (Gupta & Gupta, 2007, p.13). For patient safety, it is essential to utilise standardised equipment to reduce potential error (Powers, 2009, p.28). Some evidence strongly indicated the importance of controlling infection (NHS Estates, 2005a, p.10 & 2004b, p.15, 48; Tonkin, 2015, p.89, 91). Architecture and planning (i.e. building systems, materials, finishes and furnishings) require specifications to provide indoor air quality to prevent mold, dust and smoke in the interior environment, which can cause problems for children who suffer from asthma (Guerin & Bunker-Hellmich, 2004, p.3).
- **Avoiding congested spaces.** The architecture must include spaces that help prevent congestion, and thus avoid aggressive behaviour. An empirical study about the effects of overcrowded spaces in a children's emergency department found that, as the number of children increased, so the behavioural problems also increased. Potentially, thoughtful design can alleviate some of the problems of overcrowding (Baily, 2002, p.19; Dilani, 2008, p.60).
- **Providing technology integration.** Integrating technology into the design of children's hospitals can help facilitate services in the hospital (Karlsberger, 2005, p.8-11), such as the provision of digital services.

Technology can be used where appropriate to save time and reduce errors (e.g. providing wifi so hospital users can access their emails and receive messages).

- **Providing individual bedrooms**. For the inpatient unit, it is important to provide individual bedrooms that allow the patient to socialise with his/her family, friends and peers, and to provide spaces other than the bedroom to socialise with other patients (Del Nord, 2006, p.340).
- **Providing child-friendly design.** It is important to design spaces that are appropriate and child-friendly (Del Nord, 2006, p.336). The exterior and the interior design should be beautiful but not extravagant, and should signify that it is a children's hospital facility (e.g. a toned colour palette, showing age variation through specific designs) (Schneider, 2010, online). Children need to be able to play and to continue their studies when hospitalised. Therefore, it is important to provide appropriate spaces, with age-related activities and tools for teaching (Coull & Cahnman, 2004, p.42; Blumberg & Devlin, 2006, p.296). Lambert et al. (2014a, p.196) suggest that children also need entertaining, and to have easy access to peers and parents. Play opportunities can enhance healthcare environments if they are designed to be appropriate and according to age because children like to play and it can provide a positive distraction for them (Biddiss et al., 2013, p.50). Biddiss et al. evaluated and tested children's use of screen-based technologies for recreational activities in order to design an interactive media display to meet the needs of children in waiting areas in a hospital. The results demonstrated that screen-based entertainments

provided a positive, engaging experience without the use of contact surfaces through which infections can be spread (ibid, p.49).

- **Providing flexible design**. This is important in children's hospitals because it can provide patients and parents with a comfortable environment. For example, creating multi-zoned patient rooms by using three specific zones: staff, patients and family can provide comfort for the users (Schneider, 2010, see online). Also, providing decentralised nursing units give nurses the opportunity to be close to patients and to avoid having to walk long distances (Karlsberger, 2005, p.6). In the literature, design of the facilities in children's hospitals should not only be for children, but for all users, i.e. staff, parents and other visitors (Komisk, 2005, p.149).
- **Providing supportive spaces for parents and families**. Workspaces for parents, such as internet, desks etc., would allow them to continue their work while at the hospital (Schneider, 2010, see online). It is also important to provide a place for parents to sleep, and to provide family respite spaces. These spaces can be used by family members when they need time outside the patient's room; for example, a family room with dedicated research space, living room, kitchenette and storage to accommodate personal belongings (ibid). Also, it is necessary to have easy acccess to the car park and direct connection between the car park and the reception area (NHS Estates, 2004b and others). The location of the general administration area should provide easy access to visitors from the main entrance as well as to the other levels and departments (Kunders, 2004, pp.159, 160). The accounting department must be clearly evident and close to the main entrance (e.g. ibid, pp.160, 167, 168). According to the NHS Estates (2004a,

pp.10-11), there should be dedicated support facilities for different age groups (i.e. play room, recreation room, napping, changing and infant feeding room and education facilities, TV, internet, video games); separate dining facilities away from the playroom and bed spaces for of children of all ages and their families; accommodation for parents beside their children's room to be with their children; and isolated rooms for children who have infections; natural light, quiet study rooms with appropriate and comfortable furniture; room for breast feeding, and outdoor play area with a garden (ibid, pp.10, 18, 20, 32, 36). Also, it is important to provide baby change, and infant feeding to be close to the children's waiting area with a child-friendly environment (ibid, 2004a, p.21).

- **Providing long- and short-visit waiting areas** (Dilani, 2014, p.16). For this study, short-visit waiting is for those who visit the hospital to have a treatment and return home in the same day (i.e. in the outpatients or emergency departments). However, the long-visit waiting area can be used by visitors or patients who need to be hospitalised for several days or more (ibid). Moreover, in Lambert et al., (2014a, p.201) study, children appreciated the inclusion of an outdoor set of seats that could be placed close to each other for social gathering. To provide comfort, NHS Estates (2004a, p.25) recommends providing several types of waiting areas.

  Waiting areas should have direct access to the reception area and easy access to patient areas; be friendly; include a play area and a comfortable relaxing environment with comfortable furniture appropriate for all ages (ibid, 2004a, p.24). It is also important to connect waiting areas with play

areas, outdoor green areas, restaurant or cafeteria, coffee shops, snack bar, prayer room, sleeping facilities, smoking, breastfeeding and diaper-changing facilities, administrative area, changing room, places to sleep and rest, family spaces, offices with computers and access to the internet (Marcus, 2014,p. 70; NHS Estates, 2004c, pp.14, 24, 27). It is important to connect interior spaces of the main waiting areas with outdoor green areas for people to have fresh air, relax, and be comfortable; and also to provide an open plan design for the waiting areas to provide easy wayfinding (National Services Scotland-NHS, 2007, pp.3, 4, 13; NHS Estates, 2004a, p.23).

- **Including play areas** for children. Including age-appropriate outdoor and indoor games is recommended by NHS Estates (2004c, p.6-8). However, Lawson (2010, p.103) pointed that children particularly like outdoor games because nature provides them with a chance to discover and experience, and they have more room to play. Miller and Kuhaneck (2008, p.412) also felt that outdoor play areas provide children with more opportunities to run and move, but that indoor play areas can be used in poor weather conditions. For instance, at Derbyshire Children's Hospital they provide a playroom for children aged 0-5 that contains soft toys, sand and water, and other types of games (see NHS Estates, 2004c, p.37). Lambert et al.,(2014a, p.199) identified seven types of games played by children aged 5-8 years. However, Tonkin (2015, p.45) identified six types of activities that are preferred by children across the age ranges. These activities are related to video games, television, computer games, DVDs, reading books, calm music, and aquariums. Yim and Ebbeck (2009, p.103) identified young children's

preference for listening to music. Football games were evident in a few studies (e.g. Lambert et al., 2014a, p.199). More details about children's preferences are to be found in Table 2.5. Koller and Mclaren (2012, p.10) concluded that children up to the age (i.e. 2-8) prefer their personal toys with them.

The recommendation for provision of age-appropriate play areas is evident in the literature. For instance, Tonkin (2015, p.18) discussed three ideas that are relevant for age-appropriate design:

- **0-5 years**: calming sensory experiences are important (p.18).
- **6-11 years**: activities that offer challenge and opportunities for exploration (p.20).
- **12-17 years**: playing games and creative activities such as drawing and artwork in an environment that allows privacy from parents and families (ibid).

Table 2.5: Children's preferences in terms of the types of entertainment activities and games (Adapted from Lambert et al., 2014a, p.199).

No	Activity Category	Examples of activities
1-	**Active\physical**	Bikes to move around on, snooker\football table, trampolines
2-	**Passive\solitary\quiet**	Reading books, cinema to watch films\movies, listening to music
3-	**Imaginative\creative**	Drawing, colouring, painting, art, and craft
4-	**Shared\interactive**	Board games e.g. Monopoly, Guess Who, Connect 4
5-	**Educational**	Worksheets, puzzles, school
6-	**Technological**	Electronic games e.g. Play Station, Nintendo DS, television, DVD, computers, iPod
7-	**Multisensory**	Touch- and audio-toys, books, games, and activities

The role of interior design in creating supportive healing environments

Appropriate interior design can provide elements that support healthcare design in a balanced way and lead to a positive outcome in terms of healing (Hill, 2008, p.6; Ghazali & Abbas, 2011, p.956). For example, using attractive colours, art, décor, and furniture might reduce stress, prevent anxiety and depression (Caspari et al., 2011, pp.138-139; Lindsey, 2011, p.3). Additionally, the integration between function, materials, structure and visual expression can support and produce an appropriate interior environment (Bjorgaard, 2010, p.15).

There is little research that focuses on the interior design of children's hospitals (Bishop, 2008, p.3). However, to improve the patient service experience, NHS Estates (2004c, pp.19-29) suggests several guidelines for providing friendly healthcare environments for children. For instance, the interior design of hospital reception areas should be welcoming to invite people to come further into the building and should be pleasing and acceptable to people of every culture, and stimulating for children and visitors. The décor may include water features, lighting, semi-permanent types of art (sculpture), tactile models and working models (i.e. automatons, 2D artwork and aquariums). In a study on the views of adolescents and children about the interior design in Bristol Children's Hospital, improved lighting and use of colour, age-appropriate décor, and a separate area for adolescents from young children were recommended. The décor in the hospital was deemed by adolescents as being only suitable for young children and therefore unsuitable for them (ibid).

The academic literature suggests that a number of interior design features may impact healing environments for children and their families. These features include forms and shapes, artwork, furniture, and quality of materials, colour, wayfinding signs, light and thematic interior design.

Forms and shapes: There is a shortage of studies that discusses the forms and shapes that are appropriate for the design of children's hospitals. Dazkir, 2009, p.33 suggested creating organic forms and shapes because they are linked to nature and to the human body; are more psychologically reassuring; and can reduce stress and promote pleasure (ibid). Good practice examples included semi-circular reception forms and shapes at the reception desks of Homerton University Hospital and University Hospital Lewisham London (NHS Estates, 2004b, p.15, 20). However, other studies, not specifically related to the context of children's hospitals (e.g. Palmer et al., 2013, p.92) demonstrated some preferences to include symmetrical configurations because they are more easily processed and remembered. However, Read (2007, p.388) pointed to the potential influence of creating gable roof forms because *"the roof design of the building is important for conveying a home-like atmosphere to children"*. In Zhangs' study (2014, p.393), children aged 8-11 and 15-18 appreciated symmetrical forms.

Artwork. It can be presented in many forms: paintings, murals, photographs, sculptures, decorative tiles, ceramics, textile hangings and furniture (Ulrich et al., 2012, p.15). Some designers and scholars believe it is important to include artwork in the public spaces of hospitals because it can be therapeutic; might

function as a cultural resource for the surrounding community (Macnaughton, 2007, p.86); and may help to decrease children's fears and anxieties. Art could be also used on walls, floors and ceilings as a means of wayfinding because that can be helpful to all users and can provide children with a pleasant distraction (Tonkin, 2015, p.86).

In a study about art preferences among hospitalised paediatric patients, findings suggested that the majority of hospitalised school-aged patients prefer nature instead of abstract or cartoon-like art (Eisen et al., 2008, pp.185-188). For instance, Eisen's (2007) qualitative and quantitative study found that there are no differences in children's preferences regarding art that is related to nature and water features (p.83). A qualitative study with children aged 12-14 demonstrated that artwork in hospital atriums should be age-appropriate and should not include childish elements, such as cartoon characters, balloons, and clowns (Blumberg & Devlin, 2006, p.293, 295; Bishop, 2012, p.82).
Some interior designers believe that abstract art is suitable in healthcare buildings but it should only be used in public areas, such as patient care and waiting areas (McCullough, 2009, p.23). Ulrich et al. (2008, p.32-33), pioneers in the use of art in hospitals, prefer that designers do not use abstract art as it has an open, ambiguous interpretation when patients feel depressed (i.e. the interpretation may have a negative impact on their health and emotions). However, in Eisen (2007, p.70) a few children preferred the inclusion of impressionistic art that included inspiring modern art, but with more realism than abstract art. Moreover, the literature review suggested including various types of art in hospitals, as at the Royal Infirmary of Edinburgh and the new

Stobhill and Victoria Hospitals in Glasgow. Such types of art have a positive effect on the stakeholders (see Lankston et al., 2010, p.497).

Including art that is preferred by children is important, but designers should also consider gender differences. Eisen's study (2007, pp.69-70) showed a minor difference between boys and girls, particularly between 5 and 7 years; three boys preferred chaotic abstract art compared to one girl who chose the same type of art. However, there were only minor differences found regarding the inclusion of the impressionistic type of art. The findings showed that two of the girls preferred impressionistic art, but no boys did (ibid).

Furniture. It is important to provide furniture design for children that:

suits their age and development (Coyne and Kirwan, 2012, p.29, and others); is easy to move and not too heavy (Karlin and Zeiss, 2006, p.1377); is comfortable, home-like, attractive and flexible; and should promote social interaction. The implication of these features can decrease stress and enhance children's well-being (Ulrich, 1991, p.101); and nurture children's kinaesthetic movements (Bailey, 2002, p.22). It specified creating several levels for the admissions and reception desk (NHS Estates, 2004a, p.24) by providing two different heights (i.e. the first to be 70 cm to serve wheelchair users and for women nursing babies, and 1m as the height for older children, for occasional writing, and for comfortable use of computers). According to literature, it is essential to provide outdoor spaces for hospitals with appropriate furniture (Nedučin et al., 2010, p.294; Naderi & Shin, 2008, p.104, 118; and others); to include attractive and coloured furniture; and to use modern designs for the furniture to create healing environments (Day, 2012, p.111; Lindsey, 2010, p.3).

Quality of materials. It is argued that using natural materials (e.g. wood, stone and rock) can promote the idea of a healing environment (Bailey, 2002, p.22). Natural materials with little or no modifications can provide a connection between the surrounding environments and can have a positive impact on body and spirit. For example, stones can give a sense of permanence and solidity, while wood can be described as life, energy and spirit (Zetterquist, 2009, p.16). Research has recognised the importance of quiet and restful environments for promoting a sense of well-being, and sound can be controlled by using appropriate interior design materials that absorb noise (NHS Estates, 2004c, p.53). However, other studies (e.g. Gupta & Gupta, 2007, p.9) recommended avoiding textured and absorbent materials, particularly on horizontal surfaces, and to provide easy-to-clean materials.

Colours. They can affect buildings, shapes and forms by helping to distinguish between different elements (Zetterquist, 2009, p.18). Based on the literature, colours can change the image of architecture and present it like a piece of art full of colours, or show it like abstract art. Using colour is considered *"a powerful tool and should be carefully specified for each child"* (NHS Estates, 2004a, pp.48-50 & 2004b, p.32). In the interior design environment, designers should avoid using plain red, yellow and blue for furnishing and décor because they can cause aggressive behaviour (Ceppi & Zini as cited in Del Nord, 2006, p.352). A few studies (e.g. Tivorsak et al., 2004, p.55) suggested using neutral colours for secondary waiting areas to provide comfort. Other studies prefer to avoid using bright colours because they create a busy and chaotic environment in the atrium (e.g. Koller and Mclaren, 2012, p.8; Coad and Coad study 2008, p.41). Lankston et

al. (2010, p.498) conclude that children preferred nature scenes that are dominated by greens and blues, and very few preferred the inclusion of turquoise, black and orange. Although the literature review identified the potential influence of colours in providing healing, a few studies argue that there are no specific colours that should be applied in the public spaces of children's hospitals due to psychological or cultural reasons. Tonkin (2015, p.82) said to no longer use primary colours in hospitals because they have been judged by scholars to be inappropriate and can cause a sense of disturbance.
According to literature (Read and Upington, 2009, p.1), there is a shortage of studies that consider children's colour preferences. It appears to be adults who always choose the colours and materials for children in a hospital environment. Thus, this area requires further investigation (ibid).

Wayfinding signs*.* Bjorngaard (2010) states that: wayfinding signs are the features that enable *"the formation of cognitive maps through interpretation of key elements by patients"* (p.3). The patients can find their way by having directions signposted. For example, signs should be clear, easy to read and must be entertaining for children and adults as that can help them find their way (NHS Estates, 2004c, p.29). In the literature review, there is reference to the importance of providing integration between interior architectural spaces and wayfinding signs. For instance, Rooke et al. (2009, p.4) state that *"a wayfinding system should go beyond mere signage and use colour codes to differentiate various hospital areas"*. However, Calori and Vanden-Eynden (2015, p.13) addressed the importance of using *"the visual characteristics of a site's design or architecture to*

create a seamless, totally integrated identity". Such a concept can provide harmony and visual unity for the wayfinding system.

Light. Florence Nightingale (1860) recognised the importance of light in helping patients recover more quickly. The quality and quantity of natural or artificial light has a major impact on the body's healing process and people's perceptions (Hobday, 2011, p.7). NHS Estates (2004a, p.14) recommended the inclusion of attractive elements (i.e. lights with different colours) in the imaging services to help decrease the children's fears.

Themes and image design. Coad and Coad (2008, p.35) pointed to the important of themes in hospital environments. In their research, there is limited evidence that children participate in the decision to plan their preferred décor in terms of thematic design and colour in healthcare environments (ibid). In the Evelina Children's Hospital, London, the participation of children in the design process has led to spaces with strong colours, themed floors, abundant glass and solid construction materials that help create a suitable environment (ibid). Coad and Coad (ibid, p.44) state that there are*, "no absolutes in colour and design preferences due to the many psychological or cultural reasons"* . However, some children's hospitals' design themes are not suitable for all ages of children. For example, in Bristol Children's Hospital, children reported that thematic design features (i.e. art, images, design, and colours) are "too young". The ward themes might include: sea, nature, animals, and shapes such as waves, metal, stars, glitter and shiny textures. However, using these themes is not fixed as they might change according to age and cognitive development. For instance, children aged

3-5 preferred the sea theme to be cartoon-like, with elements such as a simple boat. Children aged 6-10 could imagine the sea as having a beach, fish and people, and children aged 11 and older preferred more conceptual sea themes, and preferred the design to be more abstract. In general, there is a preference among young children for animals or Disney-type characters. Also, it is important to provide a home-from-home feel, by including items such as cushions, pictures, lamps and rugs.

There are minor preference differences between the genders, and it is generally agreed that themes have to work for both sexes.
Including themes connected to nature is not only preferred in the wards, but also in the waiting areas. Tonkin (2015, p.87) indicated the importance of including themes and elements connected to nature to provide comfort. Also, Turner (2004, pp.31-35) suggested providing a landscape that encompasses elements from surrounding environments (i.e. plants).

Designers have many different ideas of how to design a friendly environment in children's hospitals. For example, the designers for the Royal Children's Hospital in Melbourne, Australia, say that to optimise a friendly and appropriate design for children, cartoon-like characters should be avoided, the design should utilise images from nature (e.g. deserts, flowers), and they should address children's love of discovery (e.g. aquarium) (ibid). Designers should also avoid using "fairy tales" because some fairy tales, such as Snow White and Red Riding Hood can be violent and frightening for children. Themes from nature, however are consistently preferred (Ceppi & Zini as cited in Del Nord, 2006, p.352).

In another study, guidelines have been developed to improve the waiting areas for doctor's offices by taking into consideration adolescent (11-14) design preferences (Tivorsak et al., 2004, p.55, 56):

- The interior design should be less childish, more teen-oriented and more home-like.
- Provide diversions for teenagers by decreasing waiting time and enhancing the waiting experience.
- Use artwork that portrays realistic images, use neutral colours, and construct smaller sub-waiting areas.

  Using storytelling in thematic design by children was considered *"a powerful tool for communication, collaboration, and providing creativity"* (Alborzi et al., 2000, p.95). Also, getting rid of the medical staff's uniforms is important in providing comfort for children (Eriksen, 2000, p.145). Kunders (2004) advised designers and planners to avoid a clinical appearance that might cause stress to patients, to create an inviting environment and to consider the physical interior spaces and functions inside the atrium (p.339).

An imaginative and home-like interior design is another thematic design concept that can help people feel comfortable. It can be achieved by using a variety of colours, textures, wow factor and surprise (Lawson, 2010, p.103; Komiske, 2013, p.15). Erikson (2000, p.143) pointed to the importance of including a home-like designed kitchen to provide comfort. Including home-like furniture from the perspective of children is discussed in Verschoren et al. (2015, p.7). Blumberg &

Devlin (2006, p.3090) indicated that designing eating spaces from the perspective of adolescents would provide them with comfort.

In a study (Koller & McLaren, 2012, pp.7-10) conducted in the atrium of a paediatric hospital, children preferred the inclusion of themes in their décor, such as characters from television shows and sports themes, with related photographs and animated objects that young children, older children and adolescents can all enjoy.

Other design considerations related to function, architecture and interior design of medical spaces

The design considerations of the medical functional spaces of hospitals is affected by many factors: the types and extent of services; departmental relationships; administrative practices; and the total number and distribution of beds (Kunders, 2004, p.30). The departments and the services of the hospitals can be categorised into two groups—one is concerned with the professional care of patients and the other with the business management (ibid, p.124)**.** For the purposes of this thesis, my research will concentrate on the former, particularly the functional spaces that are affected by the interior design and interior architecture of public spaces (i.e. main entrance, thoroughfares, and atrium) of children's hospitals.

Accident & Emergency Department (A & E): The *"front door, a microcosm, and portal entry"* of the hospital provides an interaction with large numbers of patients needing critical care. It is the unit that uses the largest amount of materials (Del Nord, 2006, p.344). The key planning and design consideration of this department is to keep its location on the ground floor to provide easy access for patients and ambulances (Gupta & Gupta, 2007, p.27). It should have a sheltered, adequately large entrance, separate from the main hospital entrance and from the outpatient department entrance so as to facilitate easier access for emergency ambulances. Also, the A & E entrance should be clearly visible through the use of appropriate lights and signs (NHS Estates, 2003, p.17). A sub-waiting area with a friendly environment for children and their families should be included (NHS Estates, 2004a, p.17). For instance, a play area for children beside the waiting area, positioned slightly away from the main section of the seating to provide distraction for children to forget their illness. To limit the noise, the play area of children can be installed with one-way glass windows, so that people can observe their children, but the children cannot see out (p.17, 18). A & E has various important functions: to provide effective management during disaster situations: to act as an information centre during disasters; and to provide emergency treatment at all times and for all situations (ibid). Also, A & E provides general outpatient services, and sophisticated management of surgical and medical emergencies (Kunders, 2004, p.227).

Two types of people pass through A & E – ambulatory and non-ambulatory – both types needing to use the reception and waiting area, and then be diagnosed at the triage room before going to the Resuscitation where the patient may need further

treatment, or they may need to enter the Outpatient Department (OPD) (Gupta & Gupta, 2007, p.27).

A & E has important design considerations related to its relationship with the other departments and facilities in hospitals (Kunders, 2004, pp.227-228). It should be adjacent to the admissions department, medical records, cashier, ICU and operating room(s), lifts (GB), laboratories and the operating theatre, radiology unit to facililitate the movement of accident cases, and it should also have easy access to the laboratory services, including the blood bank. A & E itself provides services such as: blood bank, X-ray or scanner room and ultrasound services. For imaging (i.e. scanner rooms), Malkin (1992, p.117) suggests that the interior environment should be attractive to distract the attention of the child by using colour, furnishings, wall graphic, art and decor, e.g. using features such as underwater photography overhead above the scanner machines as at St. Mary's Hospital (Malkin, 1992, p.117).

Outpatient department (OPD): It is considered the "shop window" of the hospital. It is the first point of contact between the hospital and the community (Gupta & Gupta, 2007, p.18, 19). It is preferable to *position it close to the main hospital entrance* o*n the ground level* and close to vital services such as registration, medical records, admissions, emergency and social services (Mills, 1969, p.189; Kunders, 2004, p.38, 222). This location allows for control of circulation and smooth flow of traffic to other departments. Additionally, this location shares diagnostic services, such as medical imaging (X-ray), laboratories, pharmacies, and blood banks with other investigations and therapeutic facilities such as: physical therapy and radiology. OPD has various important functions: to

facilitate and investigate admission and hospitalisation, to offer actual therapy for ambulatory patients, and to decide whether or not patients should be hospitalised (Del Nord, 2006, p.348). Designing the interior environment should provide spaces that are suitable for all ages of children; play areas with a waiting space for parents to observe their children while they play; the functional design of the outpatient department should prevent crowding; the architectural plan should connect to the outpatient department with a courtyard or green areas to provide privacy, and attractive, comfortable spaces for children and their parents (Del Nord, 2006, p.340, p.348-349).

2.3 The importance of interior design and interior architecture to the healing environments, particularly in the context of children's hospital design public spaces in creating

This study concentrates on the public spaces of children's hospitals (i.e. main entrance, thoroughfares, and atriums). Such spaces can work as an organising element, can help people socialise and find their way, and can provide a healing environment if they are well designed (Komiske, 2005, pp.34-35).

Within the literature, atriums are described as *"spaces characterised by high ceilings, a large architectural footprint, and wide entrance with open concept, multi-use areas, and large glass windows that allow natural light into the space"* (Koller & McLaren, 2012, p.1). The atrium is considered a focal element that has reflected architectural trends in hospital design since the 1980s (Verber, 2000, p.157). In the atrium of a children's hospital, it is important to introduce elements that are appropriate for children of different ages and cultures,

providing positive distraction, and creating smaller spaces for groups in the larger atrium space to fit the needs of children and accompanying families (Malkin, 1992, p.57; Komiske, 2005, pp.62-63). However, thouroghfares described as “a main road for public use or a passage through somewhere” (Cambridge Dictionary, 2016, online).

Koller and McLaren (2012) conducted a qualitative study at the Hospital for Sick Children in Toronto to investigate patients’ perspectives on the design and architecture of the atrium by using participatory method techniques including semi-structured interviews, photo elicitation and field observation. They involved thirty-five inpatients and forty-five outpatients; thirty-six of the participants were aged between 5-11 years, and forty-four of them between 12-18 years (ibid, pp.1, 4, 5, 6). The study concludes that children have a variety of emotions and functions related to intended atrium architectural design (ibid, pp.7-10). More details are summarised in Table 2.6.

Table 2.6: Participants' requirements and evaluations of atrium architectural design at the Hospital for Sick Children, Toronto and how they impact on well-being (adapted from Koller and McLaren, 2012, pp.7-10).

Participants' needs and evaluations of atrium architectural design and how that impacts on well-being	Examples
Interior design	• Young children showed a strong effect in relation to the artwork, pictures, colours, and plants (e.g. using pictures that have characters from cartoons has a positive effect on young children; the artwork provides a sense of comfort; bright colours can bring happiness; and plants help children to relax). • Some adolescents have negative emotions toward the intended atrium and need more appropriate thematic design suitable to their age.
Size and suitability have contradicting responses	• Some children commented that the large size is scary for them whereas others felt it was comfortable.
Play and action are important for children	• There is a lack of opportunities for play and leisure activities in the atrium. • Some of the participants, especially adolescents, found the atrium boring because it has the characteristics of non-therapeutic design that lacks diverse resources, accessibility and aesthetic design that promotes emotional well-being and decreases the stress caused by their illness. • Children need a diversity of activities and play, such as video games, computers, television, magazines, and a pool table.
Safety and protection versus fear and interruption	• The interior features of the atrium aroused positive and negative feeling in the young participants. The positive feelings of comfort and safety can be depicted by using transparency in elevators (i.e. using glass windows for elevators helps the people see both inside and outside). • The negative emotions and feelings emerged from the use of benches and wires (Figure 2.14) that have been positioned in the elevations opened to the atrium. Some of the participants state that the design of the benches and wires in the intended atrium give them a sense of "entrapment", however, others commented that it feels safe.

Figure 2.14: Digital photograph taken by a nine-year-old boy, featuring overhanging benches with protective cages and netting above (Koller & McLaren, 2012,

In their conclusion, Koller and McLaren state that their, *"findings offer further evidence of children's ability to identify personal preference related to hospital places"* (ibid, p.10), such as the design elements of the paediatric hospital atrium. It is important to design an environment that has a diversity of resources and easy access to play to create a child-friendly environment. However, Koller and McLaren's findings need further investigation. They cannot be generalised to all cultures (ibid). Such variations and considerations are important in the assessment of child-friendly environments (Kyttä, 2004, p.179).

Reception areas within atriums' interior spaces are particularly important because they are the areas the children first see upon entering the hospital. According to NHS Estates (2004, p.2) entrance and reception areas are:

" *the first aspect of a hospital building that most users encounter and is also the natural hub of the hospital… [also they are] associated with the following: arrivals and departures (for many different departments); waiting; meeting and socialising; obtaining information and assistance".*

The children may already be distressed and anxious because they require medical attention and are entering a strange environment, so it is particularly important for them to be made to feel comfortable from the point they enter the facility (Tonkin, 2015, p. 87; Komiske, 2013, p.53). Del Nord (2006, p.350) concludes that children's hospital environments should be pleasant and provide comfort and hope for all users. He identified several characteristics for the interior environments of children's hospitals. For example, the entrance, atrium, and thoroughfares should be easily distinguished, welcoming and identifiable (see Table 2.7 for more details) (ibid). That can be achieved by by providing enough light (Zetterquist, 2009, p.22), artwork, and some welcoming signs for both adults and children. Also, the atriums should be welcoming and suitable for

all ages and for different numbers of people. Providing different spaces that can be occupied by different age ranges of children and by the other stakeholders can increase comfort (Komiske, 2005, pp.34-35).

Table 2.7: The characteristics of the main entrance, the atrium, and thoroughfares (Del Nord, 2006, pp. 337, 349-353).

Setting	Characteristics
The main entrance for the atrium.	It should be clear, easily identified and distinguished. To achieve that, a covered open space should be designed in front of the atrium entrance. This design can work as a "filter between the outdoor and indoor environments", providing a friendly impression for young children, and protecting them from changeable weather.
The interior design and the interior architecture of the atrium.	The interior design environment for the atrium should look like a "hotel" and not have "institutional characteristics" because it receives visitors and patients who are in need of an environment that can decrease their stress.
	The interior architectural design should decrease the noise that can be caused by overcrowding and the movement of people.
	Providing clear directions for people by integrating the "architectural elements, light, colours, décor, artwork, and artistic installations"; for example, lifts and stairways should be easy to find and access.
	Lighting design (both natural light and artificial) and ceiling design for the atrium should help direct people to other spaces.
	Waiting areas in the atrium should allow for privacy and there should be adequate seating.
	The design of the services areas of the "admissions procedure" and payment areas should work efficiently and should be provided with waiting areas as there can often be a lengthy wait for families and patients.
	There should be play areas inside the atrium to amuse children.
	The artwork should provide distraction and please all users.
	The interior design and the interior architecture for the atrium should convey easy access to the other healthcare settings (i.e. libraries, schools, fitness centres, consultation areas for prevention and health education, family resource centre, spaces for prayer, medication meeting spaces, conference areas, etc.).
	Provide glass walls to connect the outside with the inside.
The interior design and architecture of thoroughfares	These should be designed to provide comfort to all users, especially children. Therefore, they should be large, high, straight spaces, but not "oversized".
	Thoroughfares should be provided with comfortable furniture arranged in a way that prevents interruption of conversation and movement, and can be suitable for children and adults.

A small number of studies examine how children perceive hospital atriums and how that affects the planning of hospital design (Adams et al., 2010, p.658; Koller & McLaren, 2012, p.1). Adams et al. (2010) tried to compare the architect's

intentions to children's experiences and perceptions of the atrium and its effect on the well-being of children. He used observation, focus groups and architectural maps and associated documents as methods for collecting data from thirty-five inpatients and forty-five outpatients aged between 5-18 years (ibid, pp.661-662). The setting was the Hospital for Sick Children, Toronto. His research results highlighted two important needs of participants: their evaluations of the atrium's architectural design (Figure 2.15), and how that impacts on well-being (Table 2.8) (pp.662-666):

Figure 2.15: The overhead view of the south end of the atrium of the Hospital for Sick Children in Toronto, Canada – notice size of the atrium (Adams et al., 2010, p.660).

Table 2.8: Participants' requirements and evaluation of atrium architectural design and how that impacts on children's well-being (adapted from Adams et al., 2010, pp.661-662)

Participants needs and evaluations of atrium architectural design and how that impacts on wellbeing at the Hospital of the Hospital for Sick Children, Toronto	Examples
Connectivity and surveillance	• The size of the atrium is an important element that can help people socialise and orientate themselves to find their way around. • The size of the atrium is overwhelming and scary especially since a large atrium can cause embarrassment for cancer patients, because it allows them to be seen by other people. • Provide transparency to help patients connect the outside with the inside (i.e. using glass walls in the main entrance of the atrium to offer a balance between physical openness, safety and security for patients).
Wayfinding	• To provide clear signs and wayfinding information that help people to find their way (i.e. wall maps, footprints, landmarks, and artwork).
Architectural associations	• The atrium at the Hospital for Sick Children, Toronto, is designed to look like a shopping mall. This characteristic can have a positive effect on the stakeholders. It can provide an appropriate atmosphere and amusing public space.
Consumption distraction	• The design of the atrium worked like a shopping mall because it can provide distraction and delight for children. • The design was described as overwhelming and annoying because of the many visitors from outside who visited the shop.
Entertainment and play area	• Adolescents emphasised the need for age-appropriate activities (e.g. a playground for younger patients and for themselves; lounge with access to computers, TV, and video games).

Although Adams' study shows a high correlation between designers' intentions and children's experiences to reframe the evidence-based design in terms of architectural needs, the study does not suggest a new process or offer new criteria about how to develop atrium design for children. It does, however, suggest the need to think expansively about how to determine the effect of design on well-being.

Coad and Coad (2008, pp.34-42) used a qualitative method for the first phase of their research to explore children's preferences for thematic design and colour in a children's hospital. They conducted semi-structured interviews with forty children aged between 3-18 years. The second phase of the study included a questionnaire tool for quantitative research (survey with 120 children). The study concentrated on a number of spaces, such as wards, thoroughfares, main entrance, reception areas and outpatient departments. Children and young people highlighted several characteristics related to the main entrance, reception areas and to the thoroughfares as follows:

- In the main entrance and reception areas, it was found that children preferred a well-defined and clear entrance, having a plenty of light, paintings, and welcoming signs. The interior design elements should not be characterised by childish themes, and should suit all age levels.
- In the thoroughfares, children preferred large pictures or paintings, simple thematic designs, and clear signposting, using coloured arrows or prints, single warm and inviting colours (i.e. warm blue, pastel green, pale or mid-yellow, and mid-orange). However, offering too many choices to the participants may have a negative effect on the results, and the children's preferences may be affected by the adults' ideas (ibid, p.45). These findings contradict the findings of another study about colour preferences in children, which found that boys preferred vivid colours of yellow, red, blue, green, purple, and bright colours of yellow (Zlotkowska & Cassidy, no date, p.385). Due to this contradictons in colour preferences, these findings need more investigation to be generalised. Thus, this research will cover these gaps.

This section identified the importance of the physical environment for patients. It is considered the cornerstone for creating healing environments in children's hospitals. Although the literature review provides some evidence about designing interior spaces of public spaces of children's hospitals, few studies are concerned with the interior architecture and interior design of atriums, main entrances, and thoroughfares; and few studies examine how children perceive hospital atriums and how such elements (discussed above) influence the planning of hospital design. Thus, this study deals with how to optimise a supportive healing environment in the public spaces of children's hospitals. Also, there are several research findings regarding children's preferences aesthetics and design elements that cannot be generalised to all cultures (Koller & McLaren, 2012, p.10). Thus, their findings will be used to identify research objectives for this study, in turn that will help to conduct primary research in Palestine, which will be the focus of the next section.

2.4 Context Considerations – Palestine

This section discusses the context of this project – Palestine and the city of Nablus where the research was undertaken – with a focus on two main topics: Palestinian Background and Special Considerations (see Figure 2.1).

2.4.1 Palestinian Background

The Palestinian health sector has been affected by several factors that have influenced the development, structure and accessibility of health services. These include: occupation, culture, architecture, economics, and environmental considerations (i.e. climate and location, topography, typology and materials). Before discussing these factors, we will first consider the geography of Palestine.

Palestine is located on the eastern side of the Mediterranean Sea, bordered by Lebanon to the North, Egypt to the South, and Jordan to the East (Ayyash, 2010, p.19). This unique location has given it an important historical status and has made it a target for invaders over thousands of years.

Palestine is split geographically into the West Bank and the Gaza Strip. The latter is considered the most densely populated area on earth (Worth et al., 2009, p.295). The number of Palestinians worldwide recently reached 13 million: 4.2 million live in the occupied Palestine territory; 2 million are refugees; 1.3 million live in Israel; and 5.5 million live abroad (Qlalweh et al., 2012, p.1). Palestine has a total area of 27,000 km^2. Israel controls 85% of the area (ibid, p.2).
Palestinian society is proportionally young; according to the Palestinian Central Bureau of Statistics (PCBS) (2011, p.22) the proportion of individuals under the

age of 15 years is 41.3%, while the proportion of elderly individuals is low (see Figure 2.16). For instance, in another statistic by PCBS (2005, p.6), the percentage of young children between 0-17 years old forms 51.04-53.04% of the total population, particularly in the cities of Nablus, and Khan Yunis (see Figure 2.17). Such statistics indicated the need of a dedicated children hospital in Palestine.

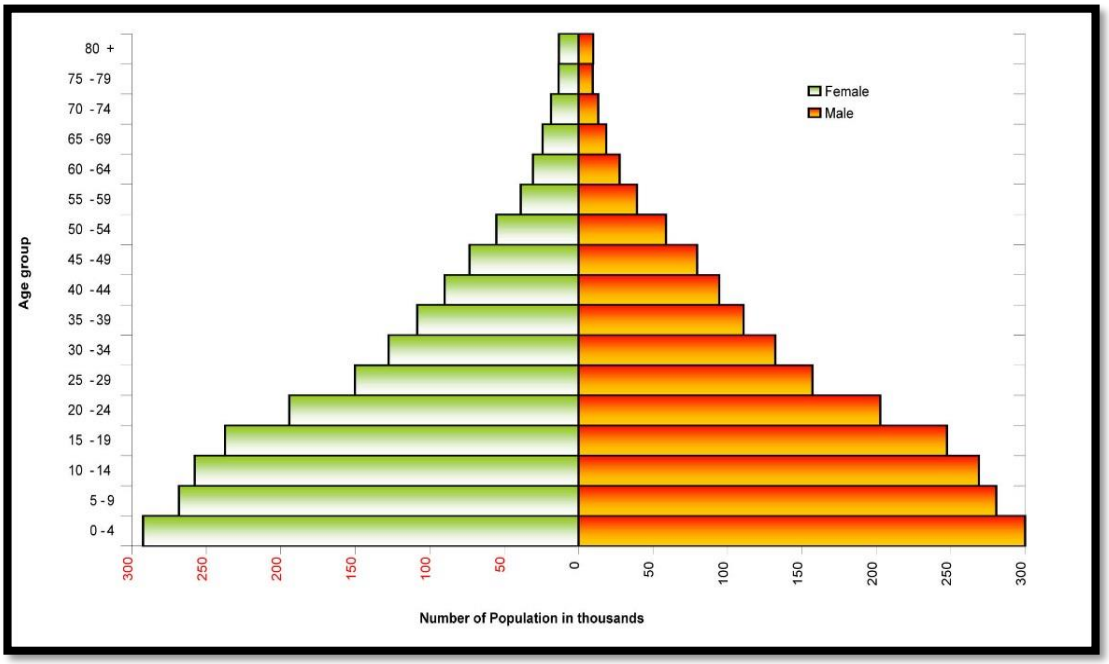


Figure 2.16: Palestinian population pyramid – notice the high proportion of individuals under the age of fifteen years is 41.3 % while the proportion of elderly is low (Palestinian Central Bureau of Statistics, 2011, p.6).

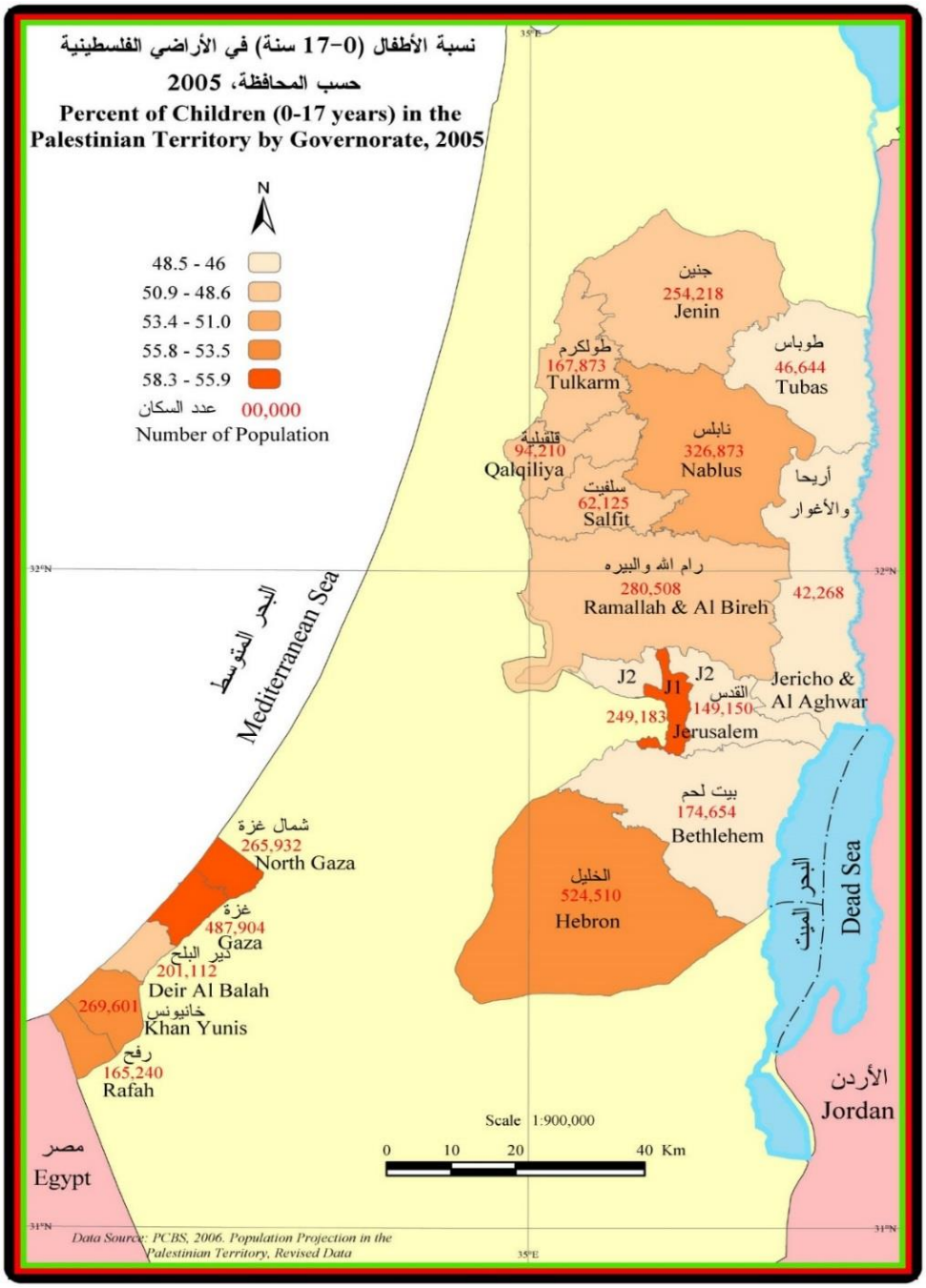


Figure 2:17: Percentage of children between 0-17 years in the Palestinian Territory Governorate (Palestinian Central Bureau of Statistics, 2005, p.6).

The West Bank is divided into eleven governorates (Figure 2.18) Bethlehem, Hebron (Al Khalil), Jenin, Jericho, Al-Aghoar (Ariha), Jerusalem (Al Quds), Qalqilia, Ramallah and Al-Bireh, Salfit, Tubas and Tulkarm, and Nablus (Eklund,

2010, pp.13-14). Nablus city (the focus of this study) is one of the largest cities in the region after Jerusalem (Haddad, 2010, p.57). According to the Palestinian Central Bureau of Statistics (PCBS, 2006 as cited in AL Sharif, 2008, p.10), the Nablus Governorate is home to 336.380 inhabitants, including three refugee camps and surrounding villages. Nablus is distinguished by its mixture of different cultures and civilisations that contributed to the building of its roads, palaces and mosques, and is considered a unique example of architecture, art and archaeological heritage. The old city of Nablus is regarded as a *"cultural treasure"* because it represents an example of the old cities that developed over many civilisations in the Islamic world (Castronovo et al., 2012, pp.2, 8).

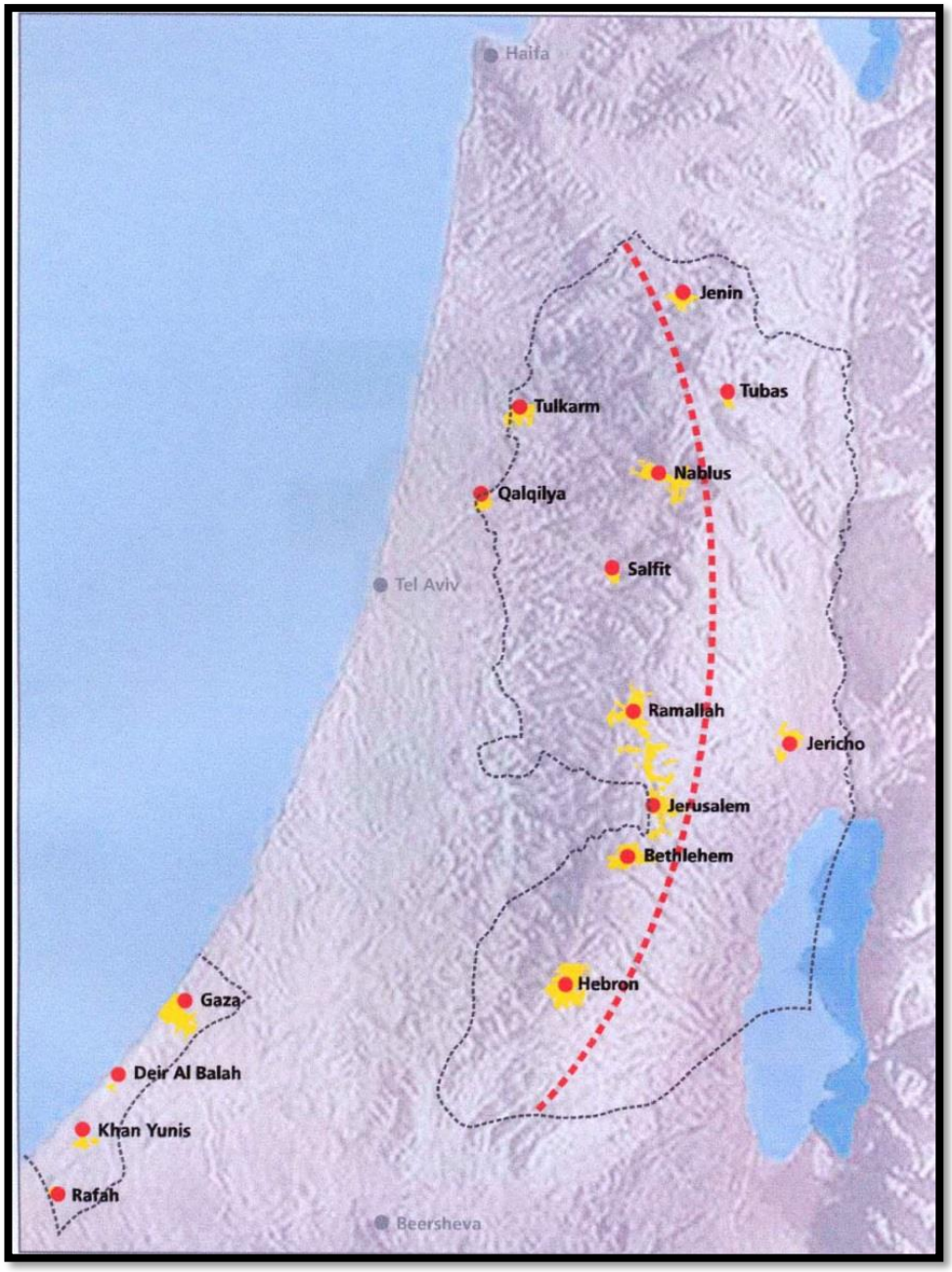


Figure 2.18: West Bank's eleven major cities or governorates (Abu-Hilal, 2009, p.375).

2.4.2 Special Considerations

The literature review identified many factors that have had positive or negative effects on Palestinian life, including culture, and architecture (indoor space and outdoor space), economics, functions, and environmental considerations (i.e. climate & location, topography, typology and materials):

2.4.2.1 Architecture and interior design: The architecture of Palestine has been interpreted and affected by different cultures and layers of history, and has also been impacted by the changing political conditions (Ayyash, 2010, p.31). Senan pointed to the contradiction between traditional and contemporary architecture in Palestine. This contradiction caused a sense of loss and confusion and obscured the identity of the Palestinian territory for its inhabitants (1993, p.6). As a result, significant architectural heritage with different styles has emerged in Palestine—including traditional and contemporary architecture (Hadid, 2002, p.2). Contemporary (modern) Palestinian architecture can be described as architecture that has been created from new materials and techniques. At the beginning of the 20th century, new materials such as cement and steel were used for the first time, resulting in new structural designs, such as beams, columns and thinner walls (Hadid, 2002, p.25; Ayyash, 2010, p.32).

However, traditional architecture refers to a structure that has been created in a traditional way, using local materials and techniques, and is designed to react to nature and extreme changes in climate (Haddad, 2010, p.26). Traditional Palestinian architecture has different characteristics according to the different climates and materials of specific areas. For example, different styles of roofing are used in some areas to adapt to the weather conditions (Hadid, 2002, p.13). Within the literature, it is clear that traditional Palestinian architecture was affected by different cultures, such as the Ottoman, Roman, Byzantine, Crusaders, and many others who left their influence on the traditional architecture. Many buildings still survive from the Ottoman period as well as some connected to Mamluk architecture and a small number related to the Umayyad and other periods (Hadid, 2002, p.13).

There are many elements and details that distinguish traditional from contemporary architecture (i.e. very thick walls, inclined roof, floors, iwan courtyard and fountain, portico, openings, Al-Mashrabiya (Figure 2.19-21), plaster and lime washing (for more details see Hadid, 2002, pp.20-24, Mushtaha and Noguchi, 2005, p.99, Haddad, 2010, p.48).

Figure 2.19: Mashrabiya and shade in the courtyard (Haddad, 2010, p.47)

Figure 2.20: Inside a traditional courtyard house (Haddad, 2010, p.44)

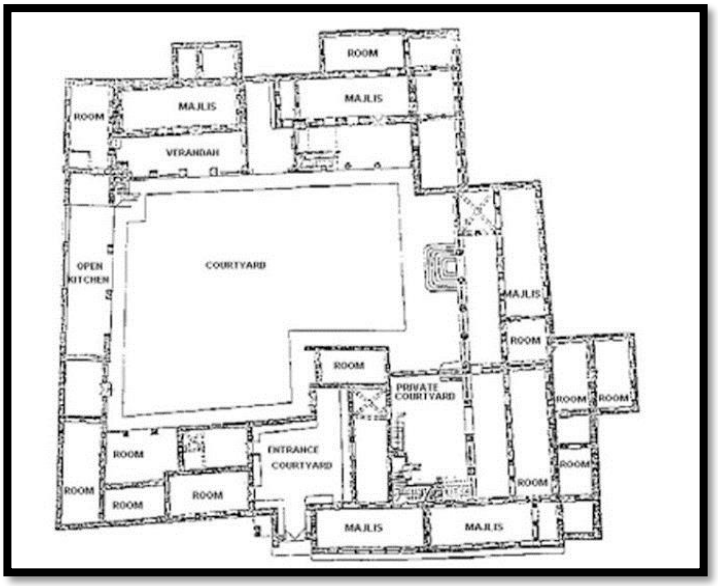


Figure 2.21: Plan of a traditional courtyard house (Haddad, 2010, p.44)

In Palestine, hospitals are designed (in most cases) for specific functions, with different form and spaces to adapt to the weather conditions (Hadid, 2002, p.23, 32). For instance, designers in some hospitals create porticos (riwaq), lobbies, complicated forms, curtain walls, windows shelters, etc. However, other hospitals have simple forms (e.g. rectangular). It indicates that, using riwaq is very useful in the summer months because it creates a space that can prevent the sun from entering directly into the rooms and allows a continuous through flow of air to maintain ventilation and provide comfort (ibid). For more details about riwaq see Glossary of Terms.

Factors affecting Palestinian architecture and interior design:

Culture: It can be manifested in both physical objects and subjective responses to the environment (Ng, 1998, p.57). According to Jabareen (2005), the concept of culture and its components, such as worldviews (i.e. value, meanings, norms, standards, expectations, rules), kinship relations, family structure, gender, politics, religion, and social networks are manifested in people's behaviours and

in the design considerations of houses in Gaza (p.134). For instance, one of the most important elements of traditional architecture is the courtyard. It reflects Palestinians' beliefs, religion, traditions, and economic and cultural aspects. In the literature, the courtyard in Palestine is considered a sustainable space. Courtyard design differs in size and shape according to the geographical location, type of climate, property shape, restructuring activities, and socio-cultural situation. Generally, two types of courtyards are used: the first is surrounded by the building and open to the sky. The second has been created by adding rooms around an open space as the family increases in size. The concept of using courtyards is to: i) create an open space for circulation; ii) to provide private space; iii) to create a social gathering area and for security; iv) to provide daylight; and v) to be used day and night in winter and summer according to changes in temperature (Hadid, 2002, p.20; Haddad, 2010, pp.46-47, 50).

In Palestinian culture, hospitality is paramount, so the interior decoration of the guest room is always specifically designed (Hussein et al., 2010, p.71). In addition, privacy is the most important element when designing the interior space, particularly the spaces where women spend most of their time. For instance, in Nablus city, privacy in indoor and outdoor spaces is preferred, so, to achieve this, they suggested using light materials such as aluminium windows, window boxes and canopies (ibid, p.72).

Palestine shares its Islamic values alongside a Christian and Jewish culture (Qazzaz, 2008, p.87). The largest section of Palestine is Islamic (Sunni), particularly those parts under the Palestinian Authority, with smaller Christian and Jewish areas. The Sunni religion affects Palestinian arts, design and graphics.

For instance, Islam forbids the portrayal of people and animals; most Arab designs feature plants, greenery, geometric shapes, and calligraphy (See Robert & Riffin, online).

Economics: It is clear that people with low incomes are not able to build the same type of houses as rich people (Jabareen, 2005, p.135; Giacaman et al., p.837). In 2005, the Palestinian National Poverty reported *"three out of five Palestinians live under the income poverty line"* and *"a third of the Palestinian population lives under the consumption poverty line"*; the level of poverty in Gaza was twice that of West Bank (Qazzaz, 2008, p.90). Consequently, interior design is affected by factors that include personal, economic and social features (Senan, 1993, p.295). Some Palestinians organise the interior décor of their houses using purely a modern or traditional theme, while others used a mixture of both. For example, the interior decoration of guest rooms in the West Bank villages reflect and represent the unity of the family by displaying photographs of male family members. Such elements represented the taditional themes of interior décor (ibid).

Function: the function of the building plays an important factor in shaping the form and the style of the buildings (Jabareen, 2005, p.135). The function of the courtyard is particularly important. The courtyard (Hosh) can be used for different social celebrations such as weddings; funeral ceremonies; and domestic activities, such as eating, cooking, sleeping, entertaining, meeting members of the family, and playing (Hussein et al., 2010, pp.73-74).

2.4.2.2 Climatic considerations: The climate of Palestine is in general influenced by the Mediteranean climate: hot and dry in summer and short, cool, rainy winters (Asfour, 2010, p.2062). However, this climate has some variations according to the topographical regions in the West Bank/Palestine (The applied Research Institute, 2003, pp. 8-10; Hadid, 2002, pp.4-6). For instance, in the the West Bank (Nablus City) it's warm and sub-humid in summer and cold in winter: mechanical cooling and heating systems are needed. The orientation of the building is important to tackle the various types of climate. In Nablus city, the outdoor spaces are oriented to the west to deal with the excessive heat of summer and the strong winds that come from the northwest (Hussein et al., 2010, p.75). More information can be found at Hadid, 2002, p.4, and Haddad, 2010, pp.5-6, 60-61.

2.4.2.3 Health system in Palestine: The Palestinian healthcare system is a mixed system divided into four sectors (Mataria et al., 2009, p.1207; Schoenbaum et al., 2005, p.17):

(1) the governmental sector, administered by the Ministry of Health (MOH);
(2) private sector for profit;
(3) the NGO sector for non-profit; and
(4) the sector run by UNRWA (The United Nations Relief and Working Agency for Palestinian Refugees in the Near East).

The diversity of the Palestinian service has enabled the health system to face the challenges brought about by regional conflict, but it also leads to diffusion and duplication of the services (USAID, 2008, p.22).

The Ministry of Health manages public health services and delivery of primary, secondary and tertiary care in governmental facilities. It has primary responsibility as the provider and regulator of the health sector (Alsharif, 2008, pp.4-5).

Private sector health provides services such as clinics, hospitals, pharmacies, laboratories, and radiology, physiotherapy, and rehabilitation centres. According to the Municipality of Health, in 2006, the private sector provided approximately 433 beds in twenty-three hospitals that specialised in maternity and diagnostic units (USAID, 2008, p.9). NGO services have declined in Palestine since the establishment of the Ministry of Health. However, they do still provide most secondary and tertiary care services, especially for underserved and vulnerable populations in rural areas (ibid). UNRWA has played a significant role since 1950; they provide a health service for the 1.3 million Palestinian refugees in the West Bank and Gaza with only 10 % of the total Ministry of Health budget. UNRWA health services include primary and some secondary care, disease prevention and control, family health, health education and physiotherapy support (ibid).

The Palestinians healthcare system depends on many sources for income. The USAID (2008, p.14) pointed to these main sources:

(1) General taxation

(2) Health insurance premiums, fees, and co-payment

(3) Private for-profit investment

(4) International donors including UNRWA

(5) Household expenditure

Factors affecting health and health system: The ongoing conflict in the region has had a detrimental effect on the health system in Palestine (Giacaman et al., 2009, p.837). According to UNRWA (2009), the conflict between 2007-2008 damaged 15 hospitals and 41 health clinics in the Gaza Strip (p.104). In addition, low incomes, unsuitable housing, unsafe workplaces, and lack of access to health facilities have negatively affected the health of residents (Worth et al., 2009, p.295).

Evaluation of the health system in Palestine: The health service in Palestine has remained static, with no potential improvement registered since the 1990s (Qlalweh et al., 2012, p.7). There are still gaps in the quality of health service provision. Uncomfortable interior environments for waiting areas and the need for privacy indicate an urgent need for investment in the clinic infrastructure (Alrifai, 2010, p.43). Access to adequate health service in Palestine remains low due to financial, geographic and political barriers (USAID, pp.2, 7).
According to Horton (2009, p.786), the Palestinian health system can be improved by having a balanced solution of economic, social and political accountability. Eklund (2010, p.71) pointed to the importance of *increasing the number of hospitals to increase the accessibility of Palestinian people to reach their healthcare services.*

The Palestinian Authority and Ministry of Health created several strategies to develop the health sector in Palestine with the collaboration of foreign countries. One of the primary strategies is to increase access to the health services by

increasing and establishing new facilities (Alrifai, 2010, p.41). The proposed complex will be represented by four new hospitals (i.e. Sheikh Zayed Hospital for emergencies, Kuwait Hospital for specialised surgery, Bahraini Hospital for paediatrics, and blood banks in Ramallah city); these will provide specialised services and tertiary care to the Palestinian people (USAID, 2008, p.45). According to the literature and these strategies there is *no suggestion for establishing a dedicated children's hospital* in Palestine, although the number of children under five years of age accounted for 14.7% of the total population living in the Palestinian territories; 40.2% were in the age group (0-14 years) (World Health Organisation (WHO), 2013, p.4). According to the WHO (2001) young people's mental and psychological health needs focussed attention because they face a combination of violence, high levels of unemployment and a lack of control over their lives (p.15). Furthermore, there is a need to improve the management of health facilities, physical environments, and satisfacion of stakeholders, in especially hospitals (Al Sharif, 2008, pp.74, 77-80).

There are eighty-one hospitals in Palestine (Stilwell et al., 2014, p.3). They are distributed in the West Bank (Figure 2.22) and Gaza (including East Jerusalem). More details can be seen in Table 2.9.

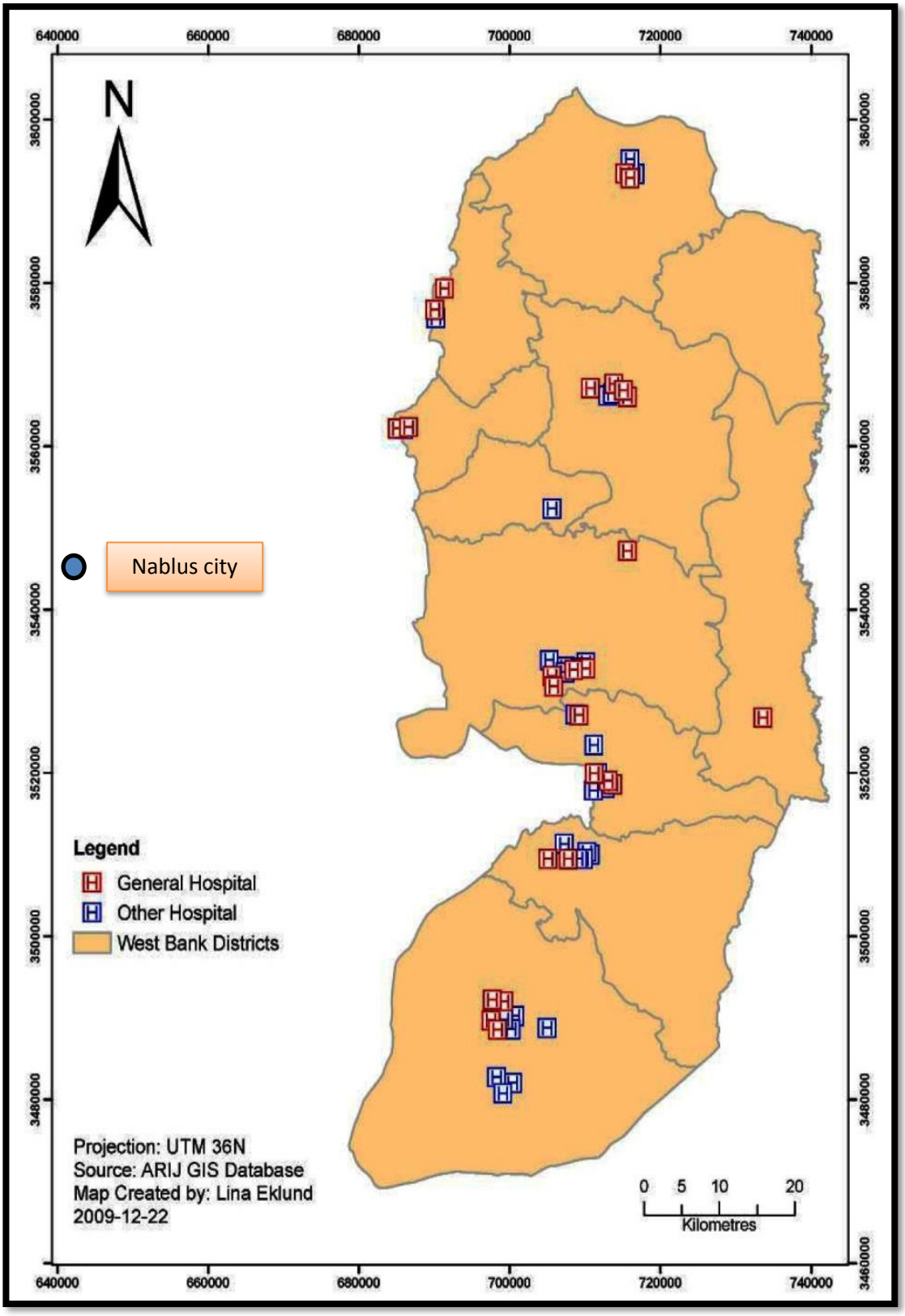


Figure 2.22: Distribution of hospitals in Palestine/West Bank (Eklund, 2010, p.17)

Table 2.9: Distribution of hospitals (H) and beds (B) by governorate, Palestine 2014 (adapted from Stilwell et al., 2014, p.3)

Governorate	Population	MOH		UNRWA		NGOs		Private		MMS				Total
		H	B	H	B	H	B	H	B	H	B	H	B	Beds/10000
West Bank	2,684,066	13	1529	1	63	20	1447	17	498	00		51	3537	-
Jenin	292,248	1	160			1	16	1	37			3	213	6.2
Tubas	59,584	1	35									1	35	5.9
Tulkarem	173,859	1	105			2	60					3	165	8.5
Nablus	360,231	1	296			3	272	2	165			7	733	19.0
Qalqilia	103,989	1	56	1	63							2	119	11.4
Salfit	66,880	1	50									1	50	7.5
Ramallah/AlBireh	324,114	1	176			2	97	5	101			8	374	10.5
Jericho	48,716	1	56									1	54	11.1
Jerusalem	400,438					6	560	3	82			9	642	16.0
Bethlehem	202,196	2	311			4	240	2	27			8	578	27.5
Hebron	651,811	2	286			2	202	4	86			8	574	8.4
Gaza Strip	1,672,865	13	1578	0	0	14	569	0	0	3	177	30	2324	-
North Gaza	328,689	2	118			3	100			1	68	6	286	8.7
Gaza	578,874	6	804			7	299			1	44	14	1147	19.8
Deir AlBalah	242,978	1	110	`		1	20					2	130	5.4

In 2008, Nablus city had six hospitals (Table 2.10): two are private; two are run by NGOS; two are general, public sector hospitals, including Rafidia Surgery Hospital (Al sharif, 2008, pp.11-12). Recently, a new teaching hospital (An-Najah Teaching Hospital) has opened.

Table 2.10: Hospitals in Nablus city and their distribution (Al Sharif, 2008, p.16).

Hospital	No. of Beds	No. of patients		Average duration of stay	Hospital Days	Treatment without hospitalisation
		Discharged	Admitted			
Al-Watani	101	9.893	9.862	2	20,083	61,459
Rafidia	165	13.722	13,671	2.7	37,590	64,757
Al-Itihad	71	5.830	6.425	2.3	13,603	13,936
St.Lukes	48	4.055	4.091	1.2	4,854	8,493
Nablus Specialised	70	5.967	5,982	1.7	9,923	6,678
Specialised Arab	30	3.695	3,715	2.5	9,283	5,237

Rafidia Surgery Hospital is considered one of the largest hospitals in Palestine, and it is the only public sector hospital in Nablus that can accommodate children. It is a public sector, district hospital with a well-established paediatric capability, serving about 300,000 people (Al Sharif, 2008, p.11,12). Although there are several other hospitals in the city (Figure 2.23), a large number of people depend on Rafidia for their healthcare. Most citizens in Palestine do not earn a high income and, therefore, are unable to afford treatment in one of the private hospitals. According to Alrifai (2010, p.17), 58% of Palestinians live below the income poverty line, and 30% live in extreme poverty, and in Gaza, 70% live below the poverty line (see Section 2.4.2).

Figure 2.23: The location of Rafidia Surgery Hospital – Nablus/ Palestine (Giacaman et al., 2009, p.838)

The hospital is owned and operated by the Ministry of Health and is, therefore, run under Ministry of Health regulations and guidelines. It has 376 employees and a capacity of 163 beds. The primary objective of the hospital is to provide general and surgical services to the community. It is a general hospital providing numerous specialities, such as orthopaedics, surgical and burn operations, neonatology, general surgery, intensive care unit (ICU), intermediate care unit (IMU), delivery, and specialised surgery (i.e. neurosurgery, ophthalmology, and urology). Outpatient services are provided in most of these speciality areas, in addition to a dentistry clinic and physiotherapy clinic.

The Rafidia Surgery Hospital is considered a representative hospital of the area, due to its size, and the level and number of services it offers. For example, it provides approximately 90% of the services that can be found in the area in government hospitals (Younis et al., 2010, p.168). Therefore, we argue that the methodology and results of this study can be applied to other hospitals in the Occupied Territories.

One of the hospital wards and departments is dedicated solely to the treatment of children. This paediatric ward has approximately thirty beds. Before 2010, hospital services for children were divided between Al Watani Hospital and Rafidia Hospital (Gunkel, 2010, pp.6-12). In March 2010, the paediatric patients, equipment and staff were moved to Rafidia Hospital. According to an evaluation by the USAID in 2010, the space allocated to paediatric patients in Rafidia Hospital had several problems. These were related to the inadequate number of beds; as well as there being no play area, no waiting area specifically for families,

and no suitable furniture for parents to stay beside their child. In short, it was not really suitable for children (ibid).

Rafidia hospital tried to add a new children's ward in 2010 with the assistance of a consultant from the U.S Agency for International Development (USAID). The hospital evaluation found several problems related to the healing environment, hospitalisation, physical spaces and interior design, which shaped the aim of this study (Gunkel, 2010, pp.4-9). For more details about these findings see Table 2.11.

Table 2.11: Findings related to the paediatric ward at Rafidia Surgical Hospital (Gunkel, 2010, pp.8-13)

Key findings	The clarifications
No suitable space for paediatric ward	• The space for the new paediatric ward at Rafidia Hospital is not suitable for children's wards, because it was previously used for adult surgical patients.
Overcrowded spaces	• Insufficient floor space to hospitalise thirty-six patients, which resulted in crowded conditions, From the observation, a six-week-old infant was hospitalised in the "ICU of Rafidia Hospital" on an adult size-bed, next to a 60-year-old man with pancreatitis.
Uncomfortable hospitalisation	• Because Rafidia hospital does not have a Paediatric ICU, ill children are hospitalised in the adult ICU.
Interior design problems	• Poor interior design and furniture, no aesthetic or colourful environment, and for parents, no space to stay overnight beside their children.
The absence of healing environments	• In the Ministry of Health, children are considered to be small adults which may lead to a deficiency in providing "optimal care" and produce a less than optimal environment for children and their families.
Inadequate physical space and facilities	• No facilities for monitoring children of "intermediate disease severity" on the general ward; inadequate bathroom facilities and poor attention to waste management by staff.
No recreational spaces for children	• No places for children to play.

For these reasons the primary research for this project will take place in Nablus city, to conduct *a qualitative research that uses an innovative workshop format* for a new children's hospital in Palestine.

2.5 Conclusion

This chapter has discussed the literature covering three aspects (see chapter map Figure 2.1) related to *designing healing environments for children: children's hospital design*; and *context considerations – Palestine*.

- The discussion about *Healing environments - defining terms* (section 2.1.1), identified the lack of agreement between scholars in the use of terms and definitions related to 'healing environment'.
- In the literature review related t*o design considerations to create age appropriate and better healing environments* (Sections 2.2 & 2.4), seven key issues (see Figure 2.24) need to be taken into consideration, and they will inform field work research. More details will be discussed in Chapter 3.

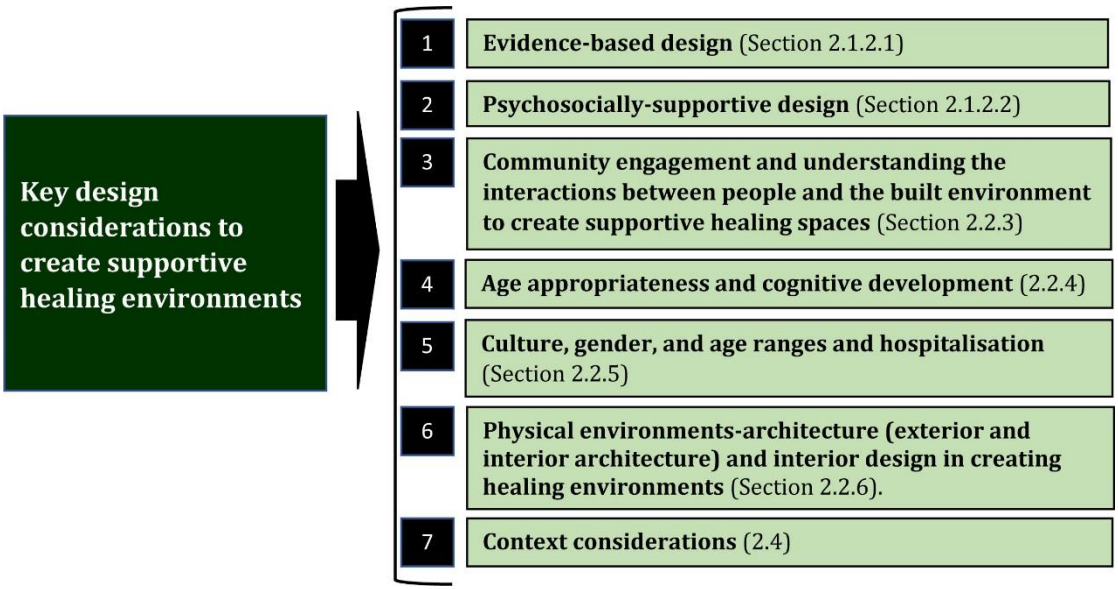


Figure 2.24: Key design considerations to create supportive healing environments (Researcher)

The discussion of literature review of:

1. **Evidence-based design** (Section 2.1.2.1) suggested considering the best available infortamtion from empirical research to create supportive and comfortable spaces.

2. **Psychosocially-supportive design** (Section 2.1.2.2) describes the relationship between individual needs and the surrounding physical environment to guide healthcare designers and planners, and recognise the relationship between humans and the built environment.

3. **Community engagement and understanding the interactions between people and the built environment to create supportive healing spaces identified the importance of (Section 2.2.3):**

    1. Including children as well as their parents in the process of designing healthcare spaces (Section 2.2.3).
    2. Using appropriate, and where necessary, innovative approaches and methods for including children in the design of their healthcare spaces (Section 2.2.3).

4. **Age appropriateness and cognitive development of children** (Section 2.2.4) indicated the importance of designing spaces according to age and *cognitive development* of children; the factors that influence children's cognitive development e.g. culture, parents, language, etc.; and to consider Piaget's theory that is related to the four stages of cognitive development (Section 2.2.4). Such elements might have a potential effect on designing supportive and appropriate healing environments for chidren.

5 **Culture, gender, and age ranges and hospitalisation** (Section 2.2.5) identified the importance of taking into account culture, gender, age ranges and the effects of hospitalisation in determining the interior design and interior architecture of children's hospitals. Three main issues need to be considered:

- Culture can influence the design of children's hospital. i.e. using symbols, colours, materials with optimistic cultural meaning.
- Gender can have a potential influence on preferences and choices of children.
- Age ranges and hospitalisation can affect design spaces.

6 **Physical environment - (exterior and interior) architecture and interior design in creating healing environments** (Section 2.2.6) indicated to:

1. Provide a *well-designed physical environment* (Section 2.2.6). Two models related to the proposed conceptual models by Ulrich (2012) and Ananth (2008) (see Figures 2.12 & 2.13) were illustrated to support the importance of physical environments in creating healing environments.
2. Consider the *components of physical environments* that contribute to exterior and interior architecture and interior design (Section 2.2.6.3). In this respect, three issues were identified:
    - Appropriate architecture helps create an effective positive place for healing by creating comfortable and active spaces.

- Architectural features can influence the anti-social and destructive behaviour of patients, visitors, and staff.
- Physical environments identified the importance of determining the key considerations for interior architecture that help create healing environments for children's hospitals (see Figure 2.25).

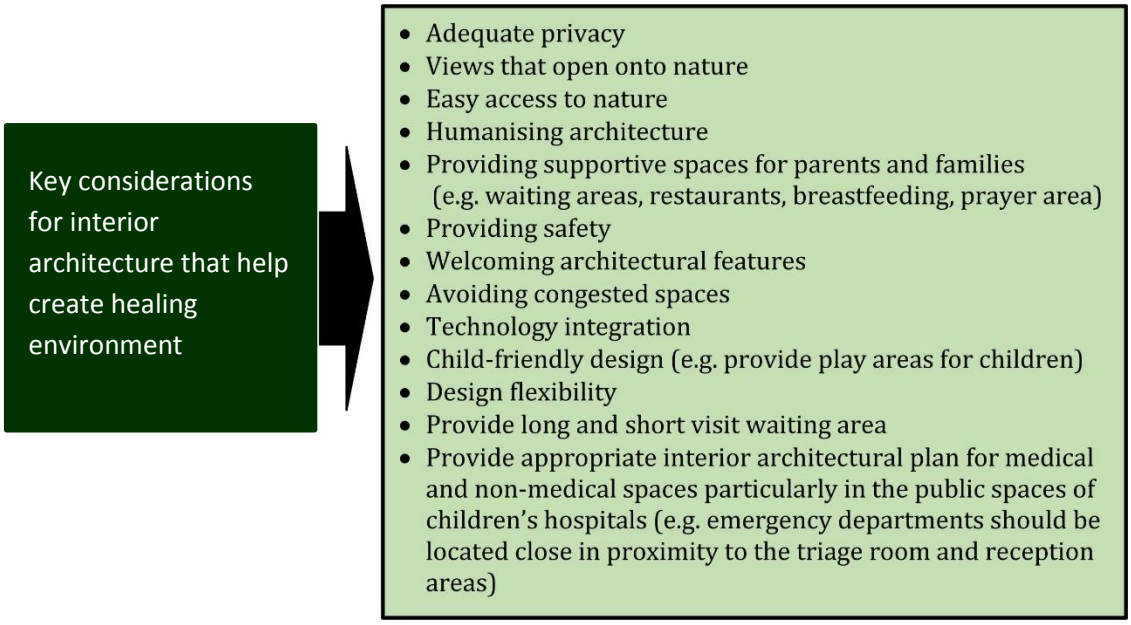


Figure 2.25: key considerations for interior architecture that help create healing environments for children's hospitals (Researcher).

3. Provide *age-appropriate* designs for children. Three examples from the literature (Section 2.2.6.1) identified the importance of:
    - Providing comfortable and appropriate interior design spaces (i.e. classes) for different age levels of children.
    - Creating appropriate design that is connected to architecture, interior design, interior architecture and landscape to provide

a positive effect on children's health and behaviour within schools.

- Providing diverse activities, art, craft and technology within interior design spaces for children (e.g. museums).

4. Consider environmental factors (Section 2.2.6) i.e. architecture and style of building, aesthetics, form and space, noise levels, size of space and overcrowding.
5. Create appropriate interior design spaces (Section 2.2.6.1-3).
6. The discussion about the interior design and interior architecture to the **public spaces** in creating healing environments, particularly *in the context of children's hospital design* (Section 2.3) identified the importance of the atrium, main entrance, and thoroughfares in providing supportive healing environments for children. The literature showed that in hospital design, particularly in the public spaces, designs should be home-like where possible, child-friendly across a range of ages and provide comfort.

7 **Context specific issues** (Section 2.4) identified four main factors that designers should consider because they have a potential influence on healthcare design in Palestine, particularly children's hospital design. These *factors* are related to:

(1) **Architecture** (Section 2.4.2.1) i.e. traditional and contemporary. Palestinian architecture has been influenced by three key elements i.e. culture, economics, and function.

(2) **Interior design** (Section 2.4.2.1): three concepts of *interior design* are used i.e. purely modern, traditional, or a mixture of both.

(3) **Evironmental considerations** (Section 2.4.2.2): three important environmental elements were identified: topography and climate and location.

(4) **Healthcare system in Palestine** (Section 2.4.2.3) highlighted three issues that need to be taken into consideration.

- The Palestinian healthcare system is a mixed system divided into four sectors (see section 2.4.2.3), which tends to result in duplication of resources and inefficiencies.
- It is important to increase the number of hospitals in Palestine.
- The Palestinian healthcare system depends on many sources for income i.e. general taxation; health insurance premiums, fees, and co-payment; private for-profit investment; international donors including UNRWA; and household expenditure.

Based on the evaluation of the healthcare system in Palestine (Section 2.4.2.3), four key issues were identified that need to be taken into consideration for this research:

- There are still gaps in the quality of provision of appropriate environments within the health service (i.e. uncomfortable waiting areas and the need for privacy).
- There is a need to increase the number of hospitals in Palestine to foster accessibility, but there has been no recent announcement by the authorities to establish a hospital dedicated to children.
- Nablus city is one of the largest cities in Palestine. It has eight hospitals but none of these has the capacity to provide treatments for all age ranges of children (0-18 years). Rafidia Surgery Hospital, the largest public hospital in Palestine/Nablus city, is the only public hospital that can accommodate children from 0-13 years. However, this hospital still lacks some of the appropriate environments to accommodate children. For instance, it does not have a sufficient number of beds, play areas for children, nor a special waiting area for children's parents to stay with their children. In addition, the number of children aged between 0-17 form around 51.0-53.04 of the population of Nablus city (PCBS, 2005, p.6). Thus, for the above reasons, it is important to provide a dedicated children's hospital in Palestine.

- Although the literature review provided key design considerations for designing children's hospitals to create healing environments, one still finds uncertainty about (Sections 2.2.1-6, 2.3, 2.4):

  - How to involve children in the design process.

- How children can contribute in the early stages of the design process for creating more age-appropriate and healing environments.
- How to include children, parents, medical staff, psychologists and others in the process of designing their healthcare settings.
- What methods should be adopted to ascertain the perspectives of children to achieve effective change in optimising the healing environment.
- How to uncover the specific psychological needs of children.
- How to incorporate environmental, interior architecture and interior design considerations that result in age-appropriate public spaces in hospitals.
- How to design a programme for medical functions and its effect on the interior design and interior architecture that can or should be contributed to the public spaces of children's hospital.

It is important to study the considerations related to the design of hospitals in Palestine due to the different cultural and social influences in the region. Thus, *for a new children's hospital in Palestine, and for all the above reasons,* my research will use *qualitative research that employs an appropriate and innovative workshop format. The field research will be conducted in Palestine*, particularly in Nablus city; this will be discussed in Chapters 03 and 04.

Chapter 03

Key Findings from Literature Leading to Field Research Objectives

3.0 Introduction

This chapter describes the key findings and conclusions from the previous chapter (Section 2.5). The aim is to identify factors that inform the nature and focus of the field research. To achieve this, the conclusions and findings were categorised into three main areas (see Table 3.1).

Literature Review Categories	Conclusions	Section/s
Factors that are essential to provide supportive healing environments.	**1. Factors that are essential when designing supportive environments for children**: • **Age appropriateness and cognitive development** – providing age-appropriate interior design and interior architectural spaces, cognitive development of children, and Piaget's four stages of development. • **Environmental and architectural elements** include architecture, noise level, style of building, form, and shape, size of space and overcrowding. • **Age-appropriate designs for children:** Three examples were discussed related to age-appropriate design for children i.e. for learning, creativity, & individual health. • **Culture** includes social habits and cultural beliefs that shape choices of users and their needs.	2.2.4, 2.2.5, 2.2.6.1 2.4, 2.5
	2. Essential spaces to provide healing environments related to the design of public spaces of children's hospitals include main entrances, atriums, and thoroughfares.	2.2.6.3, 2.3, 2.5
	3. Factors that are important to create supportive healing environments related to design dedicated children's hospitals, particularly public spaces: • **Evidence-based design** – making decisions based on the best available information from the empirical evidence**.** • **Age ranges and hospitalisation** that influence the interior design and interior architecture of children's hospitals. • **Age appropriateness and cognitive development** – providing age-appropriate interior design and interior architectural spaces (see also Point 1 above). • **Interior architecture and interior design elements of the physical environment** include interior architectural elements i.e. architectural plan, environmental issues, size, form and shape, safety, design flexibility, supportive facilities for parents; and interior design elements i.e. aesthetics, form, thematic design. Three models need to be considered i.e. psychosocially-supportive design model, Ulrich's (2012), and Ananth's (2010) conceptual models • **Gender issues** – providing privacy, closed spaces, separation between boys and girls. • **Functional medical issues** that influence interior design and interior architecture of public spaces of children's hospitals i.e. emergency and outpatient departments. • **Context specific issues** include culture i.e. Palestinian culture, environmental design considerations i.e. type of architecture and interior design, and environmental issues, and health system in Palestine.	2.2.1, 2.2.2, 2.2.6, 2.2.6.1-3, 2.3, 2.4
The appropriate process for gathering data on these essential factors in the field research.	Two important elements were identified: **1. Through community engagement and understanding the interactions between people and the built environment to create supportive healing spaces.** Design with and for children and engaging parents in the design process is important. **2. Using age-appropriate methods and methodology** – providing age-appropriate and innovative design methodologies and methods.	2.2.3
Gaps and findings in literature that inform the field research.	For all gaps identified in the literature review, see Chapter 2, Section 2.5.	2.2.5

Table 3.1: Key findings of the literature review chapter and its conclusions

3.1 Factors that are essential when designing supportive environments for children

The research identified three important factors related to the design of appropriate and supportive environments for children's needs:

(1) Age appropriateness and cognitive development. Literature (Section 2.2.4) suggested that children should be treated differently from adults because they have their own views, cognitive development needs, learning and exploration. They cannot understand problems in the world until they reach a specific stage of cognition. Therefore, special attention needs to be paid to the stages of children's development, especially those factors that influence their cognitive development and learning (e.g. culture, play, language, parents and peers, knowledge, teaching, physical environment, etc.). *Piaget's four stages* (Section 2.2.4) *of cognitive development* (i.e. 0-2, 3-7, 7-11, 11-18 years) *and Vygotsky's* theory of cognitive development of children were discussed as a basis for considering the design of interior spaces for children. As children grow up, suitable interior design for children needs to be flexible, adaptable, and age-appropriate. Such needs can be translated into healing spaces.

(2) Environmental and architectural elements. These can provide a positive effect for users, particularly children if they are well designed (Section 2.2.6). They can have a potential influence on children's learning, spiritual well-being, and social interaction:

- **Architecture** (Exterior and interior)**:** It can have a significant impact on human health and behaviour (Sections 2.2.6.3 & 2.2.6.1). The

physical environment of a kindergarten has a positive impact on social, and cognitive behaviour, and the perceptual learning of children if it is well designed and appropriate to children's needs.

- **Style of building**: literature indicated that some buildings designed for children display a lack of understanding and empathy for children's needs and perspectives (Section 2.2.6).
- **Form and space**: They can either cause individuals to gather together and groups to socialise, or people to separate and create an antisocial feeling. For instance, a circular table encourages socialisation, but a rectangular one can cause division and hinder socialisation.
- **Noise level**: a high level of interior noise impacts negatively on children's cognitive development and affects the quality of their learning.
- **Size of space and overcrowding**: can cause mental health problems among children and can decrease their motivation. For example, it has been indicated that in large spaces, children are encouraged to move and to discover the space around them, whereas in small, contained spaces, they will be more focused.

(3) Age-appropriate designs for children: Three examples from the literature were discussed (Section 2.2.6.1). These identified the importance of:

- Providing comfortable and appropriate interior design spaces (i.e. classes for learning) for different age levels of children to stimulate

and encourage the processes of learning (see the example of Steiner and Montessori schools).

- Creating appropriate architecture, interior design, interior architecture, and landscape to provide a positive effect on children's health and behaviour within schools. For instance, connecting indoor spaces (i.e. spaces for eating) and outdoor green areas, and providing open plan areas that provide visibility and transparency can induce a positive effect on children's behaviour, development, learning, and nutrition (see Section 2.6 the example about open plan kitchens and co-located teaching kitchens for upper and lower elementary schools in Virginia).
- Providing diverse activities such as art, craft and technology within interior design spaces for children (e.g. museums) can promote learning and creativity, and can be fun (see the example about Children's Museums). Providing play areas is important for children: play is *"a natural part of childhood, and a vital factor in the mental, social, and emotional growth of children"* (NHS Estates, 2004c, p.37). Thus, designers should take into consideration age-appropriate design for children when they design play spaces for stimulating children's growth, creating a sense of magic that encourages their imagination.

Leading literature explains that, *creating appropriate interior design environments* for children requires the integration of function, materials, structures and visual expression to provide children with

imaginative and creative environments that can engage their minds, decrease fears, promote well-being and be appropriate to different age levels (Section 2.2.6.1).

(4) Culture: From the literature (Section, 2.2.4), the cultural context is considered an important element that shapes children's thoughts and influences children's cognitive development. Thus, it is important to understand the cultural aspects in which children are living. For instance, in developing countries (Section 2.2.5), many aspects of life are strongly influenced by cultural beliefs and social habits. They shape choices, and influence needs. Building on this, one can conclude that, with respect to designing environments for children, cultural considerations need to be taken into account.

3.2 Essential spaces to provide healing environments related to the design of public spaces of children's hospitals.

From literature (Section 2.3), the interior design and interior architecture of the public spaces of children's hospitals (i.e. atriums, main entrance, and thoroughfares) are considered very important for children and other people in hospitals. They serve as organising elements, can help people socialise and find their way, and can provide a healing environment if they are well designed. Despite this, there is a shortage of studies that concentrate specifically on designing such spaces in children's hospitals.

Literature (Section 2.3) showed that, particularly for the public spaces in hospital design, three factors need to be considered:

- There is a need to provide comfortable, *'home-like'* design features.
- The interior design of the atrium should be *child-friendly*, with access for all children, and provide for a variety of activities.
- The interior design of thoroughfares should provide comfort i.e. simple thematic design, clear signposting and use of appropriate colours.

3.3 Factors that are important for creating supportive healing environments related to the design of dedicated children's hospitals, particularly the public spaces

From literature (Ch. 02), seven factors were identified:

(1) Evidence-based design (EBD). According to literature (Section 2.2.1), to create healing spaces, designers should reach decisions based on the best available information from the *empirical evidence* that emerges from existing research and project evaluations that have important outcomes for patients.

(2) Age ranges and hospitalisation. The discussion about age ranges and hospitalisation (Section 2.2.5) identified the importance of providing a cheerful and comfortable environment for children to decrease their stress. However, the design of interior spaces should be according to age ranges of children. Based on findings from the literature review, the age ranges for hospitalisation and admission to children differs from one hospital to another (Section 2.5). Some hospitalise children

between 0-18 years (Section 2.1.5), others between 0-13. However, the WHO indicated the paediatric age range to be 0-18 years old. Such differences influence the interior design and interior architecture of children's hospitals (see Section 2.2.5). For instance, the hospitals that admit children from age 0-21 may need additional interior spaces and/or design requirements compared with hospitals that admit only children from 0-16 years old.

(3) Age appropriateness and cognitive development. From literature (Section 2.3), an obvious but important finding is that children need a range of different kinds of facilities, including classrooms, play areas, welcoming spaces, and age-appropriate interior design. Such elements should be designed according to the age and cognitive development of children (see also Section 3.1). Despite this, we still find healthcare spaces and atriums of children's hospitals that do not address the needs of all age stages; rather, they tend to support the views of adults only or they may encompass themes appropriate for younger children but not for adolescents. Also, there is a lack of empirical evidence about the effect of cognitive development of children that can be used when designing these kinds of spaces; and there are still gaps in the empirical evidence related to age-appropriate healing environments.

(4) Interior architecture and interior design elements of the physical environment. From literature (Section 2.5), architectural features such as shape or form, size, scale, furniture, layout, ventilation, cleanliness,

and openness to nature, safety natural environment, natural light and privacy, pleasant views, and having a comfortable interior architecture, are essential to determine the design of hospitals because they can affect antisocial and aggressive behaviour of patients, visitors and staff (see Section 2.2.6.3). Moreover, interior design features such as aesthetics, colour, natural and artificial light, music therapy, ergonomics, artwork, quality of materials, and thematic design can increase or decrease stress level, anxiety and depression (See Section 2.2.6.3).

Literature (Section 2.5) pointed to the positive effect of providing *integration* between architecture designs, and healthcare design that consider the perspectives of children, architects, designers, technologists, healthcare professionals and their specific functions. When these factors are taken into account in an integrative way, it has the potential to lead to a more supportive healing environment. Despite this, we still find a shortage of studies that discuss the impact of the interior architecture and interior design of the public spaces of children's hospitals in providing healing environments.

Also, literature (Section 2.5) identified the importance of considering three different models for providing healing environments:

- **Psychosocially supportive design** (Section 2.2.2). This recognises the relationship between humans and the built environment, which can help guide healthcare designers and

planners. However, in some older hospitals, the designer may not have considered design in relation to psychological, social, and spiritual needs, and this may cause anxiety and stress for patients.

- **Proposed conceptual model of Ulrich (2012)** (Section 2.2.6.2). This model includes a great number of features related to psychopathology that help to reduce stress and aggression that can be caused by surrounding environments.
- **Ananath's (2008) model** (Section 2.2.6.2) includes various features that can cause or reduce stress levels, fears and depression. For example, children may recover from their illness more quickly if they are treated in an environment that has natural light, good ventilation, adequate hygiene and basic sanitation.

(5) Gender issues. From literature (see Section 2.5), gender can have an influence on preferences and choices of children. e.g. girls tend to prefer private and closed spaces more than boys. Also, gender can influence types of interior spaces. e.g. providing separation between boys and girls for religious reasons or for differences in terms of preferences (see Section 2.2.5).

(6) Functional medical issues. Literature (Section 2.2.6.3) indicates that medical spaces require considered design, and designers should provide a balance regarding environmental design between spaces that are connected to medical treatment and non-medical spaces. Given the

importance of this, one can conclude that in designing the main entrance and atrium of children's hospitals in particular, one needs to determine the functional programme of the medical spaces, particulary functions that have a direct relationship, and perhaps even share functions, with the main entrance and atrium spaces or are adjacent to these locations. Literature indicates (Section 2.2.6.3) that there are some medical spaces (e.g. A & E, OPD) that should be located on the ground floor in close proximity to the main entrance. Also, it is indicated that some patients will need access to medical spaces (i.e. triage room) before entering the public spaces (e.g. play areas). Despite this, literature (Section 2.5) indicated a shortage of studies that discuss the design programme of medical functions that can or should be closely connected to the main entrance and atrium of children's hospitals.

(7) Context specific issues. From literature (Section 2.4) culture can influence the design of hospitals e.g. symbols, colours and materials that can hold positive cultural meanings; (see also Section 3.1).

Based on the findings from literature, there are very few studies that include children as participants to design children's hospitals. Other studies cannot be generalised in terms of their findings related to children' preferences, aesthetics and design elements (e.g. Koller & Meclaren, 2012, p.11). Thus, this present research will be conducted in Palestine to provide deeper insights into these areas in relation to this

specific context. Based on this, three elements need to be considered (Section 2.4.2):

- **Palestinian Culture**: In Palestine (see Section 2.4.2.1), the Muslim community constitutes the strongest presence, particularly those parts under the Palestinian Authority (Section 2.4.1). Islamic cultural considerations will have an influence on architecture and interior design. For instance, the Sunni religion (Islam) forbids the portrayal of people and animals. Design of courtyards in Palestinian architecture depends on beliefs, religion, traditions, as well as economic and cultural aspects. Given the importance of this, the reviewed literature (Section 2.4.2.1) indicated a shortage of empirical evidence that examines the effect of culture in designing the public spaces of children's hospitals.

- **Architecture, interior design, and environmental design considerations:** From literature (Section 2.4.2.1), Palestinian architecture requires special design considerations related to the types of materials, climate and location, culture and religion. For instance, traditional architecture in Palestine is created in a traditional way, using local materials and techniques, and is designed to react to nature and climate changes. In Nablus city (the location of the fieldwork research), the interior environments of the buildings require mechanical cooling and

heating systems due to hot, sub-humid weather in summer (see Section 2.4.2.2).

Based on conclusions in literature (Section 2.5), there is little empirical evidence in the research that focuses on environmental considerations related to children's hospitals. For instance, interior architecture and interior design spaces, particularly of the public spaces, do not address the needs of children.

- **Health system in Palestine**: Based on findings from the literature, (Sections 2.4.1, 2.4.2.3) Palestinian healthcare is a mixed system divided into four sectors, which can be problematic because there is often duplication of services and distribution of services. Also, there are gaps in the quality of provision of appropriate environments, particularly for children. Hospitals still exist that lack all or some of the special considerations that children need. For example, the Rafidia Surgery Hospital does not provide for the specific requirements for treating children. There is a need to increase the number of hospitals in Palestine to enable greater accessibility. There have been no recent announcements by the authorities of any intention to establish a hospital dedicated for children, although the percentage of young children (Section 2.4.1) of age 0-17 years constitutes around 52% of the population (Palestinian Central Bureau of statistics, 2005, p.6). In addition, there are problems and difficulties for the Palestinian people in

accessing the health centres and hospitals in Palestine because of ongoing conflicts in the area.

Thus, based on the above issues, copying the prototypes in developed countries will not work in such a different cultural and social environment like Palestine (Hadad, 2010, p.26). Therefore, the primary research will be conducted in Nablus city, in Palestine, using qualitative methodology which will be discussed in Chapter 4.

All the above factors are essential for creating supportive healing environments in healthcare settings. However, the implications of these in designing children's hospitals are that more innovative and friendly methods are needed to better understand children's needs.

3.4 The appropriate process for gathering data on these essential factors in the field research

The reviewed literature identified two factors:

- **Through community engagement and understanding the interactions between people and the built environment to create supportive healing spaces**. From the literature review (see Section 2.2.3), hospitals affect everyone; therefore, designing hospitals needs input from the broader community, i.e. medical staff, parents, children, clubs, schools, etc. Such participation can provide valuable information about needs and preferences in terms of functions, interior design and interior

architecture. Despite this, there is a lack of research that includes these other users of children's hospitals.

Findings from literature (Section 2.5) point strongly to including children in direct participation in the creation of their healthcare spaces and to shape the research instrument. It is important to understand the interaction between children and their built environment before engaging in the process of designing. However, there are few empirical studies that examine children's perceptions of children's hospital interior design in a fully participatory manner; how to involve them in the design process; and how that affects the planning and the design of these spaces.

- **Using age-appropriate methods and methodology**. From literature (Section 2.2.3), it is important to use appropriate, and where necessary, innovative approaches and methods for including children. Using qualitative approaches and participatory methods with children can help in gaining in-depth understandings of children's perspectives. When including children participants in the process, researchers should use age-appropriate methods. However, there is still uncertainty about how to involve children in the process of designing, and what are the appropriate methods that should be adopted in order to sensitively understand their perspectives and preferences. To overcome these gaps, this thesis will aim to use qualitative methods involving innovative methods within a workshop format – this will be discussed in Chapter 4.

3.5 Gaps and findings in literature that inform the field research

From the literature review it was found that**:**

- There is a shortage of empirical evidence that examines the effect of cognitive developments of children in designing the public spaces of children's hospitals.
- There is little empirical evidence in the research that focuses on environmental considerations related to children's hospitals. For instance, interior architecture and interior design spaces do not address the needs of children, especially in the public spaces of children's hopsitals (i.e. main entrance, atrium, and thoroughfares).
- There is a very little research that concentrates on the function of the interior architecture of the public spaces of children's hospitals and how that affects the interior design. In addition, there are few empirical studies that examine children's perceptions of children's hospital interior design, and how that affects the planning and the design of these spaces.
- Hospitals still exist that lack all or some of the special considerations that children need. There are still gaps in the empirical evidence that designers should follow to create age-appropraite healing environments for children, especially in the public spaces of the children's hsopitals. For example, the Rafidia Surgery Hospital does not provide for the specific needs of children.
- There are few examples of empirical evidence that examines the effect of culture in designing the public spaces of children's hospitals.

- There is a lack of research that includes children in a fully participatory manner, and there is still uncertainty about how to involve children in the design process.
- There is a shortage of research that includes the other users of children's hospitals (i.e. parents, medical staff, and others) in order to provide supportive environments that help in the treatment and caring of children.

From these findings, specific objectives need to be achieved through the field research. This will be discussed in the next section.

3.6 Specific objectives of the field research

This research has six objectives:

1. Identify the key factors to be taken into account when designing the interior architecture and the interior design of children's hospitals (e.g. age and cognitive development, hospital functions, and healing environments, in particular the public spaces of children's hospitals.
2. Identify the functions and the programme requirements for the main entrance and the atrium in children's hospitals (e.g. play areas, separate waiting zones, shops, cafeterias, plants, aquariums, furniture).
3. Identify the functional constraints or requirements of the public spaces which will inform design decisions (e.g. reception, play areas, waiting areas, admissions zone, access).
4. Identify the context-specific issues to be taken into consideration (e.g. culture, gender).

5. Identify the most important considerations for interior design and interior architecture related to public space of children's hospitals.
6. Identify the factors pertaining to 'healing environments' that should be brought to bear in the design of the public spaces.
7. Identify the appropriate methods to be used with children in the design process to optimise the supportive healing environments in the public areas.

In attempting to achieve these objectives and aims, this research will use a qualitative research that uses an innovative workshop format. Also, the field research will need to involve a broad range of participants - children, parents, medical staff and administrators, and designers. This will be the focus of the next chapter.

Chapter 04

Methodology and Research Design

4.0 Introduction

This chapter discusses the methodology, research design, and data analysis for this study, focusing on six topics (see chapter map, Figure 4.1):

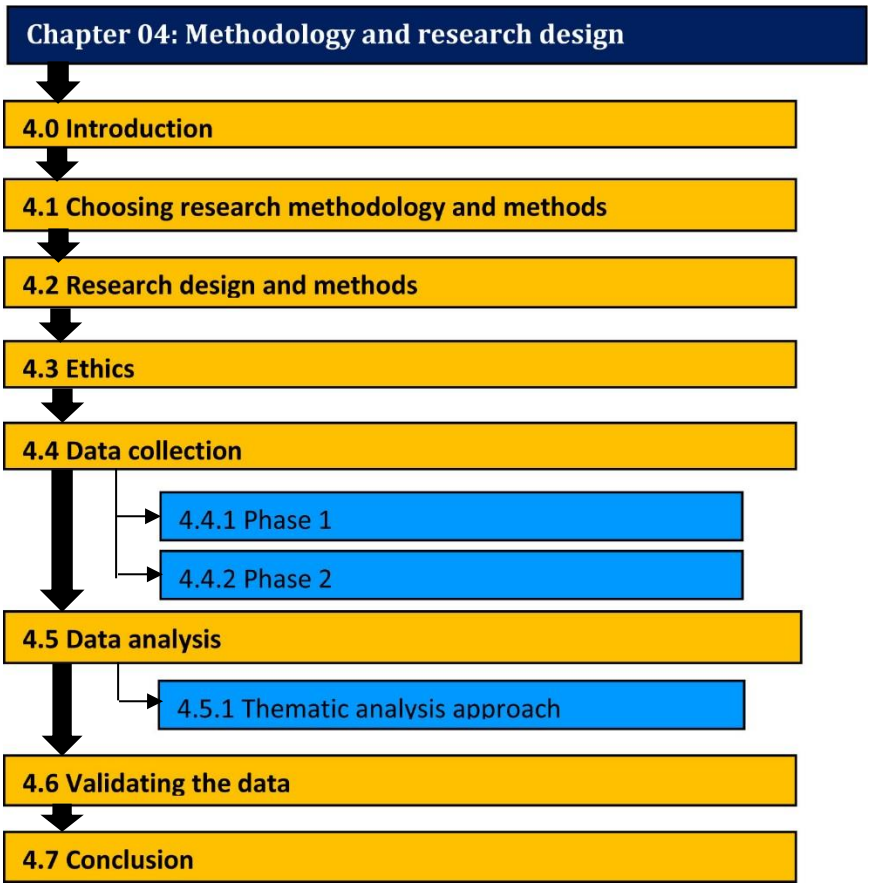


Figure 4.1: The structure map of chapter

4.1 Choosing research methodology and methods

This section discusses the adopted methodology, research design, methods and the potential considerations of research methods for this study. However, before discussing the actual undertaken research for this study, it is important to discuss in brief: *research questions and specific objectives of the field research*; *types of research approaches; research design; and methods that are offered in literature and might not be utilised in this study* in order to include supportive evidence that help to provide a clear idea about the reasons for choosing the adopted research approaches for this study.

Research question and specific objectives of field research for this study

This study seeks to address one research question and five specific objectives of field research (see Ch. 1, Sections 1.5, 1.6). The research question seeks to investigate '*how should the public spaces of children's hospitals (i.e. main entrance, atrium, and thoroughfares) be designed so that they are conducive to healing and are suitable for all age ranges of children (i.e. 0-18 years)?'.*

Types of research approaches, research design and methods that are offered in literature and might not be utilised in this study.

Research approaches are defined as *"plans and procedures for the research that span the steps from broad assumptions to detailed methods of data collection, analysis, and interpretation"* (Creswell, 2013, p.3). Creswell and others discuss seven criteria that help researchers reach a decision about which approach should be used for their study (ibid):

- *Philosophical assumptions the researcher brings to the study*: the researcher should understand the philosophical background and nature of the research that are legitimate to the study (Gray, 2004, p.16). Understanding one's philosophical background will help the researcher to clarify issues of research design, and to recognise which designs will work and which will not (ibid, p.7). For instance, Creswell (2013, p.6) discusses four types of philosophical background: post-positivism, constructivism, transformative, and pragmatism – to be discussed later.

- *Knowledge:* Choosing a research methodology should be based on knowledge gained from previous work, methodological literature study, and a conceptual framework (Marshall & Rossman, 2011, p.7).
- *Nature of research problem or issues being addressed and research question*: Gray (2004, p.69) pointed to research questions, their focus and the kind of data they seek to achieve; their connection to the philosophy and research paradigm are elements that help the researcher choose an appropriate methodology for his/her study. Silverman (2005, p.8) argues that choosing a method depends upon what one is trying to find out. Ritchie and Lewis (2003, p.47), however, pointed to the importance in considering the research question, purpose of study, time and money as elements that help to choose the appropriate methods.

  > *"A good research study design is one which has a clearly defined purpose, in which there is a coherence between the research questions and the methods or approaches proposed, and which generates data which is valid and reliable. It is also one which is realistic, conceived with due regard for both practical constraints of time and money and the reality of the research context and setting".*

- *Procedures of inquiry (research design) or approaches to research*: researchers should identify the strategies of inquiry or research design within the chosen methodology (i.e. qualitative, quantitative, or mixed methodology), the implication of which provides a specific direction for procedures in a research design (Creswell, 2013, p.11, 12).
- *Specific research methods of data collection, analysis and interpretation*: the choice of methods or techniques can be linked to the methodology in which they are used (Gray, 2004, p.16); and to their broader societal context (Silverman, 2005, p.123).

- *Researcher's personal experience*: the experience and training of the researcher might have a potential impact on the choice of research design. For example, the researcher who has experience and expertise in both qualitative and quantitative research can choose a mixed methodology approach (Creswell, 2013, p.21).
- *Audiences for the study*: the researcher's audiences could be editors, the public, specific industries (e.g. healthcare), designers, colleagues and journals. Knowing the experience of the audience will help researchers decide how to design his/her research.
- *Timescales;* those that are available to the researcher (Gray, 2004, p.31).

The review of the literature provided three approaches to research: *quantitative, qualitative, and mixed method*. Each approach has its specific meaning, characteristics, philosophical background, strategies and methods.

Quantitative research: is an approach for *"testing objective theories by examining the relationship among variables"* (Creswell, 2013, p.4). The philosophical worldview of quantitative approaches is *post-positivist*. It is referred to as the scientific method. This worldview builds on assumptions represented by traditional forms of research (ibid, p.7). It is considered to be less appropriate for research with children. Boyden and Ennew state that *"structured surveys and questionnaires … reinforce adult power and preconception as well as failing to take children's own ideas and language into account"* (1997, p.10).

Qualitative research: is *"an approach for exploring and understanding the meaning individuals or groups ascribe to a social or human problem"* (Creswell, 2013, p.4)**.** The philosophical worldview of qualitative approaches is *social constructivism*. In this, the researcher focuses on: participants' views of the case being studied to construct the meaning of phenomena; and the specific context in which people live and work to understand historical and cultural aspects (ibid, p.7, 19).

The qualitative approach has several characteristics:

- It can deal with a complex social structure by looking at everyday actions and interactions (Marshall & Rossman, 2006, p.132).
- It is more flexible than quantitative approaches because qualitative research design *"often allows for far greater (theoretically informed) flexibility than in most quantitative research designs"* (Silverman, 2005, p.133).
- It is considered a strong approach that can provide three important purposes for research: to *explain* (or understand), to *describe* (or discover), and to *explore* (or develop) a phenomenon (Marshall & Rossman, 2011, p.68, 77). Exploratory studies seek to explore a phenomenon when there is not much known about it. It can be conducted to research literature, interview experts and focus groups (Gray, 2004, p.32). A descriptive study aims to provide a picture of a phenomenon. It could be purely descriptive, compare data against some standard, or comprise a normative study. Explanatory studies focus on discovering correlational relationships between variables (ibid).

This study encompasses all three purposes. The data from the field research includes ideas, preferences, factual descriptions and explanations as well as essential practical/functional information related to the workings of the hospital. For instance, the workshops with children provided insights and information about the elements that are important to inform the overall design.

- It can provide several types of qualitative typologies: ethnography, participant observation, case study, phenology, grounded theory, and participant observation (Marshall & Rossman, 2006, p.3).
- It provides more room in which to use innovative and creative methods (e.g. participatory research methods) that are liked by participants. Such methods can work better within researcher-designed frameworks, and can *"allow more creative, literary-style writing, a form that individuals may like to use"* (Punch, 2002, p.21).

For the above reasons, this study employed the qualitative research methodology. Although there are obvious potential advantages in using qualitative approaches, researchers should also consider their limitations. The most important limitation is that findings cannot be generalised. However, the findings can be transferred to other specific cases (Marshall & Rossman, 2006, p.42).

Mixed method approach: is the method that uses both qualitative and quantitative methods to generalise results to its audience (Creswell, 2013, p.14, 19). The philosophical worldview of the mixed method approach is *pragmatism*,

which *"arises out of actions, situations, and consequences rather than antecedent conditions"* (ibid).

Based on the literature review, traditional methods do not give children and young people much opportunity to express their ideas and experiences effectively (Lewis & Lindsay, 1999, p.xv). Thus, the next section will discuss the appropriate methods that can be used with children.

Appropriate research methods to be used with children

This section will discuss two main ideas: research with children is different from research with adults; and appropriate research methods to be used with children.

Based on literature, conducting research with children is different from conducting research with adults (James et al., 1998, p.31). These differences are due to many reasons:

- *Children are constitutionally and genetically* different and need special treatment in research (Punch, 2002, p.1). Children may have limited and different use of vocabulary and understanding of words in comparison to adults, and between themselves, and they have less experience of the world and may have a shorter attention span. Thus, it is problematic to assume that research with a five year-old child is the same as with a sixteen year-old (ibid, pp.1-6).
- *Children have different social competencies* and they experience life differently from adults (ibid, p.1). Many things in children's lives are controlled and limited by adults; thus they face unequal power relations with adults (ibid, p.5). Alderson and Coody (1996) state that *"the main complications do not arise from children's*

inabilities and misperceptions, but from the positions ascribed to children" by adults (p.106).

- *Researchers may have to consider extra responsibilities* when the participants are children. They should determine children's ages, general cognitive abilities, emotional states, and knowledge (Lewis & Lindsay, 1999, pp.10-12). Alderson and Coody (1996) also state that *"ethics and methodology of research with children implies that research with children necessarily raises unique questions about ethics and methods"* (p.106). Therefore, ethics can control the unequal power relationships between the adult researcher and child participant (Punch, 2002, p.4).
- *Adults perceive children to be different from them* (Punch, 2002, p.6). Adults should have a comprehensive understanding of childhood, and they need to recognise how children behave in society and understand the world (Greene & Hogan, 2005, pp.2-3).

In literature, scholars suggest several ways to conduct research with children:

- *Not imposing the researchers' own ideas*. To understand the perspectives and visions of children, researchers have to understand children's point of view to prevent enforcing their views, particularly when they use qualitative methods (Punch, 2002, p.6). Greene and Hogan (2005, p.4) recommend determining children's feelings about their daily life, diversity, individuality, development and requirements.

Researchers should not assume that they are more knowledgeable than children because that will lead them to lose children's understanding of culture (Fine &

Sandstrom, 1988, p.10). In order to enhance children's communication and have rich and deep findings (Hill, 1997, p.180), Punch (2002) suggests using *Participatory Action Research (PAR).* This technique can help to facilitate children's participation in research and help them to express themselves (p.7).

- *Clarity of language*. Children may have some limitations regarding their language clarity and literacy (Punch, 2002). This limitation can vary according to the ages of children. Younger children may have more difficulty in articulation and language than older children (ibid, pp.8-9). To overcome these problems, researchers have to use clear language when forming method tools and research question. In a study in Bolivia, Punch noticed that older children choose worksheets to express their views, whereas younger children prefer to use drawings (ibid). According to literature, scholars argue that using qualitative research methods is useful when conducting research with children, particularly with younger children because may they have difficulties in verbalising their experiences or answering indirect questions (Tonkin, 2015, p.560)

- *Validity and reliability*. Researchers with children are encouraged to build up a friendly relationship to prevent negative behaviours, and support trust (i.e. avoid fear, lies, evasion) and confidence (Ennew, 1994, p.57; Fine & Sandstrom, 1988, p.58). Researchers also need to be aware *that "children may give answers that are determined more by their desire to please than their desire to be truthful"* (Green & Hogan, 2005, p.9).

- *Research context and setting*. Punch argues that alertness and consciousness may emerge from the research context and settings with children. Researchers may face some difficulty in finding suitable spaces to conduct their research with children. For example, conducting participant observation with children at schools may be accepted by some children because they are in the places where they learn; however, others may feel uncomfortable and under pressure to give the correct answer because they feel that schools are controlled by adults. Children may feel more comfortable to do participant observation with adults in their own spaces (e.g. at home), while other children do not like adults to invade their environment (2002, p.9).

- *Analysis*. Researchers must take care when they interpret children's views in their research because the interpretation and inclusion of children's data could prevent bias and misinterpretation (ibid, p.10). Fine and Sandstrom (1988) state that *"we are limited by our tendency to process their talk through our own view of the world"* (p.9).

- *Building Rapport*. It is seen as important for the researcher to build rapport with all participants (Punch, 2002, p.9). Punch (2001) suggested a strategy to communicate with children and have a good relationship. Her strategy is to *"react to the children and follow their guidelines"* (p.9). She conducted ethnographic research in the rural community of Churquiales, in southern Bolivia. Her study concentrated on children's negotiation of their autonomy at home, at school, at work and at play (p.1). She spent a long time building a friendly relationship with the children. For instance, she accompanied them in

their daily tasks, playing with them and observing which games they preferred (ibid, p.5).

- *Using appropriate methods*. Punch (2002) also argues that using an appropriate research method is the core of any research, but with children it may need more consideration and effort to develop interesting, fun and 'child-friendly' methods (p.10). This may be because children experience unequal power with adults, they have a shorter attention span, and some of them may lack confidence and have limited competencies (James et al., 1998, p.188).

Choosing the appropriate research methods with children depends on: the research question; the children's age, class, gender and ethnicity; (Lewis & Lindsay,1999, p. xv), their level of understanding, knowledge, interests; their particular location in the social world (Greene & Hogan, 2005, p.8); and the specific research context and setting (Punch, 2002, p.9).

It is indicated that, using innovative methods (i.e. drawings, pictures, diaries, writing and sentence completion), can provide interest and fun for children and researcher (Punch, 2002, pp.3, 23). Innovative methods can be considered as a 'research-friendly' technique. Tonkin (2015) described it as *'task-centred' and as 'open-ended' techniques* (p.562). Child-friendly techniques are considered to be flexible methods because they can be used in combination with other data-collection methods, and can be used to collect data, or help to lead to another method of data collection. For instance, drawing and writing techniques are used by themselves or as an opening to an interview (ibid). Other examples of child-friendly techniques that have been used with school children are: sentence

completion; art and play methods such as drawing and photography; writing a diary; worksheets; storytelling; videotaping; reacting to video recording; and body movements (ibid). Also, research-friendly or child-friendly techniques are more applicable and adaptable for children than the traditional methods and they are useful in accessing children's perspectives and views (Lewis & Lindsay, 1999, p.xv). However, it can be more valuable if researchers used a range of methods that includes both traditional and innovative (Punch, 2002). Children have many different types of preferences and competencies, and it is difficult to fulfil them all because each child is different. Using traditional and innovative methods can help provide a balance and address some of the ethical and methodological issues (p.23); can decrease the boredom and increase interest; and can prevent bias arising from over-reliance on one method (Morrow & Richards, 1996, p.101).

Several scholars encourage the use of participatory research and design. It can be defined as the process *" of enabiling users to participate in the design process and with the task of generating ideas by means of generative toolkits and workshops"* (Baek & Lee, p.173). Bishop (2008, pp. 255-259) pointed to the values and strengths that can be achieved from having children and young people participate, particularly in healthcare design. These *values and strengths* provide insight into children's lives; challenge adult's depictions and assumptions about children lives; reveal the unique perspectives of children's experiences; and, in turn, all these values can help in creating healing and supportive environments for children. Also, Baek and Lee (2008, p.176, 177) indicate that participatory research is considered more appropriate for children because it is less dependent on language skills and verbal expressions; helps researchers deal with variations

in cognitive development of children; and makes it fun for the children. Participatory practices with visual approaches can be used to study children's experiences alongside other qualitative approaches that utilise observations and interviews (Mand, 2012, p.149). In addition, it is distinguished from traditional research by focusing on things people do, in order to extract what they feel and think about. Participatory research can also be the best approach to research adults who are less verbal (Boyden & Ennew, 1997, p.37). In contrast, traditional methods focus on observational research and questionnaires, which might not allow for such creativity (ibid, p.10).

In an empirical study, Punch (2002) used task-based methods, including drawings, photographs, diaries, spider diagrams and activity tables and worksheets, in her research conducted in rural Bolivia with thirty-seven children aged 8-14 years. The author made a comparison between using traditional task-based methods (p.12), arguing that using traditional research methods with children such as participant observations and interviews may require the children to be treated in the same way as adults. However, utilising special, 'child-friendly' techniques can support their experiences and competencies, empower them for greater participation in society, and support them in being decision-makers. Thus, children need more innovative approaches such as task-based methods that help them to feel more comfortable with the adult researcher, which can aid in the generation of relevant data (p.7, 11, 12).

Another study used qualitative research methods with 102 children aged 12-15 years in two schools in the south of England to investigate young children's views

and perspectives on their social context and environments, and the effects on their general well-being (Morrow, 2001, p.255, 256). The study utilised a combination of three research methods: (1) structured methods in the form of writing to elicit personal information; (2) visual methods applied by asking children to take photographs of places that are important to them and then to describe why; and (3) group discussions to explore young children's use and perceptions about their town and their neighbourhoods (ibid, pp.257-258). The study concluded that using a combination of qualitative methods helped to reflect children's views about quality of life issues and their environment (Ibid, p.266). Visual methods were considered successful because they helped to engage participants, produced data for the purpose of the study, and provided a visual approach to understanding children's quality of life and everyday experiences. Photography in particular was a method that was easy to use, fun, generated visual data that was used to stimulate further data about environments, identified areas that had problems, and generated ideas about how to improve them (ibid).

As children are the cornerstone of this research they should have full participation in it. It is necessary to use innovative and creative methods, especially when the aim of research is connected directly to their lives. Thus, my research aims to achieve that.

Choosing appropriate methods/techniques for data collection

There is no right or wrong in choosing appropriate methods. However, the researcher should make a choice based on what he/she is trying to discover, and the societal context and broader reflection in which the methods will be utilised

(Silverman, 2005, pp.100, 110 & 113; Silverman 2013, p.11). Choosing data collection methods in qualitative research design can flow from the research question, context, structure, research topic, the type of data that can illuminate the research topic, practical issues, time of research, and techniques of data collection that can achieve creativity (Ritchie, 2014, p.53, 54; Silverman, 2013, p.166).

In qualitative research, a wide range of data collection methods is available. In this research, the focus was on the following:

- **Observation**: It can be used by the researcher to take field notes on the behaviour and activities of individuals at the site (Creswell, 2013, p.190). Observation as a technique for data collection is more closely associated with ethnographic methodology research design (Gray, 2004, p.5). Thus, it is not appropriate to this type of study. In contrast, interviews and focus group techniques are considered effective methods in qualitative data collection. Ritchie et al. (2014) state that:

> "*Data generated via these methods are based on verbal communication and spoken narratives. The value of these methods is founded on the belief that participants are individuals who actively construct their social words and can communicate insight about it verbally. In other words, that data can be generated that gives insight in participants' lives or views via the active verbal communication of a group or individual interview"* (p.57).

- **Interviews:** They are useful when participants cannot be directly observed; they provide historical information and give the researchers control over the line of questioning about which they might not be clear (Creswell, 2013, p.191; Gray, 2004, p.214). There are several types of interviews (e.g. structured, semi-

structured, non-directive). Choosing the type of interview depends on the aims and objectives of the research study (Gray, 2004, p.215). For the aims and objectives of this study, individual interviews and focus group interviews were used. Individual interviews can generate detailed data that include a detailed investigation of people's personal preferences, perspectives, stories, for *"in-depth understanding of personal context within which the research phenomena are located"* (Ritchie, 2003, p.36).

- **Audio-visual materials**: It is a technique that is considered unobtrusive for collecting data (e.g. photographs, videotapes, art objects, film). Such techniques can provide an opportunity for the participants to directly share their reality; they are considered creative because they visually capture the attention of the interviewee (ibid, p.192).

Using participatory research provides several types of innovative and creative methods or techniques that draw on inventive and imaginative processes that help in the data collection process (Greene & Hogan, 2005, p.253). Boyden and Ennew (1997, p.54) discuss some of these methods:

- Visual techniques with groups or individuals (e.g. drawings, diagrams, maps, photographs). Drawings are particularly important when working with children, because they can represent both cultural and individual aspects (ibid, p.119). They are considered appropriate tools for children, particularly for those whose verbal expression is still not developed, and they help children to express themselves more creatively and intuitively (SilavUtkan, 2012, pp.112-113).

> *Children transfer their inner world, unconscious desires; feelings through the pictures they have drawn. Children's picture, depending on the child's mental-sensory stages of development, tells a lived experience reflecting the feelings of the secret of his inner life. In other words, painting allows the child to express him/herself. So the pictures are an indispensable tool* (ibid, p.113).

- Group techniques.
- Children's writing (e.g. essays, diaries, recall observation schedule).
- Interviews with children that draw on group-friendly interview techniques. Such methods should be used with other methods and only when the research is well under way to provide children with confidence.

Choosing appropriate methods (i.e. tools, techniques, and toolkits) can depend on the purpose, aims and context of the tools and techniques (Sanders et al., 2010, p.2); for instance, using 2D collages can be for probing, priming, generating, and understanding. They provide a framework that provides an overview of participatory design tools and techniques. This framework has three dimensions (ibid, p.2):

- Form: can be described as making, telling/or enacting. It is also described as the kind of action taking place between the participants.
- Purpose: describes the reasons behind using the tools and techniques (i.e. for probing and priming participants, to gain deep understanding of participants' current experiences, and to generate, explore and create ideas or design concepts about future scenarios.
- Context: describes where and how the tools and techniques are used. Four dimensions can be determined: group size and composition; face-to-face vs. on-line; venue; and stakeholder relationships.

Collecting creativity in design goes under the name of participatory design and is called co-creation or co-design (Sanders & Stappers, 2008, p.7). Co-creation is defined as *"any act of collective creativity, i.e. creativity that is shared by two or more people"* and it is *"a very broad term with applications ranging from the physical to the metaphysical and from the material to the spiritual"* (ibid, p.6). However, co-design is *"a specific instance of co-creation"*, it also refers to *"collective creativity of collaboration designers"*, and to *the "creativity of designers and people not trained in design working together in the design development process"* (ibid).

Using participatory research will provide rich themes, concepts, and guidelines for designers, health professionals and policy makers working in paediatrics to support them in making the best decisions (Bishop, 2008, p.258). Using creative methods is not only used in participatory research, it can also be employed within other qualitative methods (Greene & Hogan, 2005, p.254).

Thus, for the above reasons, and to reflect the context, participants' perspectives, experiences and interpretations about the interior environment for a new children's hospital in Palestine, this study uses *qualitative research that uses an innovative workshop format.* The forms of this participatory research design can be described as using co-design/co-creation in a workshop format with children, parents and medical staff. During these workshops, different tools were used. For instance, children created drawings and models, parents drew charts and created models, while the medical staff drew charts, classified tables, and based their discussions around a 3D model that was created by the researcher. This model encompassed parents' and children's suggestions that emerged from the earlier

workshops. The *purpose* of using such methods is to foster creativity, to express, generate, and visualise new ideas and thoughts in the participants, and to connect people's ideas from different disciplines and perspectives. Table 4.1 provides more details about the purpose of using these tools. The toolkits used are presented in Appendix A-1. Since the particular context of this project is Palestine, all the workshops were conducted in Palestine with a total of fifty-five participants.

Using such methods, particulary in the context of Palestine, is considered innovative. To the author's knowledge, using such methods (i.e. workshops) has not previously been looked at in Palestine, particularly in the context of children's hospital design.

Table 4.1: Summary of the data collection and participants of this study

No	Workshop	Purpose	Participants	Outcomes
1-	Children from governmental school aged 6-7 years. Location: Bait Wazan elementary school	To draw and create a 3D model, which identifies their favourite place that makes them feel happy and comfortable.	2 girls (1 aged 6 and 1 aged 7), 2 boys (1 aged 6-7and I aged 7-8).	4 individual drawings and 4 individual models that identified: • The type of spaces they like, interior design and interior architecture elements, entertainment activities, culture and gender.
2-	Children from private school aged 8-11 years. Location: Pioneers schools		2 girls (1 aged 10-11, 1 aged 8-9)	2 individual drawings and 1 model that identified: • The type of spaces they like, interior design and, interior architecture elements, entertainment activities, culture, and gender.
3-	Children from private school aged 10-11 years. Location: Pioneers schools		4 boys (aged 10-11)	4 individual drawings and 1 model that identified: • The type of spaces they like, interior design and, interior architecture elements, entertainment activities, culture and gender.
4-	Children from private school aged 12-14 years. Location: Pioneers schools		2 girls (1 aged 12-13, 1 aged 13-14)	2 individual drawings and 2 individual models (the boy didn't participate in the model activity). These activities identified: • The type of place, interior design and interior architecture elements, entertainment activities, cultural elements and gender.
5-	Children from governmental school aged 15-18 years. Location: Al-Malik Talal School		3 boys (1 aged 15-16,1 aged 16-17, 1 aged 17-18)	3 individual drawings and 1 model that identified: • The type of spaces they like, interior design and interior architecture elements, entertainment activities, culture and gender.
6-	Children from private school aged 15-18. Location: Tala'a Al-Amal Schools		3 girls (2 aged 15-16, 1 aged 16-17)	3 individual drawings and 2 individual models (I girl didn't participate in the model activity). These activities identified: • The type of spaces they like, interior design and interior architecture elements, culture, gender, and entertainment activities.
7-	Parents of young children aged 3-6 years. Location: A-Najah University	To identify children's needs in the age range 0-6 years and to represent them via charts and 3D models.	4 fathers and 4 mothers	8 individual charts, 1 model for fathers and 1 model for mothers that identified: • Children's needs (0-6 years) in terms of the interior design and interior architecture elements, arrangements of the functional spaces, how to provide distraction for children, age appropriate design, cognitive development, and parents' needs for long and short visits.
	Children aged 3-6 years	To draw their favourite place that makes them feel happy and comfortable.	1 boy (aged 5-6) and 4 girls (3 aged 3-4, 1 aged 4-5)	5 individual drawings that identified: • The type of spaces they like, interior design and interior architecture elements, entertainment activities, culture and gender issues.
8-	Doctors, nurses, admissions, and reception staff (from private and governmental hospitals. Location: A-Najah University	To determine their needs, and children's and parents' needs, by classifying tables, drawing charts and discussing a sample 3D model.	3 doctors (1 female, 2 males), 4 nurses (2 females, 2 males), 1 admission and reception, staff member (male) (Chief Financial Officer and administrator of Rafidia Surgical Hospital)	5 tables (1 table for 2 male doctors, 1 table for a female doctor, I table for the admissions staff, 2 tables for nurses (male and female), 4 charts (working in groups) and all who participated in the discussion of the sample model. These activities determined: • The context of the hospitals in the main entrance and the atrium (i.e., function, hygiene, clean, functional constraints, materials, flow, culture, and gender), employees', children's and parents' needs for long and short visits.
9-	Designers (fine art; ceramics; architecture; interior, landscape and graphic design). Location: A-Najah University	To draw out ideas and concepts that help in designing public spaces of children's hospitals Designers were provided with tables, children's models and drawings, and parents' and doctor's comments.	3 interior designers, 3 interior architects, 4 fine artists and ceramicists, and 2 graphic designers	4 groups of designers drew out their perspectives by using cards and A3 sheets that identified: • Ideas for how to design and use the results of the workshops in terms of the art issues, interior architecture and interior design spaces, Landscape, signage or way finding elements, materials, style, thematic design, constraints and cognitive development of children.
9-	Individual interviews Location: A-Najah University, Ministry of Health & Rafidia Surgical Hospital	To determine the availability of appropriate materials, constraints, and design considerations for the admissions area.	3 (1 civil engineer (Ministry of Health), 1 admissions manager at the Rafidia surgical Hospital and 1 manager of the engineering department at A-Najah University.	3 interviews that identify: • The availability and types of materials, hygiene, easy to clean materials, problems and constraints faced on completion of the interior construction of hospitals in Palestine. • The function of the admissions department, its relationship with surrounding spaces, and design considerations (i.e. form, location, materials and age-appropriate design).

4.2 Research Design and Methods

This study employs *qualitative research that uses an innovative workshop format*. Data were collected using nine *co-design and co-creation workshops* that included arts-based activities and semi-structured recorded interviews conducted in Palestine. Participants included children from 3-18 years, parents, doctors, nurses, staff from the reception and admissions desks and four groups of designers. All the participants, apart from the designers, participated in drawing and modelling activities. These methods can provide valuable information and lead to better design solutions; use of drawings with children is considered an indispensable and valuable tool because verbal expression is often insufficient, not only because of a lack of developed vocabulary but also because preferences and ideas can be expressed more intuitively (SilavUtkan, 2012, pp.112-113). Similarly, models can be an effective tool because they can express ideas and preferences about form, materials and size, and can facilitate and represent the ideas of children (Dunn, 2013, pp.44-445). More details will be discussed in the data collection section.

Sample size: Fifty-five participants (n=18 school children (9 male (m) & 9 female (f)), 5 children under six years (1m & 4f), 8 parents (4m & 4f), 3 doctors (1f & 2m), 4 nurses (2f & 2m), 2 staff members (f) working in admissions and reception; 12 designers (7m & 5f), and 3 individual interviews (2m civil engineers & 1m Director of Rafidia Surgical Hospital).

Before starting the data collection, I acquired all necessary ethics approvals from the RSO Ethics Committee at Lancaster University.

4.3 Ethics

The processes used to recruit participants and obtain consent are discussed below:

1. **For school children and parents participating in focus groups**. Prior to the children's workshop and parent focus groups, I spent one week contacting parents at schools during registration time to sign the consent form for their children. I briefly explained my research objectives, the benefits of taking part in the research, and what their children would be asked to do in the workshops. I provided them with an invitation letter, information sheet and the consent form to give their approval (see Appendix A-2).
2. **For the parents' workshops**. About twenty parents whose children went to the school that participated in my research were chosen randomly from Nablus city using social media (Facebook). I sent them an invitation, consent form and information letter by email. Eight out of the twenty accepted the invitation.
3. **For the medical staff focus groups**. I displayed a poster about my research project at the reception desks of the Rafidia Surgical Hospital and the Specialised Arab Hospital in Nablus city inviting staff to participate in the workshop. The managers of the two hospitals also assisted in contacting the medical staff.
4. **For the designers' workshop**. The secretary of the Faculty of Fine Art at An-Najah National University sent the invitation, information sheets and consent letters to all faculty and staff by email. The designers who agreed to participate confirmed by email to me and, on the day of the workshop, signed the consent letter.

5. **For the interviews:** I invited the interviewees by mobile phone. I sent those who agreed an invitation, consent form and information letter by email. On the day of interview, they signed the consent letter.

4.4 Data Collection

This study included secondary and primary data collection. Secondary data refers to the data that reviews and synthesises via a comprehensive literature review. The secondary data in this research consists of four main topics: *children's cognitive development* – especially age-appropriate interior design*; hospital design* – especially children's hospital design, and designing healing environments for children*; public spaces in hospitals* – interior architecture and interior design*; design in context* – especially in the context of Palestine. Primary data refers to data that is generated from field research (Evans, 2010, p.100). The primary data for this research includes nine workshops that encompass art-based activities and semi-structured recorded interviews using co-design and co-creation workshops. The data collection process for the primary data was divided into two phases (Figure 4.2).

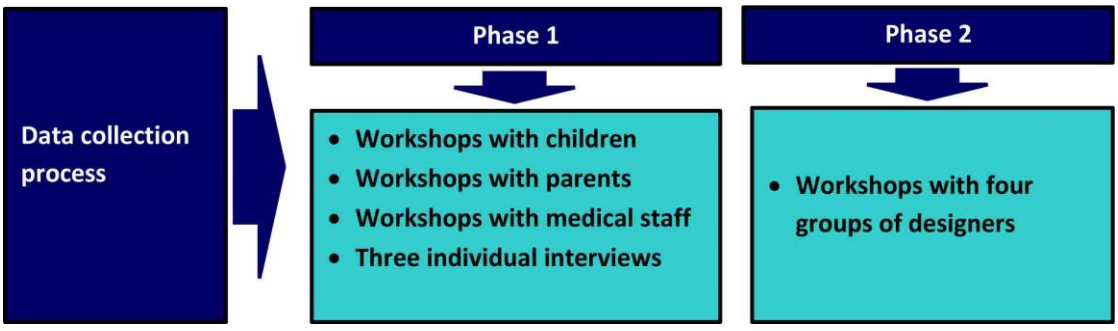


Figure 4.2: Two phases of data collection

4.4.1 Phase 1. This phase focuses on three types of participants (they are arranged according to the sequence of data collection)**:**

i) Workshops with *school children* aged 6-18 years to create drawings and 3D models. Another group of children aged 3-6 years only produced drawings.

ii) Workshops and focus groups with *parents* creating models and drawing charts to determine their needs and those of their young children.

iii) Workshops and focus groups with *doctors, nurses, and reception and admissions desk* staff using documents, charts, and focus group discussions based on a model that included the preferences of the children and parents.

4.4.2 Phase 2. This phase comprised two types of participants:

i) Workshops with four groups of designers.

ii) Three individual interviews

The data collection process is summarised in Table 4.1.

i) Workshops with school children aged between 6-18 years to create drawings and 3D models.

The age range of children: Based on the findings from this research, children between 0-18 years will be catered to in the eventual design recommendations; however, in these workshops, children between 6-18 years were asked to participate for the following reasons:

1. Qualitative methods focusing on relatively small samples (Patton, 1990, p.185) usually involve between five to twenty participants (Crabtree & Miller, 1999, p.33). In this phase, the number of the participants was eighteen, which is suitable because the aim of this study is not to generalise to a wider sample of cases (i.e. statistical generalisation) (De Vaus, 2001, p.240).
2. Piaget's theory of cognitive development suggests that children can be divided into four stages (i.e. 0-2, 3-7, 7-11, and 11-18) and at each stage the child will have a different level of knowledge, information and understanding (Gallagher & Reid, 1981, p.10). In these workshops, the children's groups did not all work together in the same place at the same time because of their different levels of cognitive perception and cognitive development (Davey et al., 2010, p.12) and because of culture and gender issues (e.g. separation of teenage boys and girls).

3. Research suggests that children younger than six years old need to engage their parents to establish communication with them (see online Naranjo-Bock, 2011); also, they cannot conduct tasks for a very long time; they have difficulty expressing what they like or dislike; and they tend to only concentrate on one aspect of a task and neglect others (Hourcade, 2008, p.298). In addition, children start school in Palestine at six years old (see UNICEF, 2010, p.15). Therefore, the views of children between 0-6 will be included in the parent workshops, which will be discussed later.
   The design of this study is based on the logic and strategies of replication that can help to empower the internal validation of my research i.e. time

constraints, funding, quality rather than quantity, and access to the relevant participants (De Vaus & de Vaus , 2001, pp.238-247). For example, the choice was to work with school children rather than children who were patients in hospitals because non-medical spaces can be more accessible, thus saving time, and achieving more valuable data (e.g. using drawings, modelling, and visual materials). These strategies were implemented by choosing groups, age ranges, the number of the participants in each group, the type of school (private or governmental), and the location of the schools:

Activities: the eighteen participating school children were divided into six groups (see Table 4.1). The children participated in two activities (discussed below).

1. **Creating drawings with children**: In this activity, I asked the children to create freestyle drawings with the following activity titles: (1) *My favourite places that make me feel safe, happy and playful; (2) A place where I would like to be while I'm waiting my turn* (Thomas & O'Kane, 1998, p.342; Johnson et al., 2012, p.167). The children used A3 sheets of paper, pencils, sticky notes, scissors, crayons, stickers, and collage materials (see Appendix A-1). According to studies, children's drawings are very important as rich and insightful research methods because they can express children's thoughts and emotions (SilavUtkan, M., 2012, p.113). They work like metaphors that can convey information about participant interpretation and understanding (Guillemin, 2004, p.272). They are also considered a suitable and enjoyable

activity for children (Johnson et al., 2012, p.166). I then asked the children to explain their drawings and to write down their explanations. Every child had a chance to describe their drawings verbally and I recorded their interpretations. The inclusion of the children's interpretations of their drawing in conjunction with the 3D models method (Guillemin, 2004, p.287) helped to identify new themes related to interior design and architecture of spaces for children. Such activities can contribute to understanding the requirements for the entrance/atrium. The themes that emerged from children's drawings were initially categorised and analysed, and then used in the models that were created by children in the second phase of the workshops. This session lasted about an hour, see Figures 4.3-4.5. (see also, Appendix A-3).

Figure 4.3: Drawing activity

Figure 4.4: Writing their explanations

Figure 4.5: Recording children's interpretations

2. **Creating 3D models**. The same groups of children also created models, which helped to further draw out their ideas, perceptions and insights that were included in the research data. These types of methods can help to create

inclusive insights into the social world of children that cannot be achieved by traditional anthropological data collection methods (Johnson et al., 2012, p.165). Models are considered as effective design tools: the *"advantage of physical models is their immediacy as they are able to communicate ideas about form, material, shapes, size, and colour in a highly accessible manner"* (Dunn, 2013, p.441). They can help interior designers to investigate specific ideas, communicate thoughts in an effective way, aid in understanding the function of the design and space, and can facilitate representation (ibid, pp. 441-445). In this study, each group of children aged between 8-18 years created a model of where they most like to be while they are waiting their turn (the same concept as the drawing activity). However, the four children aged between 6-8 created their own individual models. In total, eight models were created (see Table 4.1). These helped to identify in more detail the functions to be considered within public spaces, relationships between spaces, openings, and form and shape. All the participants had a chance to express their ideas about their models verbally (which were recorded), and the 8-18 year-olds also did so in writing (see Appendix A-3). These models were analysed and they highlighted the important functions wanted by each age range, and the characteristics of these functions in terms of interior design and interior architecture. This activity lasted about one hour, see Figures 4.6-4.8. The recorded interviews were transcribed, and an initial analysis (Appendix A-4) was provided to inform the parents' workshops.

Figure 4.6: Group of children aged 15-18 years

Figure 4.7: Recording group of children aged 9-11 years

Figure 4.8: Recording individual child aged 7-8 years

ii) Parent workshops and focus groups to determine their needs and those of their young children.

The sample size and the participant groups: The thirteen participants (eight parents and five children aged 3-6 years) were divided into three groups: two groups of parents (4f & 4m), and one for the children (see Table 4.1). This sample size was chosen based on the literature review which recommended that a focus group should be between six to eight people (Zeisel, 2006, p.235). An equal number of men and women was chosen; gender is an important contextual variable in this research so a purposive sampling was to obtain similar numbers of mothers and fathers (Crabtree & Miller, 1999, p.340; Gray, 2004, p.84). Unfortunately, it was more difficult to have the same number of boys and girls for this workshop, as the children accompanied their parents.

Parents participated in two activities (discussed below). The researcher prepared a schedule of questions and facilitated the focus group discussion (Gray, 2004, p.213). Some of these questions were related to the initial data that

emerged from the children's artwork. Using focus group discussion can "*provide more efficient means of collecting the views of individuals than do other methods"* (Flick, 2014, p.314). The setting for the parents' meetings was the An-Najah National University, where a suitable location was offered.

1. **Drawing a flow chart**. Parents drew a flow chart that outlined the problems they have faced when entering hospitals with their young children (0-6 years) in terms of functions, spaces, aesthetics, and facilities. They were provided with pens, crayons, and A3 sheets of paper. This activity lasted twenty-five minutes for drawing and twenty-five minutes for recording, see Figures 4.9 and 4.10a.

Figure 4.9: Parents' workshop during chart activity

Figure 4.10a: Recording individual chart activity

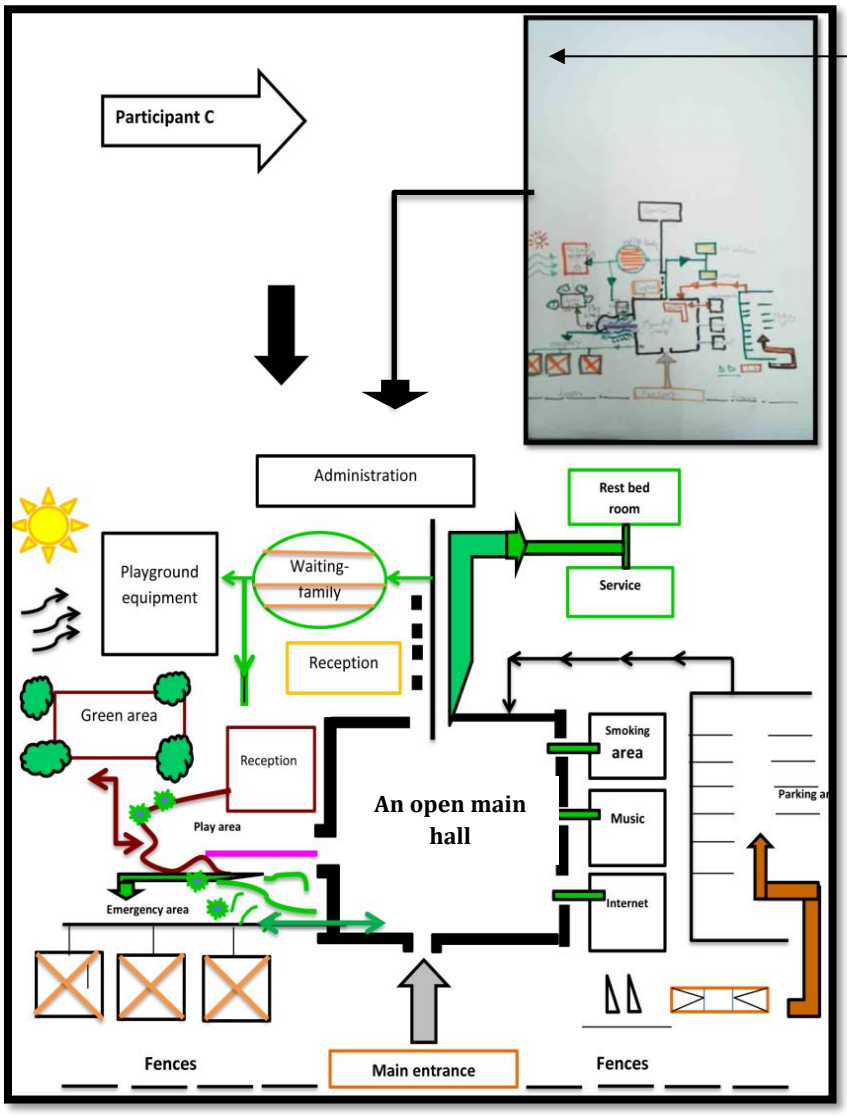


Figure 4.10b: Individual chart activity (improved from parents' chart)

2. **Creating 3D models**. Parent were provided with the same materials as the children to create 3D models (see Appendix A-1). I asked parents to create a model that expressed both their and their young children's needs to feel happy and more comfortable when they entered the hospital. I recorded their verbal interpretations, see Figures 4.11 and 4.12.

Figure 4.11: Fathers during their model activity

Figure 4.12: Focus group discussion around fathers' model

For the young children, I provided a space next to their parents and asked them to draw their favourite spaces that made them feel happy and comfortable. They created individual drawings and four of them (3-5 years) interpreted their drawings with the help of their mothers. The children took fifteen minutes to explain their drawings, and I recorded them. Two of the children had difficulty interpreting their drawings (see Figures 4.13 and 4.14).

Figure 4.13: Young children (aged 3-6 years) during their drawing activity

Figure 4.14: Recording the interpretation of a young child's drawing with the help of her mother

iii) Medical staff workshops and focus groups.

The sample size and the participant groups: there were ten participants (see Table 4.1). Eight medical staff were divided into four groups. They participated in three activities (discussed below). An administrator participated in the focus group discussion and I interviewed one admissions manager separately.

I started the workshop by giving the participants a small presentation about my research, including the aims of the study, and I explained the agenda of the workshop, which lasted about two hours, see Table 4.1.

1. **Classifying tables**. Five tables were classified (2 male doctors, 1 female doctor, 2 female nurses, 2 male nurses, and 1 admissions and reception staff). Each group was provided with writing implements and three A3 pages of tables for classification, which included parents' and children's preferences regarding public spaces of children's hospitals. For instance, the table included parents' and children's cultural needs, and physical interior spaces. The

groups had a chance to arrange and classify the initial preferences in terms of interior design elements and interior architecture spaces. This activity lasted about twenty minutes, see Figure 4.15.

Figure 4.15: Doctors group arranging and classifying the preferences of children and parents.

2. **Drawing charts**. The medical staff were then asked to include their preferences and what they need to make them feel happy and comfortable during their work, particularly in the public spaces of children's hospitals. They created four charts and each group had a chance to explain their chart verbally and I recorded their explanations. The activity lasted about thirty minutes, see Figure 4.16.

Figure 4.16: Nurses group recording their interpretation of their needs on charts.

3. **Discussion around a model that included preferences of workshops I & II**.

   I explained the children's and parent's needs that emerged from their respective workshops. The aims of this activity were to address any contradictions and consistencies between medical spaces and children-friendly spaces, and to determine the context of child-friendly spaces within the context of the hospital. This activity lasted forty minutes and all the medical staff (n9) had an opportunity to participate in the discussion. The session was audio recorded and photographed (Figure 4.17).

Figure 4.17: Recording the medical staff focus group discussion

Phase 2: Workshops with designers to develop ways of designing the public spaces of a children's hospital

This phase involved workshops with four groups of designers in Palestine (i.e. architects, artists and ceramicists, interior designers and graphic designers). Such methods can be considered valuable, can strengthen the process of collecting rich perspectives from the participants, and can support the input of the stakeholders through activity-based research (Hanington & Martin, 2012, p.62).

The size of the sample and the group activities: These workshops involved twelve participants (see Table 4.1). I have chosen this sample size based on the available time and resources (SilavUtkan, 2012, p.148) – also, see above discussion.

Before conducting this workshop, I did some initial analysis of the children's and parents' workshops using tables, reports and memos. I classified the initial data according to the four groups of designers and I highlighted some questions for

each group. For instance, I arranged and classified the entire initial analysis connected to interior design in one document and delivered it to the interior designers two days prior to conducting their workshop. The same process was applied for the other groups. This process helped designers to understand in more depth the type of research, their role in the workshops, and enabled them to prepare ideas about how to deal with such data to design the public spaces of children's hospitals. Also, all the participants were provided with the initial analysis of specific data during the workshops (e.g. interior design-related data for interior designers) in the form of tables, pictures and charts to assist them in their activity. They were given pencils, coloured pens, hexagon cards (each group had a different colour of hexagon cards to help the researcher distinguish between them).

I presented the findings for fifteen minutes from Phase 1 and I talked about the agenda for the workshop. I also answered designers' questions before and during the group work.

1. **Interior architecture**: This group of designers consisted of three architects. They discussed the initial results of the data that emerged from the Phase 1 workshops. They drew sketches and diagrams on the A3 and A4 sheets, and used hexagon cards to present their ideas about how to deal with the architectural and interior architectural elements that were highlighted by parents, medical staff and children (see Figure 4.18 & 4.19). For example, they suggested how to determine the integration between inside and outside.

Figure 4.18: Discussing, drawing and creating ideas (interior architecture)

Figure 4.19: Recording the interpretations of interior architecture group

2. **Interior designers**: this group consisted of three interior designers. They followed the same process as the interior architecture group, with their ideas concentrating on interior design elements. These helped to reveal issues pertaining to the 'healing environment' that could be created in the hospital atrium and entrance design. This will be discussed in more detail in Chapter 6. They all had a chance to present and explain their ideas (Figure 4.20 & 4.21), and I was able to record and photograph their explanations.

Figure 4.20: Recording the interpretations of interior designers group

Figure 4.21: Discussing, drawing and creating ideas (interior designers)

3. **Graphic designers**: Two graphic designers (Figure 4.22) participated in this group. Before they drew out their ideas, they had a discussion about the initial data. They suggested some ideas about the concept design and materials that are available in Palestine, and the importance of connecting wayfinding signs in the entrance and atrium with the interior architecture and interior design concepts. At the end, they had a chance to present their ideas, and the session was audio recorded, see Figure 4.23.

Figure 4.22: Discussing, drawing and creating ideas (graphic designers)

Figure 4.23: Recording the interpretations of graphic designers group

4. **Artists and ceramicists**. There were four in this group. Before they drew out their ideas and thoughts about art, they had a discussion about the initial data. Using the hexagon cards, they jotted down their suggestions and ideas about the concept design of art, materials and how to determine how culture in the arts can be suitable for adults and children. Also, they highlighted the importance of using children's drawings and models in the concept design of art. All the designers had a chance to discuss and interpret their ideas, which I recorded and photographed (Figures 4.24, 4.25).

Figure 4.24: Discussing, drawing and creating ideas (artists & ceramicists)

Figure 4.25: Recording the artists' interpretations

4.5 Data analysis

Data analysis usually involves the process of breaking data down into smaller units to investigate the characteristics (Gray, 2004, p.327), and follows three phases: data reduction, data display and conclusion drawing/verification (ibid., p.177).

The focus of qualitative data analysis was described by Dey (2003) as a circular process that depends on three main procedures; describing phenomena, classifying them and seeing how they interconnect (pp.30-31). Qualitative research involves a series of questions that can drive the project. For example, a research question might be very broad and exploratory, using 'how' and 'what' questions. These questions may guide the coding and the analysis of the data (Braun & Clarke, 2006, p.85).

It is important to recognise that qualitative analysis is not a linear process; it is more recursive and needs to move back and forth (Braun & Clarke, 2006, p.86). According to literature, there are no specific rules, *no simple technique* that one

can follow with the analysis of the *unstructured data* (Sapsford & Jupp, 2006, pp.250-251). From a review of academic literature, a number of structural approaches to qualitative data analysis have been developed. For instance, Marshall and Rossman (2011, p.209) identify analytic procedures in seven phases: organising the data, immersion in the data, generating categories and themes, coding the data, offering interpretations through analytic memos, searching for alternative understandings, and writing the report or other format for presenting the study. However, Engel and Schutt (2012, p.325) draw out five techniques that can be used and shared with most approaches to qualitative analysis: documentation and the process of data collection, organisation and categorisation of the data concepts, connection of the data to show how one concept may influence another, validation by evaluating alternative explanations, disagreement of evidence, searching for negative cases, and finally, representing and reporting the findings.

According to Braun and Clarke (2006), the qualitative approach is incredibly diverse, complex and nuanced (p.77). In order to deal with such complexity, other approaches are needed. It has been found that *qualitative content analysis and thematic analysis* approaches are used in exploring and analysing complex data (ibid). However, there is still ambiguity in terms of the boundaries, division, similarities and differences, and how researchers should choose between them (Vaismoradi et al., 2013, pp.399, 400). For the purposes of this research a thematic analysis approach was used.

4.5.1 Thematic analysis approach

A thematic analysis approach can be identified as *"a method for identifying, analysing and reporting patterns (themes) within data"* (Braun & Clarke 2006, p.79). The aim of thematic analysis is *not to produce themes that can be quantified*, although sometimes they may be used to transform qualitative data into a quantitative form (ibid, p.98). It is a useful method that uses a *participatory research paradigm* that includes participants and is collaborative; can highlight similarities and differences across the data; and allows for social as well as psychological interpretations of the data (ibid, p.78). In addition, it is considered an independent, reliable, descriptive approach that can help researchers conduct and broaden many other forms of qualitative research; it is a flexible research tool; provides a rich and detailed analysis for complex data; is able to offer the systematic element characteristic of content analysis, and allows the researcher to combine analysis of their meaning within their particular context (Vaismoradi et al., 2013, pp.400, 401).

The identification of themes is considered fundamental to all kinds of qualitative research (Sandelowski & Leeman, 2012, p.1407). Themes are identified *"as a coherent integration of the disparate pieces of data that constitute the findings"* (Vaismoradi et al., 2013). However, themes in thematic analysis are equivalent to the unit of analysis in content analysis, meaning unit, code, and category/theme (ibid).

Themes or patterns within data can be identified in one of two primary ways in thematic analysis*;* in an inductive or 'bottom up' way, or deductive or 'top down'

way (Braun & Clarke, 2006, p.83). An inductive approach means the themes identified are strongly linked to the data themselves, and the process of coding the data should not try to fit into a pre-existing coding frame or the researcher's analytic preconceptions. In this sense, this form of thematic analysis is data driven (ibid) which is the focus of this research. In thematic analysis, the researcher can concentrate his/her analysis on the manifest (developing) categories and latent (developing) themes of data because they are important for interpreting the themes being found (ibid, pp.401, 403).

For the purposes of this study, and to deal with the complex data (ibid, p.77) the researcher applied Braun and Clarke's (2006, p.87) framework for a thematic content analysis approach (Table 4.2).

Table 4.2: The process of data analysis in thematic analysis (adapted from Braun and Clarke's, 2006, p.87)

Thematic Analysis Approach		
Phases of thematic analysis		**Description of the process**
1.	**Familiarising yourself with your data**	• Transcribing data (if necessary), reading and re-reading the data, noting down initial ideas.
2.	**Generating initial codes**	• Coding interesting features of data in a systematic fashion across the entire data set, collating material relevant to each code.
3.	**Searching for themes**	• Collating codes into potential themes, gathering all data relevant to each potential theme.
4.	**Reviewing themes**	• Checking if the themes work in relation to the coded extracts (Level 1) and the entire data set (Level 2), generating a thematic 'map' of the analysis.
5.	**Defining and naming themes**	• On-going analysis to refine the specifics of each theme and the overall story told by the analysis, generating clear definitions and names for each theme.
6.	**Producing the report**	• The final opportunity for analysis. Selection of vivid, compelling examples, final analysis of selected extracts, relating the analysis back to the research question and the literature, producing a scholarly report of the analysis.

1. **Familiarising oneself with the data.** This stage encompasses transcribing data, reading and re-reading the data, noting down initial ideas and reporting. In this thesis, all the data collected from the field research (i.e. photos, art-work, and interviews) were transcribed – first to Arabic and then translated to English. According to Braun and Clarke (2006), there are no specific tools or guidelines to follow when producing a transcript, but one should strive for rigour, and be sure that the transcription is appropriate to the purpose of analysis (p.88).

   According to my research thesis, spending time (about four months) collecting data helped me to understand the context in-depth and helped inform the early stages of analysis (ibid, p.87). After every workshop, I reported, transcribed, and organised the data into one document. Marshall and Rossman (2011, p.210) emphasised the importance of transcribing every workshop in one report. The reports are useful documents because they form *"a key phase of data analysis within the interpretive qualitative methodology"* (Bird, 2005, p.227). I read and reread the documents, wrote ideas and memos for every workshop and attached these memos at the end of each document that included the raw data.

   Miles and Huberman (1994) describes memos as:

   > *"A rapid way of capturing thoughts that occur throughout data collection, data reduction, data display, conclusion, drawing, conclusion testing and final reporting* (pp.74-75).

   Memos are considered important for the first stage of data analysis; they can provide extensive categories of information for codes and emerging themes (Creswell & Clark, 2007, p.131). For this study, memos and initial analyses shaped further data collection from the other workshops (Gibbs, 2008, p.44).

For instance, memos and initial analysis (see Figure 4.26-4.30, & Appendix A-4) related to children's workshops shaped further data collection for the parents' and the medical staffs workshops.

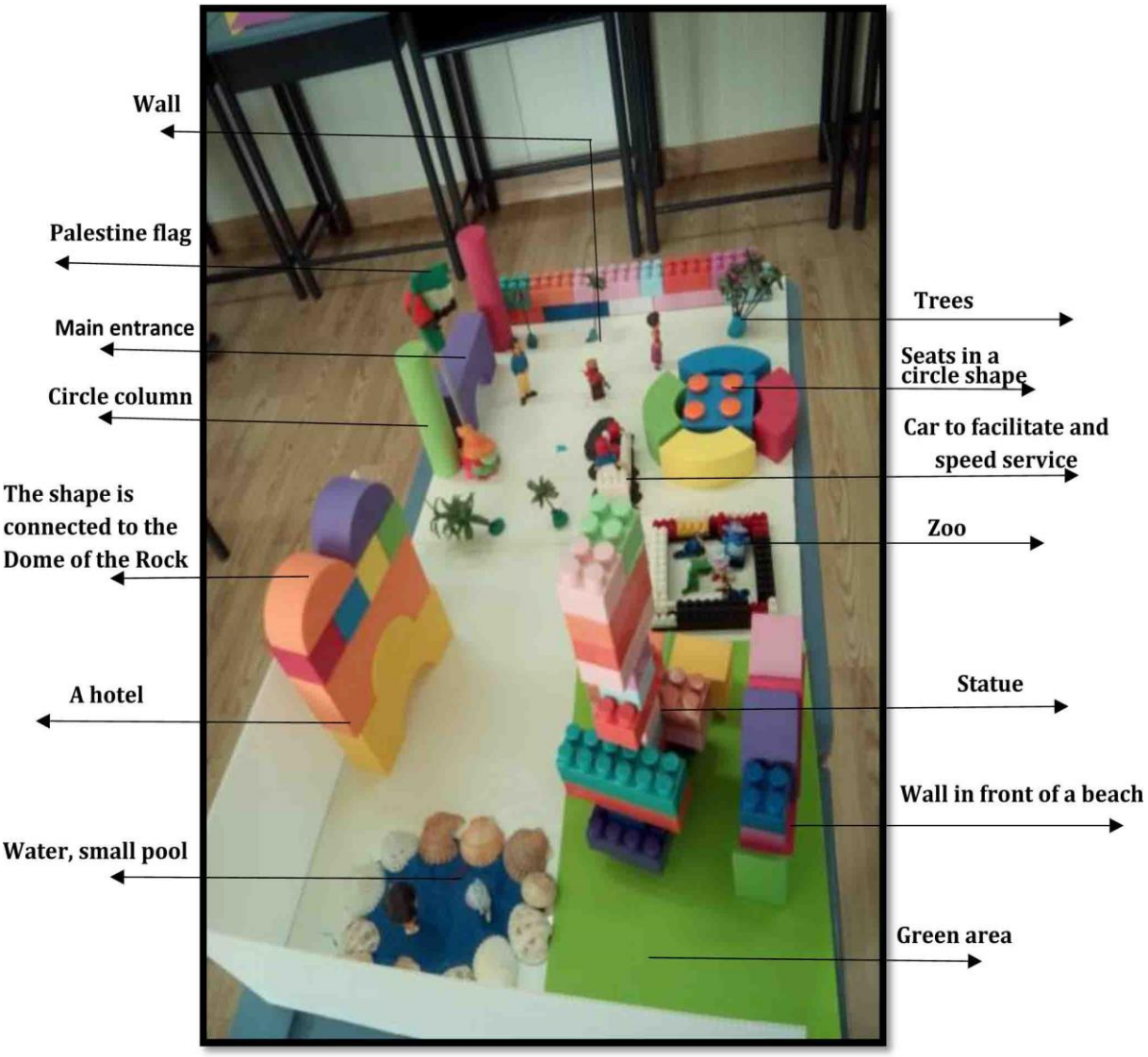


Figure 4.26: A 12-year-old girl's model illustrating elements that she likes to see while waiting her turn. Notice her preferences related to interior design elements and interior architecture spaces.

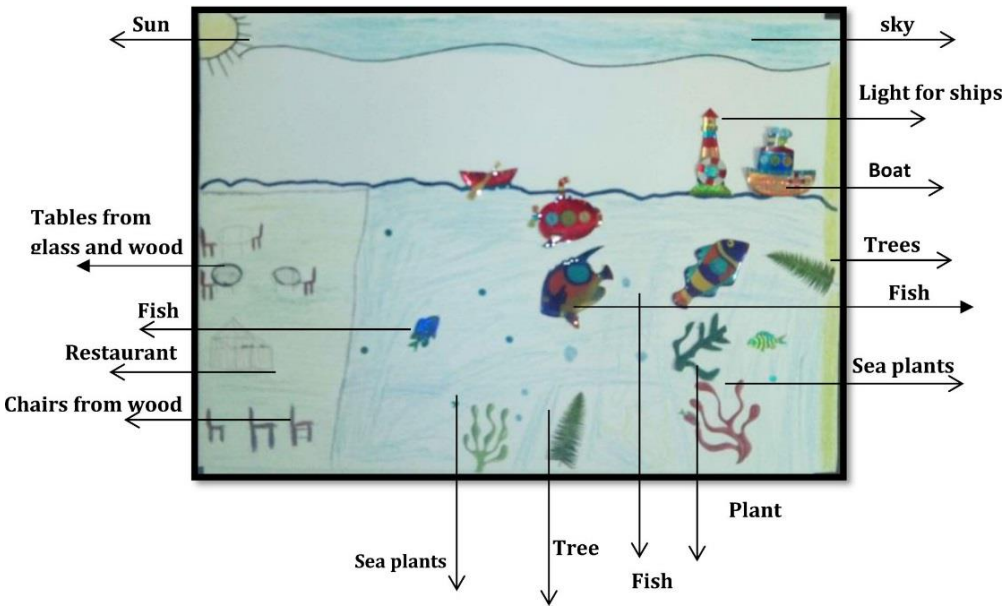


Figure 4.27: An 11-year-old boy's drawing illustrating elements that he likes to see while waiting his turn. Notice his preferences related to nature themes and features.

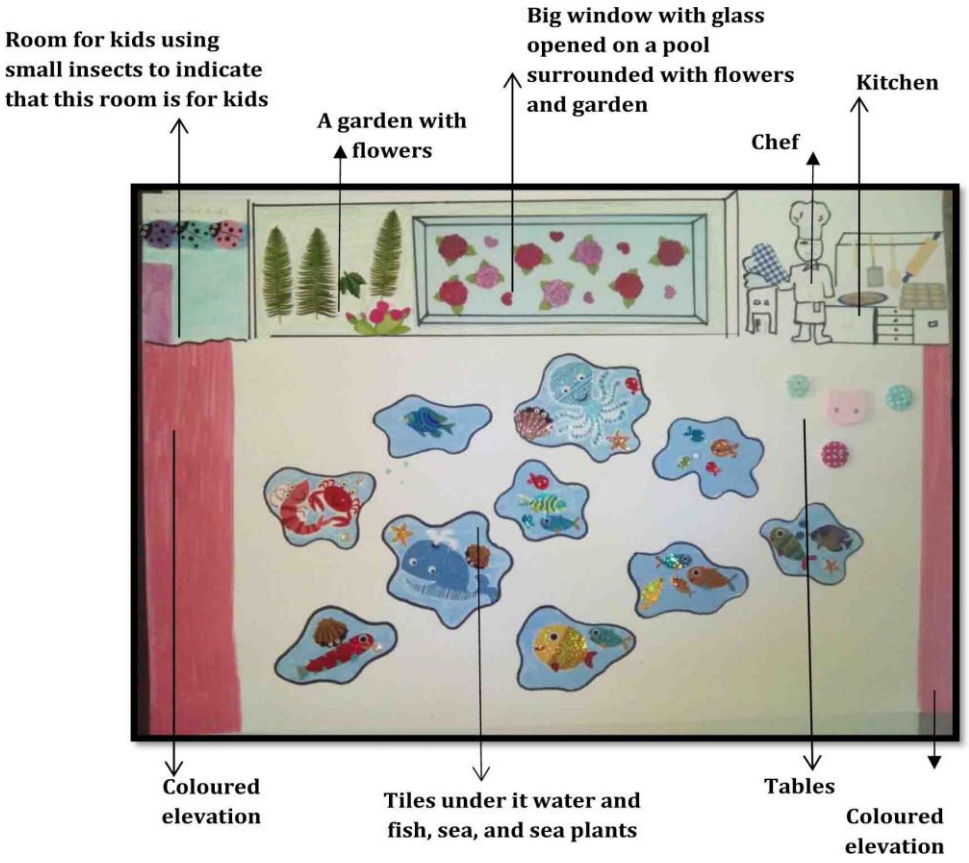


Figure 4.28: A 15-year-old girl's drawing illustrating elements that she likes to see while waiting her turn. Notice her preferences related to nature themes, interior design elements and interior architecture spaces.

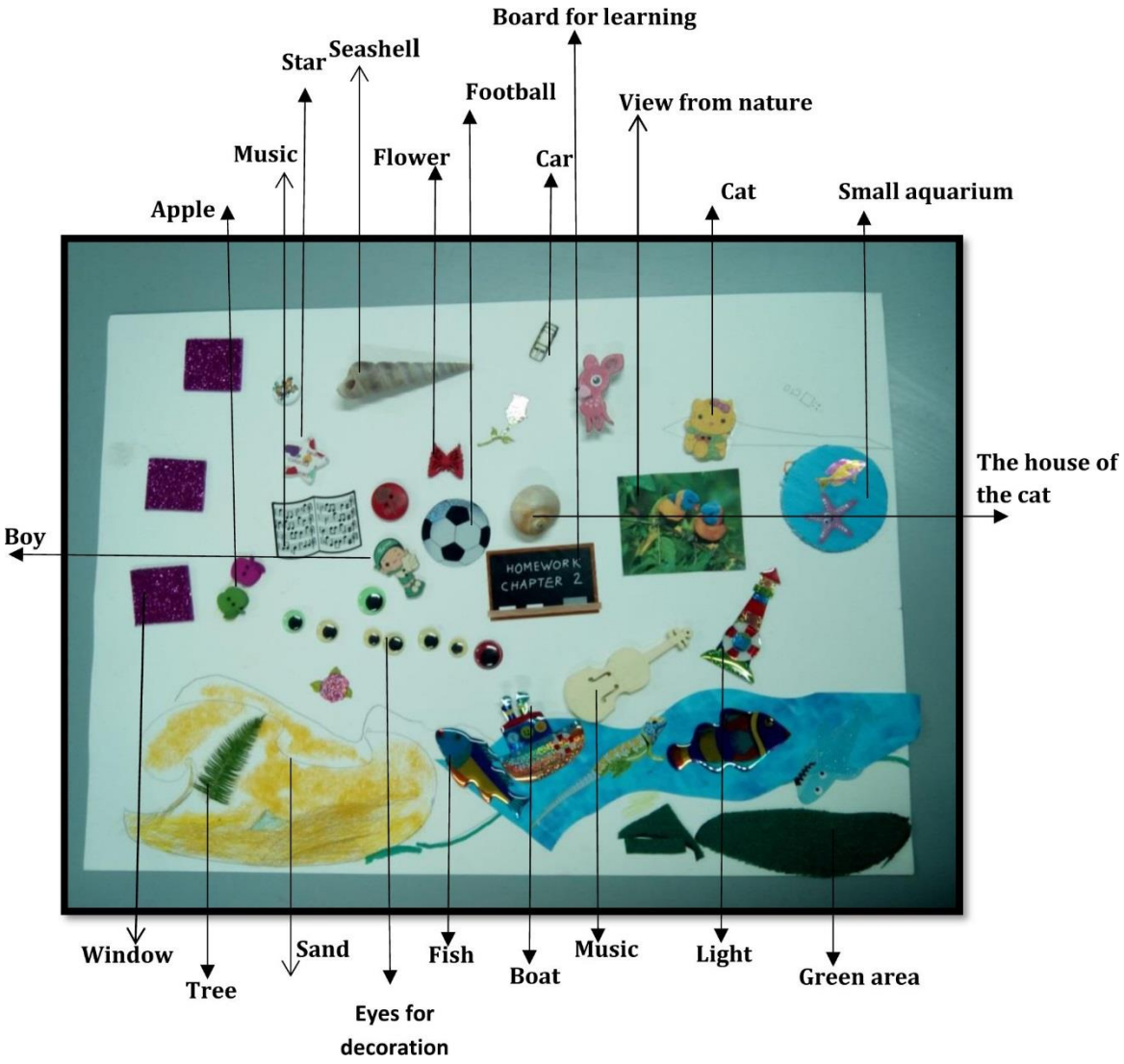


Figure 4.29: A 7-year-old boy's drawing illustrating elements that he likes to see while waiting his turn. Notice his preferences related to nature themes, types of games and aesthetics.

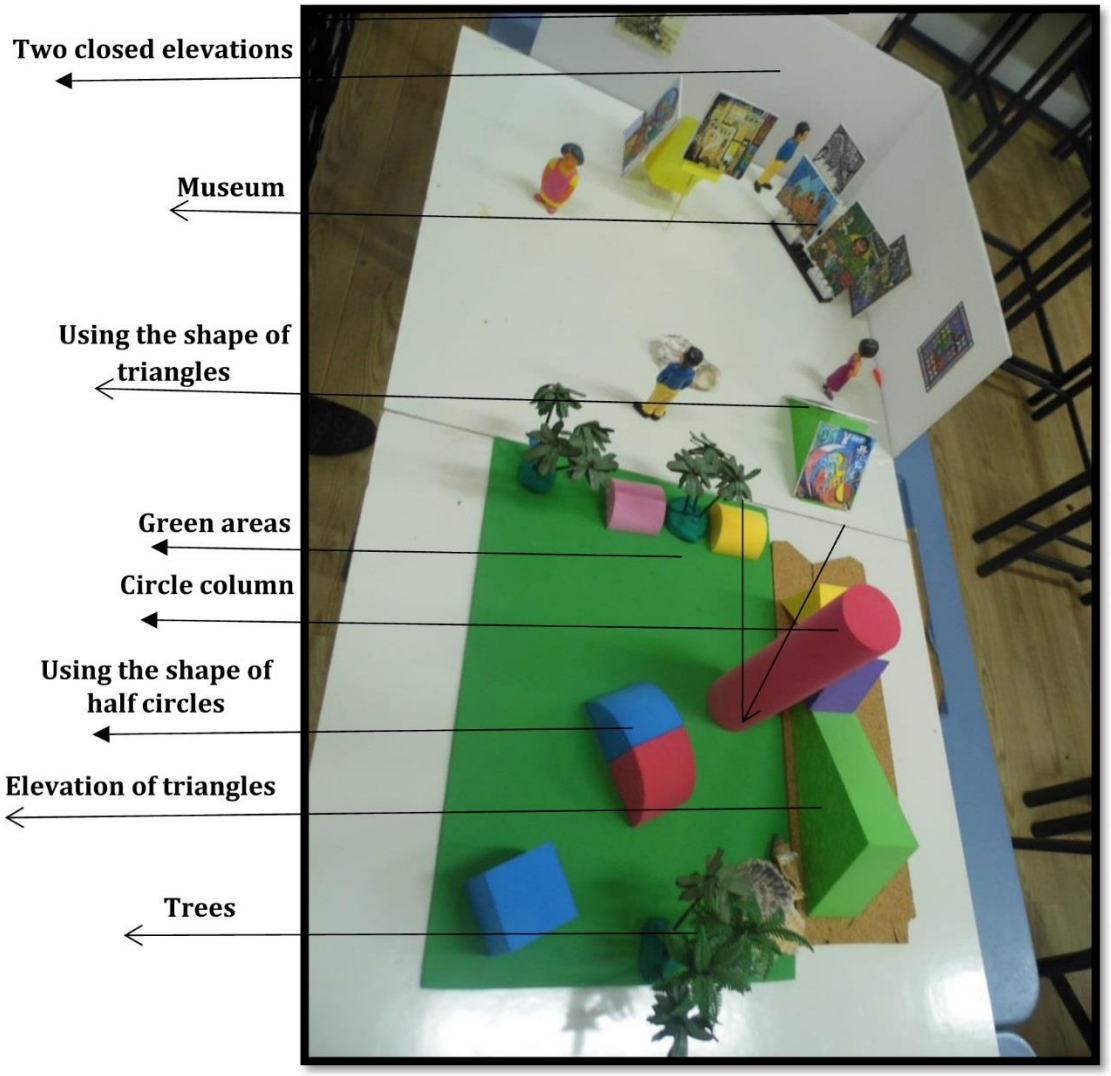


Figure 4.30: A 12- year-old girl's model illustrating elements that she likes to see while waiting her turn. Notice her preferences related to interior design elements and interior architecture spaces.

2. **Generating initial codes.** The second phase of thematic analysis is generating initial codes, defining and naming themes, searching for themes and reviewing themes (Vaismoradi et al., 2013, p.402). Code can be a word, phrase, sentence, or a whole paragraph, and it may be the exact words of the participants (Evans, 2010, p.116). Gibbs (2008) identifies codes and coding as *"a way of indexing or categorising the text in order to establish a framework of thematic ideas about it"* (p.38). Coding is viewed as the most important approach to

analysing qualitative data, and it helps in orienting, dealing with and reducing big data sets and the complexity that exists in the data (Strauss, 1987, p.28).

According to Saldaña (2013)

> *A code in qualitative inquiry is most often a word or short phrase that symbolically assigns a summative, salient, essence-capturing, and/or evocative attribute for a portion of language-based or visual data. The data can consist of interview transcripts, participant observation field notes, journals, documents, literature, artifacts, photographs, video, websites, e-mail correspondence, and so on"*(p.3).

To capture the complexity of data in the fifty-five interviews, data analysis started with coding the data, particularly using open coding, which is considered to be the initial sort of coding during a research project (Strauss, 1987, p.28), and is *"the naming and categorising of phenomena through close examination of the data"* (Gray, 2004, p.331). According to this study, open coding was achieved by thoroughly inspecting the field notes (i.e. line by line or word by word), interviews, memos and all the documents produced during and after the data collection process. Doing so helps in fracturing, breaking down the data analytically, and conceptualising it (Strauss, 1987, p.28, 29). These techniques helped the researcher to generate an initial list of ideas (Figures 4.31 & 4.32) about what the data are and which aspects are interesting (Braun & Clarke, 2006, p.88), and it helps to provide the infrastructure for the formal coding process (ibid, p.17).

The next stage involved developing the formal code by coding the data thoroughly. This stage was started by organising the data into meaningful groups (ibid, p.88) and by arranging all the text linked to the participants' interviews and

focus groups into separate documents. Seven documents were produced (i.e. four for children, one for parents, one for medical staff, and one for the designers). This process helped to simplify the data analysis and provided an easy way to compare and contrast between codes later in the process.

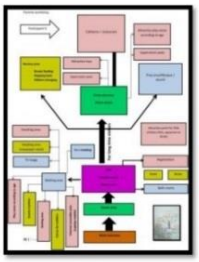
Mothers' chart record Saturday 18 /10/2014. Time : 11-12	The Transcription	Highlighting the extracts	Open coding	Initial ideas
FP2: Ronsa   Recording and archiving the activity took 1 hour	**Researcher: can you talk to me about your needs and the elements you like to find when you enter the main entrance or the atrium which makes you feel happy and comfortable? And what are the elements and needs for the children that have age range between 0-6 years old?** **Participant**: now the most important thing is the area of the reception in specific area of admission and registration....Am...In order you can distract the child who has four years old, there should be some an attraction point that can attracted the child. I have concentrated to include seats and desks for writing until you finish the registration process... also I have concentrated to have an attraction point for example small aquarium, small birds that can distract the child until you finish the admission and the registration because children at this age level like to move and complain too much... ...now if we have a waiting area for a long time visit,	*Main Entrance. *Atrium *area of the reception *Important function area of admission and registration. * Distraction of the child particularly in the admission and registration. * Attraction point for age 4 years. * facilitate the process of admission and registration by providing (seats and desks for writing). *Attraction points in the registration area (small aquarium, small birds. *Characteristic behaviour for age range of children (0-6) (i.e. moving too much, complain and cry). * Function of space: Two types of waiting	-Interior architecture space function. -Interior design consideration, needs of children & interior architectures consideration). - Design according to age & provide attractive elements -Elements help in registration area (i.e. seats, desks for writing (design consideration & mother's needs). - Interior design & interior architecture consideration & children's needs (i.e. age 4). Cognitive development (key factors) -Long visit & short visit functions(Interior design and interior	**Father's needs:** • Enough spaces to sit and have a rest area • Entertainments activities (TV), access to internet,& laptops, reading spaces • Smoking areas • Spaces for reading • Restaurants, snacks machine • Waiting areas for long visit and short visit **Children's Needs:** • Distraction element in the admission and reception areas (i.e. sank machines, restaurants • Provide safety (i.e. toddles needs fences). • long visit needs (i.e. distraction elements, playing areas, green areas, age appropriate games, entertainment activities • Age appropriate design activities & games for age 0-6 (i.e. Lego, drawing area, stickers, technology machines such as I pads, mobile). • not to separate the playing areas of children for social reasons • Provide safety for children • Provide **Mother's Needs:** • Functions to be located in the waiting areas(breast feeding, napping, dibbers room, pray

Figure 4.31: An example of the initial codes (parents' workshop)

The initial ideas that help in formal coding process

FP:1	FP:2	FP:3	FP:4
Parent's needs: -Comfortable elements -Separation in gender Functional spaces (i.e. club, cafeteria) **Father's needs:** The same needs for mother can be provided for father (i.e. entertainment activities, internet, spaces to have a rest **Children Needs:** • Attractive elements (i.e. garden, small pool, green colours, swimming pool, natural colours). • Prevent Scary elements (i.e. white custom, emergency) • Safety (i.e. assistant to observe, a special custom to play –sand). • Entertainments activities (i.e. video games) • Age appropriate games • Prevent feeling of boring • Separation in activities according to age. • Assistant (i.e. to read stories,	**Father's needs:** • Enough spaces to sit and have a rest area • Entertainments activities (TV), access to internet,& laptops, reading spaces • Smoking areas • Spaces for reading • Restaurants, snacks machine • Waiting areas for long visit and short visit **Children's Needs:** • Distraction element in the admission and reception areas (i.e., Sank machines, restaurants • Provide safety (i.e. toddles needs fences). • long visit needs (i.e. distraction elements, playing areas, green areas, age appropriate games, entertainment activities • Age appropriate design activities & games for age 0-6 (i.e. Lego, drawing area, stickers, technology machines such as I pads, mobile). • not to separate the playing areas of children for social reasons • Provide safety for children • Provide **Mother's Needs:** • Functions to be located in the waiting areas(breast feeding, napping, dibbers room, pray room, cafeteria) • Needs for long visit(i.e. Cafeteria, restaurants	**Mothers need:** • Provide services (Calm areas, internet, computers) • Provide privacy, but not completely separation • Provide spaces for husband or relatives from men (spaces for family. • Easy flow to the reception area. • Provide functions for long visit (i.e. office). **Children's needs:** • A welcoming main entrance having distraction elements from nature (i.e. green areas, birds, small animals, butter fly, colours) • Distraction element (animals, cartoon, TV, music, drawing, moving and coloured items, • Safety.	**Parent's needs:** • Calm area, music • A separate waiting area **Children's needs:** • Attractive elements in the main entrance (i.e. moving things & colours on the glass). • The form and shape in the main entrance not to be scary. • Attractive elements at the reception desk • Green areas with nature elements • Provide entertainment activities • Spaces to eat and play area and seats • Provide in the waiting area (i.e. small garden, trees, flowers, calm environment, small pool, seating area, drawing areas, cafeteria, television, play area, balls, music

Figure 4.32: An example of the initial ideas that helped in the formal coding process (from parents' workshops)

This study used a manual coding process that included several stages: the researcher started the process by highlighting the potential patterns in raw texts with colours, identifying the codes, and then matching them with the extracts that demonstrated the code (Braun & Clark, 2006). All the identifying codes and extracts were transferred to small cards using file cards (p.89). Some of the extracts were coded two or more times, depending on their content (Gibbs, 2008, p.49). These small cards were designed by the researcher in a way that helped to distinguish between the types of codes (Figure 4.33). For instance, they included information about participants, the day of data collection, title of codes, extracts (Marshall & Rossman, 2011, p.210), and different colours for every code concept.

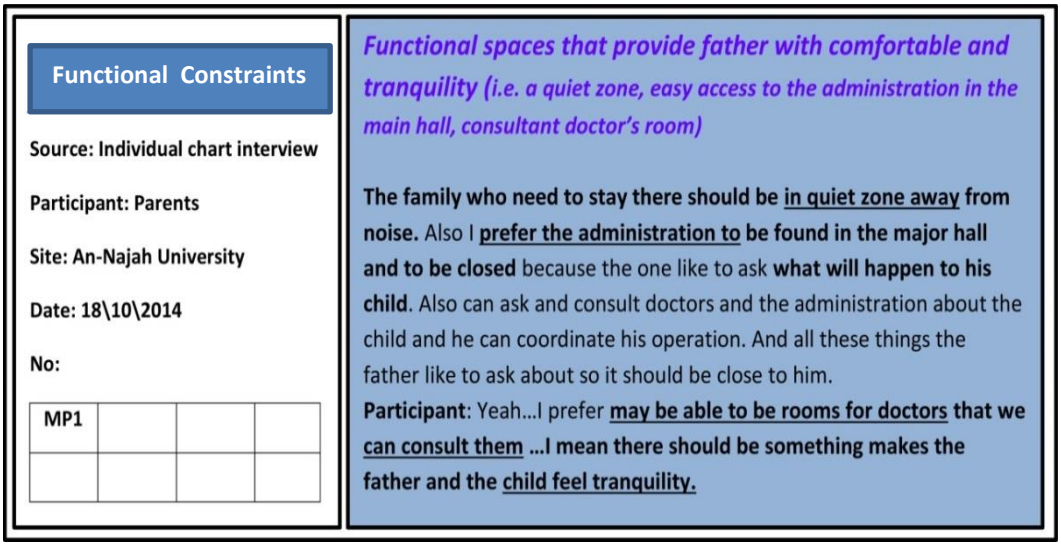


Figure 4.33: An example of the small cards used for coding manually

The researcher coded all the extracts (Braun & Clark, 2006, p.12). The same extract or unit of codes that had more than one code concept were coded using different labels. These labels (small cards) were created by using Microsoft Word and then printed for the next stages of categorisation and classification (Gibbs,

2008, p.49). More than 300 codes were created (Figure 4.34). The colours used by the researcher were essential for manually classifying and categorising the codes (Figure 4.35). The codes were then compared and combined into larger descriptive categories (Engel & Shut, 2012, p.342), transferred and saved on a computer file (Braun & Clarke, 2006, p.89), then printed and saved for further analysis.

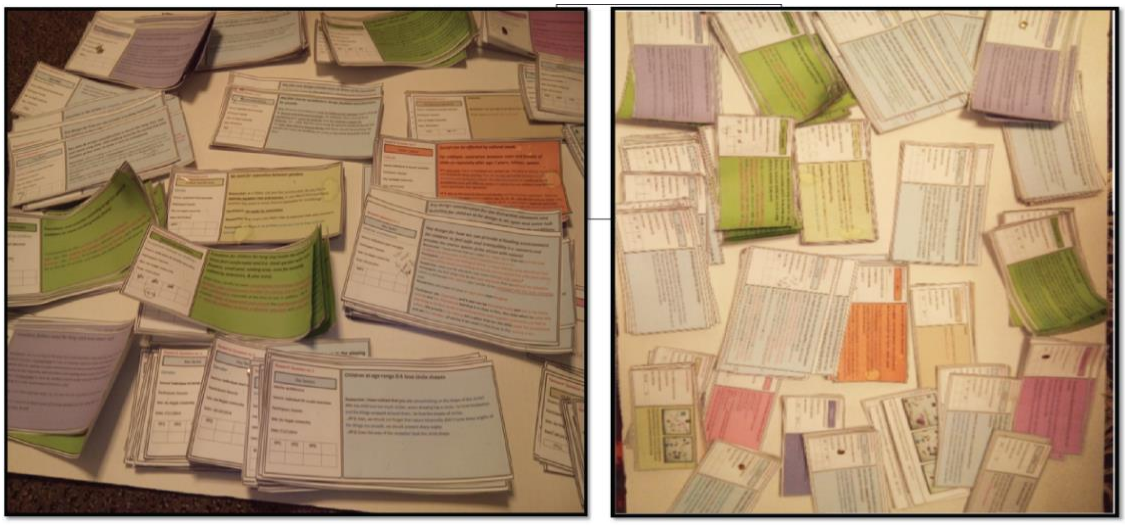


Figure 4.34: Different types of codes of field research – notice the different types methods used to manage the coding

Figure 4.35: Categorising different codes manually.

To create the initial themes (Level 1) the researcher used charts (Figures 4.36 & 4.37) to classify and arrange the codes. The themes were then described, refined, and classified using tables (Figures 4.38 & 4.39). Classifying, categorising and retrieving data provided a basis for comparison, and for redefining categories that can produce more rigorous conceptualisation (Dey, 2003). Classification *"lays the foundation for identification of substantive connection"* (ibid, p.48). The classification at this stage was guided by the research questions (ibid, p.47). The researcher applied these stages for every workshop and made a copy to use later for cross analysis between all the workshops. Using these techniques helped the researcher to identify the relationship between the codes i.e. contradictions,

similarities, and differences (Braun & Clarke, 2006, p.89). These categories were grouped to form the patterns or themes that are considered to be *"the result or the final product of data analysis"* (Vaismoradi et al., 2013, p.402).

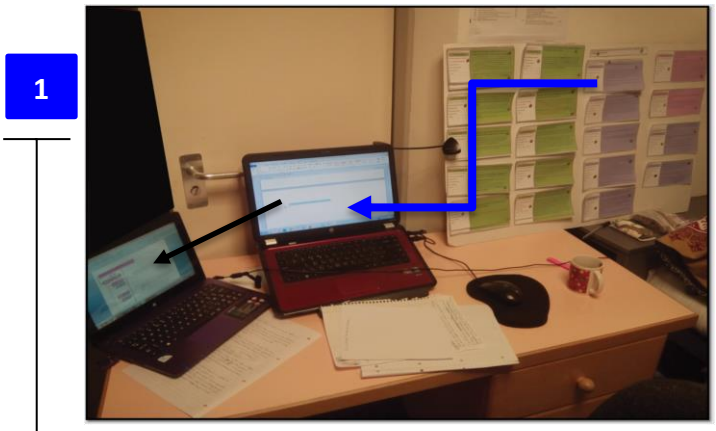


Figure 4.36: Transferring the codes to a computer document to create the initial themes (Level 1)

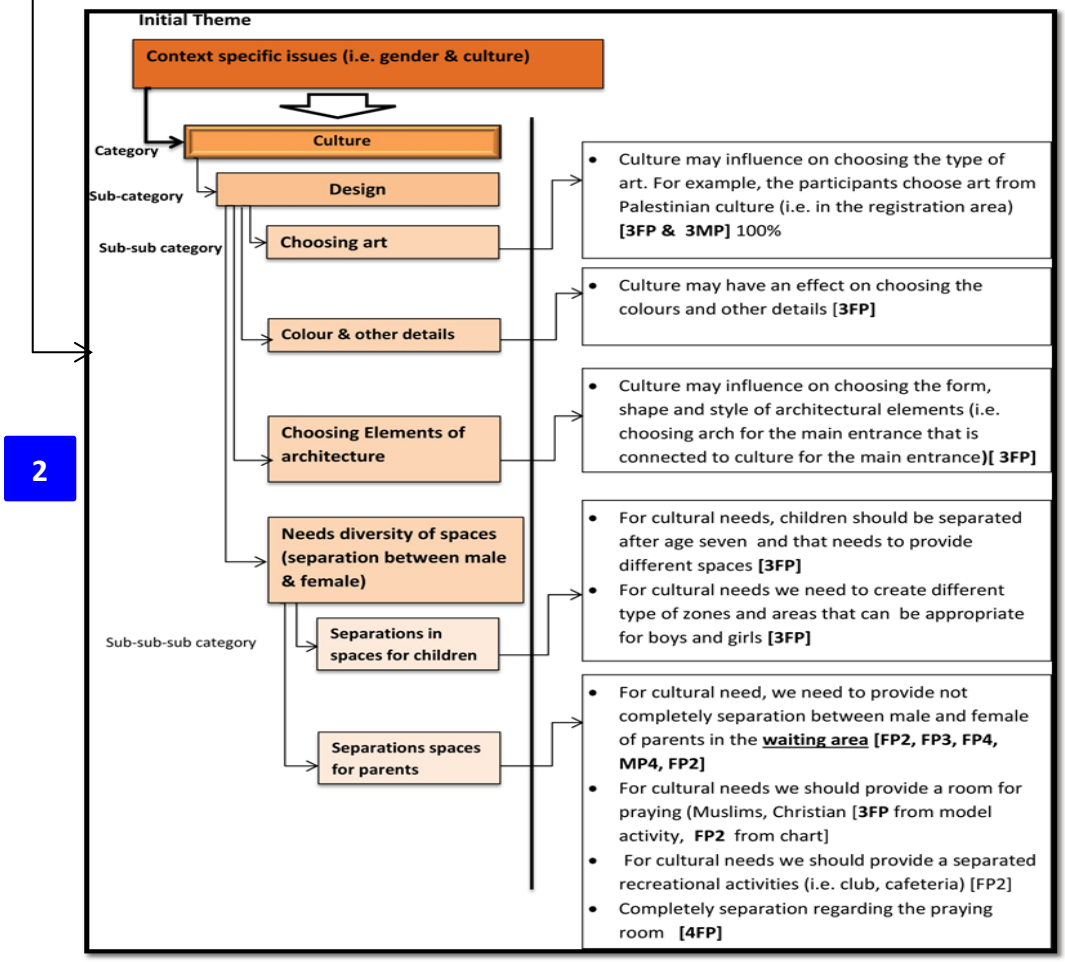


Figure 4.37: Using charts to categorise and classify the codes to create the themes of Level 1

Main themes	Name of Categories		Participants Males Female
Context specific issue: Culture	Choosing art	• Chosen art that is connected to Palestinian culture and to be located in the area of the admission and registration. • Create art from culture to be appropriate for children	
	Colour	• Provide appropriate colour for all age ranges of children because children have different needs and preferences	
	Choosing elements of architecture	• Including elements for traditional architecture which is connected with Palestinian culture	
	Separations of children		
	Separation between children	• Separate between children after age seven	
	Appropriate spaces for boys and girls	• Provide different types of zones and spaces to be appropriate for boys and girls	
	Separation between parents	• Not completely separation between parents in the waiting area	
	Providing separation in the recreational activates	• Provide a separation in the recreational activity (i.e. club, cafeteria, etc.)	
	Completely separation in the praying area	• Providing praying room and to be separated for male and female	
	Providing space to pray for religion issues	• Providing a prying area or a mosque because all the Palestinian people are Muslims	
Context specific issue: gender			
	Separation between male and female of children		
	Not completely separation	• In the waiting area, in the playing area,	
		• Between the functions of children. spaces of children should be divided in age ranges (i.e. 0-8, 8-18)	
		• Not completely separation after age seven years	
		• Not completely separation in the waiting area for long visit	
	Separation between male and female of parents		
	Separation	• In the waiting and rest area	
	Not completely separation	• In the waiting area for long visit	
	Completely separation	• Completely separation in three functions (i.e. praying room, toilets, and sleeping area).	
	No need for separation	• No need to separate between ml end females particularly In the spaces for socializing	
	Neutral	• No big difference if the waiting are for short visit is separated for male and female	

3

Figure 4.38: Using tables to refine and classify the themes of Level 1

1. Context specific issues: Culture and gender

Based on data analysis of parents' workshop, two contexts specific issues are emerged: culture and gender

1.1 Culture:

It has an effect on interior design and interior architecture of the main entrance and the atrium. For instance, it can influence on choosing type of art, colour, choosing elements of architecture, and separation between male and female.

1.1.1 Choosing art

- **Three females were chosen art that connected to Palestinian culture to distinguish the area of registration for adults and demonstrated that as the only area that can express culture of Palestine.**
- **Four males have been chosen art that is connected to Palestinian culture to be appropriate for adults (i.e. they are created museum beside the administration full of art that is related to Palestinian culture.**
- **Four males recommended creating art from culture to be appropriate for children.**

1.1.2 Colour

- **Three females demonstrated their need to include colours for children for all ages. For instance, teenagers and the age before teenagers may have different preferences in terms of colour.**

4

Figure 4.39: Using descriptions to refine the themes of Level 1

3. **Searching for themes.** Dealing with data in a systematic way helped the researcher pay more attention to each data item and identify repeating themes (Braun & Clarke, 2006, p.86). Searching for themes was achieved by re-focusing the analysis at the broader level of themes, sorting different codes into potential themes, and collating all the relevant coded data extracts within the identified themes. Then, cross analysis was done between all the workshops that included different types of data sets (i.e. individual interviews, focus groups, drawings, charts and models), combining categories into potential themes and gathering all data relevant to each potential theme. The researcher used visual representations in searching for themes. Some of them were created manually while others were achieved by using Microsoft Word documents to sort different codes into themes. For the latter, a variety of methods were used: tables; colours to highlight and distinguish between categories and themes; symbols for the number of participants; charts; and naming each code with a separate, brief description (ibid), see Figures 4.40 and 4.41. Some of these visual tools were used for the analysis of each workshop and for the cross analysis between all the groups. At this phase, the researcher determined some initial codes, which, combined with other codes, formed initial themes (ibid).

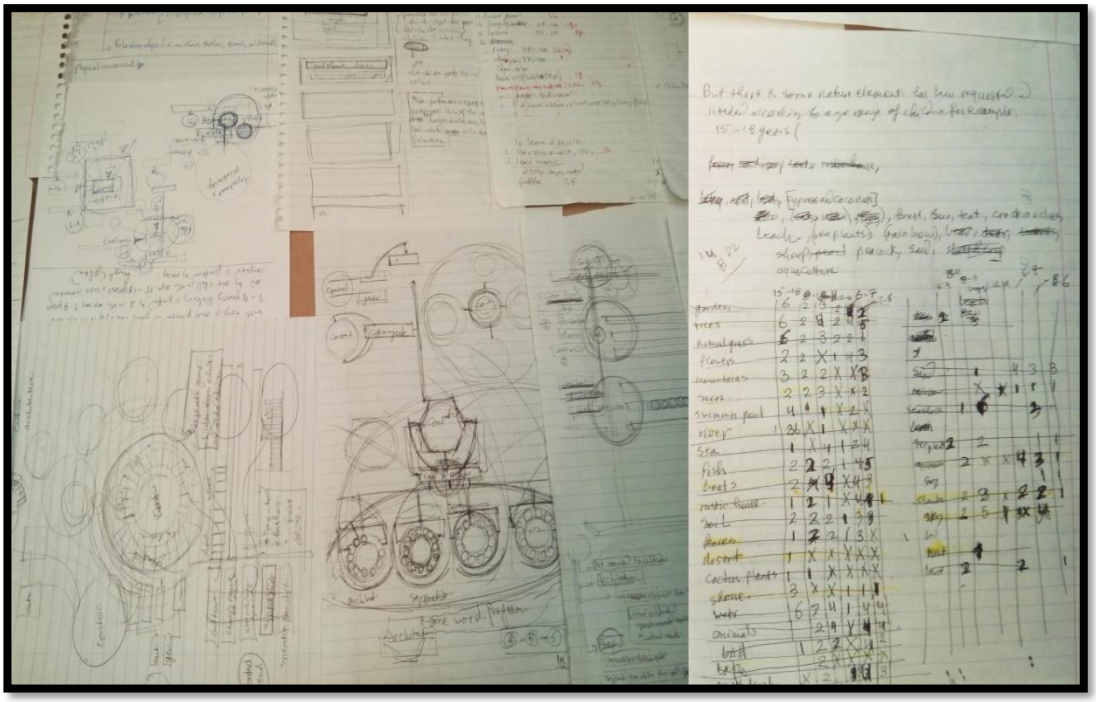
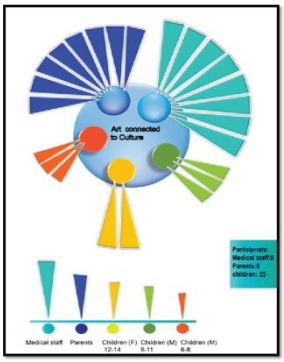
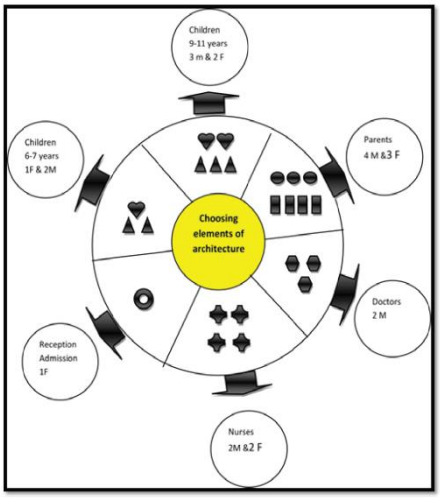
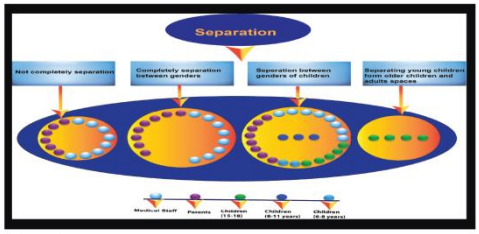


Figure 4.40: Manual visual representations that help in sorting different codes into themes

From recording data	Functional spaces, activities and facilities for children that provide comfortable, tranquillity, safety, and preventing boring and fears and can encourage them to love hospitals.	Participants
Functional spaces and activities for children to provide comfortable, tranquillity and safety	Water features	
	Area of food (i.e. kitchen, restaurants)	
	Music	
	Green area with nature elements	
	Play area	
	Entertainments (i.e. television)	
	Area to draw	
	Natural ventilation	
	Attractive elements	
	Toilets, art pictures including birds and animals, coloured elevations for the restaurants, and appropriate waiting area for three age range 0-6, 6-12, and 12-1	
Functional spaces to prevent boring and reveal fears of children	Music, kitchen, museums, internet and Attractive and aesthetics elements (i.e. mirror)	
	Water features	
	Playing area (i.e. sand)	
Functional spaces that help children love hospitals	Video games, reading stories and present sketches by a nurse, and preventing white coats that doctors and nurses usually wear.	







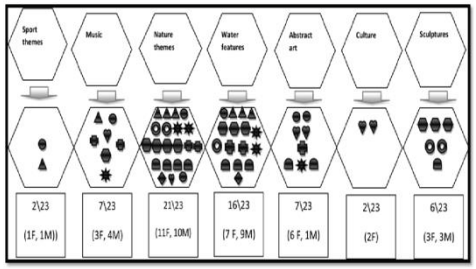
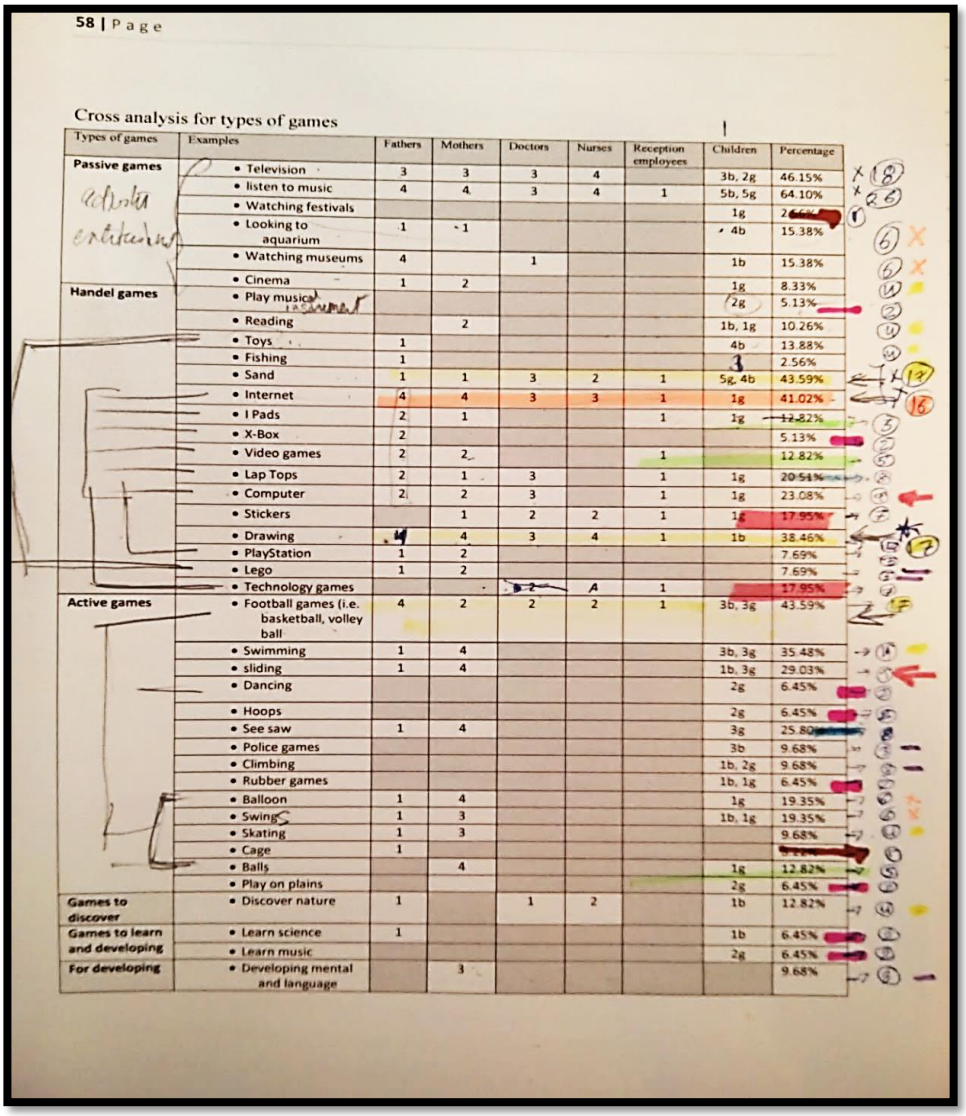


Figure 4.41: Visual representations that help in sorting different codes into initial themes

However, it was still not clear how to measure a theme and there is no easy answer to what constitutes a theme (Braun & Clarke, 2006, p.82). However, themes can be created in all shapes and sizes (Ryan & Bernard, 2003, p.87) and there is no right or wrong method to determine the prevalence of the theme (ibid, p.83). However, the prevalence of the theme is not necessarily reliable according to quantifiable measures (ibid), but it is important to the research questions and can represent some level of meaning regarding the data set (Vaismoradi et al., 2013, p.403). Ryan and Bernard (2003) connected the importance of the theme to four main aspects: how often it appears; how prevalent it is across different types of cultural ideas and practices; how people react when the theme contradicts expectations; and the degree to which the number, force, and variety of a theme's expression is controlled by specific contexts (p.87). Others pointed to how the consistency in identifying themes within any particular analysis provides sense of what the theme might be (Braun & Clarke, 2006, p.83). In this study, and because of the various types of data that are gained from various types of participants, the researcher determined all these elements to identify themes during data analysis.

In thematic analysis, it is advisable not to depend on the frequency of the theme to identify its prevalence, particularly in cases where the sample size does not meet the minimum requirements for statistical analysis (Marks & Yardley, 2004). However, it is beneficial to give some indication of the occurrence of the theme (i.e. rarely or commonly) by using qualitative terms such as 'most', 'some', or 'few', etc. (ibid, p.66). Thus, in my research, particularly in Chapter 05, the results

of themes were presented with the number of participants. However, in Chapter 06, the emerging themes were discussed and presented using qualitative terms. This study used thematic analysis to bolster the meaning in context and to identify what the themes might be. Consideration has been given to the number of different speakers who articulated a specific theme across the entire data (Braun & Clarke, 2006, p.82). For example, cross analysis of themes regarding play areas and entertainment was identified across workshops related to parents, children and medical staff (Figure 4.42).



58 | Page

Cross analysis for types of games

Types of games	Examples	Fathers	Mothers	Doctors	Nurses	Reception employees	Children	Percentage
Passive games	• Television	3	3	3	4		3b, 2g	46.15%
	• listen to music	4	4	3	4	1	5b, 5g	64.10%
	• Watching festivals						1g	2.66%
	• Looking to aquarium	1	1				4b	15.38%
	• Watching museums	4		1			1b	15.38%
	• Cinema	1	2				1g	8.33%
Handel games	• Play musical						2g	5.13%
	• Reading		2				1b, 1g	10.26%
	• Toys	1					4b	13.88%
	• Fishing	1					3	2.56%
	• Sand	1	1	3	2	1	5g, 4b	43.59%
	• Internet	4	4	3	3	1	1g	41.02%
	• I Pads	2	1			1	1g	12.82%
	• X-Box	2						5.13%
	• Video games	2	2			1		12.82%
	• Lap Tops	2	1	3		1	1g	20.51%
	• Computer	2	2	3		1	1g	23.08%
	• Stickers		1	2	2	1	1g	17.95%
	• Drawing	4	4	3	4	1	1b	38.46%
	• PlayStation	1	2					7.69%
	• Lego	1	2					7.69%
	• Technology games			2	4	1		17.95%
Active games	• Football games (i.e. basketball, volley ball	4	2	2	2	1	3b, 3g	43.59%
	• Swimming	1	4				3b, 3g	35.48%
	• sliding	1	4				1b, 3g	29.03%
	• Dancing						2g	6.45%
	• Hoops						2g	6.45%
	• See saw	1	4				3g	25.80%
	• Police games						3b	9.68%
	• Climbing						1b, 2g	9.68%
	• Rubber games						1b, 1g	6.45%
	• Balloon	1	4				1g	19.35%
	• Swing	1	3				1b, 1g	19.35%
	• Skating	1	3					9.68%
	• Cage	1						9.68%
	• Balls		4				1g	12.82%
	• Play on plains						2g	6.45%
Games to discover	• Discover nature	1		1	2		1b	12.82%
Games to learn and developing	• Learn science	1					1b	6.45%
	• Learn music						2g	6.45%
For developing	• Developing mental and language		3					9.68%

Figure 4.42: Considering frequency and occurrence for cross analysis.

In addition, themes capture something important in relation to research questions (Ryan & Bernard, 2003, p.87); thus, the researcher decided upon the initial themes by returning to the research question and objectives of the study (Vaismoradi et al., 2013, p.403), using charts to classify the initial themes under each research question. This approach helped in refining, classifying and re-defining the initial themes, see Figure 4.43.

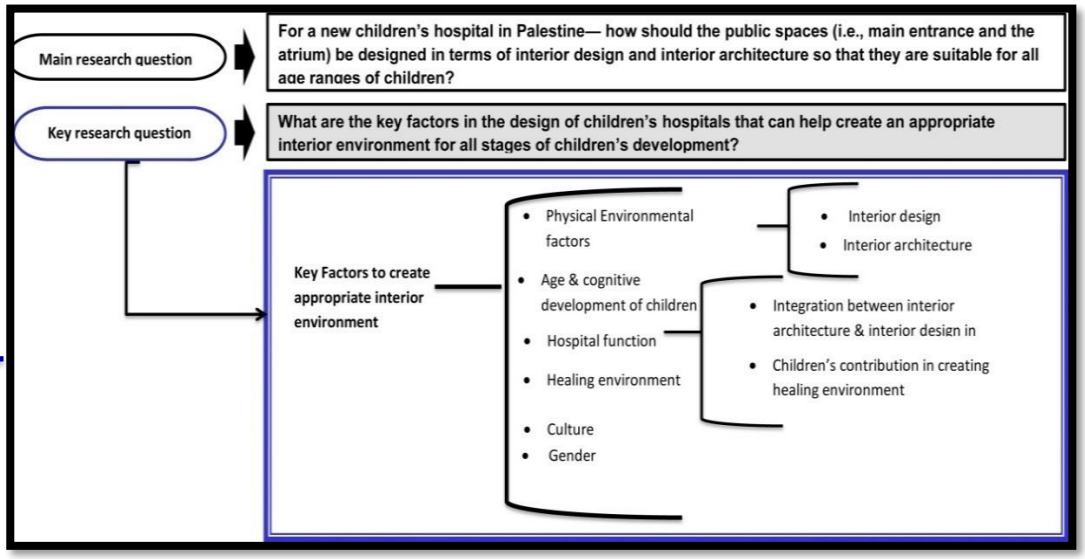
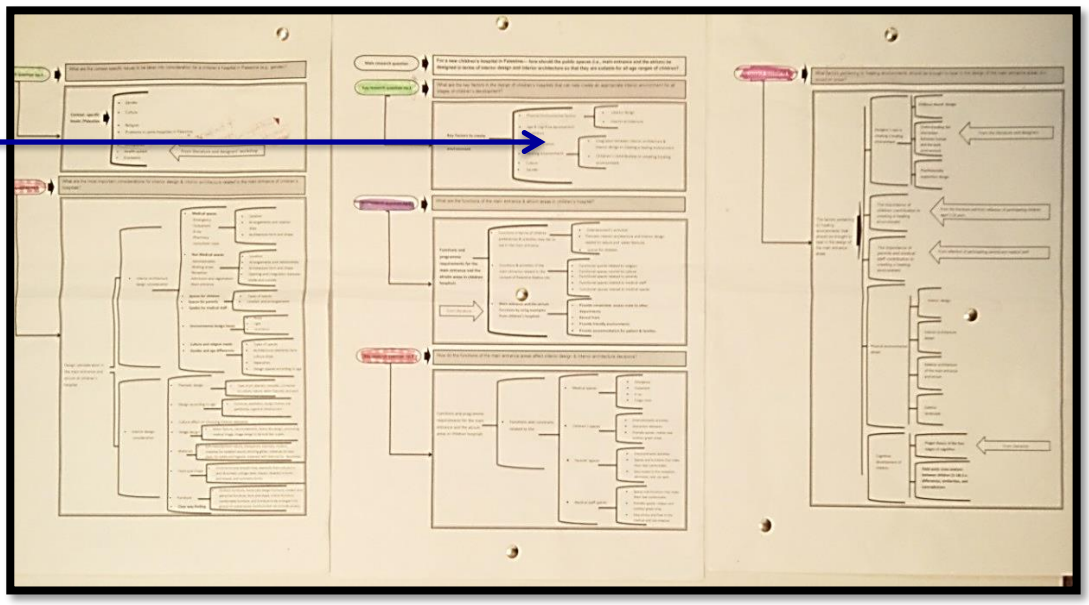


Figure 4.43: Connecting, categorising and re-defining the initial themes to the field research objectives.



4. **Reviewing themes***.* This phase included reviewing and refining themes on two levels (Braun & Clarke, 2006, p.91, 92):
    - **Level one**. This level re-focused the analysis by looking at all coded extracts in detail for each theme to determine whether they appear to form a comprehensible pattern. In case issues arose within some themes (e.g. some of the data extracts might not have fit), the researcher created new themes and found a new place for those extracts (ibid, p.91).
    - **Level two**. In this level, the researcher read the entire set of data for two reasons: to figure if themes 'work' in relation to the data set and to code any additional or missing data. The researcher stopped refining and coding when the reviewing added no further important issues. At the end of this stage, the researcher had a clear story about the overall themes and their meaning (ibid, pp.90, 91).

The emerging themes from the second phase (searching for themes) were refined and combined by using visual tools (e.g. tables). Creswell and Clarke (2007) stated that *"themes can be grouped into even larger dimensions or perspectives, related, or compared"* (p.132). For this study, the refining process was done twice: once for the themes that emerged from the cross analysis between participants (Figure 4.44) and once for the themes that were produced from the cross analysis between workshops. The emerging themes for the data analysis of every workshop were compared and combined manually to create the intermediate themes (Figures 4.44 & 4.45 a+b).

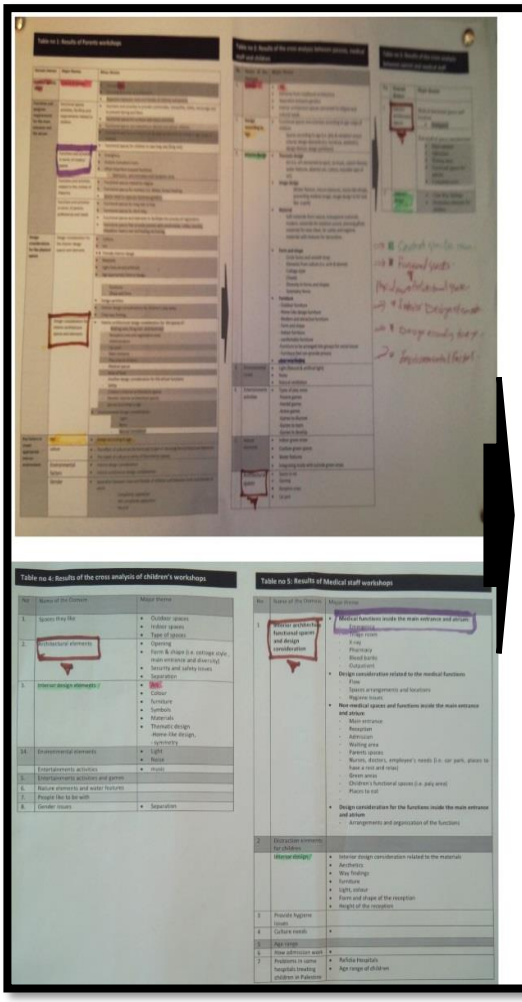


Figure 4.44: Intermediate themes that emerged from the cross analysis of themes

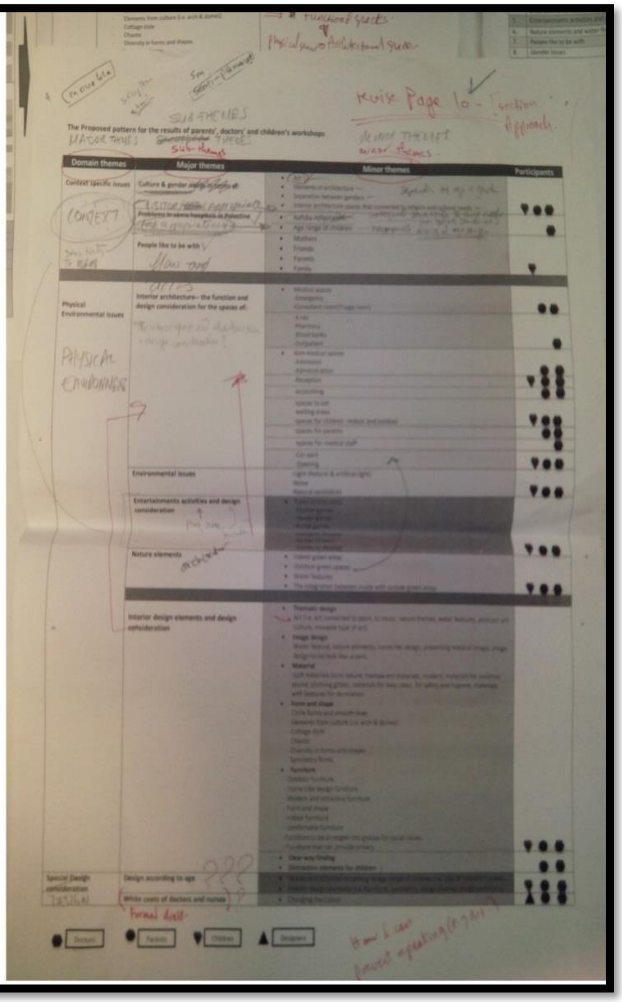


Figure 4.45a: Intermediate themes that emerged from the cross analysis of workshops

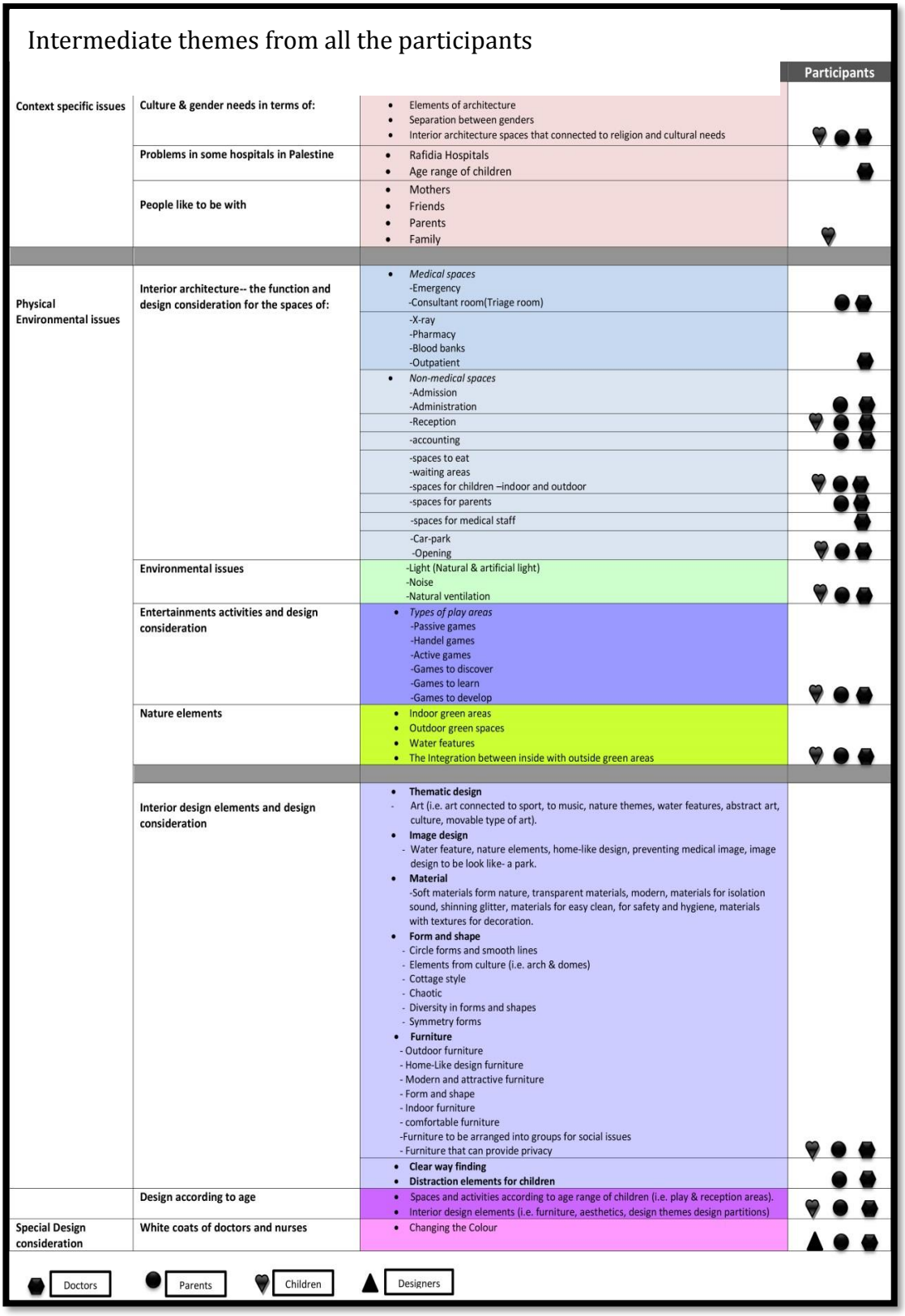


Figure 4.45b: Intermediate themes from all participants

5. **Defining and naming themes.** In this phase, another refinement was needed after creating a satisfactory thematic map. Braun and Clarke (2006) suggested defining and refining the major themes by identifying the essential aspects of individual themes within whole themes. This involves determining what aspects each theme captures of the data (p.92).

   For this study, the researcher returned to collated data extracts for each theme, organised them into a coherent and consistent format, and supported that with narrative quotes (ibid, pp.91, 92). The researcher ensured that all themes fitted into the broader overall 'story' that described the data in relation to the research questions. This was achieved by applying the following steps:

   - Categorising the emerging themes under each research question by using charts and graphs.
   - Refining all the themes by creating a cross analysis and by combining emerging themes to avoid overlap and repetition between the themes.
   - Building up the structure within the large complex theme by considering the relationship between themes according to the aims, function and meaning of that theme within the larger context of data (ibid). For example, all themes that have the same function in terms of interior design were classified under themes of physical environment – interior design and interior architecture.

   At the end of this phase, the themes of this research were refined and identified with the help of peer reviews (Figure 4.46). Braun and Clarke (2006) suggested describing the scope and content of each theme in a couple

of sentences; to give themes working practical titles; to be sure that themes are succinct, and that the name provides a clear sense of the context of the theme (pp.92, 93).

All these stages were saved in a file document (Microsoft Word file), which allowed the researcher to report the data analysis.

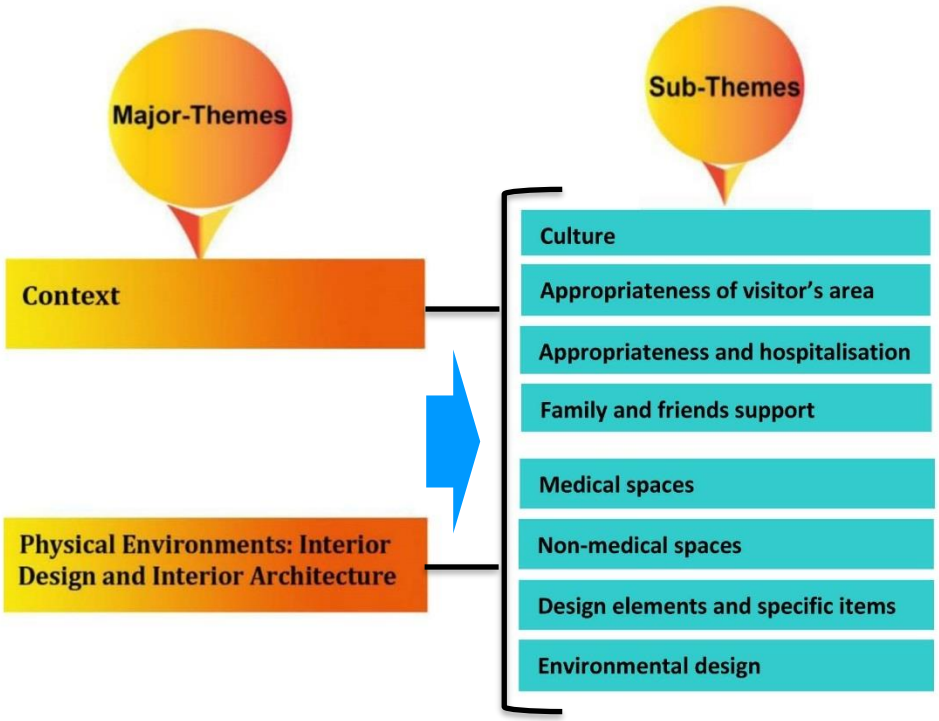


Figure 4.46: Final themes

6. **Producing the report.** Reporting and writing was done before, during and after data analysis. For instance, the researcher jotted down ideas and memos during data collection, described the categories during coding and reported the themes after analysing (ibid, p.86). According to some scholars, reporting should include information in the form of a story that encompasses coherent and interesting knowledge and processes to convince the reader and support validity of the analysis. The writing up should be provided with sufficient

evidence of the themes within the data to go beyond description of the data and to make an argument in relation to the research questions (ibid, p.93). According to the literature, there is no one, specific way to represent qualitative data analysis (Flick, 2014); however, for this research, the data were presented using themes, and supported by direct quotations from interviews, transcriptions, descriptions and models that explained the process of data analysis, which included diagrams and visual representations of key concepts (p.305). Sufficient examples were provided to illustrate the analytic points of the data. Brown and Clarke (2006) state that "a weak or unconvincing analysis can also stem from failure to provide adequate examples from the data - *for example, only one or two extracts for a theme"* (p.95). In addition, the results were visualised. Using images to present and interpret data is important (Miles & Huberman, 1994, p.201), because they can provide knowledge about the whole study and can activate people's memories more effectively than word transcription (Gibbs, 2008, pp.240, 243).

4.6 Validating the data

This study specifically engaged with Braun & Clarke's (2006, p.96) criteria that provide good thematic analysis. These criteria are summarised in Table 4.3.

In addition, interviewing experts in the early stages of data analysis helped in the validation process. This was achieved by conducting workshops with four groups of designers in Palestine. I asked participants to comment upon the validity of the initial findings of data analysis, and these initial results were not dissimilar to the

final results. All the validation interviews were recorded, transcribed and analysed, and will be discussed in detail in Chapter 06.

Table 4.3: 15-point checklist of criteria for good thematic analysis (adapted from Braun & Clarke, 2006, p.96)

Process	Criteria
Transcription	The data have been transcribed to an appropriate level of detail, and the transcripts have been checked against the tapes for accuracy.
Coding	Each data item has been given equal attention in the coding process.
	Themes have not been generated from a few vivid examples (an anecdotal approach); instead, the coding process has been thorough, inclusive and comprehensive.
	All relevant extracts have been collated for each theme.
	Themes have been checked against each other and back to the original data set.
	Themes are internally coherent, consistent, and distinctive.
Analysis	Data have been fully analysed, not just paraphrased or described.
	Analysis and data match each other – the extracts illustrate the analytic claims.
	Analysis tells a convincing and well-organised story about the data and topic.
	A good balance is provided between analytic narrative and illustrative extracts.
Overall	Enough time has been allocated to complete all phases of the analysis adequately, without rushing a phase or giving it cursory attention.
Written report	The assumptions about, and specific approach to, thematic analysis is clearly explicated.
	There is a good fit between what is claimed, and what is shown to have been done-i.e. described and reported analysis are consistent.
	The language and concepts used in the report are consistent with the epistemological position of the analysis.
	The researcher is positioned as active in the research process; themes do not just 'emerge'.

The literature review shows several ways to achieve validation for qualitative research methods. For example, Vaismoradi et al. (2013) advised researchers how to provide rigour when using thematic analysis approaches. Because there is scepticism about the value of thematic analysis, rigour can be achieved *by keeping a personal diary*. Such additional materials in relation to raw material or field notes are expected to contribute to interpretation. On the other hand, the best way to evaluate the quality of findings is, *"whether new insights into the studied phenomenon have been provided, if so, the study should have increased the understanding of a particular phenomenon or informed practical action"* (p.403).

4.7 Conclusion

This chapter presented a discussion of the research design and methodology (Sections 4.1, 4.2). It provides a justification for the methods and approaches, ethics issues that were applied for data collection (Section 4.4) and data analysis (Section 4.5). This research uses *qualitative research that uses an innovative workshop format.* Data were collected using nine *co-design and co-creation workshops* that included arts-based activities and semi-structured recorded interviews conducted in Palestine.

The data collection and data analysis of field research of this study demonstrates that using innovative methods can provide (Sections 4.4, 4.5):

- Valuable information and lead to better design solutions (e.g. using models).
- Valuable and indispensable tools that helped participants, particularly children to express their preferences more intuitively (e.g. using drawings with children). This will be discussed in more detail in Chapter 05.

A thematic analysis approach was used to analyse the primary data (Section 4.5.1). The process of analysing such data is recursive; it needs to move back and forth between research data (Braun & Clarke, 2006, p.86). The results of data analysis helped to identify two major themes (see Figure 4.46) connected to the participants' preferences:

(1) Context-specific issues to be taken into consideration for children's hospitals: culture, appropriateness of visitors' area, age appropriateness of hospitalisation, and support of the children by family and friends.

(2) The physical environment: interior architecture and interior design: medical spaces, non-medical spaces, design elements, and environmental considerations.

The emerging themes will inform the development and design of the interior architecture and the interior design of the public spaces of a children's hospital in the particular context of Palestine. These themes will be presented and discussed in the next chapter.

Chapter 05

Field Research Findings and Results

5.0 Introduction

This chapter presents findings and results from eight co-design and co-creation workshops in Palestine, which included arts-based activities and semi-structured recorded interviews (see Figure 5.1), together with analysis of eight of the workshops. Five were conducted at different schools with children aged 3-18 years, two with parents, and one with medical staff (i.e. doctors, nurses, administrators and staff from the reception and admissions desks). Additional interviews and workshops conducted with designers, will be discussed in the next chapter.

The findings from these various interviews and workshops will be compared with the findings from the literature review to arrive at the final conclusions from this overall study. These findings will then inform the development of design recommendations for the design of the public spaces of children's

hospitals. The results presented employ the terminology of themes. These are supported by evidences from the participants. Due to the variation of activities and different types of participants in the study, the number of the participants varied from one activity to another.

This study focuses on how to provide appropriate healing environments for public spaces of children's hopsitals for all age ranges of children (i.e. 0-18 years). Due to the field work, participants aged 3-18 years took part in the workshops (see Sections 4.1-4.2). Thus, children's preferences were presented in three age ranges (i.e. 3-7, 7-11, 11-18 years). These age ranges have been created according to the four stages of cognitive development (see Section 2.2.4). However, children between 0-2 years were addressed through parents' workshops in addition to those 2-6 years old (See Section 4.4, point 3).

The emerging themes discussed include participants' preferences and needs regarding those factors they considered essential for their comfort within public spaces of a children's hospital. These findings are classified according to final themes and presented in two main sections (see Figure 5.1).

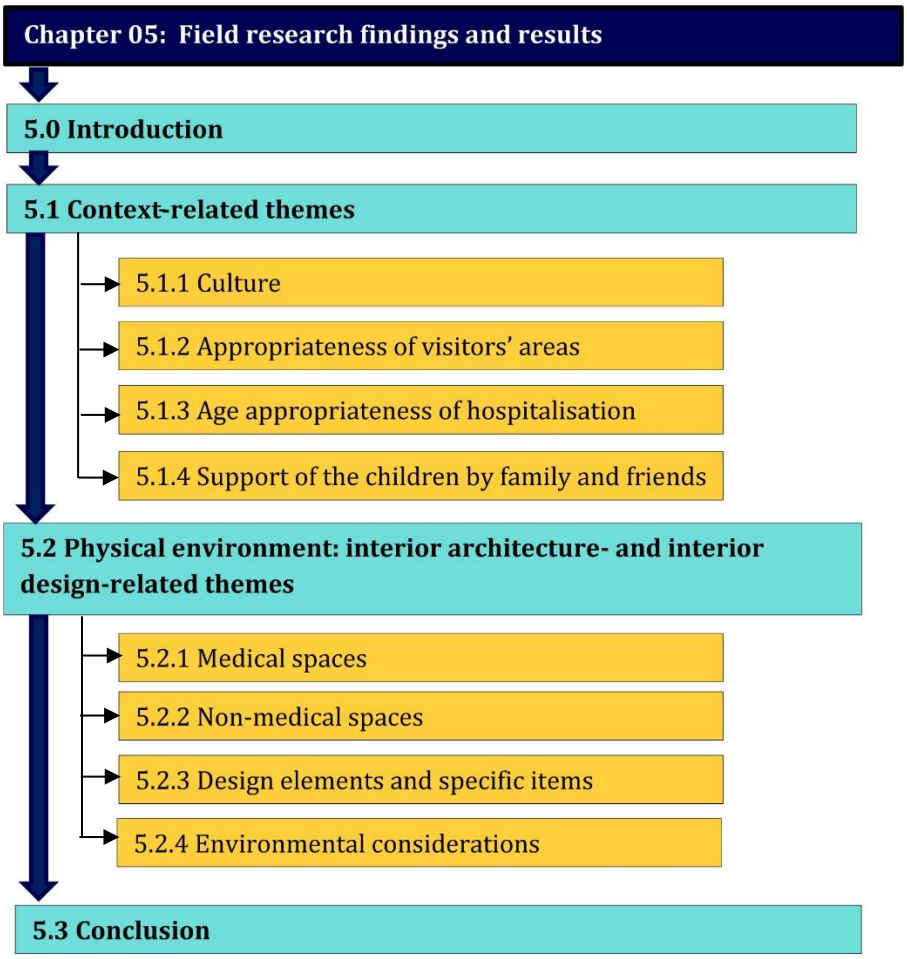


Figure 5.1: The strcuture map of the chapter

5.1 Context-related themes

This section considers the various themes related to the context of the research. Four themes were identified: culture, appropriateness of visitors' area, age appropriateness, and support for the children by their family and friends. All these themes are visualised and presented at the end of this section (Figure 5.2).

5.1.1 Culture

Two principal areas related to culture were identified:

Art and architectural elements connected to culture: One type of art and two elements connected to traditional architectural elements were identified for inclusion in the reception and registration areas. Participants explained that such art contributes to the creation of distinct, attractive spaces and a sense of pride in one's culture, and traditional architectural elements are seen as being culturally important, characteristic and can offer a sense of comfort (see Table 5.1 for more details).

Table 5.1: Preferences of parents (P), medical staff (MS), and children (CH) regarding the inclusion of art and traditional architectural elements that are connected to culture

Art and architectural elements connected to culture			
Preferences	**Participants**	**Total Number**	**Ideas**
Art Connected to culture	8 (P) 8 (MS) 1F (CH) 3-7 years 3M (CH) 7-11 years 2F CH) 11-18 years	**22/39**	• Pictures that include cultural elements, and a small museum that encompasses different types of art related to Palestinian culture
Elements from traditional architecture	8 (P) 8 (MS) 1M (CH) 3-7 years 3M, 2F (CH) 7-11 years	**22/39**	• Include half-domes & arches.
Interior architectural spaces connected to religious and cultural needs	8 (CH) 8 (MS) 1M (CH) 3-7 years	**17/39**	• Provide spaces for prayer

> *These pictures and drawings are traditional. They are connected to culture, but for adults. We didn't find drawings related to culture that can be appropriate for young children. Thus, we should create a suitable art from our culture to be appropriate to children* (Fathers).

> *In front of the reception desk, I put a picture from our culture to provide people with a sense of pride that they are in their country* (Girl, 13-14 years). … *This flag means the great state of Palestine, which means this place only belongs to Palestinians* (Children, 9-11 years).

In the waiting area, also there is a room for Muslims (Mother). .... *Domes and arches are more beautiful, it gives me a feeling that it is connected to the Dome of the Rock in Jerusalem and to the old era like the old Souq or Khan al-Tujar in Nablus city* (Children, 9-11).

Gender and age separation: Three types of separation were identified: complete separation, partial separation, and no separation. Providing separation is linked explicitly to culture and religious needs, see Table 5.2.

Table 5.2: Participants' preferences regarding gender separation

Separation between genders			
Type of separation	**Participants**	**Total Number**	**Ideas**
Complete separation	8 (P) 8 (MS) 3 (CH) 3-7 years 6 (CH) 7-11 years 8 (CH) 11-18 years	**33/39**	• Spaces for praying and sleeping and toilets.
Partial separation	6 (P) 8 (MS) 3 (CH) 3-7 years 6 (CH) 11-18 years	**23/39**	• In social spaces (e.g. long visit waiting, eating, and playing).
Partial separation of children older than 13	8 (P) 8 (MS) 6 (CH) 11-18 years	**22/39**	• In the children's spaces.
Partial separation of children older than 7	4 (P)	**4/16**	• In the play areas and other social spaces; this is connected to school policy and religious requirements.
No separation	1 (P)	**1/39**	• Preferred in all social spaces.

Complete separation should be in the praying area and the toilets...we do not prefer to provide complete separation in the area of waiting and eating food because a child might prefer to be with his father more than with his mother, so you need to keep him in the environment of the family… perhaps we can separate them in the play area, and we can give permission for the mother to be with her child when he/she wants to play. So, the most important thing is to provide complete separation in the praying area … children can be with each other until seven years old because we are a Muslim community, and we have cultural needs. After seven years, we prefer areas with different zones and spaces because children have different needs. Thus, you need to separate girls from boys. However, if we need to create only one zone for them, that will not be

appropriate for our culture. According to teenagers, yes, we need to separate them. … Maybe we can follow the school policy. For example, after age seven we can provide separation. I prefer to divide and to give segregation in the waiting area to offer comfort (Mother). … *I created here for men and women. ... Maybe my husband or my father will be with me. So, I prefer not complete separation* (Mother).

If there are girls in the waiting area beside me, I will be nervous, and I will feel uncomfortable. Of course, it's better to provide a small partition between boys and girls. For example, if I sit down with my friends (boys) and there are girls beside us, I will not feel comfortable, I will stop talking to my friends, and I will feel shy (Boy, 15-18 years).

5.1.2 Appropriateness of visitors' areas

All medical staff (10/10) highlighted some problematic issues in Palestinian hospitals related to inadequate environments offered to visitors, particularly in Nablus city, for a number of reasons, including: i) inappropriate location of medical functions, ii) the relationship between the medical departments, iii) lack of space in governmental hospitals. For example, the location of the emergency department at Rafidia Surgery Hospital is adjacent to the main entrance, which causes pressure on staff and anxiety for all users, particularly children.

5.1.3 Age appropriateness of hospitalisation

Medical staff highlighted the lack of age-appropriate spaces in some hospitals. They explained that the age range 0-13 years classified as children for hospital admission. Older children are hospitalised in adults' wards, especially in Nablus city.

In all the Palestinian hospitals, the age range of children is between 0-13 years. In other countries, the age range of children is from 0-18. However, here in Palestine the age range is 0-13 years because of the lack of spaces to hospitalise children. ... So, if we build a new children's hospital, it should be for children from 0-18 years (Medical staff).

5.1.4 Support of the children by family and friends

Three groups of people were identified by children that offer a sense of comfort and happiness. For complete results see Table 5.3.

Table 5.3: Children's preferences in terms of having support from family and friends

Support of the children by family and friends		
Types of support	**Participants' of children**	**Total Number**
Family and friends	4M, 2F (CH) 3-7 years 2M, 1F (CH) 7-11 years 3F (CH) 11-18 years	**12/23**
Friends	2M (CH) 7-11 years 3M, 1F (CH) 11-18 years	**6/23**
Family (i.e. father, mother, siblings, and grandparents	2F (CH) 3-7 years 1F (CH) 11-18 years	**3/23**

The most important are the friends. One can be more comfortable with his friends (Boys, 15-18 years). *… No, I like my mother to be with me, but, I mean, me and my friends walking and playing, but my mum to be in another space in the same place* (Girl, 8-9 years).

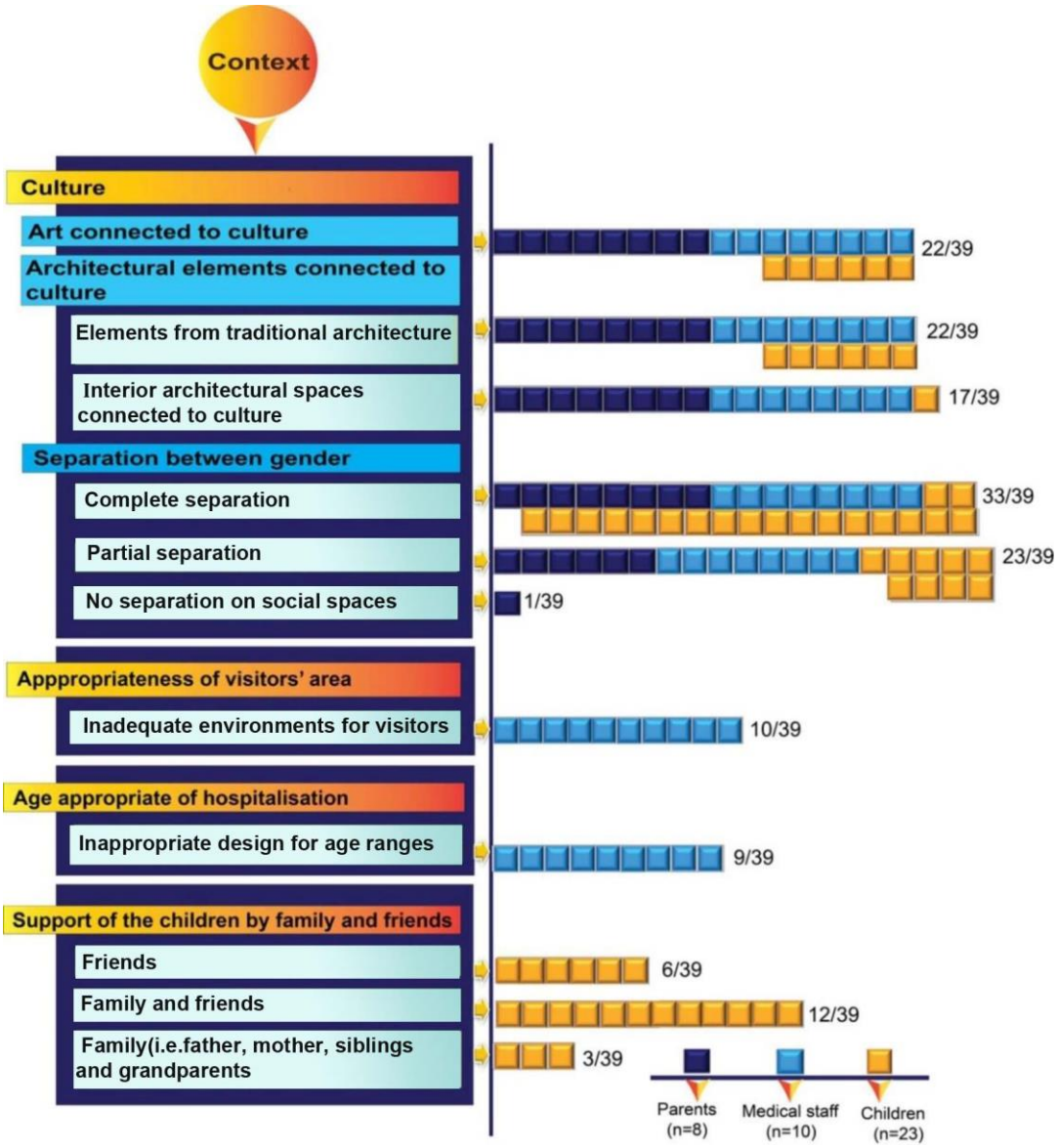


Figure 5.2. Participants' preferences related to the context-specific issues

5.2 Physical environment: interior architecture- and interior design-related themes

Four themes were identified: medical spaces, non-medical spaces, design elements and specific items, and environmental considerations.

5.2.1 Medical spaces

Adult participants identified eight spaces related to emergency: a triage room, radiology and x-ray, laboratories, outpatients, pharmacy, physical therapy and orthopaedic departments, and consultation room. Several design considerations were highlighted related to location, access, relationship with other departments, and image design. For complete results see Table 5.4 and Figure 5.3.

Table 5.4: Preferences of adults regarding medical spaces in terms of location, access, relationships with other departments, and image design

Medical spaces		
Key design issues	**Total Number**	**Ideas**
Location	**8/8 (P)** **10/10 (MS**	• Emergency room away from the main entrance to decrease children's fears, to improve their state of mind, and to make them feel comfortable (App B-1.1).
	3/8 (MS)	• Emergency room close to the x-ray room and labs for quick delivery of samples (App B-1.2).
	2/8 (MS)	• Emergency room away from children's entertainment spaces to provide smooth flow of movement, and to provide children with a sense of safety and calm while they are playing.
	8/9 (MS)	• Triage room adjacent to the emergency department and the outpatient department for immediate medical work, to prevent congestion and to provide easy flow of movement.
	1/8 (MS)	• Triage room beside the reception area in the middle of the atrium and main entrance to provide easy flow of movement, and for diagnosing and classifying patients if they are outpatients, emergency, or need to be hospitalised.
	6/8 (MS)	• Laboratories on the same level as the main entrance and atrium.
	10/10 (MS)	• Outpatient department on the same level as the main entrance (App B-1.3).
	2/10 (MS)	• Physical therapy and orthopaedic departments on the same level as the atrium and main entrance to provide patients with easy access and movement.
Access	**8/8 (P)** **10/10(MS)**	• Easy access to the emergency department.
	8/8 (MS)	• Do not include play areas or any distracting elements in front of the emergency department to provide easy access for the ambulance and the medical staff.
	4/8 (P)	• Consulting room with easy access to consult with doctors to provide parents with information and reassurance about their children.
	1/8 (P)	• Easy access from emergency to a green area (i.e. provide a small courtyard).
	1/8 (P)	• Play areas, particularly for young children, adjacent to the emergency department.
Relationship with other departments	**8/8 (MS)** **1/8 (P)**	• Waiting areas adjacent to the emergency department.
	7/8 (MS)	• A pharmacy close to the emergency department.
	2/8 (MS) **2/8 (MS)**	• X-ray room adjacent to the emergency department. • X-ray room close to children's play areas.
	3/8 (MS)	• Pharmacy close to admission, outpatients and main entrance.
	2/8 (MS)	• Pharmacy close to the emergency department (App B-1.4).
	1/8 (MS)	• Pharmacy ajdacent to the labs.
Image design	**8/8 (MS)**	• Attractive design for triage room to distract the children.
	5/8 (MS)	• Attractive design for x-ray room to alleviate children's fears.

We have here two entrances, the main entrance to the hospital and another entrance for the emergency (Doctors). … *The emergency should not be away from the lab and x-ray to deliver samples easily … We need a waiting and a rest area for children with play area, and we need to see them and observe them from the emergency department* (Nurses). … *I prefer to enter the emergency*

through a green area, a pool might be not for swimming, but only to look at to provide a sense of comfort. This transition area may include open areas for playing (Father).

Why we didn't make an open room for the emergency cases? I imagine myself as a citizen; my son's temperature is very high. I didn't know if my son's case is an emergency, or just needs a clinic. So, why not have here a triage room? … Triage classification to make a quick diagnosis and to be the first contact. I suggest placing it beside the reception area in the middle, and it should be designed in a way to be attractive to children. ... No, we need it as soon as the child enters the hospital so they won't cry and get depressed. Thus, it should not be in the centre beside the reception. All these issues here are related to aesthetics, green and play areas in the main entrance and the reception to make the child feel happy and comfortable. … One can take the samples from emergency to the labs which can be positioned between the outpatient clinics and emergency to deliver the samples in an easy way to the lab (Doctors). ...*The labs should be located away from children because they are crying and are afraid when they see needles. Thus, it is better to be located away from the waiting area that is specialised for children* (Group discussion of medical staff)

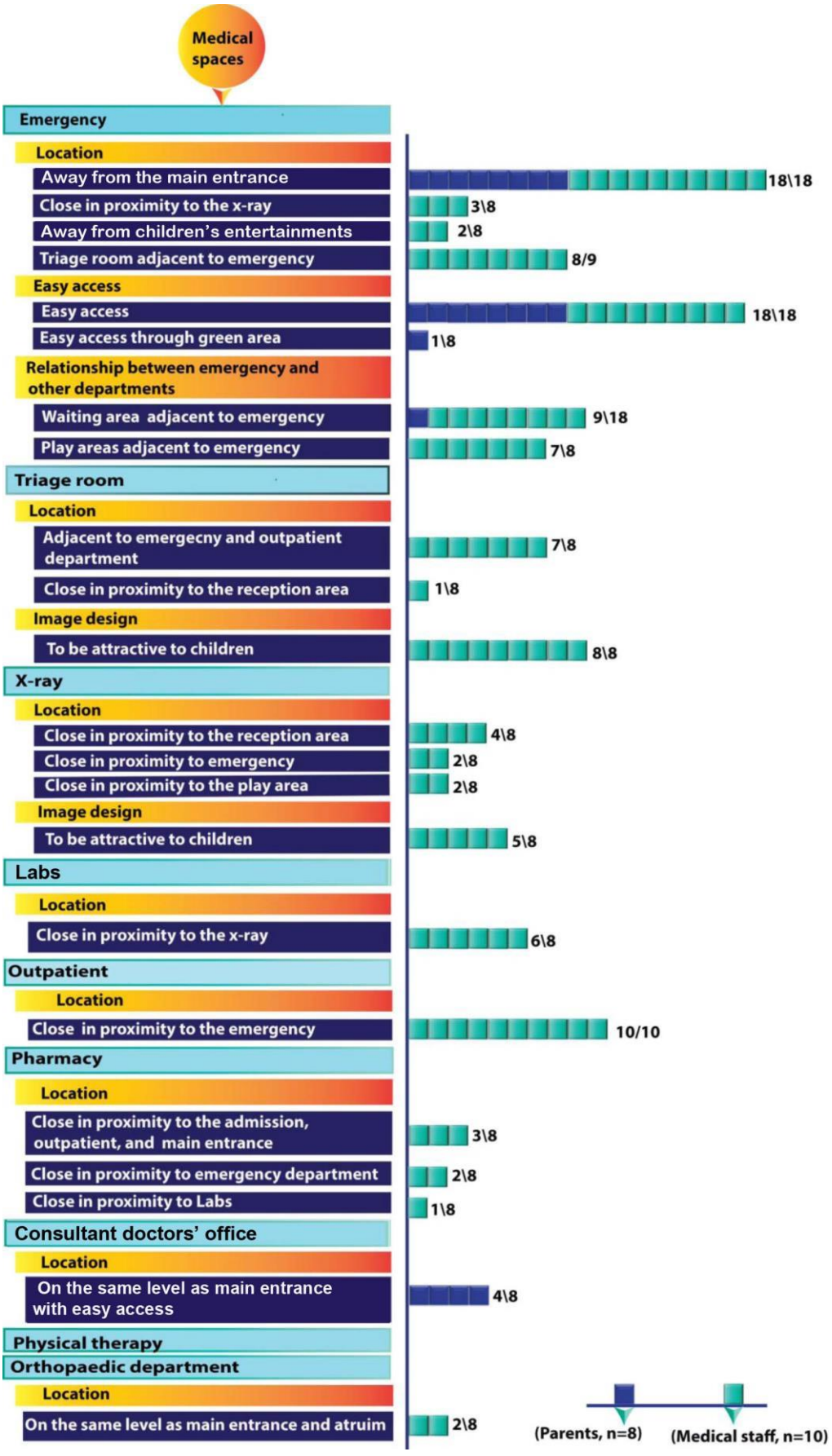


Figure 5.3: Adults' preferences regarding interior design considerations of the medical spaces

5.2.2 Non-Medical Spaces

This section considers the various themes that discuss design considerations related to the non-medical spaces that emerge from the field research. These ideas and design considerations are connected to eleven areas and are discussed below.

Main entrance: Four elements were identified: form and shape, location, attractive distraction elements, and security and safety, see Table 5.5 and Figure 5.4.

Table 5.5: Participants' preferences regarding the main entrance

Main Entrance		
Key design issues	**Total Number**	**Ideas**
Form and shape	**8/8 (P)** **9/10 (MS)** **1M (CH) 3-7 years** **3M, 2F (CH) 7-11 years** **3M, 2F (CH) 11-18 years**	• Combined modern and traditional architectural forms such as arches supported by large circular columns to attract the attention of children and to make the spaces beautiful (Appendix B-2).
	1 **(P)**	• Light and transparent materials (unlike modern style) to provide clear vision and enough light.
Location	**8/8 (P)** **10/10 (MS)**	• The location of the main entrance should not be near the emergency entrance to alleviate the fears of children.
Attractive distractions	**8/8 (P)** **10/10 (MS)**	• Attractive distractions in front of and inside the main entrance (i.e. green areas with small animals, natural elements, water features, coloured glass mobiles, entertainment activities); these items can provide an uplifting first impression, provide tranquillity and a sense of safety, and can decrease (particularly young) children's fears.
Security and safety	**2F (CH) 7-11 years** **5/8 (P)** **8/10 (MS)**	• Fences around the hospital and security in the main entrance.

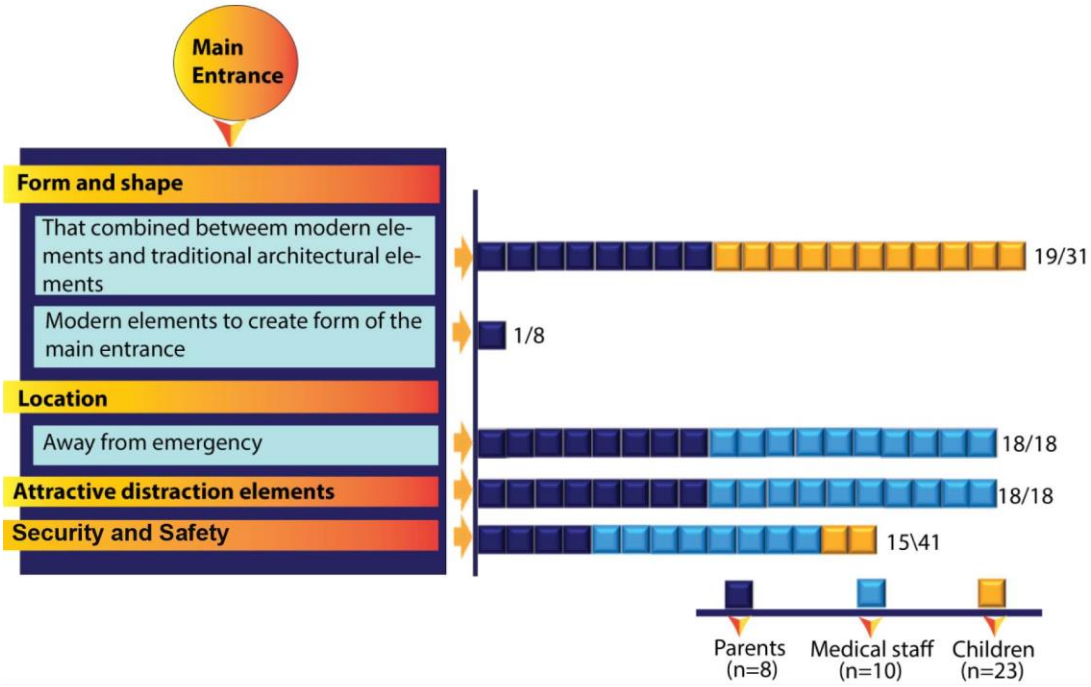


Figure 5.4: Participants' preferences related to the interior and architectural design considerations of the main entrance areas.

Reception and admission areas: Ten issues were identified: location, attractive distractions, design according to age, height of the reception and admission desks, architectural openings, spaces to be connected to the reception to provide comfort, form and shape, types of materials, admission main function, and design to facilitate admission and registration process, see Table 5.6. All preferences related to the reception and admission areas were visualised and presented in Figures 5.7 and 5.8.

Table 5.6: Participant's preferences regarding reception and admission design considerations

Reception and Admission		
Key design issues	**Total Number**	**Ideas**
Location	**8/8 (P)** **10/10 (MS)**	• The reception desk in the centre of the atrium, close to the admission and registration areas to provide easy access and flow.
	7/8 (P) **8/10 (MS)**	• Admission and registration areas adjacent to the reception area.
	4/10 (MS)	• Admission area in the centre of the atrium near the main entrance to provide easy access and flow of movement.
Attractive distractions	**8/8 (P)** **10/10 (MS)**	• Different types of attractive elements near the reception desk to distract children and alleviate their fears (e.g. colours, play areas, lights, smiley faces, and a lot of mirrors).
	4/23 (CH) 11-18 years	• Modern design in the reception area that includes decorative and attractive elements with different forms and shapes to stimulate and provide a comfortable environment for children.
	8/8 (P) **3/10 (MS)**	• The reception area with the admission area to provide easy wayfinding and flow of movement.
Design according to age	**1 (P)**	• Interior design spaces for the reception areas to be appropriate to three age ranges of children (i.e. 0-6, 6-12, 12-18 years) and to help parents find their way more easily and quickly.
	9/10 (MS)	• Interior design space for the reception areas to be appropriate to three age ranges, but 12-18 year olds to be divided into male and female. Medical staff linked this to religious and cultural needs, and felt it would prevent congestion.
	1/10 (MS)	• The admission area to be divided into three age ranges (i.e. 0-6, 6-13, 13-18 years) to alleviate congestion especially when children need to enter the outpatients department.
Height of the reception and admission desk	**7/8 (P)** **9/10 (MS)**	• The reception desk should not be too high; however, it is important for it to be at different levels to allow the receptionist to see the young children, but also give them privacy for working.
	1/8 (P)	• An admissions desk that is at the right level for eye contact with young children during the registration process.
Architectural openings	**8/8 (P)** **6/8 (MS)**	• Open design spaces for the reception area, but ensure privacy for males and females. This should also provide a smooth flow of movement for parents and visitors, clear vision, and prevent congestion.
Spaces to be connected with the reception area to provide comfort	**3/8 (P)** **10/10 (MS)**	• Reception spaces with green areas to provide a pleasant and welcoming environment (Figure 5.5).
Form and shape	**8/8 (P)** **1/10 (MS)** **2F (CH) 11-18 years**	• Smooth and circular form and shapes for the reception desk (Figure 5.6). Participants highlighted three reasons for this: i) to provide easy flow of movement, ii) children like smooth, circular and flexible lines, and iii) they like nature, which generally doesn't include straight lines.
	1/10 (MS)	• A circular form and shape to the admissions desk to provide ease of movement.
	4/8 (P)	• The admissions desk in an L-shape but make the reception desk circular. This would help visitors distinguish between them.
Types of materials	**1/10 (MS)**	• Durable, sustainable and easy to clean materials, particularly for furniture. For intance, medical staff suggested using granite for the admissions desk.
Admission main function	**3/10 (MS**	• Registration for three types of patients: emergency, general, and those needing hospitalisation.
Design to facilitate the registration and admission processes	**1/8 (P)**	• Distraction elements (e.g. aquariums) to distract the attention of young children.
	1/8 (P)	• Adequate and comfortable furniture (i.e. seats and desks).
	1/10 (MS)	• Enough computers and internet access for employees.

Figure 5.5: The preferences of interior architectural design considerations for the reception area—notice the prevalence of architectural openings and how the reception area connects with a green area (Parents' workshops).

View from mothers' model | **View from fathers' model**

Figure 5.6: The preferences of interior design elements regarding form and shape – notice prevalence of smooth and circular shapes and forms for the reception desks (Parents' workshops).

I like the reception that has modern, beautiful elements and with several types of shapes. For example, I like using organic lines (Girl, 13-14 years). *… the child loves circles very much, his drawings always have circles; he loves shapes of circles, incubation. ... Also, we should not forget that nature inherently does not have sharp angles. All the things are smooth. We should prevent sharp edges. Thus, the area of the reception took the circle form and shape* (Mothers).

I divided the reception into three departments (0-6, 6-12, 12-18 years) to facilitate the flow and the movements of patients to find the unit that can be appropriate for their child's case (Father). *We prefer to divide the age ranges of children into three age ranges (0-6, 6-12, 12-18) (M&F). Dividing children into three age ranges can help to alleviate the congestion particularly in the outpatient's reception area, where a huge number of children are crying when they arrive with their parents* (Medical staff).

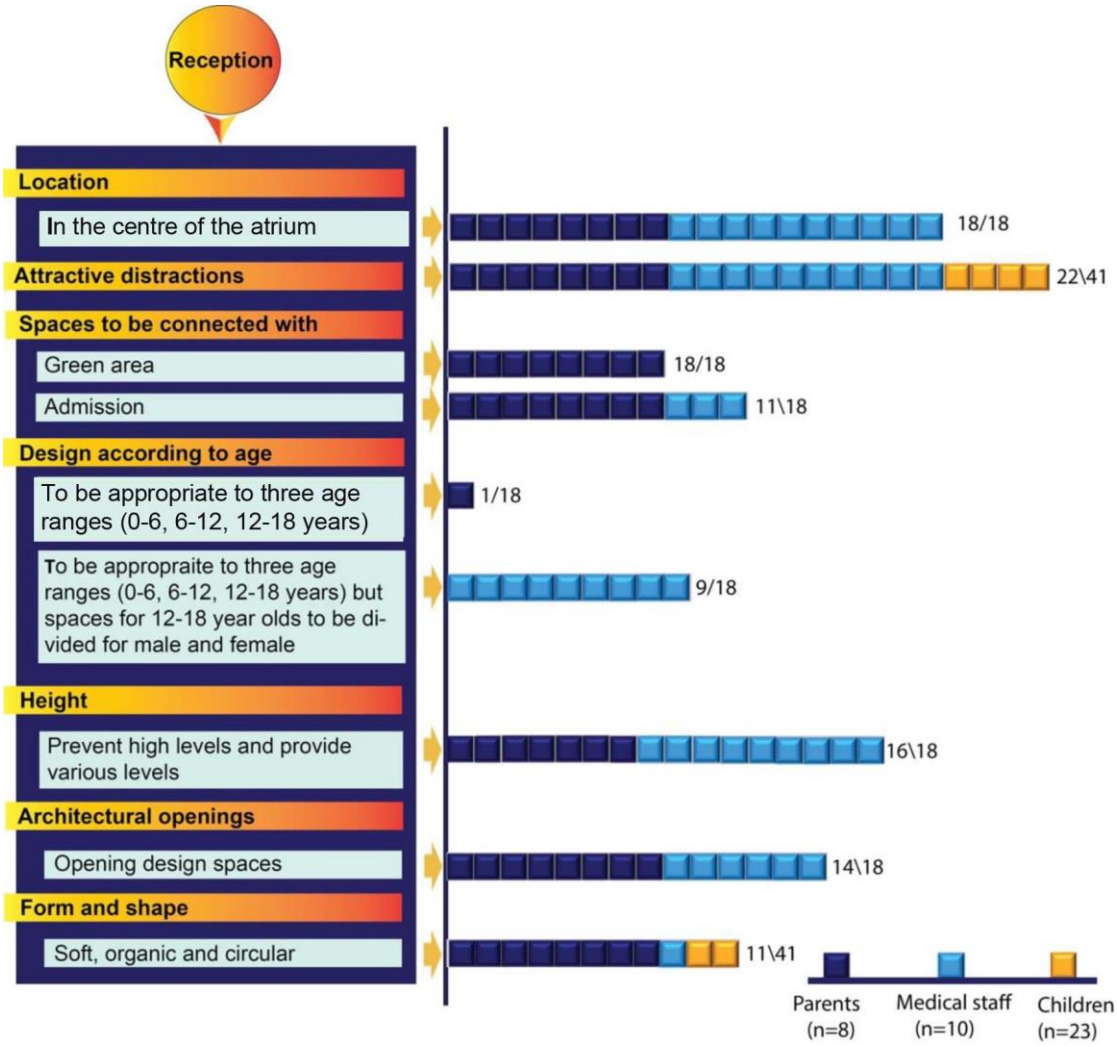


Figure 5.7: Participants' interior design and interior architectural needs and considerations regarding reception areas.

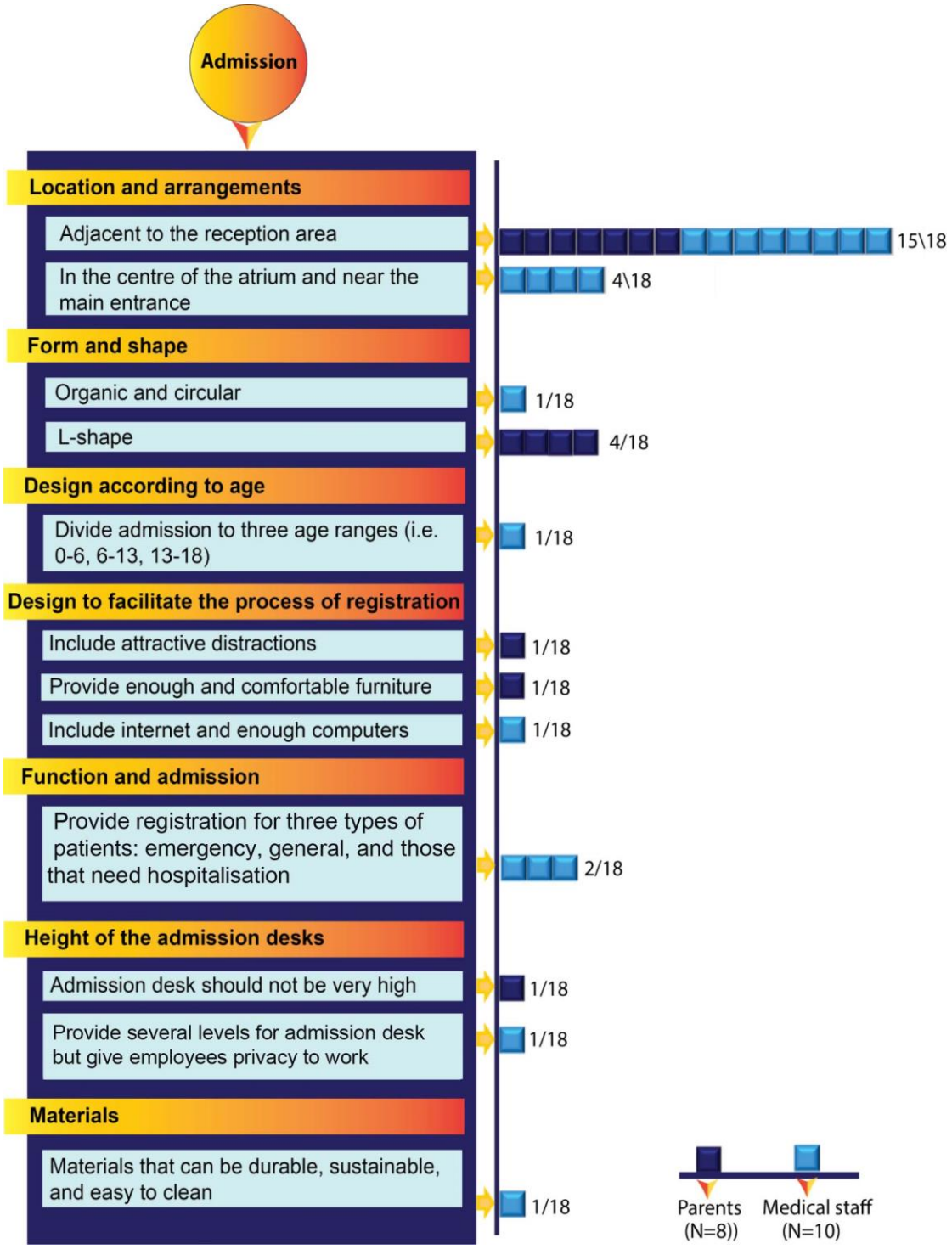


Figure 5.8: Participants' interior design and interior architectural needs and considerations regarding the admissions area.

Waiting area: Eleven issues were identified: types of waiting areas; architectural openings and arrangements; environmental issues – noise and natural

ventilation; thematic design; appropriate amount and comfortable spaces for long - and short-term visits; attractive distractions; types of materials; design according to age; separation between gender; family spaces, and functional spaces to be connected with long visit waiting areas, see Tables 5.7-5.9 and Figure 5.9.

Table 5.7: Participants' preferences regarding waiting areas

Waiting Areas		
Key design issues	**Total number**	**Ideas**
Types of waiting area	**6/8 (P)** **6/8 (MS)**	• Two types of waiting areas: one for long visits, one for short visits.
	8/8 (MS)	• Waiting area for short visits adjacent to admission, reception and outpatient areas.
Architectural openings and arrangements	**6/8 (P)** **5/9 (MS)**	• Two types of waiting areas with a green outdoor area to have fresh air and proper ventilation.
	7/8 (P)	• An open design for the waiting area, but one that provides privacy where necessary.
	2/10 (MS)	• A waiting area for children and their parents adjacent to the emergency department.
	2/10 (MS)	• A waiting area for children away from the labs and the medical spaces to alleviate children's fears.
Environmental issues - preventing noise and natural ventilation	**2/8 (P)**	• A quiet area, particularly in the long visit waiting area for parents to rest and relax.
	2/8 (P) **7/8 (P)**	• Natural ventilation in the waiting area.
Thematic design	**4/8 (P)**	• Themes connected to nature (i.e. birds, small animals, water features, etc.) for the interior design spaces.
Appropriate amount and comfortable spaces for long- and short-term visits	**1/8 (P)**	• Enough spaces for waiting in the short visit area, and separate the two waiting areas. This is due to the larger number of people using the short-term visiting area.
Attractive distractions	**4/8 (P)**	• Several types of attractive distractions (e.g. water features, spaces for drawing, play area, etc.) to distract attention of children and to provide them with a comfortable environment.
Materials	**3/8 (P)**	• Materials that contribute to provide clear vision and transparency, helping to connect the waiting area with the restaurants and the outside areas, and provide open design spaces.
Design according to age	**3/8 (P)**	• The waiting area spaces to be devided according to two age ranges (i.e. 0-8, 8-18 years).
	1/8 (P)	• The design for the waiting area to be according to three age ranges (0-6, 6-12, 12-18 years).
	9/10 (MS)	• The waiting areas of children to be divided to three age ranges (i.e. 0-6, 6-13, & 13-18), however, 13-18 years to be separate, one for males and one for females, and to reduce congestion, particularly in the waiting area connected to the outpatient department (also see Section 5.1.1).
Separation between genders	**5/8 (P)**	• Partial separation between males and females.
	3/8 (P) **8/8 (MS)**	• Partial separation between boys and girls in waiting areas, however, it is important to provide complete separation for those age between 13-18 years for cultural reasons.
Family spaces	**3/8 (P)**	• Family spaces to socialise and to provide contact with the children.
Functional spaces to be connected with waiting spaces	**See Table 5.8**	• Adults preferred different functions and facilities for the long visit waiting area.

Table 5.8: Preferences of adults in terms of functional spaces that can be connected with waiting areas to provide comfort

Functions and spaces to be connected with the waiting area	Participants (P, MS)	Total Number
• Play area and entertainment activities according to age (e.g. music, TV, etc.).	8 (P) 10 (MS)	**18/18**
• Green area, outdoor spaces to relax in, and restaurants.	7 (P) 10 (MS)	**17/18**
• Prayer area, services for sleeping, administration, and smoking areas.	4 (P) 9 (MS)	**13/17**
• Area for breastfeeding and changing diapers.	5 (P) 8 (MS)	**13/16**
• Changing room and spaces for medical staff to sleep and rest.	8 (P)	**8/8**
• Office for parents to use computers, and family spaces.	4 (MS)	**4/8**

It is important to connect long visit, and short visit waiting areas inside the children's hospital with a green outdoor area so that one can have fresh air and a calm environment to have a rest. …The green outdoor area should have part of it to be open and another part closed to use in winter (Parents).

We used glass partitions particularly in the waiting area and in the restaurant area to connect the waiting area with water features and natural elements to help children move between these two spaces comfortably. We concentrated on transparency because it is important for the mother to observe her children (Mothers).

I prefer not to divide age ranges of children to three age ranges; maybe we can follow the school policy. For example, after seven years you can separate genders. Then, this can be applied to the waiting area … to provide comfort. I think if you need to separate between genders, you can do that only for two age ranges, but not to divide them from 0-6, 6-12, and 12-18 years, however, I can suggest dividing them from 0-8, and 8-18 years (Mothers).

In the waiting area, there should be a television and some features related to water, an area for smoking, and non-smoking, outdoor green area, toilets, area for music that has a piano, and playing the guitar (Father). *In the waiting area, I concentrated on the activities for children according to age, spaces for toddlers who are crawling on the ground, and to include areas with fences for babies who will be carried by their mother and father to play on the ground. There are vending machines because children at this age like to eat snacks… something quick to eat during the registration process* (Mother). *We need a changing room, a room for the nurses to have a rest with services like a shower to relieve the stress, and the rest room to be opened to a green area in order to smoke and*

relax (Male Nurses*). In the longer visit area, I created a green space that can also be a play area, where parents can supervise their child. Also, it can include age-appropriate toys and games that can attract the attention of the child* (Mother).

The findings also showed that children included waiting areas in their favourite spaces, see Table 5.9.

Table 5.9: Children's preferences regarding types of waiting areas

Children's preferences regarding waiting areas		
Waiting areas	**Participants (CH)**	**Total number**
Outdoor waiting area	2M (CH) 3-7 years 4M, 2F(CH) 7-11 years 4F, 3M (CH) 12-18 years	**15/23**
Indoor circular form for children	3M, 2F (CH) 7-11 years 3M, 2F (CH) 11-18 years	**10/23**
Home-like design waiting area	1M (CH) 3-7 years 2F (CH) 7-11 years 2F, 3M (CH) 11-18 years	**8/23**
Indoor L shape for adults	1M (CH) 3-7 years 2F (CH) 7-11 years 2F (CH) 11-18 years	**5/23**

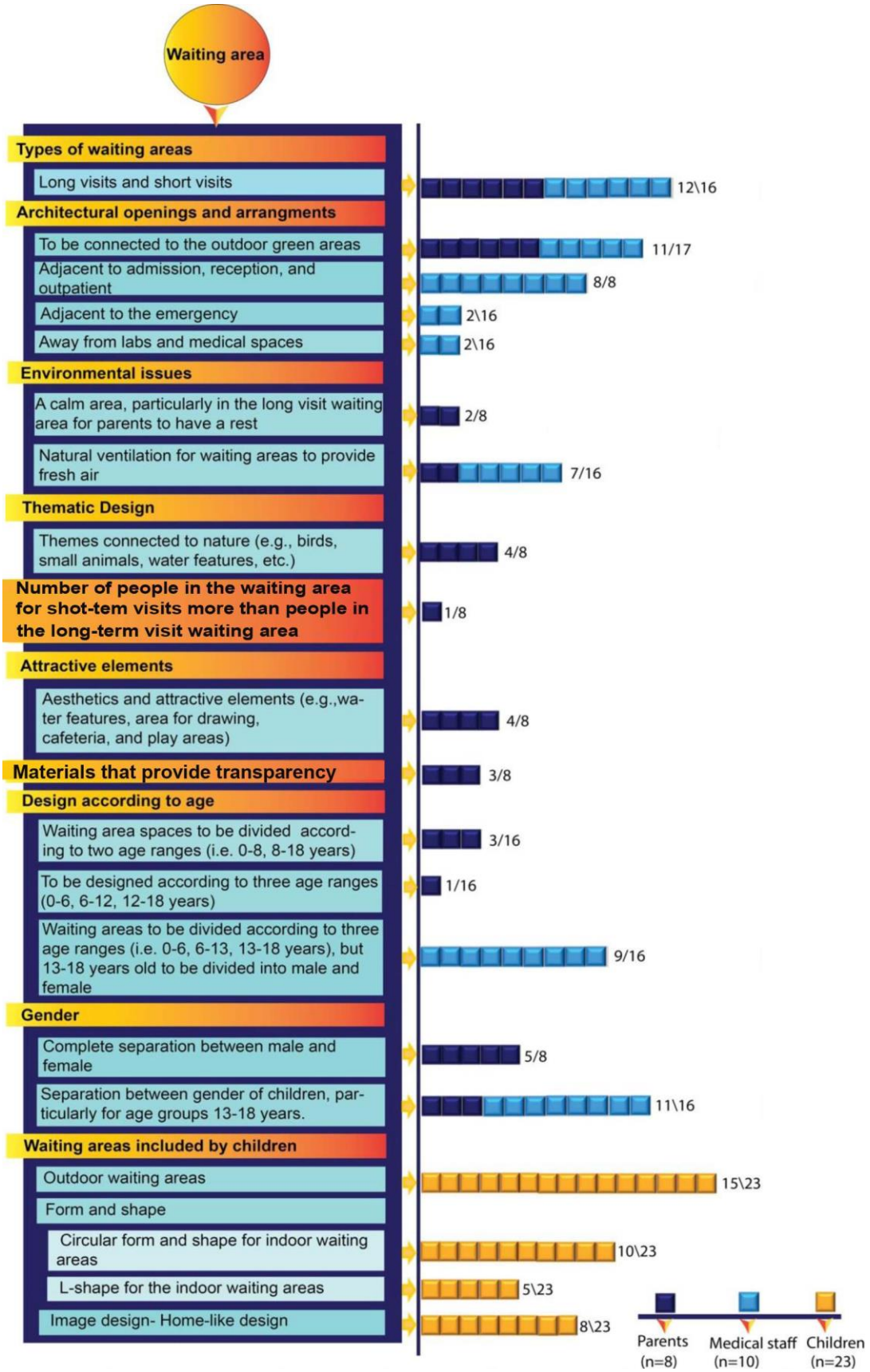


Figure 5.9: Participants' interior design and interior architectural needs and considerations regarding the waiting areas

Play areas and entertainment activities: Six issues were identified: location, play areas for children according to age, separation between genders, architectural openings, hygiene issues, and types of games and entertainment activities, see Tables 5.10-5.13. All participants' preferences related to play areas and entertainment activities were visualised and presented at the end of ths section (see Figures 5.10 a & b),

Table 5.10: Participants' preferences regarding play areas

Play areas		
Key design issues	**Total number**	**Ideas**
Location	**17/17 (P & MS)**	• Play areas away from the medical spaces to improve children's state of mind and to provide smooth flow of movement.
	16/17 (P & MS)	• Play areas adjacent to the waiting and reception areas to distract children's attention.
	10/17 (P & MS)	• A play area for children adjacent to emergency departments to decrease children's stress.
Play areas for children according to age	**See Table 5.11**	• Parents and medical staff indicated different preferences.
Separation between genders	**3/8 (P)**	• Partial separation between male and female of children in the play areas, particularly for the age range 0-15 years. This can help children play with each other and to choose the types of games smoothly and quickly.
		• Parents chose to provide separation above 15 years. They linked this with religious and cultural reasons and felt it would make the children feel more comfortable.
	8/9 (MS)	• Complete separation of boys and girls above 13 years.
	See Table 5.12	• Both similarities and differences were indicated among participants of children concerning spatial and visual separation.
Architectural openings	**8/8 (P)** **10/10 MS)**	• Participants showed their preferences for an open design for all the play areas and entertainment activities to allow them to watch their children while they are playing and to provide a smooth flow of movement.
Hygiene issues	**9/9 (MS)**	• Hygiene gel machines positioned at a low level in the play areas to control infection. • Good ventilation for children's spaces to control infections. • Test of play areas (by taking samples to the labs) once a week. • Materials that are easy to clean (e.g. using tiles to decorate the walls) in the main entrance and the atrium.
Types of play areas and entertainment activities	**See Table 5.13**	• Several types of play areas, games and entertainment activities were presented in participants' artwork (App B-3). There are differences and similarities regarding the inclusion of indoor and outdoor play games and activities to provide children with comfort and distraction.

Table 5.11: Parents' and medical staff's preferences regarding the inclusion of play areas for children according to age

Play areas according to age		
Play areas	**Total Number**	**Ideas**
Play areas according to four age ranges	**1/8 (P)**	• The spaces of play areas to be according to four age ranges (i.e. 0-6 , 6-11, 11-14, 14-18 years). The participants think this division will help decrease congestion and alleviate children's stress.
Play areas acccording to three age ranges	**4/9 (MS)**	• The spaces of play areas to be according to three age ranges (i.e. 0-6, 6-13, 13-18). However, it is important to separate spaces of play areas for the age range 13-18 years into two zones; female and male for cultural reasons.
Play areas according to two age ranges	**3/8 (P)**	• The play areas to be according to only two age ranges (i.e. 0-8, 8-18 years) because young children like to play with older children. However, it is better to include different types of games in one open space to give children the chance to choose their favourite games.
Play areas for age range 3-6 years	**4/8 (P)**	• Play areas, particularly for age range 3-6 years (i.e. drawing areas, lego, stickers, computer games and other kinetic games because this age range like to move a lot.
Play areas for toddlers	**4/8 (P)**	• Spaces for toddlers to crawl and play.

Table 5.12a: Participants' preferences regarding the types of play areas and entertainment activities

Games and entertainment activities			
Types of games and entertainment activities	**Participants: parents, children and medical staff**	**Total**	**Ideas**
Indoor and outdoor types of games and entertainment activities to provide comfort and distraction for children	8 (P) 7 (MS) 4 (CH) 3-7 years 2 (CH) 7-11 years 3 (CH) 11-18 years	**24/39**	• Listening to music
	7 (P) 4 (MS) 5 (CH) 3-7 years 4 (CH) 7-11 years 2 (CH) 11-18 years	**22/39**	• Aquariums
	8 (P) 8 (MS) 1 (CH) 3-7 1 (CH) 11-18	**18/39**	• Drawing
	5 (P) 5 (MS) 1 (CH) 3-7 years 3 (CH) 7-11 years 3 (CH) 11-18 years	**17/39**	• Swimming
	6 (P) 4 (MS) 3 (CH) 3-7 years 3 (CH) 7-11 years 3 (CH) 11-18 years	**17/39**	• Football
	3 (P) 6 (MS) 4 (CH) 3-7 years 5 (CH) 7-11 years	**17/39**	• Playing with sand
	4 (P) 5 (MS) 1 (CH) 3-7 years 2 (CH) 7-11 years 4 (CH) 11-18 years	**16/36**	• Watching television and watching films
	6 (P) 6 (MS) 2 (CH) 11-18 years	**17/39**	• Using internet
	5 (P) 3 (MS) 3 (CH) 3-7 years 4 (CH) 7-11 years	**15/39**	• Stickers
	4 (P) 8 (MS) 3 (CH) 11-18	**15/39**	• Computers, and laptops
	8 (P) 6 (MS) 1 (CH) 11-18 years	**15/39**	• Technology games (e.g. DVD, video games, X-box, etc.)
	5 (P) 2 (MS) 1 (CH) 11-18 years	**8/39**	• Visiting museums
	1 (CH) 3-7 years 2 CH) 7-11 years 2 (CH) 12-18 years	**8/39**	• Playing music
	1 (P) 4 (CH) 3-7 years 3 (CH) 7-11 years	**8/39**	• Including a petting zoo
	3 (P) 2 (CH) 3-7 years 2 (CH) 7-11 years	**7/39**	• Seesaw games

Table 5.12b: Participants' preferences regarding the types of play areas and entertainment activities

Games and entertainment activities			
Types of games and entertainment activities	**Participants: parents, children, and medical staff**	**Total number**	**Ideas**
Indoor and outdoor types of games and entertainment activities to provide comfort and distraction for children	1 (P) 3 (MS) 1 (CH) 3-7 years 2 (CH) 7-11 years	**7/39**	• Playing discovery games
	2 (P) 3 (CH) 3-7 years 1 (CH) 7-11 years	**6/39**	• Playing with small toys and balloons
	3 (P) 1 (CH) 3-7 years 2 (CH) 7-11 years	**6/39**	• Sliding games
	1 (P) 4 (CH) 3-7 years 1 (CH) 7-11 years	**6/39**	• Jumping and moving
	1 (P) 2 (CH) 3-7 years 1 (CH) 7-11 years	**4/39**	• Games for learning
	3 (P) 1 (CH) 3-7 years	**4/39**	• Skating
	1 (CH) 3-7 years 2 (CH) 7-11 years 1 (CH) 11-18 years	**4/39**	• Walking in the outdoors
	2 (P) 1 (CH) 7-11 years 1(CH) 11-18 years	**4/39**	• Reading
	3 (CH) 3-7 years 1 (CH) 7-11 years	**4/39**	• Bouncy toys
	2 (CH) 3-7 years 1 (CH) 7-11 years	**3/39**	• Camping
	3 (CH) 7-11 years	**3/39**	• Cops and robbers
	2 (CH) 11-18 years	**2/39**	• Learning music
	2 (CH) 7-11 years	**2/9**	• Climbing frames
	2 (P)	**2/9**	• Lego
	1 (CH) 3-7 years 1 (CH) 7-11 years	**2/39**	• Festivals, dancing and playing with hoops
Games for learning and developing thinking, language and psychology	5 (P)	**5/39**	• Blowing bubbles and educational games to improve their state of mind
Personal things	1 (P) 1 (CH) 3-7 years	**2/39**	• Playing with their own toys

Table 5.13: Children's preferences regarding the provision of separation in the play areas between genders

Separation in the play areas			
Separation	**Participants**	**Total Number**	**Ideas**
Provide separation	3 (CH) 3-7 years 6 (CH) 11-18 years	**9/23**	• Separation in the play areas and entertainment activities between boys and girls.
No separation	1 (CH) 3-7 years 6 (CH) 7-11 years 2 (CH) 11-14 years	**9/23**	• Regardless of age range, boys do not mind if girls are in the play area. Also, girls do not mind if boys are in the same play areas. However, both genders prefer to play with their own gender.

Maybe we can provide a play area adjacent to the waiting area for the emergency to alleviate children's stress. We divided the main entrance of the hospital into two parts; one for the entertainment things and the other for the medical issues in order not to affect the psychological issues of children (Medical staff).

Maybe one can provide a small museum. … These spaces should be divided according to children's age. I worked hard, and I divided it according to four age ranges (0-6, 6-11, 11-14, and 14-18 years). Furthermore, there should be segregation between them in the cinema (Father)…. *That means there should be age-appropriate games. For example, we should not put a boy of ten months to play with a girl who is six years old. However, maybe we can include a swimming pool for children because they usually like swimming… Some children have differences. Some of them like to play games that need more room to move. For example, my child likes to draw more than to play, however, the child of his uncle who has the same age likes to play kinetic games. So, in this way every child can choose the game which is suitable for him* (Mothers)… *Don't divide too much, this is my perspective. For example, the child of 7 or 8 years may like to play with the child of two years. But, when you talk about children with age range 15 or 16 they like to play games (i.e. Play Station and video games) we can provide special zone for them to play* (Mothers).

Open spaces can help the child listen to music while he is playing and can give a chance for his father to watch him while he is playing. I prefer an open hall to look like a park… The park, for example, provides several steps, a little ramp, small flowers, small pool and balls for children to jump on (Parents).

Now children have two areas: the playground and video games. The playground has a seesaw, drawing area and sliding toys or games. I have suggested 50% outdoor and 50% indoor. Maybe there is a part with animals and fish and other things like birds, television, sand and blocks for children to play with, etc.

Psychologically, children like to play; for example, my children are always looking for sand to play with… This generation is smart and is always looking for portable devices to play with such as IPad. They also need cinema to watch films, X-Box, Play Station, television, and PC I-Pads. … There is a child who is looking for things or likes to discover things and can see nature and planets e.g. a small museum (Father). *When I enter the reception area, I like to find many things that can be beneficial for children. For example, television for children to watch their cartoon films… or I can send my child to a play area that includes simple games* (Mother).

The preferences of all children regarding their favourite games and entertainment actvities are presented in Table 5.14.

Table 5.14: Children's preferences regarding types of games and entertainment activities

Children's preferences of games and entertainment activities	The participants of children	Total number of children
• **Aquariums**	5 (CH) 3-7 years 4 (CH) 7-11years 2 (CH) 11-18 years	**11/23**
• **Football**	3 (CH) 3-7 years 3 (CH) 7-11 years 3 (CH) 11-18 years	**9/23**
• **Listening to music**	4 (CH) 3-7 years 2 (CH) 7-11 years 3 (CH) 11-18 years	**9/23**
• **Playing with sand**	4 (CH) 3-7 years 5 (CH) 7-11 years	**9/23**
• **Swimming**	1 (CH) 3-7 years 3 (CH) 7-11 years 3 (CH) 11-18 years	**7/23**
• **Stickers**	3 (CH) 3-7 years 4 (CH) 7-11 years	**7/23**
• **Including a petting zoo**	4 (CH) 3-7 years 3 (CH) 7-11 years	**7/23**
• **Watching television**	1 (CH) 3-7 years 2 (CH) 7-11 years 4 (CH) 11-18 years	**7/23**
• **Jumping and moving**	3 (CH) 3-7 years 1 (CH) 7-11 years	**5/23**
• **Playing with small toys and balloons**	3 (CH) 3-7 years 1 (CH) 7-11 years	**4/23**
• **Seesaw games**	2 (CH) 3-7 years 2 (CH) 7-11 years	**4/23**
• **Bouncy toys**	3 (CH) 3-7 years 1 (CH) 7-11 years	**4/23**
• **Games for learning**	2 (CH) 3-7 years 1 (CH) 7-11 years	**3/23**
• **Discovery games**	1 (CH) 3-7 years 2 (CH) 7-11 years	**3/23**
• **Sliding games**	1 (CH) 3-7 years 2 (CH) 7-11 years	**3/23**
• **Camping**	2 (CH) 3-7 years 1 (CH) 7-11 years	**3/23**
• **Cops and robbers**	3 (CH) 7-11 years	**3/23**
• **Computers and Laptops**	3 (CH) 11-18 years	**3/23**
• **Walking in the outdoor area**	2 (CH) 7-11 years 1 (CH) 11-18 years	**2/23**
• **Learning music**	2 (CH) 11-18 years	**2/23**
• **Climbing frames**	2 (CH) 7-11 years	**2/23**
• **Drawing**	1 CH) 3-7 years 1 (CH) 11-18 years	**2/23**
• **Festivals, dancing and playing with hoops**	1 (CH) 3-7 years 1 (CH) 7-11 years	**2/23**
• **Reading**	1 (CH) 7-11 years 1(CH) 11-18 years	**2/23**
• **Skating**	1 (CH) 3-7 years	**1/23**
• **Visiting museums**	1 (CH) 11-18 years	**1/23**
• **Technology games (e.g. DVD, video games, x-box, etc.)**	1 (CH) 11-18 years	**1/23**

I included a small library, I love reading novels when I'm feeling bored. Here is a place for recording voice, I love singing. … Here is a cinema, when I'm feeling bored I can watch films, here is a small restaurant and here outside there are seats, volleyball court and swimming pool. I like swimming and recording studio sound, particularly when I'm being angry (Girl, 15-16). *Here there is a cinema, a stadium and Volleyball court. There is a stadium for basketball for people to play, and there is one for children … there are sliding games, soil and this is a seesaw for children* (Girls, 9-11 years).

Comparing the preferences for including entertainment activities and play areas, the children aged 11-18 years preferred six types of entertainment activities that are not included by those aged 3-11 years. These activities are: visiting museums, using internet, computers, laptops, and learning music. On the other hand, there were some entertainment activities and games that were preferred only by young children aged 3-7, and 7-11 years, see Table 5.15.

Table 5.15: Games and entertainment activities preferred only by young children (3-7, 7-11 years)

Types of games and entertainment activities included by younger children	Participants		Total Number
	3-7 years	7-11 years	
• **Playing with sand**	4/9	5/6	**9/15**
• **Zoo**	4/9	3/6	**7/15**
• **Playing with stickers**	3/9	4/6	**7/15**
• **Swings**	3/9	3/6	**6/15**
• **Jumping games**	4/9	1/6	**5/15**
• **Seesaw games**	2/9	2/6	**4/15**
• **Bouncy toys**	3/9	1/6	**4/15**
• **Games for learning**	2/9	1/6	**3/15**
• **Sliding**	1/9	2/6	**3/15**
• **Discovery activities**	1/9	2/6	**3/15**
• **Camping**	2/9	1/6	**3/15**
• **Festivals of music and playing with hoops**	1/9	1/6	**2/15**

Although there are some differences between all age ranges of children in terms of including entertainment activities and games, there are seven entertainment

activities and games that all age ranges of children included in their artwork (see Table 5.16).

Table 5.16: Entertainment activities and types of games that area preferred by children of all age ranges

Types of games and entertainment activities included by all age ranges of children	Children's preferences		Total Number
	3-11 years	12-18 years	
• Aquariums	(5F, 4M)	(2F)	11/23
• Football	(4F, 2M)	(2F, 1M)	9/23
• Listening to music	(4F, 2M)	(2F, 1M)	9/23
• Swimming	(2F, 2M)	(2F, 1M)	7/23
• Watching television	(1F, 2M)	(1F, 3M)	7/23
• Fishing	(1F, 2M)	(1M)	4/23
• Walking in the outdoors areas	(1M, 2F)	(1F)	4/23
• Playing music	(2M, 1F)	(2F)	5/23

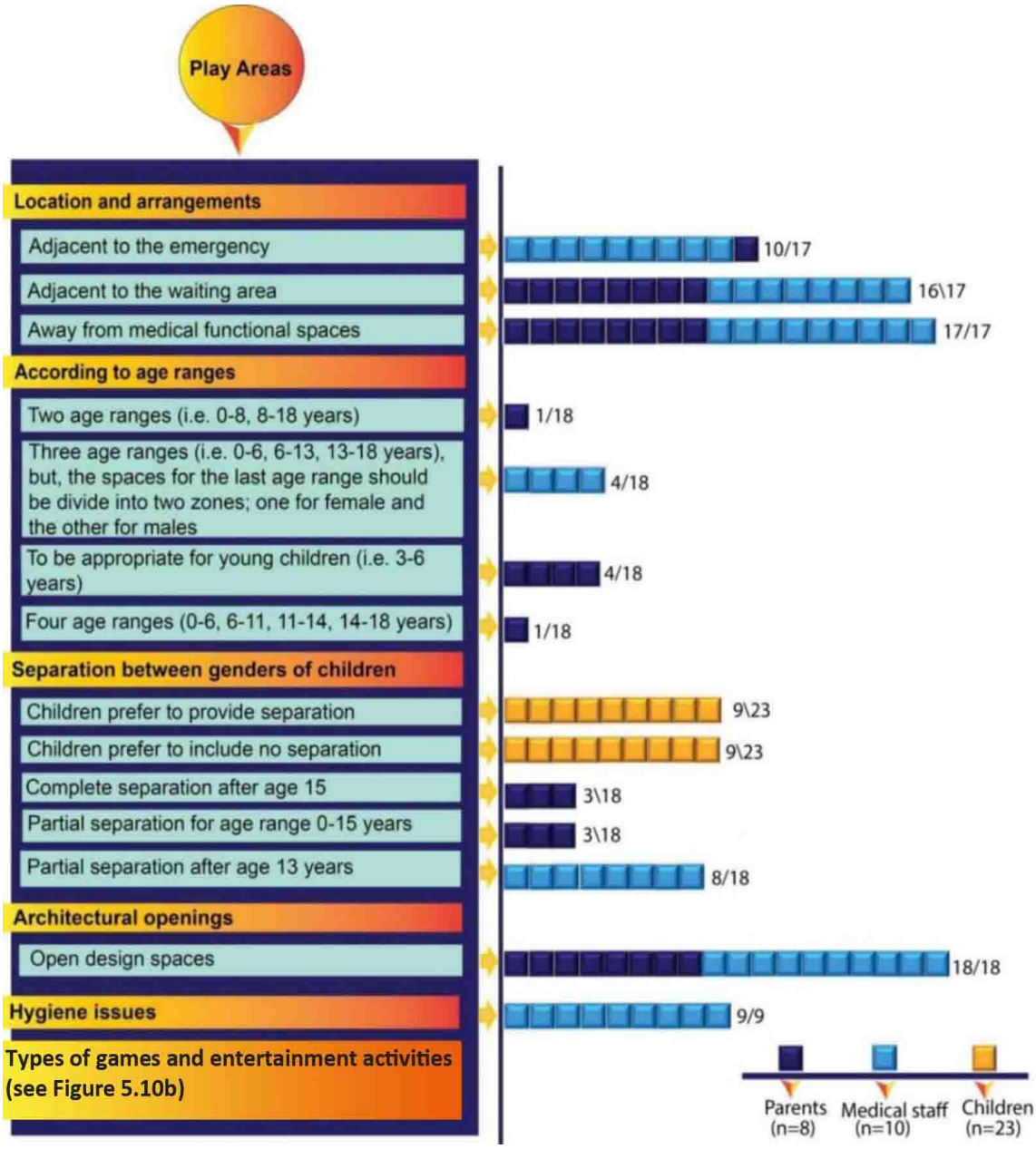


Figure 5.10a: Participants' interior design and interior architectural considerations and needs regarding the play areas

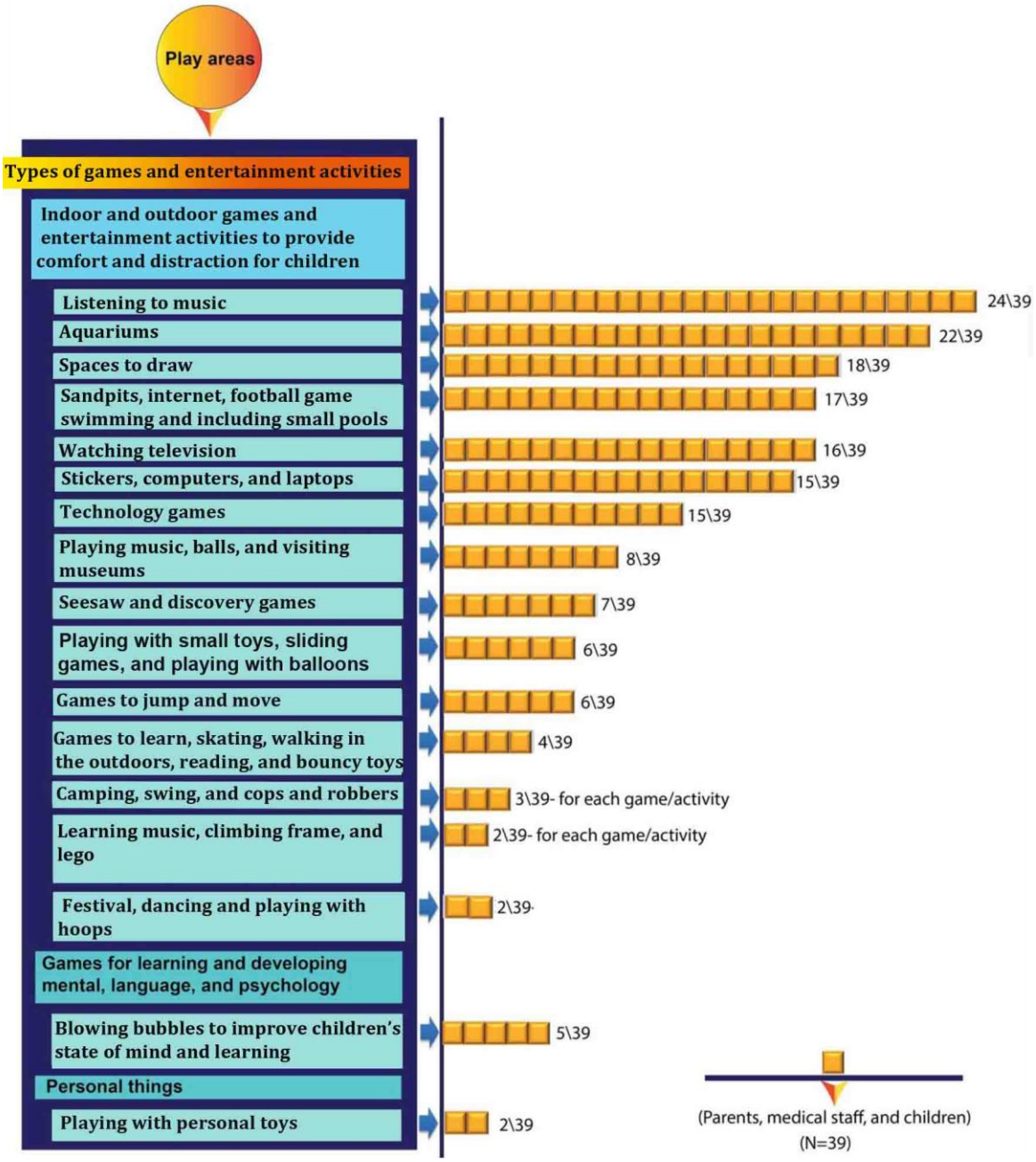


Figure 5.10b: Participants' preferences regarding types of games and entertainment activities

Other supportive spaces: Four additional, supportive spaces were identified: administration, car park, accounting, and spaces for having food. Several design considerations were highlighted by participants, see Table 5.17.

Table 5.17: The complete results related to the participants preferences regarding spaces for food, administration, car park, and accounting department (cashier).

Spaces for eating, administration, accounting (cashier), and parking			
Key design considerations	**Participants**	**Total number**	**Ideas**
Architectural openings and arrangments	8 (P) 10 (MS) 2 (CH) 3-7 years 6 (CH) 11-18 years	**26/41**	• Connect the eating areas with natural water features.
Types of spaces for having food	4 (P) 10 (MS) 6 (CH) 7-11 years 2 (CH) 12-14 years	**22/41**	• Cafeteria and restaurants.
	4 (P) 4 (CH) 11-18 years	**8/41**	• Home-like designed kitchen. Participants explained they would feel comfortable with such a design.
	7 (CH) 3-7 years	**7/41**	• Familiar food.
Materials	8 (P) 10 (MS)	**18/41**	• Transparent materials for partitions to provide clear vision and friendly environments.
Location of spaces for having food, administration, car park, and accounting	4 (P) 8 (MS)	**12/41**	• Away from the medical spaces.
	1 (P)	**1/41**	• Away from the play area to give the children exercise.
	1 (MS)	**1/41**	• Adjacent to outpatients and accounting.
	8 (P) 8 (MS)	**16/18**	• Parents and medical staff wanted the administration on the same level as the main entrance and atrium, adjacent to medical spaces, and to have easy access from reception, admissions and main entrace.
	1 (MS) 4 (P) 1 (CH)	**6/10**	• Car park underground to prevent congestion. • Enough spaces and a direct connection between car park and the reception area.
	4 (P) 1 (MS)	**5/16**	• Accounting department adjacent to the main entrance to be visible for all users of the hospital.
Spaces for parents and children to eat	3 (P)	**3/41**	• One area for children and one for parents to eat, but the design should allow parents to see their children.

We created here an open area for having food. We prefer to position it adjacent to the waiting area. We provided integration between water, green area, and waiting areas. Also, here we included the environment of the sea, and we used walls of water. Water can express an environment which can give you a feeling that you are in nature. We used glass partitions, particularly in the waiting and in the restaurant area to connect them with nature and with the environment of the sea. Such issues can help children to move between these two spaces to feel that they are in one space, and can help mothers to observe their children while they are eating and playing. We also provide a specific area for children and another one for parents to eat (Mothers).

I created here a small kitchen with a chef so that if someone needs to eat he can prepare food for them. All the restaurants sometimes have a limited menu of food that customers didn't like, but having a chef and this type of small kitchen can help people order anything they like. Also, they can see how the food is prepared in front of the kitchen. Here there are tables and chairs for anyone who likes to order something, and I opened it to the pool that has been covered and surrounded by a green garden that is full of flowers (Girl, 16-17 years).

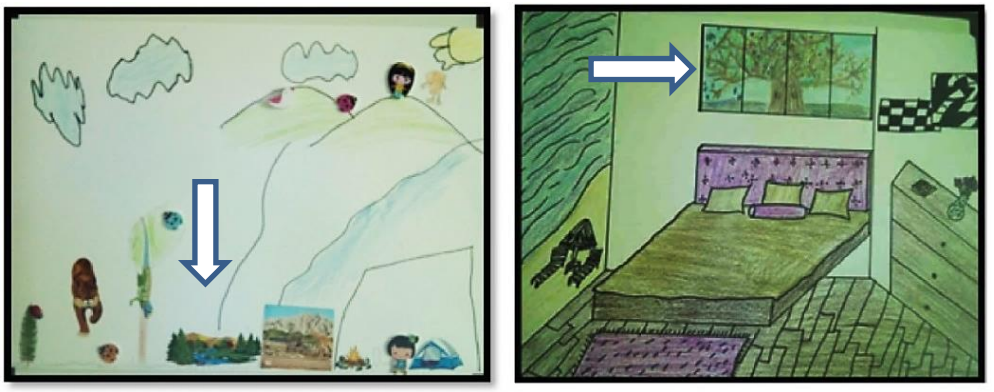
5.2.3 Design elements and specific items

Eight elements were identified: art, colour, furniture, materials, wayfinding, using symbols, form and shape, and image and thematic design:

Art. Parents, children and medical staff expressed their preferences for including different types of art to provide comfortable environments. They identified eleven themes: nature, water features, culture, sport, music, abstract art, semi-permanent art, related to the function of the space, other types of art, see Table 5.18 and Figure 5.19. All types of art that preferred by participants were visualised and presented in Figure 5.19.

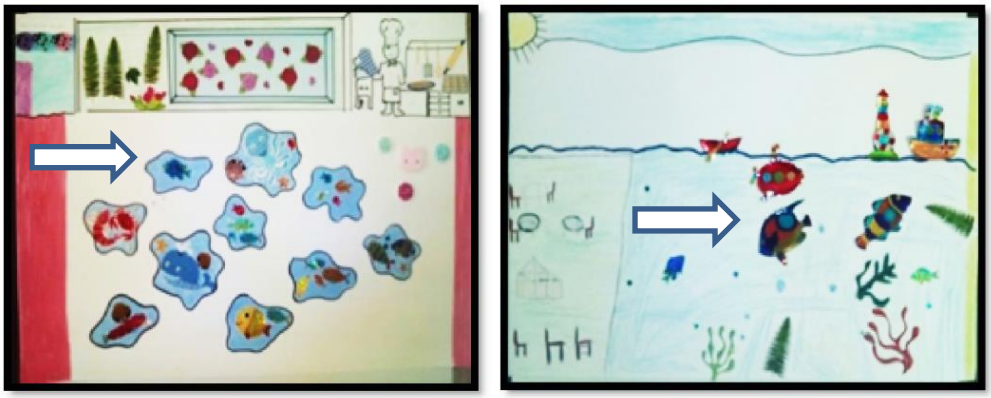
Table 5.18: Participants' preferences regarding the inclusion of different types of art

Art			
Types of art	**Participants**	**Total Number**	**Ideas**
Art connected to nature	8 (P) 9 (MS)	**40/40**	• Pictures of birds and animals for younger children.
	9 (CH) 3-7 years 6 (CH) 7-11 years 7 (CH) 11-18 years		• Different types of art e.g. zoo animals, birds (peacock), nature views. One child wanted to include their drawing, "Four Seasons" (see Figure 5.12).
Art connected to water features	8 (P) 6 (MS) 8 (CH) 3-7 years 8 (CH) 7-11 years 5 (CH) 11-18 years	**32/39**	• Pictures of water features in the eating areas (see Figure 5.13).
Art connected to culture	8 (P) 8 (CH) 1 (CH) 3-7 years 3 (CH) 7-11 years 2 (CH) 11-18 years	**22/39**	• Adults and children wanted to include art connected to culture (See Section 5.1.1).
Art that is connected to music	7 (P) 3 (CH) 3-7 years 1 (CH) 7-11 years 3 (CH) 11-18 years	**14/39**	• Participants preferred the inclusion of art and symbols connected to music. One of the children used this type of art to give an identity to the building i.e. music building (see Figure 5.14).
Semi-permanent type of art to attract and distract the attention of children in the reception desk	4 (P) 2 (CH) 1 (CH) 3-7 years 3 (CH) 7-11 years 1 (CH) 11-18 years	**11/39**	• Adults wanted to include semi-permanent type of art in the reception area (e.g. coloured glass, real fish, birds, and indoor and outdoor sculptures) to distract the attention of children and to reduce their fears. • Children preferred to include large sculptures.
Abstract art	7 (P) 4 (CH) 3-7 years 5 (CH) 11-18 years	**16/31**	• Parents wanted to include an abstract piece of art. • Some children wanted abstract art with black and white colours and smooth lines. Others wanted abstract art of various types of colours and different shapes, particularly in the restaurant area. One child wanted abstract art with straight and coloured lines to avoid childish themes (see Figure 5.15).
Art that is connected to the function of the space	7 (P) 1 (CH) 11-18 years	**8/31**	• Adults and children wanted to include art relevant to each specific area (see Figure 5.16).
Art connected to sport	4 (P) 1 (CH) 3-7 years 2 (CH) 11-18 years	**7/31**	• Adults and children wanted to include art connected to sport (see Figure. 5.17).
Modern art	3 (P)	**3/8**	• Modern art in all the interior spaces, except for reception and admissions, where art related to culture should be included.
Impressionistic piece of art	1 (CH) 3-7 years 1 (CH) 11-18 years	**2/23**	• Inspiring modern art. One girl (see Figure 5.18).
Various types of art	3 (P) 2 (CH)11-18 years	**5/31**	• Two children included eight types of pictures connected to culture, abstract art, and impressionistic type of art (see Figure 5.19).



(Boy, 10-11) (Girl, 13-14 years)

Figure 5.11: Children's drawings illustrating preferred art that is connected to nature – notice prevalence of views of nature, a zoo in the left-hand drawing, and a picture titled "Four Seasons" in the right-hand drawing.



(Girl, 15-16 years) (Boy, 10-11 years)

Figure 5.12: Children's drawings illustrating preferred art connected to water features – notice prevalence of water, sea plants, fish, boats, etc.

(Boy, 17-18 years) (Boy, 7-8 years)

Figure 5.13: Children's drawings illustrating preferred art connected to music – notice prevalence of musical symbols to decorate the interior in the left-hand drawing, and in the right-hand figure adding a musical symbol to decorate the outside of the building.

Impressionistic abstract art (Girl, 3-4 years)

Abstract art (Girl, 16-17 years)

Figure 5.14: Children's model and drawing illustrating preferred abstract art – notice prevalence of impressionistic art in the left-hand and abstract art in the right-hand images to avoid child-like themes.

View from Fathers' model

View from Mother's model

Figure 5.15: Parents' models illustrating preferred art connected to the function of the space – notice prevalence of including art related to music for the area of music, and nature views for the green zone.

(Girl, 16-17 years)

(Fathers' model activity)

Figure 5.16: Father's and child's model illustrating art connected to sport—notice the prevalence of pictures connected to sport themes.

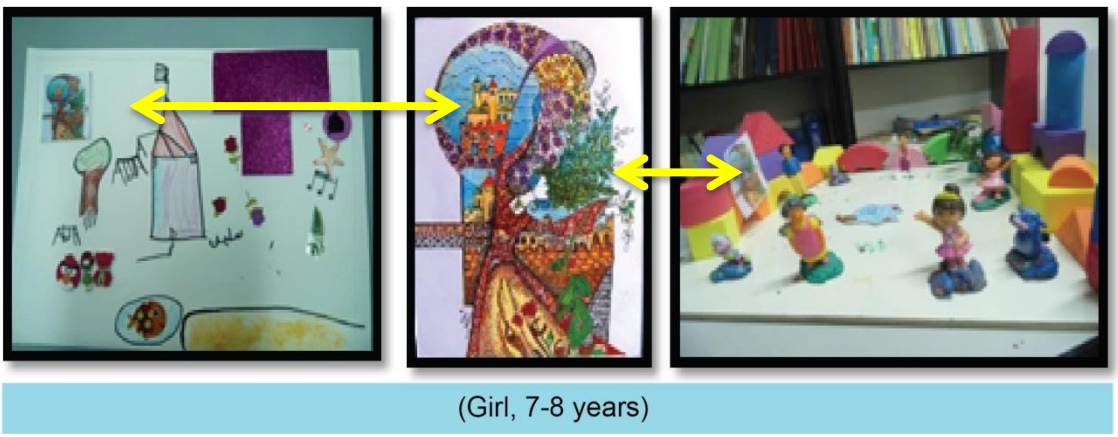


Figure 5.17: Children's model and drawing illustrating preferred impressionistic art.

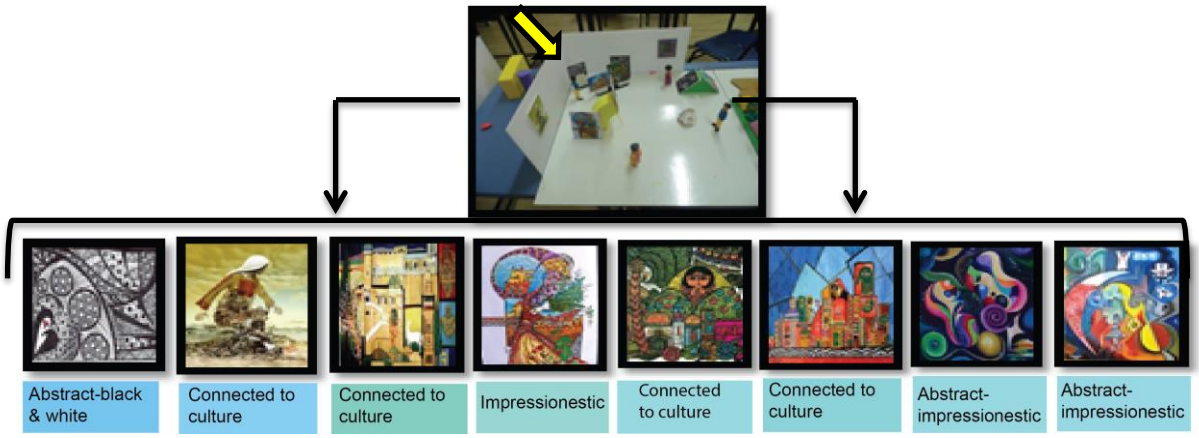


Figure 5.18: Model illustrating the various types of art included by one child (12-13 years).

Using cartoon images on walls may make you feel dull. However, including nature can be appropriate for all age levels. These pictures related to fish and water on the ground make me think of Summer season, and I feel happy. No one can feel dull because he will have things that help him relax (Girl, 16-17 years).

Here there is a museum, and the first thing I would do is have pictures hanging on different levels, … some of these pictures are from our culture and the others not. I included these pictures because they are very beautiful and connected to culture. I like the strange images that have imagination and include several elements . For example, I like these pictures which included several forms, lines and colours (Girl, 12-13 years).

It is a statue for people who want to look at it; it is a sculpture to look at only. It is a statue in the form of the tower as the tower of Khalifa in Dubai. It has a shape of a human, and it looks like a robot (Three boys, 9-11 years).

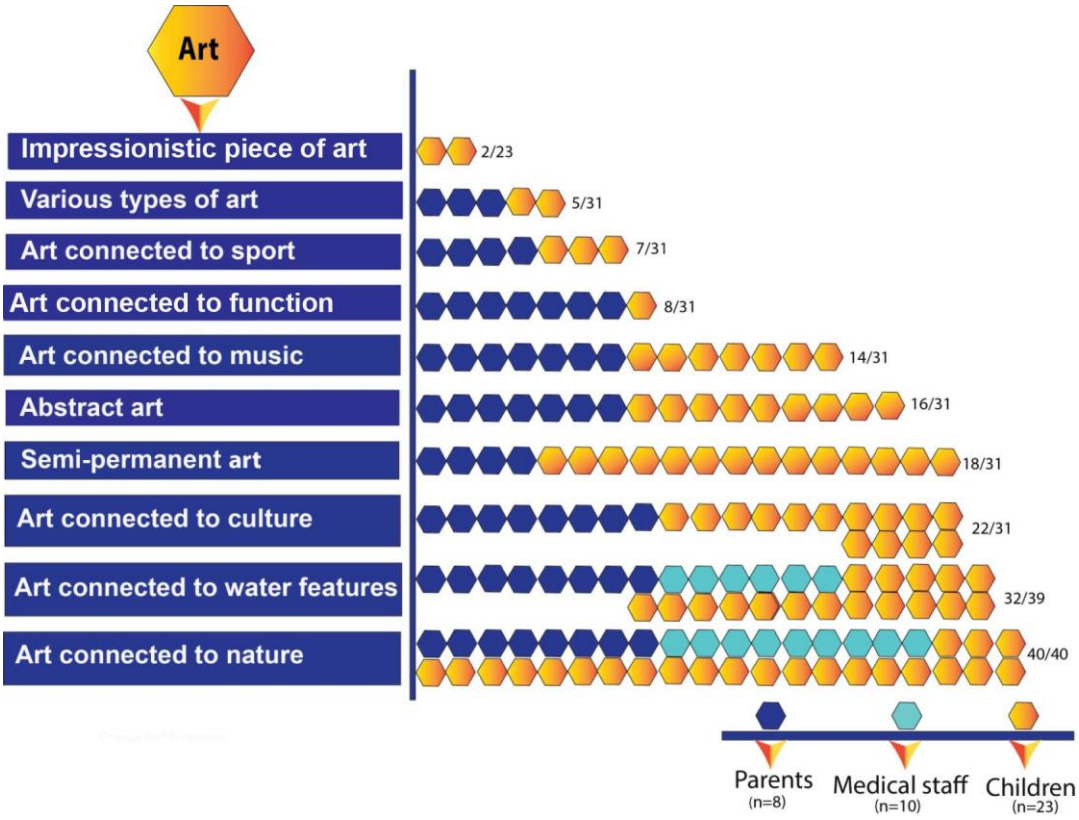


Figure 5.19: Participants' preferences regarding different types of art.

Colours. Adults suggested different types of colours to be included in the public spaces of children's hospitals. The analysis of the children's art-based activities and semi-structured recorded interviews identified eleven colours, see Tables 5.19, 5.20 and Figure 5.20.

Table 5.19: Parents' (P) and medical staff's (MS) preferences regarding types of colours

Preferences of parents and medical staff regarding types of colours	Participants	Total number
• Colours for the floor tiles of the atrium that enable easy way-finding	8 (P) 9 (MS)	**17/17**
• Colours for the main entrance that are attractive to children	4 (P) 10 (MS)	**14/18**
• Natural green colours for main entrance to distract and attract children	4 (p) 8 (MS)	**12/18**
• Colours for the triage room to provide positive distraction	9 (MS)	**9/9**
• Bright colours for reception area • Bright colours for play areas	2 (P) 3 (MS)	**5/18**
• Light colours for reception areas	1 (p) 2 (MS)	**3/18**
• Colours for x-ray room that help decrease fears of children	2 (MS)	**2/8**

The area of games should have bright and light colours ... We prefer this area (main entrance) to be provided with light colours to attract and distract the attention of the child. However, the x-ray area... should have lights and colours that can attract the child and to alleviate his anxieties (Medical staff).

Table 5.20: Children's (CH) preferences regarding colours in their favourite spaces

Colours					
Types of colours	**Participants**	**Total Number**	**Types of colours**	**Participants**	**Total Number**
Green	3F, 3M (CH) 3-7 years 2F, 2M (CH) 7-11 years 4F, 3M (CH) 11-18 years	**17/23**	**Pink**	3F, 1M (CH) 3-7 years 3F (CH) 7-11 years 2F, 1M (CH) 11-18 years	**10/23**
Blue	4F, 3M (CH) 3-7 years 2F, 2M (CH) 7-11 years 4F, 2M (CH) 11-18 years	**17/23**	**Red**	2F, 1M (CH) 3-7 years 3F, 2M (CH) 11-18 years	**8/23**
Yellow	4F, 3M (CH) 3-7 years 2F, 2M (CH) 7-11 years 2M (CH) 11-18 years	**13/23**	**White**	2M (CH) 3-7 years 3F (CH) 11-18 years	**5/12**
Purple	5F, 2M (CH) 3-7 years 1F (CH) 7-11 years 2F, 1M (CH) 11-18 years	**11/23**	**Turquoise**	1F (CH) 3-7 years 2F, 1M (CH) 11-18 years	**4/23**
Brown	2F, 3M (CH) 3-7 years 2F, 1M (CH) 7-11 years 3F (CH) 11-18 years	**11/23**	**Black**	2M (CH) 3-7 years 2F (CH) 11-18 years	**4/23**
			Orange	3F, 1M (CH) 3-7 years	**4/23**

I like light colours such as yellow, green and light-pink. I like them because they make me feel comfortable… I like blue, green and purple. … I prefer turquoise, sky-blue, and light-green… I prefer light-blue, green, light- yellow which looks like sand. However, there are colours that make you feel uncomfortable. For example, red … makes you nervous and angry (Children, 15-18). *I like green, the colour of wood and water because they provide me with a feeling of majesty and they connect you with nature. I like to merge old colours with modern colours* (Girl, 15-16 years) … *I don't think anyone does not like the light colours that provide excitement and that can remind you of Summer season. In winter, many people can feel depressed by dark colours. However, light colours provide you with vitality. I like the colour of a pool which is dark blue, the colour of the fuchsia or dark pink colour, green and yellow* (Girl, 16-17 years).

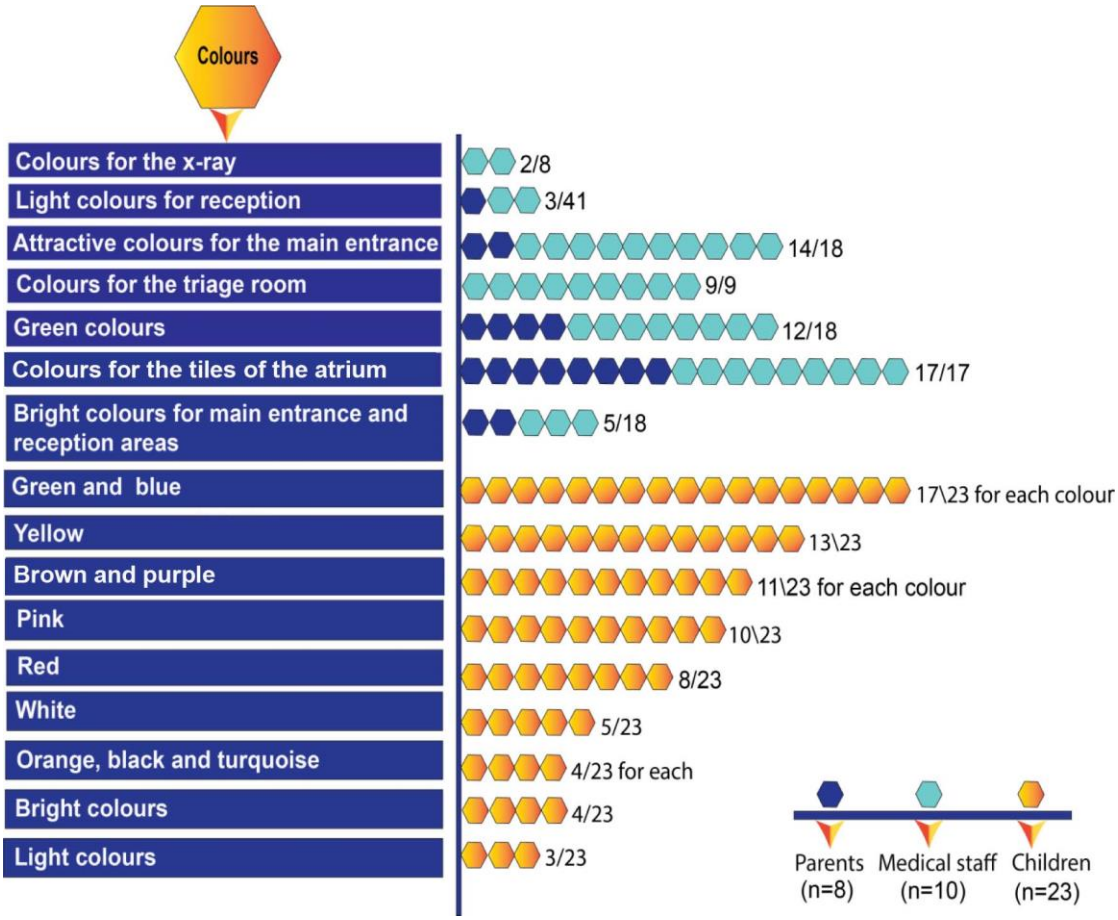


Figure 5.20: Participants' preferences regarding colours.

Furniture. Seven issues were identified: organic, circular, and soft forms and shapes, various forms and shapes, outdoor furniture, home-like design,

appropriate and according to age, modern and attractive, adaptable, appropriate amount and comfortable funiture, see Table 5.21 and Figure 5.22.

Table 5.21: Participants' preferences regarding furniture

Furniture			
Key design considerations	**Participants**	**Total number**	**Ideas**
Circular, organic and soft forms, and shapes	8 (P) 1 (MS) 1M (CH) 3-7 years 2M, 2F (CH) 7-11 years 4F, 3M (CH) 11-18 years	**21/41**	• Organic, soft, circular forms and shapes particularly in the reception and waiting areas to provide smooth flow of movement.
Various forms and shapes	8 (P) 8 (MS)	**16/18**	• See Section 5.2.2.
Outdoor furniture	8 (P) 3 (MS) 2M (CH) 3-7 years 1M, 1F (CH) 7-11 years 3F, 3M (CH) 11-18 years	**21/41**	• Outdoor furniture such as seats and tables made from steel and wood.
Home-like design furniture	4 (P) 8 (MS) 2F (CH) 7-11 years 3F, 3M (CH) 11-18 years	**20/41**	• Home-like designed furniture such as to help them feel more comfortable (see Figure 5.22).
Appropriate and according to age	7 (P) 9 (MS)	**16/18**	• Various levels to the reception desk (see Section 8.2.2 and Table 5.6).
Modern and attractive	4 (P) 4M, 2F (CH) 7-11 years 3F (CH) 11-18 years	**13/31**	• Modern and attractive furniture for children, particularly in the waiting area, eating and drawing areas (see Section 5.2.2).
Adaptable furniture	8 (P)	**8/8**	• Adaptable furniture that can be arranged in different forms and shapes (e.g. circular forms) to give children a chance to social and to be watched by their parents.
Appropriate amount and comfortable	2 (P) 4 (MS)	**6/18**	• Appropriate ampount and comfortable furniture (e.g. seats, sofas), particularly in the waiting area for long-term visiting.

Here is a modern style of furniture. Here there is a bedroom and dresser… I like the reception to be modern and different e.g. using organic and flexible lines (Girl, 13-14 years) *… I used these beautiful and unusual forms and shapes of tables because I need them to grab the attention of people (be attractive) more than the ones usually found in restaurants* (Girl, 16-17 years)

Home is the most important place; these elements should be found in every home (i.e. living area, TV, and kitchen); it makes you feel comfortable while you are waiting your turn (Three boys, 15-18 years).

Sure the size is important because if the child sit on adult seats, his legs will be hanging in the air and he will feel uncomfortable, however, when the seats are suitable for his size, the child will like them. The seats for older age children should be different from the younger age children, who can have seats according to their age (Mother).

(Boy, 17-18) **(Boys, 15-18)**

Figure 5.21: Children's drawing and model illustrating children's preferences regarding home-like design – notice prevalence of chairs, kitchen, and living rooms that are connected to home-like design.

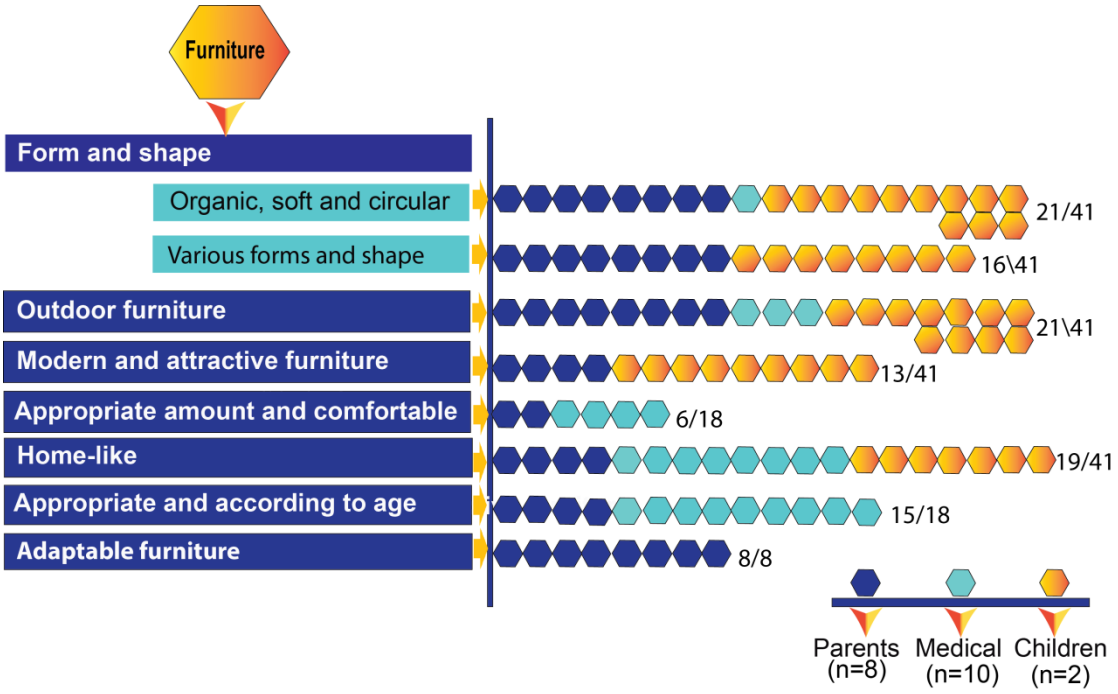


Figure 5.22: Participants' preferences regarding the inclusion of furniture

Materials. Eight issues were identified: materials connected to nature, and materials that are transparent, bright and glittery, modern, durable, sustainable and easy to clean, soundproof and have texture, see Table 5.22 and Figure 5.24.

Table 5.22: Participants' preferences regarding types of materials

Materials			
Types of Materials	**Participants**	**Total number**	**Ideas**
Textured materials	8 (P) 8 (MS)	**37/41**	• Textured materials for the interior decoration.
	5F, 3M (CH) 3-7 years 2F, 3M (CH) 7-11 years 5F, 3M (CH) 11-18 years		• Materials with textures for outdoor wall and floor coverings and for furniture.
Materials connected to nature	8 (P) 8 (MS)	**28/41**	• Natural materials for interior design (e.g. wood).
	3F, 1M (CH) 3-7 years 2F, 1M (CH) 7-11 years 3F, 2M (CH) 11-18 years		• Children chose wood for outdoor seats, stone sculptures, and seashells in the landscape to provide a sense of wonder.
Bright and glittery materials	8 (P) 8 (MS)	**28/41**	• Parents chose bright and glittering materials, particularly for the age range 0-6 years old.
	6F, 3M (CH) 3-7 years 1F (CH) 7-11 years 1F, 1M (CH) 11-18 years		• Children chose bright and glittering materials (see Figure 5.23).
Transparent materials	8 (P) 2 (MS) 2F, 4M (CH) 7-11 years 4F, 3M (CH) 11-18 years	**23/41**	• Parents and children showed a strong preference for transparent materials (e.g. glass) to connect interior spaces with nature (see Figure 5.23). For the adults this would provide clear vision, help parents and nurses to observe children, provide enough light, and provide a connection between interior and exterior spaces.
Durable, sustainable and easy to clean	10 (MS)	**10/41**	• Durable and easy to clean materials, such as tiles on the walls, particularly in the main entrance and reception areas, and granite for the admissions desk.
Modern materials	1 (P)	**4/41**	• Modern (e.g. steel) and transparent materials for the main entrance.
	1M, 1F (CH) 7-11 years 1F (CH) 11-18 years		
Soundproof materials	1F (CH) 11-18 years	**1/41**	• Soundproof materials, particularly for young childrens' spaces to lessen the noise.

(Mothers' model)	(Girl, 7-8 years)

Figure 5.23: Mothers' model and child's drawing illustrating different types of materials – notice the use of transparent materials (i.e. glass) in the mothers' model and the use of bright materials in the child's drawing.

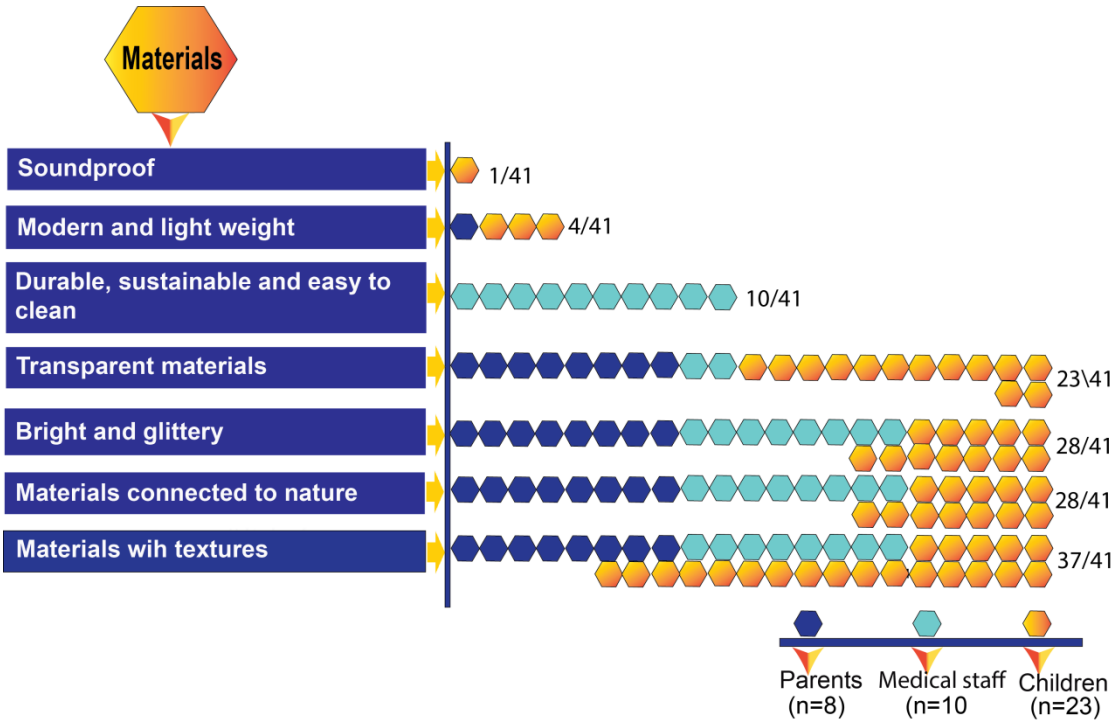


Figure 5.24: Participants' preferences regarding inclusion of types of materials

Wayfinding. Different types of wayfinding signs are identified see Table 5.23.

Table 5.23: Participants' preferences regarding wayfinding signs

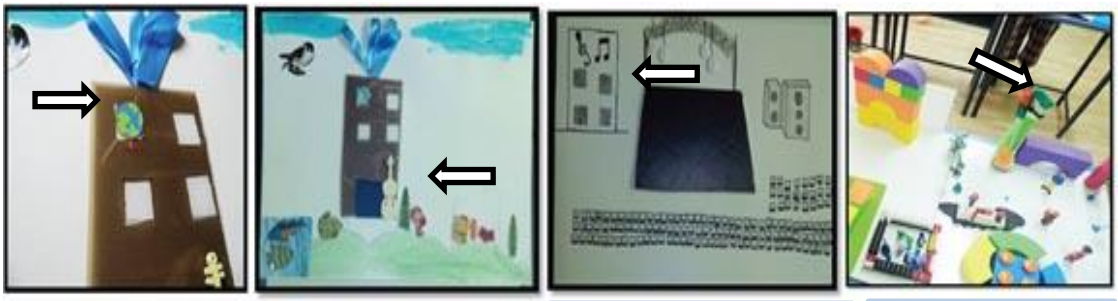
Wayfinding signs			
Type of signs	**Participants**	**Total number**	**Ideas**
Wayfinding signs to provide easy flow	8 (P) 8 (MS)	**22/40**	• Clear wayfinding signs for interior and exterior of the building on the ground and walls to help visitors find their way.
Attractive wayfinding signs to provide easy flow and clear vision	1M (CH) 7-11 years		• One child wanted an image of a guitar next to the main entrance (Figure 5.26).
Signs that give identity and distinctive character for the building (i.e. connect the sign with the function of the building)	1M (CH) 7-11 years 2F, 1M (CH) 11-18 years		• Signs that provide identity and distinctive character of the building. Children chose specific signage relevant to specific areas (see Figure 5.26).
Signs for safety issues	1M (CH) 11-18 years		• One child drew a sign saying "feel safe".

> *This sign means that adjacent to the hotel there is a space that teaches science for children to have a leisure time. Beside the main entrance of the door, there is a guitar to help people find and see the door more clearly and quickly (Boy, 8-11 years).*

Symbols: Children identified five types of symbols in their artwork and they expressed them in different ways, see Table 5.24.

Table 5.24: Preferences and examples from the participants regarding symbols

Children's Preferences Regarding Symbols			
Type of symbols	**Participants**	**Total number**	**Ideas**
Symbols to express love to family	4 (CH) 3-7 years 2 (CH) 7-11 years	**6/23**	• Symbols that express their love for their parents and family (e.g. drawing of hearts).
Symbols connected to music	2 (CH) 3-7 years 3 (CH) 11-18 years	**5/23**	• Symbols expressing their love of music.
Symbols connected to culture	1 (CH) 3-7 years 3 (CH) 7-11 years	**4/23**	• Symbols expressing their love of culture and providing identity to areas (see Section 5.1.1 and Figure 5.26).
Symbols related to nature	2 (CH) 3-7 years	**2/23**	• Symbols related to nature (e.g. animals and flowers).
Symbols to express their love of education	2 (CH) 3-7 years	**2/23**	• Symbols expressing their love of learning, school, and drawing (e.g. a blackboard).



(Boy, 10-11) years) | **(Girl, 12-13 years)** | **(Boys, 9-11**

Figure 5.25: Children's drawing and model illustrating the preferences of using symbols. From left to right hand – notice the prevalence of using attractive symbols for easy wayfindings (i.e. guitar), symbols connected to music to provide identity to the building, and the Flag of Palestine related to culture.

Form and shape: Six types of forms and shapes were identified: circular and organic, connected to culture, gable roofs, symmetrical, irregular, and various types, see Table 5.25 and Figure 5.26.

Table 5.25: Participants' preferences regarding forms and shapes

Forms and shapes			
Types of form and shape	**Participants**	**Total number**	**Ideas**
Organic and circular	7 (P) 1 (MS) 3M, 5F (CH) 3-7 years 3M, 3F (CH) 7-11 years 3F, 3M (CH) 11-18 years	**28/41**	• See Table 5.6, 5.22, and Figure 5.27.
Connected to culture	8 (P) 8 (MS) 1M, 1F (CH) 3-7 years 3M, 2F (CH) 7-11 years 2F (CH) 11-18 years	**25/41**	• (see Section 5.6).
Various types	1 (P) 3M, 6F (CH) 3-7 years 3M, 2F (CH) 7-11 years 2F, 3M (CH) 11-18 years	**20/31**	• Adults and children chose various types of forms and shapes.
Gable roofs	4M, 4F (CH) 3-7 years 2M, 2F (CH) 7-11 years 3M (CH)11-18 years	**15/23**	• Gable forms and shapes to provide a feeling of a rustic house, away from the city (See App B-4).
Symmetrical	3M (CH) 7-11 years 3M (CH) 11-18 years	**6/23**	• Symmetrical forms and shapes to provide comfort.
Irregular	3F, 2M (CH) 3-7 years	**5/23**	• Irregular forms and shapes.

(Girl, 4-5 years) **(Girl, 15-16 years)** **(Girl, 16-17 years)**

Figure 5.26: Children's drawings and model showing children's preferences regarding form and shape – notice the use of irregular, circular, and organic forms.

Using an arch can create a strange thing which can make the entrance more clear and attractive. We need something different because they always used rectangles and squares to create the form. I love the circle more than the square or rectangle because the rectangle and square are traditional, but I feel that the circular forms are more suitable to use than the square... I love circle because, it doesn't have angles and I don't like angles (Girl, 15-16 years) *... I draw it as a gable style because the place is rustic; I do not draw it as a tower building that has many levels because I need to be away from the city image and its routine. Here the place is a*

building, not a huge building. It is like an old and a rustic house; I want it to be different from the city buildings (Boy, 16-17 years).

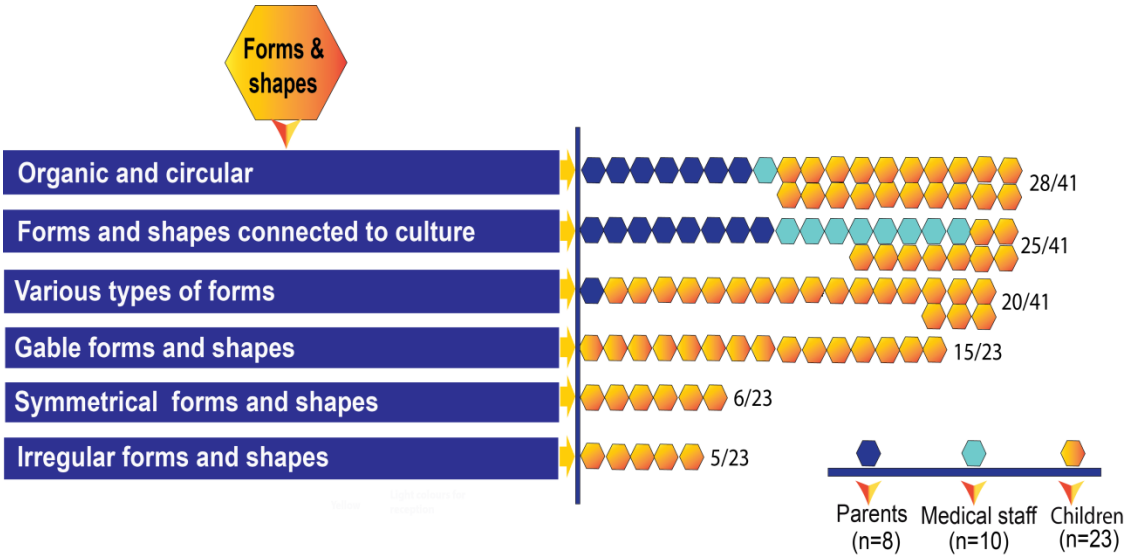


Figure 5.27: Participants' preferences regarding forms and shapes

Image and thematic design for main entrance and atrium. Three types of image design were identified: connected to nature, looking like a park or entertainment centre, and home-like image, see Table 5.26 and Figure 5.28.

Table 5.26: Participants' preferences regarding image design in the public spaces of children's hospitals

Image Design			
Type of image design	**Participants**	**Total number**	**Ideas**
Connected to nature	8 (P) 10 (MS) 9 (CH) 3-7 years 6 (CH) 7-11 years 8 (CH) 11-18 years	**41/41**	• Adults chose elements from nature (e.g. water features, green areas, etc.) to decrease the children's anxiety and to provide them with comfort. • Children preferred natural elements in their favourite spaces to feel comfortable while waiting.
Look like a park or entertainment centre	8 (P) 8 (MS) 1M, 1F (CH) 3-7 years 4M, 2F (CH) 7-11 years 3M, 5F (CH) 11-18 years	**32/41**	• Adults chose the image of a park or entertainment centre to alleviate children's fears. • Children drew images connected to entertainment centres (e.g., indoor and outdoor play areas and water features etc.).
Home-like image design	1 (P) 8 (MS) 2M, 2F (CH) 3-7 years 2F (CH) 7-11 years 3M, 3F (CH) 11-18 years	**21/41**	• See Table 5.9 and 5.21.
Avoid medical images	8 (P) 8 (MS)	**16/18**	• Adults wanted to change the medical staff's white coats for another colour to decrease the children's anxiety, particularly in the main entrance and atrium.

I prefer the main entrance and atrium to be an open hall (look like a park). Now the park, for example, can have several steps, a little ramp, small flowers, small pool and balls for children to jump on … we prefer not to see doctors in white coats, particularly in emergency and the main entrance. We must feel like we're entering a park. Maybe we can include a swimming pool for children because children usually like swimming, of course, anything that comes to the mothers' minds can be found there, just as you find in an entertainment place (Mothers)… *The main idea from these suggestions is to help the child to feel safe and secure in order to provide the child with a sense that he is not in a hospital, but to provide him with a sense that he is going to an entertainment centre* (Fathers).

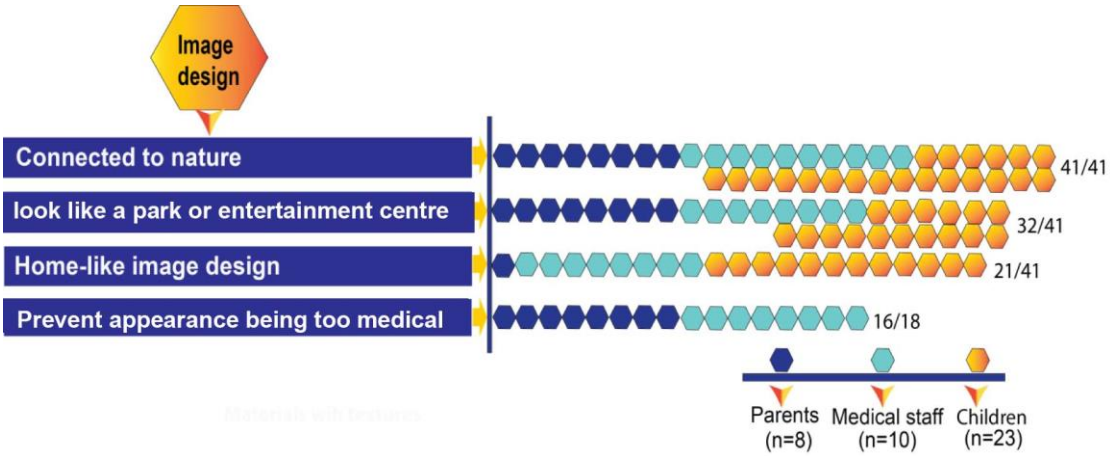


Figure 5.28: Participants' preferences regarding image design

5.2.4 Environmental considerations

Four issues were identified: light, noise, effective ventilation, and smell, see Table 5.27.

Table 5.27: Participants' preferences regarding environmental considerations

Environmental issues			
Environmental elements	**Participants**	**Total**	**Ideas**
Light	4 (P) 8 (MS) 4F, 3M (CH) 3-7 years 1F (CH) 7-11 years 2F (CH) 11-18 years	**22/41**	• Parents wanted enough light (artificial and natural) as it is essential for children's psychological issues. • Medical staff chose different coloured lights in the main entrance and x-ray areas to distract and attract children. • Children drew sky, clouds and the sun to express their need for natural light.
Effective ventilation	5 (P) 3 (MS) 2F, 2M (CH) 3-7 years 2F, 4M (CH) 7-11 years 2M (CH) 11-18 years	**20/41**	• For adults' preferences see Section 5.2.2., and Tables 5.8 and 5.11. • One child drew a fan to provide fresh air in the hot weather.
Noise	5 (P) 3 (MS) 2F, 3M (CH) 11-18 years	**13/41**	• For adults' preferences see Section 5.2.2 and Table 5.8. • One child suggested separating the young children from the older children, and to use soundproof materials.
Smell	1 (P) 1F (CH) 3-7 years 1F (CH) 7-11 years	**3/41**	• Two children drew flowers indicating a fresh-smelling and comfortable environment.

5.3 Conclusion

This section discusses the findings and results of the field research that encompasses eight co-design and co-creation workshops in Palestine including arts-based activities and semi-structured recorded interviews (Sections 5.1, 5.2). Using thematic content approaches for data analysis helped to identify two major themes connected to the participants' preferences:

- **Context-specific issues** (Section 5.1): Four themes were identified:
    1. *Culture* (Section 5.1.1): The results of field research identified *art and traditional architectural elements* connected to culture as being important to be included in the design of public spaces of children's hospitals particularly in the context of this research. Such elements can provide comfort, attractive surroundings and a sense of pride. Furthermore, *gender and age separation* were identified as essential elements to be considered, e.g. provide separation between children in the play areas, particularly over the age of seven years. Participants in this research connected their preferences to religion and cultural issues.
    2. *Appropriateness of visitors' area* (Section 5.1.2): Some problematic issues were identified in relation to inadequate environments in some hospitals in Palestine, particularly in Nablus city. e.g. inappropriate location of medical functions.
    3. *Age appropriateness of hospitalisation* (Section 5.1.3): The results of field research identified the lack of age-appropriate spaces in some hospitals in Palestine. i.e. age range 0-13 years classified children for hospital admission instead of 0-18 years old.

4. *Support of the children by family and friends* (Section 5.1.3). The results of field research identified the importance of having support from family and friends to provide children with comfort.

- **The physical environment: interior architecture and interior design** (Section 5.2): Four themes were identified:
  1. *Medical spaces*: Eight functional and medical areas were identified (see Section 5.2.1). The location, arrangements and relationship between these functions are essential to identify an architectural plan and constraints or requirements of the design of public spaces of children's hospitals. For example, the location of the emergency entrance should be away from the hospital's main entrance to provide comfort.
  2. *Non-medical spaces*: Several design considerations were identified related to interior architecture (e.g. location, form) and interior design (e.g. aesthetics) (Section 5.2.2). These findings contributed to waiting areas, main entrance, reception and admission areas, and play areas and entertainment activities. For instance, it is important to position the reception area in the centre of the atrium to provide clear vision. Also, it is important to provide attractive elements (e.g. colours and artwork) in the reception areas to provide children with comfort and help them forget their illness.
  3. *Design elements and specific items*: Eight elements were identified (Section 5.2.3): art, colour, image design, materials, form and shape, furniture, clear wayfinding, and using symbols. The field research results identified the necessity of including artwork that is connected to nature

and water features, particularly in the public spaces. Such types of art can provide comfort and attractive environments for users, particularly children.

4. *Environmental considerations*: Four elements were identified i.e. light, noise, effective and natural ventilation, and smell. (Section 5.2.4). For instance, the results identified the importance to provide enough light (artificial and natural) for children's psychological issues.

The emerging themes discussed in this chapter include participants' preferences and needs regarding those factors they considered essential for their comfort within public spaces of a children's hospital. They were presented and supported by direct quotations from the participants. The results of children's preferences were presented according to three age ranges (i.e. 3-7, 7-11, 11-18 years). The needs of age range 0-2 years were addressed by parents' and medical staff's workshops (see Table 5.28). The results of every age range are summarised in Tables 5.28-5.31.

Table 5.28: Children's needs regarding age range 0-2 years as suggested by parents (P) and medical staff (MS)

Children's needs related to age range 0-2 years old			
Thematic Design	**Preferences**	**No.**	**References**
Physical environment: Architecture – interior architecture- and interior design-related themes	**<u>Architecture and interior architecture design consideration:</u>** • Play area for young children, adjacent to the emergency department.	P (1/8)	(Sections 5.2, 5.2.1, 5.2.2 Tables 5.4, 5.8, 5.11, 5.12)
	• Closed area for breast feeding and changing diapers	P (5/8) MS (8/10)	
	• Spaces for toddlers to crawl and play	P (4/8)	
	• Spaces for toddlers to play with their own toys	P (2/8)	
	<u>Interior design considerations:</u> **Art:** • Semi-permanent type of art to attract the attention of children at the reception desk	P (4/8)	(Sections 5.2.2, 5.2.3, Tables 5.5. 5.7, 5.18, 5.19, 5.21-22, 5.25)
	Forms and shapes: • Circular, organic and soft forms and shapes	P (8/8) MS (1/8)	
	Furniture • Adaptable	P (8/8)	
	• Circular forms and shapes	P (8/8)	
	• Appropriate and according to age	P (7/8) MS (9/10)	
	Materials • Bright and glittery materials	P (8/8) MS (8/10)	
	Colours: • Bright colours to the main entrance and reception areas to provide distraction	See Table 5.19	
	Attractive and distraction elements in front of the main entrance e.g. small animals, colours, nature and water features	P (8/8) MS (10/10)	
	Thematic design • Connected to nature	P (4/8)	

Table 5.29: Children's preferences related to age group 3-7 years that provide them with a comfortable environment

Children's preferences related to age range 3-7 years old			
Thematic Design	**Preferences**	**No.**	**References**
Context-related themes	• Elements from traditional architecture	1/9	(Section 5.1, Tables 5.1-3, 5.13)
	• Partial separation in social spaces e.g. waiting, eating spaces, and play areas	3/9	
	• Complete separation in spaces for prayer, sleeping and toilets	3/9	
	• Support of the children by family and friends	6/9	
	• Elements connected to culture e.g. art	8/9	
Physical environment: Architecture – interior architecture- and interior design-related themes	**Architecture and interior architecture/design consideration:** • Form and shape e.g. combined modern and traditional architectural forms (arches supported by large circular columns to attract attention of children and to make the spaces beautiful)	1/9	(Section 5.2 Tables 5.5, 5.9, 5.15-17)
	• Home-like design waiting areas	1/9	
	• Indoor L shape waiting areas for adults	1/9	
	• Outdoor waiting areas	2/9	
	• Architectural openings and arrangements i.e. connect the eating areas with natural water features	2/9	
	• Including spaces for eating their own food	7/9	
	• Play areas that include several types of games and entertainment activities (see Table 5.15)	8/9	
	Interior design considerations: **Art:** • Connected to sport	1/9	(Section 5.2.3, Tables 5.18, 5.20-22, 5.24 5.26)
	• Connected to culture	1/9	
	• Impressionistic piece of art	1/9	
	• Semi-permanent type of art to attract the attention of children at the reception desk	1/9	
	• Abstract art	4/9	
	• Connected to music	3/9	
	• Connected to water features	8/9	
	• Connected to nature	9/9	
	Forms and shapes: • Forms and shapes connected to nature	2/9	
	• Irregular	5/9	
	• Circular, organic and soft forms and shapes	8/9	
	• Gable roofs	8/9	
	• Various forms and shapes	9/9	
	Image design: • Home-like design	4/9	
	• Looked like a park or entertainment centre	2/9	
	• Connected to nature	9/9	
	Furniture • Circular forms and shapes	1/9	
	• Outdoor furniture	2/9	
	Materials: • Connected to nature	4/9	
	• Textured materials	8/9	
	• Bright and glittery materials	9/9	
	Including symbols to express their love of: • culture (1/9), nature (2/9), music (2/9), family (4/9), and education 2/9		
	Colours: Turquoise (1/9), white & black (2/9 for each), red (3/9), pink (4/9), green (6/9), brown (5/9), orange (4/9), blue & purple (7/9 for each), yellow (7/9).		
Environmental considerations	• Fresh and pleasant smell (1/9), effective ventilation (4/9), sufficient and natural light (7/9)		(Section 5.2.4, Table 5.27)

.

Table 5.30: Children's preferences related to age group 7-11 years that provide them with a comfortable environment

Children's preferences related to age range 7-11 years old			
Thematic Design	**Preferences**	**No.**	**References**
Context-related themes	• Complete separation in spaces for prayer, sleeping and toilets	6/6	(Sections 5.1, 5.2.2 Tables 5.2-3, 5.13
	• No separation in the play area	6/6	
	• Elements from traditional architecture	5/6	
	• Support of the children by family and friends	5/6	
	• Elements connected to culture e.g. art	3/6	
Physical environment: Architecture – interior architecture- and interior design-related themes	**Architecture and interior architecture design consideration:**		(Section 5.2 Tables 5.2, 5.9, 5.17)
	• Including spaces for having their own food	6/6	
	• Outdoor waiting areas	6/6	
	• Combined modern and traditional architectural forms e.g. arches supported by large circular columns to attract attention of children and to make the spaces beautiful	5/6	
	• Home-like design waiting areas	2/6	
	• Indoor L shape waiting areas for adults	2/6	
	• Safety and security in the main entrance	2/6	
	• Architectural openings and arrangements i.e. connect the eating areas with natural water features	2/6	
	• Play areas that include several types of games and entertainment activities (see Table 5.15)		
	Interior design considerations:		(Section 5.2.3, Tables, 5.1, 5.18, 5.20-3, 5.25, 5.26)
	Art:		
	• Connected to nature and water features	6/6	
	• Connected to culture	3/6	
	• Semi-permanent type of art to attract the attention of children at the reception desk	3/6	
	• Connected to music	1/6	
	Forms and shapes:		
	• Circular, organic and soft forms and shapes	6/6	
	• Forms and shapes connected to culture	5/6	
	• Various forms and shapes	5/6	
	• Gable roofs	4/6	
	• Symmetrical	3/6	
	Image design:		
	• Home-like image design	2/6	
	• Looked like a park or entertainment centre	6/6	
	Furniture		
	• Modern and attractive	6/6	
	• Circular forms and shapes	4/6	
	• Outdoor furniture	2/6	
	• Home-like design furniture	2/6	
	Materials:		
	• Transparent materials	6/6	
	• Textured materials	5/6	
	• Connected to nature	3/6	
	• Modern and light materials	2/6	
	• Bright and glittery materials	1/6	
	Including symbols to express their love to culture (2/6), and family (2/6)		
	Colours: Purple (1/6), pink (3/6), green (4/6), brown (3/6) blue (4/6), and yellow (4/6)		
	Wayfinding signs:		
	• Attractive	1/6	
	• Signs that give identity and distinctive character to the building	1/6	
Environmental considerations	• Fresh and pleasant smell (1/6), effective ventilation (6/6) and light (1/6)		(Section 5.2.4, Table 5.27)

Table 5.31: Children's preferences related to age group 11-18 years that provide them with a comfortable environment

Children's preferences related to age range 11-18 years old			
Thematic Design	**Preferences**	**No.**	**References**
Context-related themes	• Complete separation in spaces for prayer, sleeping and toilets	8/8	(Section 5.1, Tables 5.1-3, 5.5, 5.13)
	• Support of the children by family and friends	8/8	
	• Partial separation in social spaces e.g. waiting, eating spaces, and play areas	6/8	
	• Provide separation in the playing area	6/8	
	• Elements connected to culture e.g. art	2/8	
	• No separation in the play areas	2/8	
Physical environment: Architecture – interior architecture- and interior design-related themes	**Architecture and interior architecture design considerations:**		(Section 5.2 Tables 5.5, 5.9, 5.15-17)
	• Outdoor waiting areas	7/8	
	• Architectural openings and arrangements i.e. connect the eating areas with natural water features	6/8	
	• Form and shape i.e. combined modern and traditional architectural forms e.g. arches supported by large circular columns to attract attention of children and to make the spaces beautiful	5/8	
	• Home-like design waiting areas	5/8	
	• Indoor circular form and shape waiting areas for children	5/8	
	• Home-like design spaces for food i.e. open design kitchen	4/8	
	• Indoor L shape waiting areas for adults	2/8	
	• Spaces for having food i.e. restaurants and cafeteria	2/8	
	• Play areas that include several types of games and entertainment activities i.e. watching television (4/8), football, swimming, and listening to music (3/8 for each), playing music (2/8), and fishing (1/8)		
	Interior design considerations:		(Section 5.2.3, Tables 5.18, 5.20-22, 5.24 5.26)
	Art:		
	• Connected to nature	7/8	
	• Abstract art	5/8	
	• Connected to water features	5/8	
	• Connected to music	3/8	
	• Connected to sport	2/8	
	• Connected to culture	2/8	
	• Impressionistic piece of art	1/8	
	• Semi-permanent type of art to attract the attention of children at the reception desk	1/8	
	• Connected to the function of the space	1/8	
	Forms and shapes: Connected to culture (2/8), symmetrical (3/8), circular and organic (6/8), gable roofs (3/8), and various forms and shapes (5/8)		
	Image design: Home-like design (6/8), looked like a park or entertainment centre (8/8).		
	Furniture		
	• Circular forms and shapes	7/8	
	• Outdoor furniture	6/8	
	• Home-like design furniture	6/8	
	• Modern, attractive	3/8	
	Materials: Connected to nature (5/8), with textures (8/8), bright and glittery (2/8), transparent (7/8), modern (1/8), soundproof (1/8)		
	Symbols: Connected to music	3/8	
	Colours: Turquoise (3/8), white (3/8), black (2/8), red (5/8), pink (3/8), green (7/8), brown (3/8), orange (4/8), blue (6/8), purple (3/8), and yellow (7/9).		
	Wayfinding signs:		
	• Signs that give identity and distinctive character to the building	3/8	
	• Signs for safety issues	1/8	
Environmental considerations	• Prevent noise (5/8), effective ventilation (2/8), sufficient and natural light (2/8)		(Section 5.2.4, Table 5.27)

In the next chapter, the findings and results from the interviews and workshops will be discussed and compared with the conclusions from the literature review. Also, the findings will be presented and discussed in relation to views from Palestinian designers. These findings will then inform the development of design recommendations for the design and development of public spaces of children's hospitals.

Chapter 06

Discussion: Field Research Findings Informed by Designers

6.0 Introduction

This chapter discusses the findings and field research with feedback on those findings from designers' workshops (see Figure 6.1). The designers' workshops were conducted directly after the workshops with children, parents and medical staff. Thus, the researcher used the primary analysis and results from the other workshops to conduct designer's workshops. For this reason, not all the field research has feedback from designers.

This chapter will bring together and discuss the following topics:

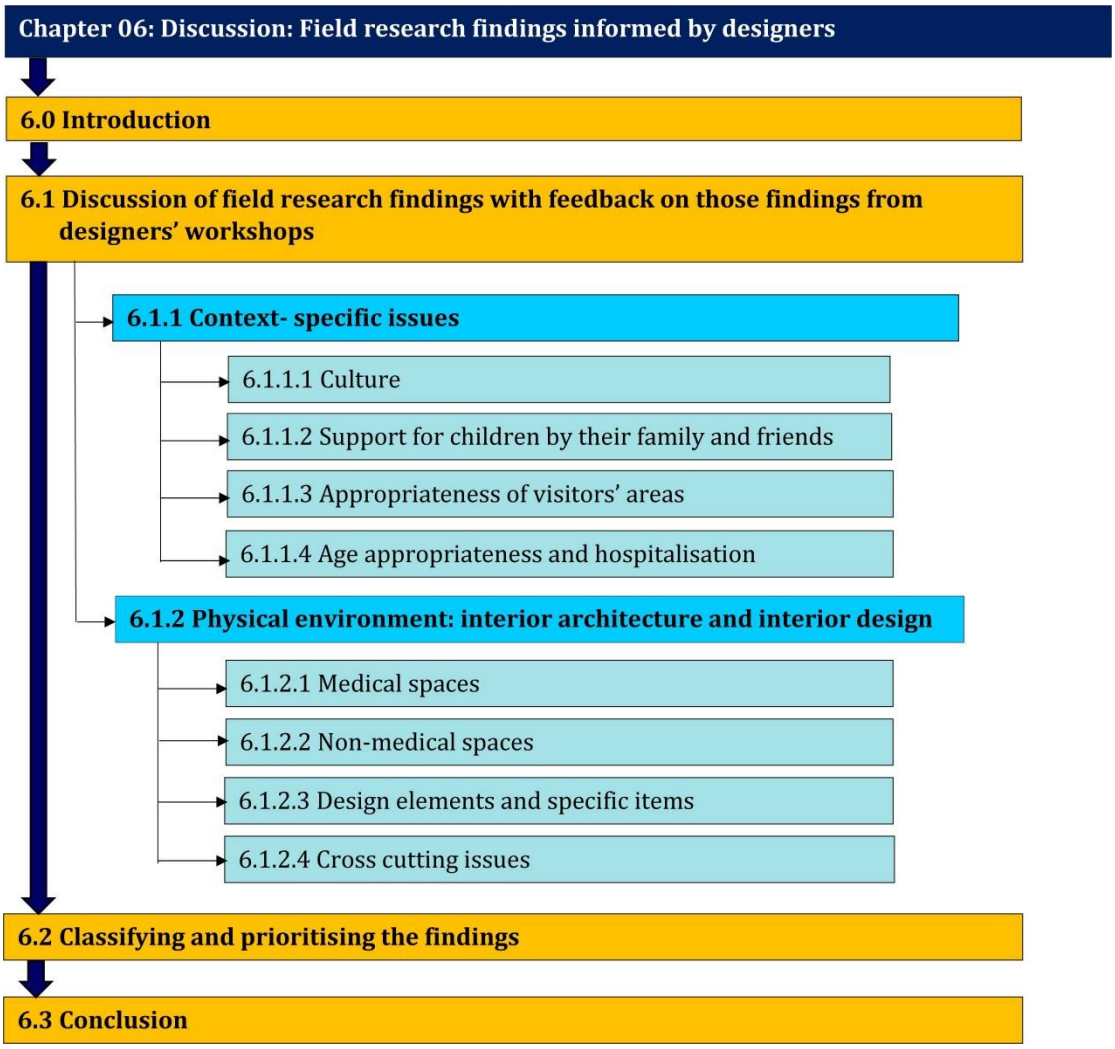


Figure 6.1: The structure map of the chapter

6.1 Discussion of field research findings with feedback on those findings from designers' workshops

This section will bring together and discuss the findings and conclusions of each part of the field research: conclusions drawn from the literature reviews and design-related insights about these findings and conclusions from the designers' workshops.

6.1.1 Context-specific issues

Central to the findings from discussions with parents, medical staff and children, the related themes under *context-specific* issues constitute one of the main factors to be taken into consideration for a children's hospital in Palestine. These themes are related to: (i) *culture, (ii) appropriateness of visitors' areas, (iii) age appropriateness and hospitalisation*, *and (iv) support for the children by their family and friends*. Some of these findings will also be discussed within the related themes of *physical environment: interior architecture and interior design.*

6.1.1.1 Culture

The field research findings indicate that cultural factors are an essential element to be determined in designing public spaces of children's hospitals (Section 5.1). The literature review identified the potential influence of culture on the design of physical environments in children's hospitals; designers should create elements to be appropriate to every culture (see Sections 2.2.5, 2.4.2.1, 2.2.4 & 2.3). Six factors related to *culture* identified from the field research are discussed below (also see Section 5.1.1).

Art connected to culture: A majority of the participants indicated a preference for art that is connected to culture, particularly children from 7-14 (Sections 5.1.1, 5.2.3, Table 5.1). This finding does not support Piaget's ideas that children of different ages would be expected to choose diverse types of elements connected to culture. However, this conclusion may be related to the tools used by children in the workshops (i.e. most children chose the same type of toolkits that expressed art related to culture). Based on the literature, some researchers

identified art as a potentially important element in the healing environment but did not specifically relate it to culture (Section 2.2.6.3). However, a few researchers (see Section 2.3) expressed the importance of including elements connected to culture particularly in the public spaces of hospitals to provide an interesting environment.

Interior designers' suggestions relating to art: From the designers' workshops, interior designers argued that children's artwork and preferences, as well as adults' needs, can provide a reference point to address interior concept designs related to the type of art. The literature review confirmed the importance of children participating in the design process (Section 2.2.3). Artists and ceramicists provided an example of how to create art related to culture in ways that are appropriate and interesting for children, particularly young children:

> *To provide identity to the artwork, we should include the folklore and cultural elements that are related to our identity, particularly in the 2D artwork (e.g. custom, embroidery, keffiyeh, and Dome of the Rock as a background for the paintings and combine them with children's preferences that are included in their artwork. Such factors are considered friendly to the child and can avoid him having the feeling that he is in a strange environment* (Art & Ceramics group).

Traditional architectural elements: A majority of the participants (including children aged 3-7 and 7-11) acknowledged the positive influence of including traditional architectural elements (Sections 5.1.1, 5.2.2, Table 5.1). The literature review identified the importance of including elements connected to culture in hospitals but did not specifically refer to traditional *architectural* elements (Sections 2.3, 2.2.4-5).

Interior architectural spaces connected to culture: A large minority of participants (including children aged 3-7) showed their strong preference for interior architectural spaces that had cultural references in their design (Section 5.1.1, and Table 5.1). Few studies in the literature review identified the importance of including elements connected to culture in hospitals (Section 2.3). For instance, Islamic culture and religion were indicated as having a strong influence on the design of physical environments (Section 2.2.5). However, there is no evidence in the literature suggesting where specific interior architectural spaces should be located in children's hospitals.

Designers' recommendations regarding interior architectural spaces connected to culture: From the designers' workshops, the *interior architects' groups* recommended including courtyards because a courtyard is one of the essential elements of traditional architectural spaces in Palestine. They argued that courtyards can reflect the spirituality of the space and serve as a concept design that might help in arranging the interior architectural spaces. In the literature review, there was little evidence to indicate the potential effect of culture on architectural design forms and shapes, including how the inclusion of courtyards reflects Palestinian's beliefs, religion, traditions, environmental issues and culture (Sections 5.4, 5.4.2).

Gender and age separation: Three issues were identified from the field research (Sections 5.1.1, 5.2.2, Table 5.2)**.**

- **Complete separation:** The majority of participants (including children, aged 3-7, 7-11, and 11-18) indicated their preference for including

complete separation in some interior spaces with specific functions (i.e. prayer area, breastfeeding room, sleeping areas and toilets.

- **Partial separation:** More than half the participants (including children, aged 3-7, 11-18) preferred partial separation in other spaces (e.g. waiting areas, play areas, social spaces) particularly for children over seven years.
- **No separation:** one of the parent participants preferred having no separation in the social spaces.

In this research, children between 15-18 years indicated a strong preference to include separation between genders so they could feel comfortable. However, although children younger than 15 years did not pay much attention to gender separation, they preferred to play with children of their own gender. This issue received little attention in the literature review, and only a few studies referred to the provision of partitions between children in hospitals to provide privacy (see Sections 2.2.5). Other studies supported the need for gender separation in terms of activities in the children's play area (Section 2.2.5). For instance, children preferred having mixed gender space for play areas, but appreciated the separation of play areas between boys and girls due to their interest in different activities.

The literature review of this study did not identify separation between genders in hospitals as an issue. Perhaps this is because the majority of the literature comes from Western, non-Muslim cultures. However, other studies identified some differences about separation between genders, even in the interpretations of the Islamic religion. For example, the Prophetic period (using Qur'an literature

as main textual source) does not suggest any evidence for separation or segregation; all the evidence indicates that *"women had full access to the Mosque"*. In the Calipha Umar Ibn-Khattab period (using Hadith literature as a minor source of the demise of the Prophet) there was separation of women from men. However, non-Islamic studies reported that *"segregation by age is considered more important than by gender"* (see Section 2.2.5).

6.1.1.2 Support for children by their family and friends

Nearly half the children indicated a preference to be with their family and friends, whereas a few preferred to be with their family or friends only in the spaces they choose, such as while waiting their turn (Section 5.1.4, Table 5.3). Significantly, all female children between 3-7, and 7-11 years preferred to be with their family. However, male adolescents preferred to be with their friends while waiting. Moreover, a few parents and medical staff chose to provide physical and social support for family and friends (Section 5.2.2); they indicated a preference to provide indoor and outdoor supportive spaces for families and for children to socialise with their friends. In the literature review, it was found that providing a comfortable environment for parents will help them support their children during their treatments and that in turn will aid children in recovering from their illness more quickly. These findings are evident in the literature review (Section 2.2.6.3). It is also supported by interior designers from designers' workshops.

6.1.1.3 Appropriateness of visitors' areas

All medical staff identified the value of appropriateness of environments for visitors in Palestinian hospitals. They connected this to *the inadequate environments* that are offered in the existing hospitals, and to *age appropriateness* (Sections 5.1.2, 5.1.3). These findings were acknowledged in the literature review (Section 2.4.2.3, & Table 2.11), but not discussed by designers because designers only discussed the initial results of data analysis.

6.1.1.4 Age appropriateness and hospitalisation

All medical staff highlighted the lack of age-appropriate spaces in some hospitals in Palestine (Section 5.1.3). They explained that children in the age range 0-13 years are classified as child patients in Palestine for purposes of hospital admission. Older children are hospitalised in adult wards, especially in Nablus city. However, if Palestine is to have a new children's hospital, medical staff indicated a preference for considering the admission age range of children to be 0-18 years. In the literature review, there are some differences regarding admission age ranges of children (Section 2.4.2.3, & Table 2.11). However, considering the age range to be 0-18 years was supported by literature (Section 2.2.5, & Table 2.2).

6.1.2 Physical environment: interior architecture and interior design

Based on the field research findings the physical environmental spaces to be taken into consideration for the main entrance and atrium can be described under four main topics (Section 5.2): medical spaces; non-medical spaces; design elements and specific items; and cross cutting issues.

6.1.2.1 Medical spaces

Eight areas were identified: *emergency, triage room, x-ray, labs, outpatient, pharmacy, physical therapy and orthopaedic departments, and consulting room. Adults participants preferred to place all these functions on the same level as the main entrance and atrium to provide easy access.* Also, the field research identified place the emergency entrance away from the main entrance to decrease children's anxiety (Section 5.2.1, Table 5.4). All these functional spaces were identified in the literature review (Section 2.2.6.3).

6.1.2.2 Non-medical spaces

This section will discuss non-medical spaces regarding interior architectural plans related to practical perception of preferred spaces and activities (Section 5.2.2). The field research identified nine non-medical areas: *main entrance, reception (or information area), admissions (or registration area), waiting area, play areas and entertainment activities, administration, car park, accounting, and spaces for having food*. These elements will also be discussed under Section 6.1.2.3 and 6.1.2.4.

Interior architecture plan for the various spaces and activities. This section will discuss eight issues: location and relationships of non-medical spaces; types of waiting and spaces to be connected with reception areas; play areas and types of games and entertainment activities; architectural openings; integration between outside green areas and inside spaces; height of desks and scale of

reception area; admission and main entrance; safety and security; and environmental considerations.

1. **Location and relationships of non-medical spaces:** All adult participants preferred siting the *main entrance* some distance from the emergency department (Table 5.5). This finding is confirmed by findings from the literature review (Section 2.2.6.3). They also all preferred a clearly visible location for the *reception desk*. They suggested positioning it in the centre of the atrium, close to the admissions and registration area (Table 5.6). Also, all interior designers (from designers' workshops) supported placing the reception in the centre of the atrium (see Appendix C-1). These findings were supported by findings from the literature review (Sections 2.3, 2.2.6.3). On the other hand, a few medical staff preferred placing *admissions* in the centre of the reception area near the main entrance to provide easy access and flow (Table 5.6). According to the literature review, the admissions area should be on the same level as the main entrance and in close proximity to the other medical spaces (Section 2.2.6.3).

Regarding *waiting areas*, two medical staff preferred to include a waiting area, specifically for children, adjacent to the emergency department (Table 5.7). Another two indicated preferences to position waiting areas for children away from the medical spaces. However, all adults indicated a preference to include waiting areas adjacent to the reception, admissions and outpatients department. In the literature review, the last preference is supported (Section 2.2.6.3).

In terms of *play areas* (Table 5.10) the findings showed that more than half the adults indicated preferences to include a play area for children adjacent to the

emergency department. Few pieces of evidence from literature review supported that (Section 2.2.6.3). Other evidence pointed to separate play areas for children away from emergency to decrease children's anxiety (Sections 2.2.6.3). Nearly all adults preferred the provision of play areas close to the main waiting and reception areas. However, all the adults indicated preferences to provide play areas away from the medical function spaces. Such findings are evident in the literature review (Sections 2.2.6.3). From the designers' workshops, all the above preferences were supported.

Based on the field research findings, other *supplementary spaces and facilities* were identified (Table 5.17).

- Most of adults preferred to include *spaces for food* away from medical functional spaces to provide comfort. However, one parent indicated his preference to position spaces for food away from the play area to give the children exercise. The literature review confirmed the inclusion of spaces for food oulets in the context of hospitals, but without indication as to the exact location (Sections 2.2.6.3).
- Most adults indicated a preference to position the *administration* on the same level as the main entrance and atrium. They prefer to place it adjacent to the medical functions with easy access to the reception, admissions and the main entrance. Such issues are evident in the literature (Section 2.2.6.3).
- All the adults and one child (11-18) wanted to include enough spaces and easy access to the *car park* and direct connection between the car park and

the reception area. These preferences are evident in the literature review (Section 2.2.6.3).

- Half the parents and one of the medical staff preferred to position the *accounting department* close to the main entrance to facilitate the payment process. In Palestine, there is no free treatment, even at the governmental hospitals. Positioning the *accounting department* close to the main entrance is evident in the literature (Section 2.2.6.3).

2. Types of waiting and spaces to be connected with reception areas

In this category, three main issues were identified (Section 5.2.2, Table 5.7-9):

- Most adults preferred to include two types of waiting: for long-term and short-term visiting. The literature review identified the importance of including main and secondary waiting areas to accommodate patients (Section 2.2.6.3). However, differentiating between long- and short-term visits is acknowledged by only a very few studies (Section 2.2.6.3). Most adults explained that waiting areas for short-term visiting requires more space because it has more visitors. In the literature review, there is no mention of this need. However, some departments (e.g. outpatient department) might have a significant number of patients per day and therefore require enough spaces to accommodate them (Section 2.2.6.3).
- More than half the children in the age groups 3-7, 7-11, 11-18 years indicated a preference to include outdoor waiting areas. In the literature review, there is a lack of information about types of waiting areas from children's perspectives. However, few studies were found in which the

children appreciated the inclusion of outdoor seats that could be placed close to each other for social gatherings (Section 2.2.6.3).

- Nearly half the children aged 7-11 and 11-18 years included an indoor waiting area. The literature did identify the potential influence of including outdoor and indoor waiting spaces (Section 2.2.6.3).

Other spaces were identified to be connected with reception and waiting areas: different perspectives were identified (Section 5.2.2, Tables 5.6-8):

- All parents preferred connecting the reception area with green and pleasant environments. These findings are identified in the literature review (Section 2.2.6.3).
- All parents preferred connecting the reception area with: cafeterias, coffee shops, snack bars and small shops; a breastfeeding room and diaper changing area; a prayer room; a play area and waiting area; and toilets. A few of the medical staff also preferred connecting the reception area with the admissions department, and providing a smooth flow from reception to the emergency department. Some of the functional spaces mentioned above were identified in the literature review, but the location of these spaces was generally connected to outpatient departments. However, other studies recommended that most of these spaces be connected to the reception areas (2.2.6.3).
- Different preferences were identified from the field research regarding the functional spaces to be connected with *the waiting area for long-term visiting* (Section 5.2.2, Table 5.8):

- All adults preferred the inclusion of play areas and entertainment activities according to age.
- Nearly all the adults preferred to connect waiting areas with outdoor green areas and a restaurant.
- More than half the adults preferred the inclusion of a prayer room, sleeping facilities, a smoking area, and an administrative area.
- More than half the adults preferred the inclusion of breastfeeding and diaper-changing facilities.
- All medical staff preferred the inclusion of a changing room, and places to sleep and rest.
- A few parents preferred the inclusion of family spaces and an office with computers and access to the internet for them to use.

Not all the functional spaces mentioned above were included in the literature review. For instance, providing play spaces in the waiting areas of children is supported; including diaper-changing and breastfeeding is evident, but without any indication to position it close to the waiting area (Section 2.2.6.3). The findings showed that all interior designers and interior architects (from the designers' workshops) recommended the above.

3. **Types of play areas, games and entertainment activities:** The findings identified six main issues (Section 5.2.2, Tables 5.11-12, 5.14-16, 5.28-31):
    - The majority of participants indicated preferences to include several types of indoor and outdoor play areas. However, few participants preferred specific indoor or outdoor games and entertainment activities.

In the literature, including outdoor and indoor games according to age is confirmed (2.2.6.3).

- Half the parents and two children (aged 11-18) wanted to separate the play areas for babies and toddlers away from those of the older children. This preference is supported in the literature review (Section 2.2.6.3).
- Nearly half the children included aquariums, and a few of them included play areas with sand, ball games and listening to music. For more preferences see Table 5.14. These preferences are identified in the literature review (Section 2.2.6.3).
- Most young children (aged between 3-11 years) preferred games and entertainment activities that are connected to learning/education and physical activities (Tables 5.15-5.16). In the literature (Section 2.2.6.3), one scholar identified seven types of games for children aged 5-8 years. Such preferences have some similarities to the preferences of younger children in this research, with some differences in relation to technological games (see Table 2.5).
- A few children between 11-18 years preferred six types of entertainment activities that were not preferred by young children (see Section 5.2.2). Some of the identified games and entertainment activities are acknowledged in the literature review e.g. video games, television, computer games, DVDs, reading books, calm music and aquariums (Section 2.2.6.3). However, , the six types of activities that were identified by adolescents in this research are evident in the literature review (see Section 2.2.6.3), but they are preferred by children across age ranges.

- Few parents indicated their preferences to provide personal toys for young children (Table 5.12). Providing personal toys and drawings is confirmed by few studies (Section 2.2.6.3).
- From the designers' workshops, all designers recommended providing play areas according to age. However, the artists and ceramicists recommended providing an open space with a magnetic floor with different shapes and forms to give children a chance to create and express themselves according to their cognitive development stage. The literature review identified the importance of providing free spaces for children to create their own craft, but such types of activities are not discussed in relation to hospitals (Section 2.2.6.1).

4. **Open plan design.** Five ideas were identified:
    - All the parents and most medical staff indicated a preference for an open plan design concept for the *reception area*, but suggested that the design should provide semi-private designated spaces i.e. spaces distinguished by some visual separation screens or other interior design elements (such as plants) for males and females. The literature review identified the potential influence of creating an open plan design concept, not only for children's hospitals, but also for other types of children's spaces because they allow for eye contact, visibility and observation of children (Sections 2.2.6.1,3).
    - All adults preferred the inclusion of open design space for all types of *play areas and entertainment activities*. There is a lack of studies

discussing this but a few refer to the provision of an appropriate design for the play areas that would help parents and nurses observe children (Sections 2.2.6.1,3).

- More than half the adult participants and almost half the children from the age ranges 3-7, 7-11, and 11-18 years preferred to have eating areas that open on to a green area. A few children, particularly in the age range 11-18 years, preferred the open design kitchen (Tables 28-31). The literature review acknowledged the importance of an open design kitchen for children, but not in the context of hospitals (Section 2.2.6.1).

5. **Integration between outside green areas and inside spaces.** More than half the adult participants indicated a preference to connect interior spaces of the *main waiting* areas with outdoor green areas to have fresh air, relax, and be comfortable. However, most parents preferred an open plan design for the waiting areas to provide easy wayfinding. The literature review identified the potential influence of providing easy access to the outdoor green areas (Sections 2.2.6.1, 3), and providing an open plan design concept, but not explicitly to waiting areas (Sections 2.2.6.1, 3). The interior architects' group (from the designers' workshops) recommended providing integration between outside and inside spaces.

> *It is essential to provide integration between the elements of the interior with the elements of the exterior by using the forms and shapes from nature* (Interior architecture group).

The literature review strongly supported the inclusion of providing integration between the interior of buildings and nature outside (Sections 2.2.6.1, 3).

6. **Desk height in main entrance, reception and admission areas** (Section 5.2.2, Table 5.6): All adult participants appreciated providing a visible, wide and easily accessible main entrance, and they appropriate scales for the main entrance and atrium. However, one parent, most medical staff,and a few children aged between 11-18 years preferred to include a reception desk that had various and appropriate heights. One parent and one admissions manager (from an interview) also indicated their preference to create several levels for the admissions desk. The inclusion of different levels for reception desks is acknowledged in the literature review (Section 2.2.6.3)

7. **Security and safety:** Half the parent participants, most medical staff and three children recognised the importance of safety and security issues in the design of the main entrance. Three children aged between 7-11 and 11-18 included security in their artwork, particularly in the spaces they like to be while waiting their turn (Section 5.2.2, Tables 5.30-31). Including security and safety in hospitals is supported by only a small amount of evidence in the literature review (Section 2.2.6.1, 2.2.6.3).

8. **Environmental considerations.** Six issues were identified (Section 5.2.4).
    - More than half the participants (including children, aged 3-7, 7-11, & 11-18) appreciated including both natural and artificial light.

- Nearly half the participants (including children aged 3-7, 7-11, & 11-18) appreciated providing natural ventilation, particularly in the waiting area, main entrance and play areas.
- More than half preferred the inclusion of adequate light.
- Two children (Tables 5.29-30) and one parent mentioned that it was important to prevent unpleasant smells.
- A large minority of children (aged 11- 18) and parents preferred the reduction of noise by using soundproofing materials to decrease noise, particularly in the open design spaces. This design consideration is discussed by designers who suggested using soundproof materials for walls, and using fabric for ceilings.
- All the medical staff preferred including hygiene gel machines; providing proper ventilation for children's spaces to control infections; and, to provide clean environments, carrying out tests on the play areas every week (by taking samples to the labs) (Table 5.10).

The literature review acknowledged the importance of providing natural ventilation and sufficient light (Sections 2.2.2, 2.2.3, 2.2.6.1, 3), a calm environment (Sections 2.2.6.1-3), avoiding unpleasant smells (Section 2.2.6.2), and including soundproofing and sound-reduction materials (Sections 2.2.6.1-3). Some evidence strongly indicated the importance of controlling infections through design, but there is not much information about the implications of it (Section 2.2.6.2, 3). From the designer's workshop, the interior architecture designers suggested three main issues (see Table 6.1).

Table 6.1: Recommendations by interior architecture designers regarding environmental design considerations (Designers' Workshops)

Environmental Design Considerations	
Environmental considerations	**Examples**
Preventing noise in the public spaces	• Using soundproofing materials e.g. using fabric on the ceiling and blocks for interior design partitions (see discussion in Section 6.1.2.2).
Providing natural and artificial light	• Creating skylights in the atrium and the interior courtyards. • Providing artificial light through the use of colours (see discussion in Section 6.1.2.2).
Providing natural ventilation	• Creating courtyards, and providing elements from nature (e.g. fountains, green areas), particularly in the children's play areas (see Section 6.1.1). • Considering the weather conditions in Palestine (e.g. wind direction). This finding is evident in the literature review, specific to the context of Palestine (Section 2.4.2.1).

6.1.2.3 Design elements and specific items

Eight areas were identified from the field research pertaining to the provision of comfort (Section 5.2.3). These areas are related to *art, colour, furniture, attractive distraction elements, materials for interior design and interior architecture of public spaces, wayfindings, form and shape for main entrance and interior spaces, and thematic design.* These elements will also be discussed in Section 6.1.2.4.

Art

Seven themes connected to art were identified (Table 5.18). They are listed in order of preference:

1. **Art connected to nature and water features**: Most participants, (including children, aged 3-7, 7-11, 11-18) strongly preferred the inclusion of art with natural themes and art that included water features. These findings were identified in the literature review (Sections 2.2.6.2, 3). From

the research findings, there appear to be no differences in children's preferences regarding art that is related to nature and water features. This finding is evident in a few studies (Section 2.2.5).

2. **Art connected to culture**: these details were discussed in Section 6.1.1.1.
3. **Abstract and impressionistic types of art:** More than half the participants (including children aged 3-7, 11-18) preferred the inclusion of abstract art that includes different shapes, colours and lines, which fill them with joy. The review of the literature identified evidence that supports using abstract art in healthcare spaces, particularly in the public spaces. However, others do not recommend including abstract art as it has an open, ambiguous interpretation when patients feel depressed (i.e. the interpretation may have a negative impact on their health and emotions (Section 2.2.6.3). However, two children (aged 3-7, 11-18) preferred the inclusion of impressionistic art that included inspiring modern art, but with more realism than abstract art. According to the literature review (2.2.6.3), a few children (age 5-7) preferred the inclusion of impressionistic type of art.
4. **Art connected to the function of the space to provide identity**: Nearly all the parents and one child (age 11-18) preferred the inclusion of art that is connected to music in the music area to provide identity and easy wayfinding. Half the parents and a few children aged 3-7 and 11-18 preferred art that is connected to sport in the play areas; this is evident in very few studies in the literature review, but is not connected specifically to play areas. However, other studies reported that art could be used on walls, floors and ceilings as a means of wayfinding because that can be

helpful to all users and can provide children with pleasant distraction (Section 2.2.6.3).

5. **Semi-permanent types of art**. A few participants (including children aged 3-7, 7-11, 11-18) preferred the inclusion of semi-permanent types of art in the main entrance and reception area (e.g. sculptures). This is acknowleged in the literature review (Sections 2.2.6.1, 3).
6. **Various types of art**: A few of the parents and two children (aged 11-18) preferred the inclusion of various types of art in all the interior spaces, excluding the reception and the admission area, in which art from the local culture can be utilised. The literature review acknowledged the importance of including various types of art in hospitals (Section 2.2.6.3).
7. **Art connected to cartoon-like elements:** One child aged 3-4 preferred the inclusion of art with cartoon-like elements (e.g. cartoon characters, balloons and clowns). In the literature review, very few studies discuss the preferences of young children related to cartoon images. However, in other studies, it is clear that adolescents and adults do not prefer cartoon-like themes; however, age-appropriate art should be included (Sections 2.2.6.3).

Colours

Three elements were identified from the field research (Section 5.2.3, Table 5.19, 5.20).

- *Adults' preferences of colours*:
  - Most adults preferred colours related to nature. In the literature review, there is inconsistency regarding the preference of colours that should be included in children's hospitals. However, some evidence strongly recommended the inclusion of different types of colours, particularly for children's hospitals (Sections 2.2.6.1-3, 2.2.3, 2.2.5).
  - Two parents preferred the inclusion of light colours in the reception areas**.** The literature review contained no such findings. However, a few studies recommended using neutral colours for secondary waiting areas (Section 2.2.6.3).
  - Two of the medical staff preferred the inclusion of colours in the x-ray area. This is also shown in the literature review (Sections 2.2.6.3).
  - All medical staff chose to provide a comfortable environment (e.g. colours, aesthetics) for the interior design of the triage room. This is not evident in the literature. However, providing a friendly environment for the medical and non-medical spaces, particularly in children's hospitals, is strongly recommended (Section 2.2.6.3).
  - Half the adults preferred the inclusion of some colours in the main entrance to provide positive distractions for children. In the literature review, providing an attractive main entrance that includes attractive colours is recommended (Section 2.2.6.3).

- All adults indicated preferences to include colours for the floor tiles. Few pieces of evidence from literature acknowledged this finding (Sections 2.2.6.3, 2.3).
- A few adults preferred the inclusion of bright and light colours for young children (0-6 years). These findings are evident in the literature review (Sections 2.2.3, 2.2.6.1, 2.2.6.3). However, some studies referred to avoiding using bright colours because they create a busy and chaotic environment in the atrium (Section 2.2.6.3).

Designers provided five recommendations regarding colours (see Table 6.2).

Table 6.2: Designers' recommendations related to colours (designers' workshops)

Colour preferences	
Designers' Workshops Groups	**Recommendations**
Interior architects	• Using colours as a means of surprise for children to stimulate their thoughts. • Using colours as a means of coding the interior architectural spaces to provide identity to the areas and for easy wayfinding. This suggestion is evident in literature (Section 2.2.6.3).
Interior designers	• Using light colours such as green, blue and natural colours in the reception, waiting room and main entrance to welcome and attract children and might help decrease their fear.
Artists and ceramicists	• Using colours to create appropriate types of art for children.
Graphic designers	• Using colours for the wayfinding signs, but the colours should be integrated with the concepts and elements of interior design and interior architecture.

- *Children's preferences of colours*: Eleven colours were identified from field research (Table 5.20).
    - Most children (aged 3-7, 7-11, 11-18) prefer green and blue
    - More than half (aged 3-7, 7-11, 11-18) prefer yellow
    - Nearly half (aged 3-7, 7-11, 11-18) prefer brown and purple

- A large minority (aged 3-7, 7-11, 11-18) prefer pink, and a large minority aged 3-7, and 11-18 prefer red
- Few (aged 3-7, 11-18) prefer white, turquoise, black, and few (aged 3-7) prefer orange.

In the literature review, there are studies with similarities to, and differences from, the above findings (Sections 2.2.3, 2.2.6.1, 2.2.6.3). However, a few studies argue that there are no specific colours that should be applied in the public spaces of children's hospitals due to psychological or cultural reasons (Sections 2.2.6.3).

Furniture

Three issues were identified from the field research (Section 5.2.3, Table 5.21).

- *Outdoor furniture*: Nearly half the total number of participants (including children, aged 3-7, 7-11, 11-18) preferred the inclusion of outdoor furniture (e.g. seats, shelters) to be placed in the outdoor landscape and green areas. This finding is identified in the literature (Section 6.1.2.2). Including outdoor spaces for hospitals with appropriate furniture is regarded as important to creating healing environments (Section 2.2.6.3).
- *Modern, attractive, adaptable, enough, and comfortable furniture*: The participants identified a range of perspectives.
  - Nearly half the parents and children aged 7-11, 11-18 preferred the inclusion of modern furniture.

    - A few parents and medical staff wanted to ensure there was enough furniture, particularly in the waiting area for long-term visiting.
    - All parents preferred the inclusion of adaptable furniture that can be arranged in different forms and shapes.
- *Age-appropriate furniture*: Half the parents preferred the inclusion of age-appropriate furniture. This is evident in the literature review (Section 2.2.6.3). One parent and one member of the medical staff wanted sufficient furniture to be provided (i.e. seats and desks), and adequate number of computers with access to the Internet. In the literature, there are a few pieces of evidence indicating that hospitals should provide an adequate amount of furniture, which is comfortable and attractive with a modern design; and have access to the Internet (Section 2.2.6.3).
- All interior designer and architect groups from the designers' workshops recommended all the above findings.

Attractive distraction elements

Two suggestions were identified (Sections 5.2.2, 5.2.3, Table 5.5-7):

- All the adults preferred the inclusion of attractive distraction elements in front of the main entrance to distract children's attention. These findings were acknowledged in the literature review (Sections 2.2.6.3, 2.2.3).
- All the parents and medical staff preferred the provision of visually attractive distracting elements that keep children busy while parents complete the registration process. These findings are also evident in the literature review (Sections 2.2.6.3, 2.3). In addition, half the parents

strongly valued the inclusion of visually distracting elements for waiting areas. This is supported in the literature review (Section 2.2.6.3).

Materials for interior design and interior architecture of public spaces

The field research findings identified different preferences related to materials (Section 5.2.3, Table 5.22).

- Nearly all the participants (included children, aged 3-7, 7-11, 11-18) preferred the inclusion of textured materials to create design decorations for interior walls.
- A majority of participants (including children, aged 3-7, 7-11, 11-18) preferred the inclusion of materials connected to nature. For instance, using wood for the furniture (e.g. outdoor seats, reception desks).
- Most of the participants (including children, aged 3-7, 7-11, 11-18) preferred bright materials, and more than half (including children, aged 7-11, 11-18) prefer transparent materials. For intance, using transparent materials to separate public interior spaces, and using bright materials to cover walls, or to provide some aesthetics for interior walls.
- One child (aged 15-16) preferred the inclusion of soundproofing materials to be used on the walls.
- All medical staff preferred the inclusion of durable, sustainable and easy to clean materials. For instance, using tiles for the interior elevations of waiting areas instead of paint. One of the medical staff voiced a preference to use such materials, particularly for the admission desk.

The literature review identified most of the above preferences (Sections 2.2.3, 2.2.5, 2.2.6.2, 2.2.6.3), however, a few studies recommended avoiding textured and absorbent materials, particularly on horizontal surfaces, and to provide easy to clean materials (Section 2.2.6.3).

From the field research, all the designers and two engineers (from individual interviews) recommended using a variety of materials (see Table 6.3). In the literature review, most, but not all, of the designers' recommendations are evident (see the above discussion).

Table 6.3: Designers' recommendations regarding types of materials (designers' workshops & individual interviews).

Groups of designers	Types and characteristics of materials
Interior architects	**Interior architecture materials** • Natural materials to provide continuity between outside and inside environments. • Soft and hard materials to provide elements of surprise and to create transition between interior spaces. • Materials that provide safety for children. • Materials that prevent noise (e.g. blocks, fabric). • Materials that have high efficiency in relation to wear and tear.
Interior designers	• Soft materials with simple textures for children
Fine artists and ceramicists	**Artwork materials** • Smooth materials for safety reasons. • Materials with forms and shapes that can be used and moved quickly by children. • Felt, plastic and flexible materials to create semi-permanent types of art (i.e. sculptures).
Graphic designers	**Wayfinding materials** • Transparent materials that provide more light (e.g. acrylic). • Materials that are easy to print on, particularly images and numbers; easy to clean; easy to move and stick things on; and can be used with and without light (e.g. Coroplast, fiberboard, polymetal and magnetic signboards).
Civil engineers (individual interviews)	**Materials in the public spaces** • Materials that are sustainable and safe; avoid using sharp-edged materials that could injure children; using safe materials for the floors (e.g. rubber for tiles); using carpets for walls, particularly in the play areas of younger children; using tiles (e.g. granite) for the walls of public spaces; avoid materials that are absorbent, particularly for furniture; using resistant materials such as polyvinyl chloride (PVC) for doors and stainless steel for handrails; and using anti-fungal paint to prevent bacteria (e.g. Vinyl silk).

Wayfinding

Two issues were identified from field research (Section 5.2.3, Table 5.23).

- All adults preferred the inclusion of appropriate and clear wayfinding signs that help them find their ways. For instance, signs that refer to emergency, reception, x-ray, play areas, etc..
- A few children in the age ranges 7-11 and 11-18 years preferred the inclusion of different types of signs in their artwork: one child from the 7-11 age group wanted attractive wayfinding signs; one included an image of a guitar next to the main entrance; two children aged between 7-11, and one child from age group 11-18 years included signs that can be connected with the functions of the building; and one child aged 17 included activity signs related to safety issues. The literature review identified the potential influence of including clear, effective, and attractive wayfinding signage in hospitals (Sections 2.2.6.2-3). However, there is still a lack of empirical studies that discuss appropriate wayfinding signs from the perspectives of children.

The graphic designers involved in the workshops suggested several design recommendations (see Table 6.4).

Table 6.4: Graphic designers' recommendations for creating clear wayfinding signs (designers' workshops)

Wayfinding signs
• **Dividing the signs into three types**: for non-medical, medical and entertainment spaces.
• **Providing appropriate and friendly themes for wayfinding signs for the interior spaces**. The results of the field research showed that children preferred nature themes. For example, using seeds for 0-7 years, flowers for 7-11 years, and trees for 11-18 years.
• **Providing appropriate wayfinding signs by integrating the design of wayfinding with the concepts and themes of interior design and interior architecture (i.e. colours, forms and shapes, furniture).** For instance, one can use different themes for the medical spaces, straight lines for the emergency, and organic lines for the play areas. The literature review identified the importance of providing integration between interior architectural spaces and wayfinding signs (Section 2.2.6.3).
• **Using comic sans font type (or similar) to create the sign script**. Such a type can provide a friendly image (i.e. not too bold, rigid or harsh for children). Also, it is advisable to use transparent acrylic to create the signs because it allows more light through.
• **Including an appropriate code of colours for the wayfinding signs**. Such a finding is suggested by a few scholars (See Section 2.2.6.3).

Forms and shapes for main entrance and interior spaces

Seven preferences for forms and shapes were identified in the field research (Sections 5.2.2, 5.2.3, Table 5.25).

1. **Circular, soft, smooth and L-shape**. Four issues were identified:
    - A majority of the adults and all the children's groups preferred organic and circular forms and shapes. For instance, most adults and a few children preferred the inclusion of circular and smooth forms and shapes for reception desk because children like organic forms and lines, and they are safer than sharp, angular forms (see Table 5.6). However, half the parent participants preferred an L-shape for the admissions desk that can be positioned infront of the admissions department. From the perspective of parents, such a design distinguishes it from the reception desk. On the other hand, one of the medical staff preferred a circular form for the admissions desk to

provide easy flow of movement. These findings, particularly from the perspectives of children, are not evident from the literature. However, in general, the inclusion of circular forms and shapes in children's spaces have a positive influence on children (Sections 2.2.6.1, 2.2.6.3).

- All interior architects' groups (from designers' workshops) recommended including organic forms and shapes.

  It is essential to include the forms and shapes from nature. For example, we can use organic forms from nature, such as sea, waves, etc. that might be utilised in the exterior and continued to be utilised in the interior. Such a concept will help to break the barrier between exterior and interior design (Interior architecture groups).

- Nearly half the children from age groups 7-11 and 11-18 years included an indoor waiting area with circular forms and shapes in their drawings and models. In the literature review, there are no specific studies that support such findings. However, the literature did identify the potential influence of including outdoor and indoor waiting spaces, but without adequate evidence that discusses the types of form and shape of the waiting area (Sections 2.2.6.3, 2.3).
- Nearly half the participants preferred furniture that has circular and organic forms. In the literature review, there is a lack of studies that discuss the form and shape of furniture. However, it identified the potential influence of forms that are circular and organic, particularly in the children's areas (Section 2.2.6.3), and a few studies pointed to the use of comfortable and non-angular furniture in hospitals (Sections 2.2.3, 2.2.5, 2.2.6, 2-3).

2. **Symmetrical forms.** A few children (ages 7-11, 11-18) preferred forms that encompass symmetry. In the literature review (Section 2.2.6.3), some scholars demonstrated that people prefer symmetrical configurations because they are more easily processed perceptually and remembered.
3. **Connected to culture.** More than half the participants (including children, aged 3-7, 7-11, 11-18) preferred forms connected to culture. For instance, all parents and nearly half the children appreciated forms that combine traditional architectural elements and reference cultural heritage with modern elements for the main entrance (see Section 6.1.1.1). A few studies suggested included elements connected to culture, particularly in the context of hospital design (Sections 2.2.5, 2.3).
4. **Modern elements.** A few parents and children (ages 7-11, 11-18) indicated a preference for including forms that utilise modern elements and lightweight materials for public spaces, particularly main entrance, and reception area. In this respect, not much information was found in the literature about form and shape that could be applied to the main entrance of children's hospitals. However, the literature review identified the potential influence of including a design that provides a welcoming and a friendly impression for children, especially to the main entrance (Sections 2.2.3.6, 2.3).
5. **Gable roofs.** More than half the children (ages 3-7, 7-11, 11-18) preferred gable roofs. They used it to express their love of the type of buildings, interior furniture and decorations that they created in their artwork. To them it provides a distance from a city image design. This finding is evident

in the literature review, but not specifically in the context of hospital design (Section 2.2.6.3).

6. **Irregular forms.** Including irregular forms and shapes is appreciated by most children aged less than 8 years. This might be interpreted as being related to their stage of cognitive development (Section 2.2.4).
7. **Various forms and shapes.** More than half the parents and children preferred the inclusion of a variety of forms and shapes. This finding is evident in the literature review (Section 2.2.6.3). However, in the literature review, there is a lack of studies that discuss the form and shape of furniture.

Thematic design

Five issues were identified from field research (Sections 5. 2.2, 5.2.3, Table 5.24 & 5.26).

- **Connected to nature:** Most participants preferred the inclusion of design that is connected to nature**.** For instance, half the parent participants preferred using themes connected to nature, particularly in the waiting area, and all the children included nature in their art work (Section 5.2.3, Table 5.26). The literature review also identified the potential influence of thematic design related to nature in providing healing in children's hospitals (Section 2.2.6.3). From the designers' workshops, all interior architecture designers recommended using thematic design connected to nature. For instance, including image design related to nature by creating an integration between outside and inside environments. Providing

landscapes that encompass elements from the surrounding environment (e.g. plants). This finding is evident in the literature review (Section 2.2.6.3). Including main courtyards and smaller courtyards that encompass natural elements has a link to a number of pieces of evidence in the literature review (see Section 6.1.1.1).

- **Home-like design**. More than half the participants preferred image design that reminded the children of home. For instance, a few children, particularly in the age range 11-18 years, preferred home-like designs for kitchens. The inclusion of home-like kitchen design is evident in the literature (2.2.6.3). Moreover, a large minority of children from all age groups preferred the inclusion of waiting areas designed to be 'homely' in their aesthetics and their feel, and nearly half the participants strongly appreciated the inclusion of home-like designed furniture. These findings are evident in the literature review (Section 2.2.6.3).
- **Avoiding medical image design**. All adults preferred avoiding the use of medical image design (e.g. changing the white coats of medical staff to other colours that the children like). Avoiding medical image design is evident in the literature (Section 2.2.6.3).
- **Using symbols.** Children identified four types of symbols in their artwork: A few (aged 3-7, 7-11) included symbols that expressed love to their family; a very small number (aged 3-7, 11-18) included symbols connected to music; and a very small number (aged 3-7, 7-11) included symbols connected to culture; two aged 3-7 included symbols connected to education; and two aged 3-7 included symbols related to nature. The literature review identified the potential influence of symbols in creating

friendly environments for children. In an empirical study of healthcare design, children, particularly adolescents, focused on symbols while adults focused on physical aspects (Sections 2.2.6.3, 2.2.5).

From the designers' workshops**,** the interior designers identified the potential influence of including symbols in the concept design. Designers should connect the symbols' elements with the interior design style, forms, materials and colours, particularly in the reception area. To achieve this, all the designers recommended considering children's artworks that emerged from the children's workshops. Such elements would inform the concept design process to create a friendly interior environment for children.

- **Telling stories**. This design consideration only emerged from the designers' workshops. All the interior designers recommended including the concept of *"telling stories"* to create a design image that provides appropriate interior design for all age groups. This consideration is evident in the literature review (Section 2.2.6.3).

6.1.2.4 Cross cutting issues

Two elements were identified from the field research (Sections 5.2.2, 5.2.3). These elements are related to *design according to age and gender issues.*

Design according to age

The findings from the field research showed differences and similarities across the total number of participants. Three main issues were identified:

(1) Specific age-range preferences. Four issues were identified:

- The findings identified that there is a difference between all age groups regarding the inclusion of bright and glittery materials. All children between 3-7 years, one child 7-11 years, and two from age group 11-18 preferred their inclusion (see also Section 6.1.2.3).
- The preference with the highest percentage across all age ranges is the inclusion of aquariums (see Section 6.1.2.2).
- Eight children (from age groups 7-11, & 11-18 years) while four children (3-7 years) indicated preferences to include home-like image design (see Section 6.1.2.3).
- Symmetrical forms were only appreciated by 7-11 year olds and in the 11-18 age group. This finding is aligned with other empirical studies in the literature (Section 2.2.6.3).
- The field research identified children's preferences of colours across all age ranges**:** results found in Tables 5.20, 5.29-31 and Table 6.5 - five issues were identified:
    - Children's colour preferences are: yellow, purple, blue, green and brown (3-7 years); blue, yellow, green, pink and brown (7-11 years); and red, green, yellow and blue (11-18 years).
    - Most children in the 3-7 age group prefer the inclusion of orange, which is not preferred by other groups.
    - Most children from age groups 3-7 and 11-18 preferred red, which is not included by the 7-11 age group.
    - A few children aged 3-7 and 11-18 years preferred black and white, which are not preferred by the 7-11 age group.

- A few children from age groups 3-7 and 11-18 preferred turquoise, which is not preferred by the the 7-11 age group.

Table 6.5: Children's colour preferences across all age ranges (developed from Table 5.23)

Children's colour preferences across age ranges								
Age range	**Type of colour**	**No**	**Age range**	**Type of colour**	**No**	**Age range**	**Type of colour**	No
3-7 years	**Blue**	**7/9**	**7-11 years**	**Blue**	**4/6**	**11-18 years**	**Green**	7/8
	Yellow	**7/9**		**Yellow**	**4/6**		**Yellow**	7/8
	Purple	**7/9**		**Green**	**4/6**		**Blue**	6/8
	Green	**6/9**		**Pink**	**3/6**		**Red**	5/8
	Brown	**5/9**		**Brown**	**3/6**		**Orange**	4/8
	Pink	**4/9**		**Purple**	**1/6**		**Pink**	3/8
	Orange	**4/9**					**Brown**	3/8
	Red	**3/9**					**Purple**	3/8
	Black	**2/9**					**Turquoise**	3/8
	White	**2/9**					**White**	3/8
	Turquoise	**1/9**					**Black**	2/8

(2) Dividing interior spaces of reception, waiting and play areas according to age. Four ideas were identified (Section 5.2.2):

- One father preferred dividing the *reception* area according to three age ranges (i.e. 0-6, 6-12, & 12-18 years). Nearly all the medical staff chose to divide the spaces according to three age ranges (i.e. 0-6, 6-13, & 13-18 years), but to divide the age range between 13-18 years into two groups: one for females and another for males.
- Two medical staff preferred dividing the *admissions* area according to three age ranges (i.e. 0-6, 6-13, & 13-18 years). Such a finding is not evident in the literature review. In the body of literature, providing design according to age was acknowledged (Sections 2.3, 2.2.6.1, 2.2.6.3, 2.2.4-5, 2.2.4), but there was no evidence to suggest dividing the reception and admission area according to three age ranges.

- A few parents preferred the *waiting area* to be divided into two age ranges (i.e. 0-8, & 8-18 years). However, one parent preferred the waiting area to be divided into three zones according to three age ranges (i.e. 0-6, 6-12, & 12-18 years). Nearly all the medical staff indicated a preference for dividing the waiting area according to three age ranges (i.e. 0-6, 6-13, & 13-18 years), but to provide the 13-18-year age range with two zones (males & females). There is no evidence of this in the literature review of this study. It did, however, recommend providing enough (and different) types of waiting areas to accommodate all hospital users (Sections 2.2.6.3).
- One parent wanted to divide the *play areas* into four age ranges (i.e. 0-6, 6-11, 11-14, & 14-18 years), while a few parents indicated a preference for two age ranges (i.e. 0-8 & 8-18 years). However, half the parents appreciated the inclusion of a play area, particularly for young children aged between 3-6 years. Those sets of preferences are not evident in the literature review. However, separating the young children's play area from that of older children is supported in the literature review (Section 2.2.6.3). The provision of age-appropriate play areas according to age is evident in the literature review, but the implication is different (see Section 2.2.6.3).
- **Age ranges preferences and cogntive development of children.** Two main issues were identified (Sections 5.2.2, 5.2.3, Tables 5.28-31):
    - **Findings that do not support Piaget's four stages of cognitive development** (Section 2.2.4). The findings from this research showed that children's preferences regarding the types of *play*

areas and entertainment activities can be divided into three age ranges (i.e. 0-2, 2-11, 11-18 years) rather than four age ranges (Section 2.2.4). Also, there are seven games and activities that were preferred by all age ranges of participants of children (Table 5.16).

The findings identified children's preferences regarding the inclusion of *art* connected to nature, abstract, and music themes. The preferences of these elements remained consistent and did not appear to alter across all age ranges . Such findings are supported by Eisen (2007, p.83-Section 2.2.6.3).

Although, children's preferences related to *colours* do alter according to age range; however, the field research findings showed six types of colours that are included by all age ranges of childen. These are **blue, green, yellow, purple, pink and brown**. In this respect, choosing colours across the age ranges is not considered a major factor of the four stages of cognitive development. Those colours identified (above) can be appropriate to all age ranges of children, particularly in the context of this study. In the literature review, there are studies with similarities to, and differences from, the above findings (Sections 2.2.6.1-3, 2.2.3, 2.2.5). Also, see Section 6.1.2.3.

Based on the findings in Table 6.6, nearly half the children, particularly those between 7-11 and 11-18 years, preferred to

include *soft and circular forms of furniture* in their favourite spaces (See Section 6.1.2.3).

Table 6.6: Children's furniture preferences across all age ranges (developed from Table 5.21).

Types of furniture preferred across all age ranges		
Age ranges of children /years	**Number of participants**	**Types of furniture**
(3-7), (7-11), (11-18)	14/23	Soft and circular forms
(3-7), (7-11), (11-18)	10/23	Outdoor furniture
(7-11), (11-18)	9/23	Modern and attractive
(7-11), (11-18)	8/23	Home-like

The findings from the field research identified six types of *materials*. From the highest to the lowest in terms of preference see Table 6.8. There are marked differences according to age with respect to preferences of *materials*. In spite of that, most children from all age ranges indicated preferences to include textured materials, and nearly half preferred materials related to nature.

Table 6.7: Children's preferences related to materials across all age ranges (developed from Table 5.22).

Types of materials preferred across all age ranges		
Age ranges of children	**Number of participants**	**Types of materials**
(3-7), (7-11), (11-18)	21/23	Textured materials
(7-11), (11-18)	13/23	Transparent
(3-7), (7-11), (11-18)	12/23	Materials related to nature
(3-7), (7-11), (11-18)	12/23	Bright and glittery
(7-11), (11-18)	3/23	Modern and light
(11-18)	1/23	Soundproof

- **Findings that support Piaget's four stages of cognitive development.** The field research findings identified children's preferences regarding *spaces for food*, demonstrating differences

according to their level of development (see Table 5.19). For instance, a few children between 3-7 years preferred the inclusion of food or certain dishes of food, a few between 7-11 years and two between 11-18 included a cafeteria or restaurant; and a few included a kitchen like theirs at home.

Including *irregular forms and shapes* in this study is appreciated by most children younger than 8 years old. This might be interpreted as being related to their level of cognitive development (see Sections 2.2.4). However, the findings showed some differences regarding the inclusion of symbols across all age groups. Significantly, only two children between 11-18 years appreciated the inclusion of symbols versus ten children from 3-7 and 7-11 years old (also see Section 6.1.2.3).

The findings from the field research showed no differences across the age groups about including *image and thematic design elements connected to nature*. However, their stage of cognitive development may have influenced their preferences (See Appendix C-2, Sections 6.1.2.3 & 5.2.3, Table 5.26):

- Children **aged 3-7 years** created 2D views of nature including many elements, not focusing on the arrangement of the elements, but focusing on symbols (e.g. boats, plants, fish, sea, trees, people, seashells)
- Children **aged 7-11 years** presented nature (animals, rivers, people, sea, the beach, small pools, fountains and trees) in a more realistic way, with

definite arrangments of the elements, and all imagined themselves in an idyllic holiday scene.

- Children **aged 11-18 years** presented nature in 3D, more realistically, with definite size and proportion to the elements. For instance, most of them expressed nature as encompassing a sea with waves, boats, beach, mountains and trees, to create a realistic image.

  In the literature review, children's preferences regarding thematic design elements connected to nature are linked to an empirical study (see Section 2.2.6.3). In this study, children depicted nature in their artwork according to their age and cognitive development. This may prove consistent with Piaget's four stages of cognitive development.

All children's preferences that are connected to the four stages of children's developments in Piagets' theory of cognitive development are summarised in Table 6.8.

Table 6.8: The findings related to the interior design and interior architecture elements that are connected to Piaget's four stages of cognitive development (developed from Sections 6.1.2.4, 5.3, Tables 5.28-31).

Findings related to interior architecture and interior design elements that are related to the four stages of cognitive development of Piaget						
Findings related to interior architecture designs	**The four stages of Piaget's cognitive development**				**Participants**	**Section number**
	0-2	**3-7**	**7-11**	**11-18**		
• Dividing interior spaces of reception, waiting areas and admission desk into three age ranges		×	×	×	Nearly all medical staff and a few parents	(6.1.2.4)
• Dividing play areas of children into three age ranges		×	×	×	A few parents	(6.1.2.4)
• Outdoor waiting areas		**3-7 years**	×	×	More than half the children	(6.1.2.2)
• Spaces for eating food		×	×	×		(6.1.2.4)
• Spaces for eating open to a green area		**3-7 years**	×	×	More than half the adult participants and almost half the children	(6.1.2.2)
• Spaces to provide support of the children by family and friends	×	×	×	×	Most of the children	(6.1.1.2)
• Complete separation in spaces for praying, sleeping and toilets		×	×	×	More than half the children Nearly all the adults	(6.1.1.1)
• Architectural openings and arrangements i.e. connect the eating areas with natural water features		×	×	×	Nearly half the children	(6.1.2.2)
• Outdoor waiting areas		×	×	×	More than half the children	
• Various forms and shapes		×	×	×	Most children	(6.1.2.2, 6.1.2.3)
• Gable roofs		×	×	×	More than half the children	
• Effective ventilation and enough light		×	×	×	Nearly half the children	(6.1.2.2)
• Passive/quiet/solitary games and entertainment activities (i.e. listening to music, watching aquariums and television)		×	×	×	All the children	
• Physical-/-active games (i.e. football, swimming, fishing)		×	×	×	Nearly half the children	
• Learning activities (i.e. playing music)		×	×	×	A few children	
Findings related to interior design elements						
• Art that is connected to the function of the space to provide identity (i.e. art connected to sport)	×	×	×	×	Half the parents and few children	(6.1.2.3)
• Art connected to nature, music and abstract		×	×	×	All the children	
• Circular forms and shapes for indoor interior waiting areas		×	×	×	Nearly half the children	(6.1.2.2)
• Circular and soft forms and shapes i.e. furniture	×	×	×	×	Most adults Nearly half of the children	(6.1.2.3, 6.1.2.4)
• Including symbols in the interior design		×	×	×	Nearly half the children	(6.1.2.3, 6.1.2.4)
• Image and thematic elements connected to nature	×	×	×	×	All age ranges of children All adults	(6.1.2.4)
• Bright materials	×	×	×	×	Nearly half the children All adults	(6.1.2.4)
• Textured materials		×	×	×	Nearly half the children	(6.1.2.4)
• Home-like design image designs		×	×	×	Nearly half the children	(6.1.2.4, 6.1.2.4)
• Art connected to culture		×	×	×	More than half the children	(6.1.1.1, 6.1.2.3)
• Semi-permanent types of art to attract the attention of children in the reception desk	×	×	×	×	A few children Half the parents	(6.1.2.3)
• Look like a park or entertainment centre		×	×	×	More than half the children	(6.1.2.3, 6.1.2.4)
• Outdoor furniture		×	×	×	Nearly half the children	
• Blue, green, and purple colours		×	×	×		
• Brown and pink colours		×	×	×		

From the above discussion, the findings indicated that there are elements preferred by all age ranges of children i.e. they do not alter by age (See Table 6.8). Such findings can inform design decisions to help create appropriate and supportive healing environments for all age ranges of children. However, these considerations also must be informed by preferences for cultural needs (Section 6.1.1.1) and gender issues, which will be discussed next.

Gender issues

Three issues were identified (Sections 5.2.2., 5.2.3):

- **Gender preferences regarding separation** see Section 6.1.1.1.
- **No gender differences**. There seem to be no gender differences between children who prefer the inclusion of art connected to nature. Such a finding is inconsistent with the results of some studies from the later literature review (see Section 2.2.6.3) where the boys, particularly in the age range 11-18 are more appreciative of representational art than girls. Also, the findings showed no gender differences across three age ranges (i.e. 3-7, 7-11, & 11-18 years). This issue is not discussed in the reviewed literature.

- **Gender differences**.Three main issues were identified:

    - There do appear to be *differences* between boys and girls regarding the inclusion of *abstract art*. For example, seven girls to one boy preferred abstract art. This finding contradicts one study in the literature review (e.g. Eisen, 2007, p.69-Section 2.2.6.3). Eisen's study

showed a minor difference between boys and girls, particularly from 5 to 7 years; three boys preferred chaotic abstract art compared to one girl who chose the same type of art. However, there were minor differences found regarding the inclusion of the impressionistic type of art. The findings showed that two of the girls preferred impressionistic art, but no boys did. This finding is evident in the literature, see Eisen (2007, p.70-Section 2.2.6.3).

- The field research identified four issues regarding *colour* preferences related to gender. The findings showed *a difference* between boys and girls across the whole age range. For instance, three girls versus two boys preferred white, eight girls versus three boys preferred purple, six girls versus four boys preferred brown, and eight girls versus two boys preferred pink. However, boys from all age ranges preferred *green, blue, brown and yellow*, and they liked less *red, pink, white, black, turquoise and orange.* The colours most liked by girls are *green, blue, purple, brown, yellow, pink and red.* Comparing such findings with another study in the literature, four of these colours (green, blue, purple and yellow) were acknowledged in an empirical study (Section 2.2.6.3)
- There is a very *minor difference* in gender preferences between boys and girls with 11 girls and 9 boys preferring the inclusion of organic and smooth lines and forms. This emerged only from the field research. However, six boys and no girls preferred the inclusion of symmetrical forms and shapes. This finding is evident in the literature review (see Section 6.1.2.3).

All the findings discussed in this chapter will be classified and prioritised in the following section.

6.2. Classifying and prioritising the findings

The findings of this research were classified and prioritised, using Microsoft Word and Illustrator programs (see Figure 6.2 & 6.3).

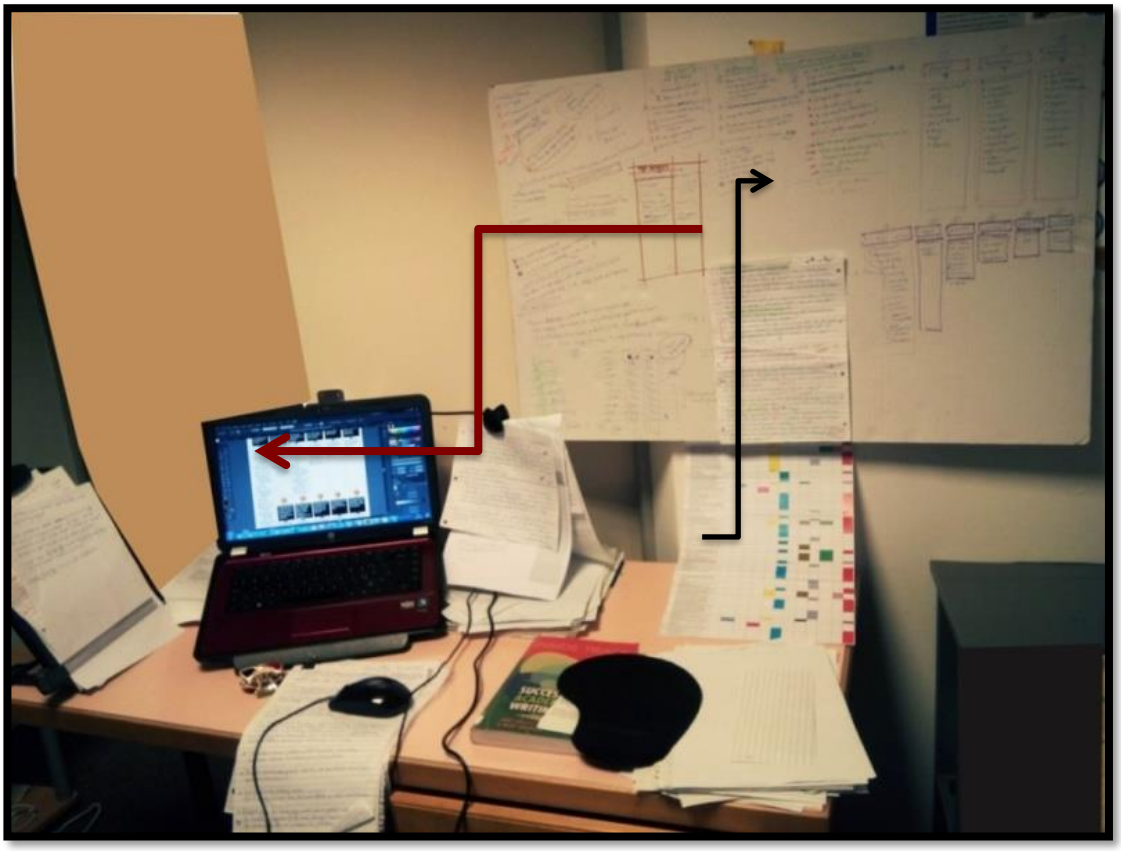


Figure 6.2: The process of classifying and prioritising the findings

A classification is identified as *"the act or process of dividing things into groups according to their types"* (Cambridge Dictionary, 2016, online). Classifications have several characteristics: they help in discovering new knowledge and meaningful information; producing something new; finding relationships in

structures; reducing complexity; and seeing the object from different angles (Kwasnik, 2000, pp.22-23). Given this, the findings from this research were classified into six groups (Figure 6.12 a + b). The criteria used to classify the findings were linked with the field research findings and literature review, as well as the perspectives of designers during the subsequent workshops (Sections 6.1.1, 6.1.2). They were also related to the research aims (Section 1.4), research question (Section 1.5), and to the objectives of this research (Section 1.6).

No	Themes	Gender differences	Minor gender differences	Consistent with Piaget's theory of cognitive development	Not consistent with Piaget's theory of cognitive development	Especially related to the context of Palestine	Agrees with literature	Disagrees/ contradicts	Not included in the literature	Partially agrees/disagrees with literature	Especially connected to the age ranges of children	Age-appropriate-Ness	Supported by designers
1.	Traditional architectural elements					✓							✓
2.	The using of courtyards (one of the essential elements of traditional architecture)					✓							✓
4.	Elements and art connected to culture by three age groups (i.e. 6-8, 8-11, and 11-14 years). Not included by age range 15-18 years										✓	✓	
5.	The inclusion of folklore and cultural elements which are related to Palestinian identity, particularly in the 2D artwork (e.g. custom, embroidery, keffiyeh, and dome of the rock).					✓							✓
6.	Not complete separation in the other spaces (i.e. waiting for areas, play areas, social spaces, etc.) particularly for children aged more than seven					✓							✓
7.	Complete separation in some specific functional interior spaces (i.e. pray area, breast feeding, and sleeping areas)					✓ Islamic literature							
8.	Effect of occupation						✓						✓
9.	Visitors' appropriateness— Inadequate environments to visitors in the existing hospitals						✓						
10.	Age appropriateness and hospitalisation problematic issues related to Palestine						✓						
11.	Post- modern style for main entarnce and atruim					✓			✓				✓
12.	No gender differences between children's preferences regarding form and style		✓										
13.	Children's preferences regarding forms and style do not support Piaget's ideas of four stages of cognitive development				✓								
14.	Culture is an essential elements in designing public spaces of children's hospitals						✓						✓
15.	Interior architectural spaces connected to culture (i.e. pray room, courtyards)						✓						✓
16.	Art connected to culture						✓						✓
17.	Children's artwork and preferences, as well as adults' needs, can provide a reference point for the interior designers to address concept design related to the type of art.						✓						✓
18.	~~Separation between genders of children~~												✓
19.	~~Effect of occupation~~												✓

Figure 6.3: The process of classifying the findings into groups.

The **classifications** and groups of findings helped the researcher to provide meaningful information that aided in reducing the complexity of the findings, and

findings relationships between results and, in turn, assisted in providing prioritisation.

Prioritisation is identified as the process to *"arrange (items) to be dealt with in order of importance; to establish priorities for (a set of items)"* (Oxford English Dictionary, 1989, online).

The process of prioritising the findings of this research is based on the types of functions and activities that take place in hospitals, participants' preferences for a comfortable environment, and how these elements inform the design process regarding implications i.e. have flexibility in terms of design.

The findings from this research indicate that children's preferences concentrated on the provision of games and entertainment activities and aesthetic issues (e.g. colours, art, materials) to provide them with comfortable environments while they are waiting their turn. However, parents' suggestions and preferences were more linked to the provision of non-medical spaces that provide them and their children with comfort. For instance, they preferred several issues to facilitate the process of registration by including enough furniture, play areas with attractive distraction elements, adequate waiting spaces, spaces for food, open plan design to provide easy access and flow, and separation between genders. In addition to confirming the importance of including parents and children's preferences, medical staff also concentrated on the provision of medical functional spaces, and relationships between medical spaces and non-medical spaces to provide treatments and effective work spaces.

According to designers, their suggestions were concentrated on the design process and how to deal with such preferences. They suggested considering children's perspectives and artwork, as well as parents' and medical staff's needs and preferences. They also discussed the limitations and difficulties that might affect the design process (i.e. the cost of implementing some of the design recommendations).

Although there are some differences regarding preferences between the types of participants, significantly, all of them confirmed the importance of including nature and water features to provide all stakeholders with comfort and which correlated with decreases in stress.

Building on the above discussion, and referring to the context of this research, three categories were created (Figure 6.4 a & b):

Category 1: This group includes findings that are essential to promoting supportive healing and age-appropriate spaces for children. They have been preferred by all types of participants, but particularly by children. Such elements are considered essential, but they are flexible in relation to their basic implementation and are therefore drawn up according to cost, availability, context, preference, and imagination of designers, and they depend on budgets and economic issues. *Thus, this category will create recommendations that are essential to provide supportive healing environments.*

Category 2: This group encompasses the findings that are related to the architectural plan of non-medical spaces. These findings are mostly preferred by adult participants, particularly parents. They are demonstrated as spaces

that provide support, easy flow of movement, and comfort for them and their children if they are well designed. Providing comfortable environments for parents is essential to help them support their children during the treatment process. While such elements are strongly recommended to be included in the design of main public spaces, they have some flexibility in their implication, which depends on the cost, and on spatial requirements. *This category will develop recommendations that aid in providing a supportive environment for all stakeholders***.**

Category 3: This category of findings indicates the effective design and functioning of medical functional areas of the hospital. These functions and spaces are mainly essential to providing treatments, diagnosis, support and well-being in hospitals. Parents do not pay much attention to such spaces to provide them with comfort. However, they are recommended by medical staff to be included. Such findings are considered essential to the design of children's hospitals, but they do not provide designers with much flexibility when it comes to applying them. *This category will form recommendations related to medical functional spaces.*

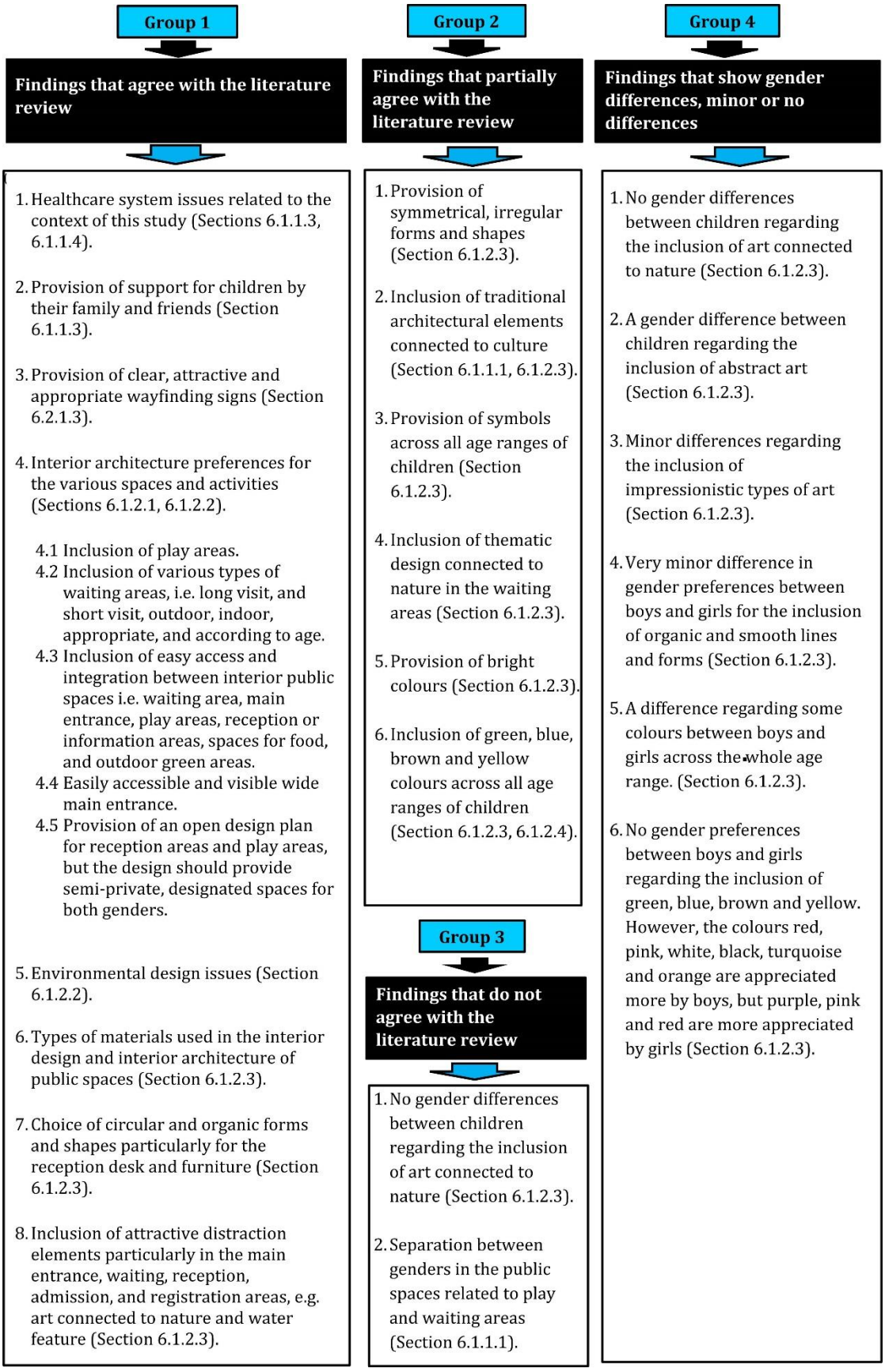


Figure 6.4a: Summary of research findings – notice classifications into six groups

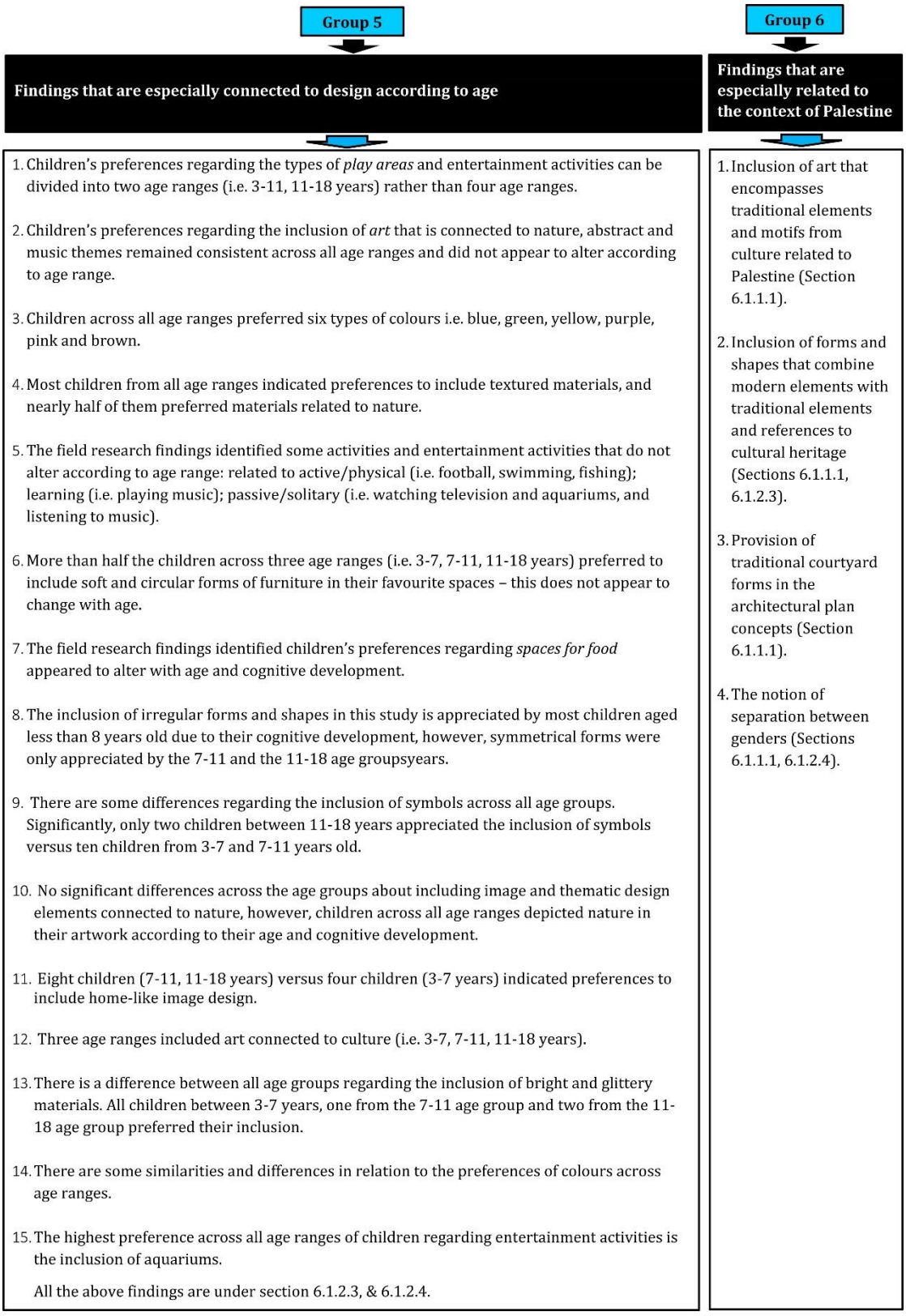


Figure 6.4b: Summary of research findings – notice classifications into six groups

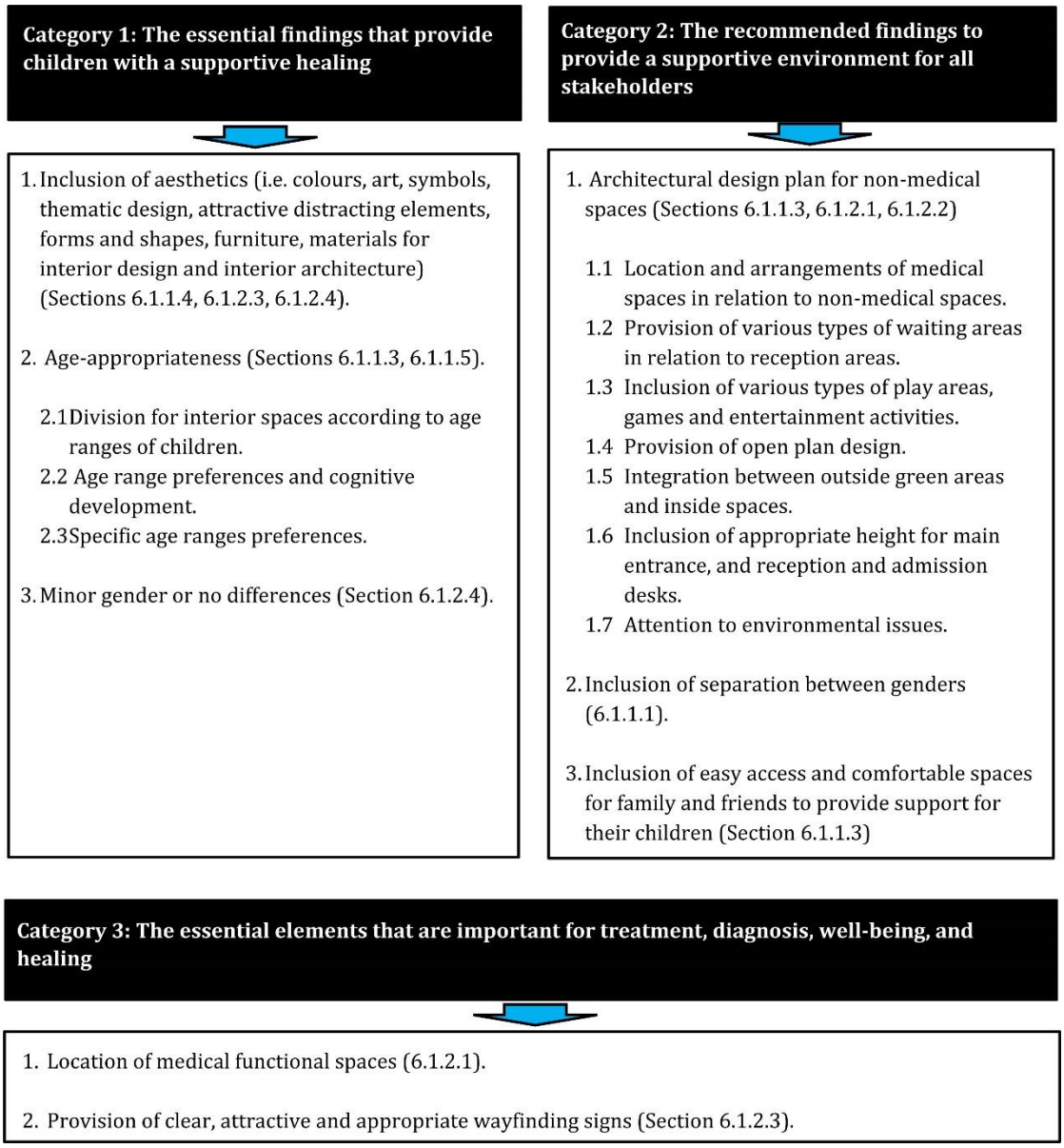


Figure 6.5: The four categories and prioritised findings

6.3 Conclusion

This chapter has discussed the findings of the field research with feedback on those findings from the designers' workshops. All the findings of this research were discussed under two themes:

- Context-specific issues (See Section 6.1.1).
- Physical environment: interior architecture and interior design (see Section 6.1.2).

The findings were classified into six groups (see Section 6.2, Figures 6.4 a & b):

1. Findings that agree with the literature review.
2. Findings that partially agree with the literature review.
3. Findings that do not agree with the literature review.
4. Findings that show gender differences, minor differences or no differences.
5. Findings that are especially connected to design according to age.
6. Findings that are especially related to the context of Palestine.

All the findings were prioritised (see Section 6.2) into three categories:

Category 1: The essential findings that provide children with a supportive healing environment: i.e. aesthetics; age appropriateness; division for interior spaces according to age ranges of children; age range preferences and cognitive development; specific age ranges preferences; and gender, minor, or no differences.

Category 2: The recommended findings to provide a supportive healing environment: i.e. separation between genders; inclusion of easy access and comfortable spaces for family and friends to provide support for their children; and an architectural plan design that can contribute to the:

- location and arrangements of medical functional and non-medical spaces;
- provision of various types of waiting areas;
- provision of various types of play areas and entertainment activities;
- integration between inside and outside spaces;
- open plan design;
- inclusion of appropriate scale for main entrance; desk height in reception and admissions areas; and environmental issues.

Category 3: The essential elements that are important for treatments, diagnosis, well-being, and healing: i.e. the location of medical functional spaces and wayfinding signs in relation to the public spaces.

The findings that are prioritised and classified in this chapter will help to: answer the research question and research objectives of this study; to draw out the final conclusions (Chapter 8); and will help to develop initial recommendations for the design of public spaces of children's hospitals, which will be presented in the next chapter.

Chapter 07

Developments and Presentation of Initial Design Recommendations

7.0 Introduction

This chapter discusses and presents the design recommendations (see Fig. 1.1). It offers a synthesis of critical aspects of the findings from the preceding chapter (Ch. 06) in the form of initial recommendations that can inform the development of evidence-based design guidelines for healthcare facilities.

Before drawing out the initial recommendations, it is important to discuss why this study will develop recommendations rather than guidelines, what the recommendations are, what they do and who will use them—These are discussed below.

7.1 The development of recommendations – critical considerations a) in general, and b) with respect to the context of Palestine

The focus of this chapter will be on developing initial recommendations rather than guidelines. Guidelines require a significant amount of testing and user feedback (World Health Organisation, 2014, p.15, 19). These are beyond the scope of this present research. Therefore, rather than guidelines, recommendations have been developed as a step towards the creation of evidence-based design guidelines for healthcare facilities (World Health Organisation, 2012, p.1).

However, the distinctions between guidelines and recommendations are somewhat ambiguous. *Guidelines* have been defined as *"a recommendation intended to assist providers and recipients and healthcare and other stakeholders to make informed decisions"* (ibid, p.1). Whereas *recommendations are "summary statements based on the latest evidence to serve population groups"* (Oja et al., 2010, p.1) and they are considered as a *"suggestion that something is good or suitable for a particular purpose"* (Cambridge Dictionary, 2016, online).

The development of recommendations is based on a comprehensive and objective assessment of the available evidence that provides the reader with *"a clear process and cohesive information about how a recommendation has been developed, on what basis, and by whom"* (World Health Organisation, 2012, p.1). Such a development can help reviewers to deal with the design, data collection, and analysis, and assist users to *"select and prioritise across a range of potential interventions"* (World Health Organisation, 2014, p.18). However, design recommendations *"are based on elemental aspects and the individual in the environment"* (Schweitzer et al., 2004, p.77).

In the literature review, there are a limited number of relevant research studies sufficient for the creation of age-appropriate design guidelines for the public spaces of children's hospitals. Therefore, initial recommendations that can be developed into guidelines will be developed here that will help healthcare planners, designers, architects and researchers to design the public spaces of children's hospitals, especially with respect to interior architecture and interior design.

The recommendations developed in this chapter encompass *general recommendations (GR)* and *recommendations related to the specific context of this project –Palestine (PR)*. Recommendations were considered general if the findings on which they are based contribute to providing supportive healing environments for children and are supported by different sources of evidence (i.e. literature review, participants of this study). Recommendations related to Palestine may:

- Contradict some findings in the literature review, or are partially supported by literature review.
- Not be supported by the literature review, but are strongly supported by participants in the field research.
- Not be evident in the literature review.

Based on the findings presented in Chapter 6, a set of recommendations have been developed that are classified into three categories:

1. **Recommendations that are *essential* to provide healing environments and age-appropriate design for children:**
   - 1.1 Recommendations related to aesthetic components
   - 1.2 Recommendations related to design according to age
   - 1.3 Recommendations related to gender differences.
   - 1.4 Age-appropriate hospitals in Palestine
2. **Recommendations for the provision of a supportive environment for all stakeholders:**
   - 2.1 Recommendations related to interior architecture plan for the various spaces and activities
   - 2.2 Recommendations related to environmental issues
   - 2.3 Recommendations related to provide separation between genders in the public spaces
   - 2.4 Recommendations related to provide a) supportive environments for families and friends, b) support for the children by their family and friends
3. **Recommendations that are *essential* to the provision of treatment and well-being of children:**
   - 3.1 Recommendation related to medical functional spaces

1. Recommendations that are *essential* to provide supportive healing environments and age-appropriate design for children

1.1 Recommendations related to aesthetic components

Art. The findings included various types of art-related suggestions (Section 6.1.2.3). From these findings, the following recommendations are made:

1.1.1 The interior design of public spaces of children's hospitals should include:

- Various types of art related to nature, water themes, culture, music, and semi-permanent and impressionistic abstract art, particularly in the main entrance, waiting, admission, and registration areas. However, designers should concentrate on using art that is connected to nature and water themes, and should prevent cartoon-like art. *This is a general recommendation.* [GR].
- Art that encompasses traditional elements and motifs relevant to the culture in Palestine. *This recommendation applies specifically to the Palestinian context.* [PR].

Colours. The findings included a number of colour-related suggestions (Sections 6.1.2.3, 6.1.2.4). From these findings, the following recommendation is made:

1.1.2 The interior design and interior architecture of public spaces should include different types of colours, but with a concentration of using natural colours and light colours, and the use of colours as a way of coding to provide identity to the different areas and to help with wayfinding. [GR]

Furniture. A high value was placed on including various types of outdoor and indoor furniture-related suggestions (Section 6.1.2.3). Therefore, from these results, the following recommendation is made:

1.1.3 The outdoor and indoor public spaces of children's hospitals should provide an adequate amount of furniture that is adaptable, safe, age-appropriate, durable, home-like, modern, and has circular and organic forms and shapes. [GR]

Thematic design. The findings showed different types of thematic design-related suggestions (Section 6.1.2.3). Therefore, from these findings, the following recommendation is made:

1.1.4 The interior design of public spaces of children's hospitals should include thematic design related to nature, particularly in the waiting areas. However home-like design and design that includes storytelling and symbols should also be applied, but perhaps in other areas. [GR]

Forms and shape. The discussion of findings acknowledged various types of forms and shape-related suggestions (Sections 6.1.2.3, 6.1.1.1). Therefore, from these findings, the following recommendations are created:

1.1.5 The interior architecture and interior design of public spaces of children's hospitals should include:

- Various forms and shapes (e.g. circular, organic smooth, gable roofs, symmetrical , l-shape, and irregular forms). [GR].

- Forms that reference cultural heritage and combine traditional architectural elements with modern elements related to Palestine. This should be included specifically for the main entrance. [PR]

Wayfinding. The findings yielded different considerations to wayfinding signs-related suggestions (Section 6.1.2.3). Therefore, from these findings, the following recommendations are made:

1.1.6 The interior design and interior architecture of public spaces of children's hospitals should:

- Include clear, attractive, and appropriate wayfinding signs with a provision to integrate wayfinding signs with thematic interior design and architecture of public areas. [GR].
- Provide three different themes of wayfinding signs related to medical, non-medical and entertainment and play areas. [PR]

Materials. The discussion of findings showed various types of materials-related suggestions (Section 6.1.2.3). Therefore, from these findings, the following recommendation is constructed:

1.1.7 The interior architecture and interior design of public spaces of children's hospitals should include various types of materials such as non-absorbent, bright, textured, safe, transparent, soundproof, easy to clean, and materials connected to nature.

Attractive distraction elements. The findings showed a high value was placed on including attractive distraction elements- see (Section 6.1.2.3). Therefore, from these findings, the following recommendation is created:

1.1.8 The interior design and interior architecture of public spaces, particularly the main entrance, waiting areas and registration areas should include attractive distracting elements for children. [GR]

1.2 Recommendations related to design according to age

Dividing interior spaces of reception, waiting and playing areas according to age. The findings showed different age-related suggestions (Section 6.1.2.4). Therefore, from these findings, the following recommendations are made:

1.2.1 The design spaces of public areas of children's hospitals should:

- Provide design according to all age ranges of children, particularly in the waiting, reception, and play areas. [GR]
- Divide public spaces of children's hospitals according to age ranges of children, particularly in the waiting areas, play areas, admission and reception. Four suggestions can be applied:
  1. Play areas and waiting areas into two age ranges (i.e. 0-8, 8-18 years);
  2. Play areas into three age ranges (i.e. 0-6, 6-12, & 12-18 years);
  3. Waiting areas into three age ranges (i.e. 0-6, 6-12, 12-18 years); however, the 12-18 age range should consider gender issues**;**
  4. Reception, information and admission departments into three age ranges (i.e. 0-6, 6-12, & 12-18 years). [PR]

Age ranges – preferences and cognitive development of children.

Findings that do not alter according to age. The findings showed various and different preferences related to children that do not alter according to age ranges and cognitive development of children (Sections 6.1.2.4, 6.1.2.2.). Therefore, from these findings, the following recommendations are made:

1.2.2 To provide age-appropriate design for all age ranges of children, the interior architecture and interior design of public spaces of a dedicated children's hospitals should consider:

- The inclusion of circular, soft and organic forms and shapes, materials connected to nature, textured materials, colours including blue, green, purple, pink, brown, and yellow, art connected to nature and music, and various types of games and entertainment activities (physical/active, passive/quiet, and learning/educational). [GR]
- The provision of schematic colours related to green, blue, yellow, purple, pink, and brown, and abstract art to the context of this study. [PR]

Findings that vary according to age. The findings identified four elements- related suggestions (Section 6.1.2.4). Therefore, from these findings, the following recommendations are created:

1.2.3 To provide age-appropriate interior design and interior architecture for the public spaces of children's hospitals, designers should:

- Include thematic design connected to nature. However, there should be a consideration of how children depict nature according to their cognitive development. [GR]

- Consider differences in cognitive development between age ranges of children regarding the inclusion of spaces for food, irregular forms and shapes, and symbols. [PR]

Findings that are related specifically to age ranges. The field research identified some elements that are connected specifically to age ranges of children-related elements (Sections 6.1.2.2, 6.1.2.4). Therefore, from these findings, the following recommendation is made:

1.2.4 The interior design and interior architecture of public spaces of children's hospitals particularly in the context of this project should consider the differences across age range preferences and needs, specifically in relation to the inclusion of bright and glittery materials, colours related to orange, turquoise, black, white, and red, games and entertainment activities, and separation between genders particularly for age range 15-18 years. [PR]

Age-appropriate hospitals in Palestine. Field research showed that current hospital environments are inadequate, especially in relation to age-appropriateness. Children's wards in existing hospitals cater to the ages 0-13, with older children entering adult wards (Section 6.1.1.5). Also, there is no dedicated children's hospital in Palestine (Section 6.1.1.4). Therefore, from these findings, the following recommendation is made:

1.2.5 The Palestinian Authority should give serious consideration to the creation of a dedicated children's hospital in Palestine that serves the age range 0-18 years. [PR]

1.3 Recommendations related to gender difference, minor or no difference

The findings identified some preferences of children that have gender differences, others showed minor gender differences, and some included *no gender differences* (Section 6.1.2.4). Therefore, from these findings, the following recommendations are made:

1.3.1 The interior design of a dedicated children's hospitals, in particular public spaces, should consider gender differences regarding the inclusion of symmetrical forms, and minor differences between gender of children regarding the inclusion of impressionistic types of art. [GR]

1.3.2 It is essential for interior designers and interior architects in Palestine when it comes to designing a new children's hospitals to consider:

- The differences between genders of children regarding the inclusion of abstract art, and the colours purple, white, brown and pink.
- Minor differences between genders of children regarding inclusion of impressionistic type of art, circular, smooth and organic forms and lines.
- No gender differences regarding the inclusion of art connected to nature, form and shape connected to culture, and schematic colours related to blue and green.

2. Recommendations for the provision of a supportive environment for all stakeholders

2.1 Recommendations related to the interior architecture plan for the various spaces and activities

The findings indicated various design considerations related to the location of non-medical and medical spaces, access, integration between inside and outside green areas, types of waiting areas, separation between young and older children, inclusion of courtyards, supplementary non-medical spaces, security and saftey, architectural open plan design, and environmental design considerations (Sections 6.1.1.1, 6.1.2.2, 6.1.2.3).

2.1.1 The architectural design plan of public spaces of children's hospitals, particularly the main entrance and atrium, should provide:

- Easy access between waiting areas and other non-medical spaces related to smoking, breastfeeding, eating, play areas, diaper changing, resting, small shops, coffee shops, snack bars, prayer room and toilets. [GR]
- Easy accessibility and wide main entrances with good visibility throughout. [GR]
- A prominent location for reception and admission desks with easy access from the car park and to the emergency department. [GR]
- Easy access between administration, medical and non-medical spaces; and direct access to the accounting department. [GR]
- Integration between outdoor green areas and interior public spaces, i.e. waiting areas, main entrance, play areas, places to eat, and reception. [GR]

- Various types of outdoor and indoor waiting areas suitable for short-term and longer-term visiting. [GR]
- Degrees of separation between young children's play spaces and those designed for older children. [GR]
- Courtyards in the architectural plan for main entrance spaces that can reflect the spirituality of the space and serve as a concept design that might help in arranging the interior architectural spaces. [GR]
- An open plan design concept for reception areas and play areas that allow for good visibility, but the design should provide semi-private design spaces that are distiguished by some visual separation (e.g. screens, or other interior design elements, such as plants) for both genders. *This is a general recommendation with particular attention necessary for providing semi-private spaces related to the context of this study.* [GR, PR]
- Natural ventilation, sufficient lighting, use of cleanable materials and surfaces that can be kept clean and hygenic, and use of sound absorbing materials/dampening, and adequate ventilation to avoid unpleasant smells, especially in a hot climate like Palestine. *This is a general recommendation with particular attention necessary for ventilation consideration in hot climates.* [GR, PR]
- Security in the main entrance that included spaces for police and CCTV cameras to provide safety for all users. [GR, PR]

2.2 Recommendations related to provide *separation* between genders in the public spaces

One of the most significant culture-related findings from this study is the notion of **separation between genders** (Sections 6.1.1.1, 6.1.2.4). Therefore, from these findings, the following recommendations are made:

2.2.1 It is essential to include separation between genders of children in the public spaces of children's hospitals, particularly in the context of this research. Designers should consider the inclusion of:

- Complete separation between genders in the spaces designated for praying, sleeping, and in the toilet areas for children age eight years or older on religious and cultural grounds. [PR]
- Partial separation between children over seven years of age, particularly in the waiting and playing areas. [PR]
- Complete separation between genders of children above the age of thirteen. [PR]

Designers also should consider that:

- Children who are younger than fifteen do not pay much attention to separation, even though they prefer to play with children of their own gender. However, children who are fifteen and older prefer strongly to include gender separation to provide them with a sense of comfort.

All the (above) recommendations apply specifically to the Palestinian context. [PR]

2.3 Recommendations related to provide a) supportive environments for families and friends, b) support for the children by their family and friends

The findings showed the value in providing easy access to family and friends. Also, the findings identified the importance of providing supportive family spaces for family-related suggestions (Section 6.1.1.3). From these findings, the following recommendations are made:

2.3.1 Dedicated children's hospitals should provide easy access to family and friends, particularly in the public spaces to support their children during their treatments, but it is important to consider safety issues.

2.3.2 The architectural design plan for the public spaces of children's hospitals should provide indoor and outdoor supportive spaces for family and friends to socialise and to provide them with comfort.

3. Recommendations that are *essential* to the provision of treatments and well-being for children

3.1 Recommendations related to medical functional spaces

The findings identified the location and access between eight medical function-related suggestions (Sections 6.1.2.1, 6.1.2.2). From these findings, the following recommendations are made:

3.1.1 The architectural design plan for dedicated children's hospitals should include eight functional medical spaces in close proximity, on the same level as the main entrance and atrium, in order to ensure they are readily accessible, namely: emergency, triage room, x-ray, laboratories for diagnosing and testing, outpatient department, pharmacy, physiotherapy and the orthopaedic department, andconsulting rooms. Also, the main entrance of the emergency department should be placed away from or be visually separated from the main entrance. [GR]

Chapter 08

Conclusions

8.0 Introduction

Based on findings of this research study (Fig. 1.1), this chapter brings together and discusses conclusions made by the author (Figure 8.1).

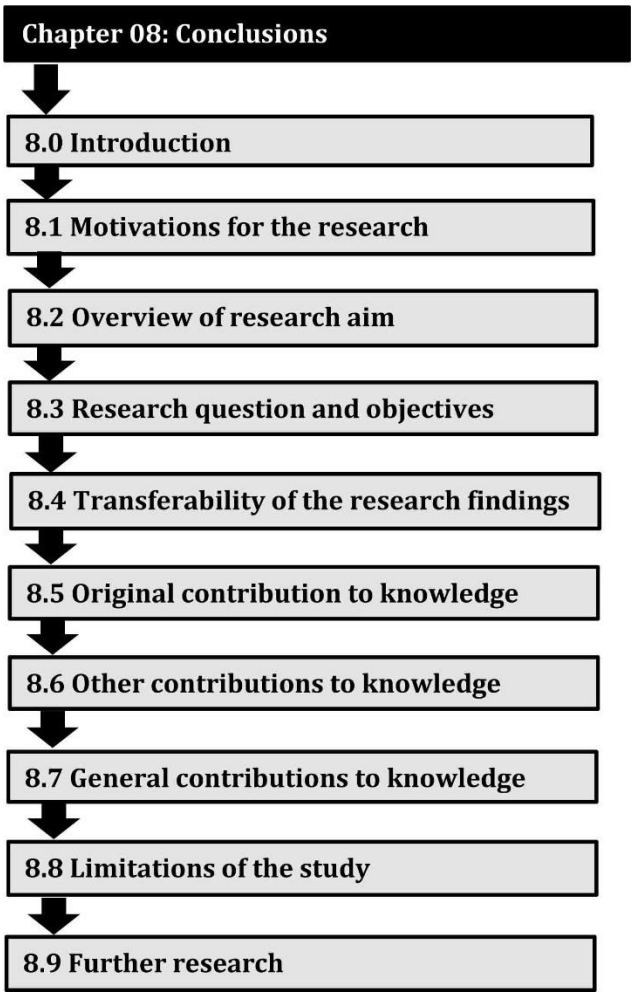


Fig 8.1: The structure map of the chapter

8.1 Motivations for the research

The motivation for this research comes from three main areas: 1) my own story (see Section 1.1) – visiting hospitals in Palestine provides one of the main motivations for conducting the research, which identified a lack of hospitals designed to meet the specific socio-psychological needs of children; 2) the limited amount of academic research in the area of design (see Section 6.3), particularly regarding the public spaces of children's hospitals that are appropriate to all age ranges of children i.e. 0-2, 2-7, 7-11, 11-18 years; and 3) the desire to develop initial recommendations that inform design practice

research about how to design public spaces of children's hospitals with and for children from the perspective of architecture and interior design (see Sections 1.3 & 1.4).

8.2 Overview of research aim

This research has two main aims concerned with developing initial design recommendations that help to create age-appropriate design for public spaces of children's hospitals (see Section 1.4).

To achieve these aims, one research question and five research objectives were developed and addressed through a combination of literature review and field research in Palestine that acquired primary data from activities with groups of school children, parents, medical staff, and designers working in the region. In addition, three individual interviews were conducted in Palestine for further data.

8.3 Research question and objectives

This study comprises one research question and five research objectives (see Table 8.1). Some of the research objectives had occurred before the literature review was conducted, while others were developed after (see Sections 1.5 & 1.6). The findings of this research provides evidence that will help answer the research question and achieve the five research objectives.

Table 8.1: The research question and objectives of the study

Main research question	
For a new children's hospital in Palestine— 'how should the public spaces of children's hospitals (i.e. main entrance, atrium, and thoroughfares) be designed so that they are conducive to healing and are suitable for all age ranges of children (i.e. 0-18 years)?'.	
Key research questions	
RO 01	Identify the most important considerations for interior design and interior architecture related to the public spaces of children's hospitals.
RO 02	Identify the functions of the public spaces in children's hospitals that affect interior design and interior architecture decisions.
RO 03	Identify the key factors in the design of public spaces within children's hospitals that can help create an appropriate interior environment for all stages of children developments.
RO 04	Identify the context-specific issues to be taken into consideration for a children's hospital in Palestine.
RO 05	Identify the factors pertaining to 'healing environment' that should be brought to bear in the design of the public spaces.

To answer my research question and achieve my research objectives, I carried out a literature review (Chapter 2), wrote a discussion of the findings from the literature review (Chapter 3), gave an account of the field research (Chapters 5-6), and developed initial recommendations (Chapter 7).

Prior to considering to what degree the research question and objectives have or have not been answered, it is appropriate to briefly discuss the findings in relation to the research objectives.

Regarding **Research Objective 01,** the research findings identified two important design considerations: i) interior architectural plans related to perceptions of preferred activities and design spaces in the public areas of a children's hospital. These design considerations encompass the importance of providing: 1) easy access to medical and non-medical spaces; 2) integration between outside, green areas and inside spaces; 3) security and safety; 4) clear

wayfinding signs; 4) environmental design considerations; 5) supplementary spaces and facilities; and (6) aesthetic components. Also, it is important to consider: ii) design according to age and gender preferences (Section 6.1.2.4). These are discussed in detail in Sections 6.1.2.1-4. See Also Section 7.1, Recommendations 1 and 2.

In relation to **Research Objective 02**, the research findings showed that there are two primary kinds of spaces to be considered: 1) the medical functional spaces and 2) the non-medical spaces. The relationship between these spaces requires special consideration regarding interior design and interior architecture. For example, the emergency admissions should not be placed close to the children's waiting areas; however, the emergency department should be close to the triage room. Also the findings indicated an open design concept space for non-medical spaces, and it is important to address all the potential design considerations including: ventilation, lighting, hygiene, avoiding infection, isolation of noise, aesthetics, and types of materials. More details were discussed in Sections 6.1.2.1 and 6.1.2.2. See also Section 7.1, Recommendations 1, 2, and 3.

Regarding **Research Objective 03,** the research findings identified five factors related to:

1) *Specific preferences of age ranges of children*. The findings showed differences and similarities across the age ranges of children – these are discussed in detail in Section 6.1.2.4.
2) *Thematic design connected to nature, telling stories, materials, and open design concept, and integration between exterior green areas and interior*

spaces. The research findings identified a strong preference by all stakeholders to include nature in the design spaces (i.e. green courtyards), outdoors spaces and landscape, art, materials, etc. However, there should be a consideration relating to how children depicted nature according to their cognitive development and age-range level. Also, the findings strongly identified the provision of open design concepts, particularly for non-medical spaces to provide comfort and ease of vision, and integration between interior spaces and outdoors green areas to provide easy access between the waiting areas and the green outdoor areas. In addition to the above issues, designers stongly recommended using storytelling in the thematic design concepts by using the children's preferences and artwork (see Section 6.1.2.4).

3) *Design according to age regarding interior architectural spaces and design elements*. Several design considerations emerged, some of which were included in the literature review, while others emerged solely from the field research. For instance, different perspectives were identified regarding the division of public spaces (waiting areas, play areas, admission and reception spaces) according to children's age ranges (See Section 6.1.2.4).
4) *Home-like design*. The findings showed a strong preference from participants to include home-like design (e.g. furniture, personal toys) to provide comfortable and age-appropriate design and supportive healing environment for everyone (See Section 6.1.2.3).
5) *Various types of forms and shapes for interior design and architecture*. The findings identified a strong preference for the inclusion of circular and

organic forms and shapes (i.e. for furniture, reception and admissions desks, interior design elements) (See Section 6.1.2.3).

6) *Gender issues*. The research findings identified the importance of determining gender differences between children in order to provide age-approriate design. These are discussed in detail in Section 6.1.2.4. Also, see Section 7.1, Recommendation 1.

According to **Research Objective 04**, the research findings identified five factors related to: 1) culture (i.e. separation between genders, referencing cultural heritage and traditional architectural elements); 2) design according to age and cognitive development; 3) specific needs of particular age ranges of children; 4) gender issues; and 5) other specific elements (i.e. age-appropriateness, hospitalisation, healthcare services). All these factors were discussed in Sections 6.1.1.1-5, and 6.1.2.1-4. Also, see Section 10.1, Recommendations 1, and 2.

In relation to **Research Objective O5**, the research findings incorporate the previous four objectives to recommend essential factors that contribute to the creation of a supportive healing environment in the public spaces of children's hospitals.

Following this, designers should incorporate the five previous objectives (i.e. O1-O5) to create the public spaces of a *new children's hospital in Palestine*, (i.e. main entrance, atrium, and thoroughfares) so that they are conducive to healing and are suitable to all age ranges of children (i.e. 0-18 years).

8.4 Transferability of the research findings

The terms 'validity' and 'rigour' are most often used in quantitative rather than qualitative research (Holloway, 2005, p.276). In this qualitative research, validity and rigour were achieved through credibility, dependability, confirmability, transferability (Vaismoradi et al., 2013, p.403), and trustworthiness (Holloway, 2005, p.77). *Credibility* is *"building confidence in the accuracy of data gathering and integration"* (Gray, 2004, p.397). *Dependability* is when *"the positivist employs technique to show that if the work were repeated, in the same context, with the same methods and with the same participants, similar results would be obtained"* (Shenton, 2004, p.70). However, *confirmability* is *"the qualitative investigator's comparable concern to objectivity"* (ibid, p.71). Graneheim and Lundman (2004, p.110) state that:

> "*Trustworthiness … includes the question of transferability, which refers to the extent to which the findings can be transferred to other settings or groups".*

Based on the literature review, providing sufficient transferable findings in qualitative research can be achieved through a thick description (Morrow, 2005, p.252). Borrego et al. (2009, p.60) describe it as:

> *"applicability of research findings to other settings achieved through thick description*".

According to Holloway and Wheeler (2013, p.7), researchers have to share their knowledge of participants' perspectives with the readers to provide them with a potential role in the research, and to provide them with a clear understanding of such phenomena. Given this importance, researchers can provide sufficient transferable findings through their *"description of the culture, context, and the process of the research"* (ibid).

This study provides thick description through context and culture, methodology and methods, results, findings and conclusions. These are discussed below:

- **Context and culture*:*** A dense and thick description of the context and culture of this study were included (Mamabolo, 2009, p.71). The thick description encompasses four main topics: children's cognitive development; hospital design; healing environments; design in context – especially the context of Palestine (see Chapter 2). These topics provide a basic structure that helps to identify gaps in the literature and to develop objectives and research questions in the study that contribute to the field research (see Chapter 3).

- **Rigour of research approach, methodology and methods**: A full and detailed methodology and methods (Chapter 4) were adopted based on a clear rationale for the research design, samples and selection of participants, settings and surrounding environment (Barens et al., 2005, pp.2, 7, 8). These went through a rigorous ethics approval process. The data collection process led to some visualisation of field research and a data analysis approach (Mamabolo, 2009, p.71) that involved coding, categorising and sub-categorising. Such visualisation will provide potential evidence to help designers, planners and architects in the design process to provide a supportive healing environment for the public spaces of children's hospitals.

- **Results and interpretation**: A highly detailed description that contributes to the results of this study is provided to help readers develop and modify the practices of designing public spaces (Morrow, 2005, p.252). Accurate information

about the results was explicitly connected to: subjects; location, methods, and the role of study (see Chapter 5). The emergent results revealed two main themes: *context-specific issues and physical environment: interior architecture and interior design*. These themes were supported with direct examples (i.e. quotations) that expressed participants' preferences, feelings and ideas about a specific aspect of the study to provide rigour (Holloway, 2005, p.277). Visualisation figures for the emerging themes provide better understanding and some visualisation pictures from the field research were included to provide evidence to support the themes (see Chapter 5); a thick description is provided as to the number of participants that preferred such themes (see Tables 5.1-5.27).

- **Findings and discussion, developing initial recommendations, and conclusions**: a detailed description is included of: the results; comparison with literature review informed by designers' workshops; and conclusions (see Chapter 6). The initial results of the workshops conducted with children, parents and medical staff were tabulated, and the findings shared with the designers prior to their workshops in order to provide a comprehensive decision that could help the reader consider if the findings could be transferred to other situations (Holloway, 2005, p.277). A comparison of the findings with previous studies is included (Barnes et al., 2005, p.8). All the findings and design insights from the discussion that included findings from literature and field research with feedback on those results from the designers' workshops in Chapter 6 were classified and prioritised; e.g. findings that were supported by, different from, or not included in, the literature (Figure 6.4 a & b), and findings that are essential and recommended (Figure 6.5). These categories were synthesised and provided

along with some critical considerations of the findings and preceding discussion (Chapter 8), which helped in developing initial recommendations and drawing out final conclusions to inform evidence-based healthcare design guidelines. Finally, the supervisors examined the findings, interpretations, and recommendations and confirmed that they are supported by the data (Mamabolo, 2009, p. 71).

8.5 Original contribution to knowledge

This research provides an original contribution to knowledge based on the adopted methodology and methods, motivations, gaps in the literature review, and rigour of the research approach, and these areas are identified in relation to potential areas for interior design and interior architecture of public spaces in children's hospitals, particularly in the context of Palestine. These include:

- **The use of 2D and 3D creative methods.** The methods used were participatory, creative and based on drawings and 3D model-making across the full age range of children from 0-18. While such methods have been used elsewhere, to the author's knowledge this has never been done across the full age range of children for the purpose of informing the interior design and interior architecture of healthcare facilities. See Pittsburgh Children's Hospital (Section 2.2.6.3) and Calgary Children's Hospital (Section 2.2.3).
- **The data collection of this research was sequential** and consisted of two phases. In the first phase, I started to collect data from the children. All the children's workshops underwent initial analysis to inform the parents'

workshops, which were also initially analysed. All the children's and parents' initial preferences regarding aesthetics, colours, art, facilities and comfortable spaces were refined and shaped into activities for the medical staff's workshops. In the second phase, all the initial analysis results from the workshops related to children, parents and medical staff were arranged and classified in tables to inform the designers' workshops (Sections 4.4, 4.4.1 and 4.4.2). While such methods have been used elsewhere, to the author's knowledge this has never been done in this type of sequence and for this type of purpose. One study was found in the literature that also used two phases; however, in the first phase, the researcher collected data from children through interviews, and the findings from the interviews were developed to shape a questionnaire tool for the second phase of data collection (Section 4.4).

- **A natural approach to determining children's preferences.** The children's general preferences were determined – the researcher did not bias the responses because the term 'hospital' was not mentioned in the workshops. The children were asked to create freestyle drawings and 3D models that expressed their favourite spaces and made them feel happy and comfortable. Such methods helped the children to express their wishes and feelings more creatively and intuitively. While such methods might have been used elsewhere, to the author's knowledge this has never been done across the full age range of school children for the purpose of informing the interior design and interior architecture of public spaces to create a new children's hospital. Most of the previous studies used drawings by children who were *inpatients* and where the children knew it related to a hospital.

For example, in the process of designing the Alberta Children's Hospital in Calgary, teenage children were asked to express their preferences specifically to children's hospitals in Alberta, so their responses might have been biased by the designers' requests; moreover, the results of their work are related more to the exterior elevations of the hospital (Section 4.3). Another example used drawings with hospital patients aged 5-8 years to express their ideas and thoughts about the ideal interior environment of an existing hospital. However, conducting workshops with such young patients has some limitations. Some of the children did not want to draw due to their illness, and some might have been influenced by the surrounding hospital environment, which affected their needs, desires, fears and concerns. So that might have prevented them from expressing their ideas easily and willingly (see Section 4.4).

- **The use of the above methods in the context of Palestine.** The specific context of children's healthcare facility design in Palestine is an original contribution; to the author's knowledge this particular context has not been looked at before. This issue is identified through aims, motivations and the research question of this study (Sections 1.1, 1.4, 1.5).

8.6 Other contributions to knowledge

Determination of recommendations for visual language appropriate for the full age ranges of children. Appropriate visual language for a large age range of children was adopted (so that older children do not see it as childish). This research indicated that 'nature-based' themes were very important but the way these are included needs to be age-appropriate. This relates to Piaget's ideas of

cognitive development (Section 2.2) but can be interpreted in a host of different ways in the design of interior spaces. For example, a wall picture could depict different age-appropriate renditions of nature, or different kinds of expressions of nature could be used in different age-appropriate areas, which could result in areas to which people are intuitively drawn, depending on their age. However, these considerations also have to be informed by preferences for gender and cultural needs.

8.7 General contributions to knowledge

Over the course of this research, the initial and interim findings were gradually transferred through:

- A peer-reviewed research paper presented at the Post-Graduate Conference at Lancaster University (2014). A poster presentation was also presented that included the main findings of the literature review and proposed methodology.
- A presentation including visualisation of the information was made to a focus group discussion prior to conducting the medical staff workshops. The presentation focussed on the initial results of children's and parents' workshops at Nablus City-An-Najah National University/Palestine (2014). Another presentation was made in the same setting prior to conducting the designers' workshops focussing on the initial results of the children's, parents', and medical staff's workshops.
- A peer-reviewed research paper presented at the Post-Graduate Conference at Lancaster University (2015). The paper presented an

overview of the research with a focus on the initial findings of the data analysis.

- A peer-reviewed research paper presented at the PhD Design conference at Lancaster Institute for the Contemporary Arts\Imagination (2015): Better Design, Environment and Society and Self. Also, the researcher presented a poster that focused on the research aims, data collection process and initial findings from data analysis of the field research.
- A peer-reviewed research paper presented at the Post-Graduate Conference at Lancaster University (2016). The presentation included information about the overall research (i.e. aims, research question, motivations, methodology, data collection, data analysis, findings, challenges and limitations of the research). This particular presentation was awarded 'best presentation' among the PhD students at the conference.
- A peer-reviewed research paper presented at Falling Walls Lab-Palestine, organised by the DAAD Information Center East Jerusalem and Birzeit University and is supported by the Federal Foreign Office of Germany and the Falling Walls Foundation (2017). The presentation included information about the problem, the solution/breakthrough, and the proof of concept/implementation.

8.8 Limitations of the study

Some methodological considerations may have influenced the results of this study:

- **Time constraints**: Some of the children's workshops, particularly the ones conducted at government schools, were interrupted due to the limited time that was offered. These schools only allowed two hours for the workshops and that might have influenced the children's contributions.

- **Settings:** It was difficult to conduct the workshops at government schools during holidays in the context of this study to allow more time. Also, it was difficult to get adolescents, particularly boys, to come to an extra session to participate in my workshops. The reasons are linked to culture and religion. I'm female, and therefore it requires more time to convince the adolescents' parents to bring their children to another session. Also, it is not easy to find a suitable place in Nablus city to conduct workshops. However, in some private schools, the workshops were held on a non-school day, where more time could be given. Moreover, the settings for the workshops, particularly in the government schools, were not always comfortable for the children (i.e. no fans or air conditioning and no comfortable furniture). This meant that the children and young people possibly did not feel comfortable during the workshops, as they were held in September (2014) when the weather was still hot in Palestine. However, at the private schools, a comfortable environment was provided.

- **The diversity of participants and primary data**: This study used adult participants, including parents, doctors, nurses, reception area staff, administrators and designers, and children from 3-18 years. Such a diversity of participants created a wide variety of primary data from the field research. These issues created some difficulties and challenges during the data analysis, particularly when the researcher made a cross analysis between all the participants.

- **Toolkits:** The researcher used a broad range of toolkits to help participants express their ideas and preferences smoothly and quickly. However, some of these toolkits may need to be developed further, particularly the one used for creating the model.

Although four potential limitations about this study were identified, there are no grounds to suggest these restrictions have significantly impacted upon the research findings.

8.9 Further research

There are several avenues for further research. The findings of this study resulted in a preliminary hierarchy of main themes and sub-themes. These themes have been developed to form initial recommendations that could be developed to form practice guidelines to be used as the basis for informing the design of the public spaces of children's hospitals. However, many of the findings from this study are not sufficiently specific to substantially contribute to designers' understanding of how those findings should be translated into

recommendations to form guidelines for the built environment. Thus, further exploration and evaluation in larger, possibly multi-site studies that consider variables of this study regarding age, culture, gender, and physical environment attributes might produce further layers of useful specifications for designers. For instance, this study did not include disabled children because of time constraints. Also, it would be more beneficial to include more people working in the reception areas to garner their insights, information and understanding about the particular functions of those areas. Moreover, these methods can be used again in another type of environment designed to be used by children (e.g. schools). Furthermore, exploring and testing the findings in real-world design settings such as children's hospitals, and by triangulating this research through survey research will provide further valuable insights into how to provide a supportive healing environment, particularly in the public areas that are appropriate for all age ranges of children. The above initial recommendations might help in providing further transferability for the findings of this research.

This agenda for further research ultimately aims to set more precise recommendations to form guidelines that would help to inform the design of children's hospitals, particularly the design of public spaces from the perspective of interior architecture and interior design. To achieve that, it is important to validate the initial recommendations from this research study by discussing findings with parents, children, staff and designers to ensure that the interpretations of what was said in the field research is reasonably accurate, and to obtain input from them.

References

Abbas, M.Y. and Ghazali, R., (2012). Healing Environment: Paediatric Wards–Status and Design Trend. *Procedia-Social and Behavioral Sciences*, *49*, pp.28-38.

Abu-Hilal, A., (2009). *The changing architectural style realised in the Palestinian domestic vernacular architecture during the end 19th/beginning Of 20th centuries-case study from Hebron* (Doctoral dissertation, Middle East Technical University.

Adams, A. and Theodore, D., (2005). *The architecture of children's hospitals in Toronto and Montreal, 1875-2010*.

Adams, A., Theodore, D., Goldenberg, E., McLaren, C. and McKeever, P., (2010). 'Kids in the atrium: Comparing architectural intentions and children's experiences in a paediatric hospital lobby'. *Social Science & Medicine*, *70*(5), pp.658-667.

Adams, D., (2005). 'Organic functionalism: An important principle of the visual arts in Waldorf school crafts and architecture'. *The Research Institute for Waldorf Education. Research Bulletin*, *10*(1), pp.23-38.

Alberta Children's Hospital Foundation., (2013). *Our Hospital* [Online]. Available from: http://www.childrenshospital.ab.ca/site/PageNavigator/hospital/our_hospital [Accessed 15 June 2013].

Al, S., Sari, R.M. and Kahya, N.C., (2012). 'A different perspective on education: Montessori and Montessori school architecture'. *Procedia-Social and Behavioural Sciences*, *46*, pp.1866-1871.

Al Sharif, B.F.T., (2008). *Patient's satisfaction with hospital services at Nablus District, West Bank, Palestine*. PhD thesis, An-Najah National University, [Online]. Available from: https://scholar.najah.edu/sites/default/files/allthesis/patients_satisfaction_with_hospital_services_at_nablus_district_west_bank_palestine.pdf (Accessed 15 August 2014).

Al-Munajjid, S. M. S., (2000). *Evidence prohibiting of mixing of men and women - islamqa.info* [Online]. Available from: https://islamqa.info/en/1200 [Accessed 1 May 2015].

Alborzi, H., Druin, A., Montemayor, J., Platner, M., Porteous, J., Sherman, L., Boltman, A., Taxén, G., Best, J., Hammer, J. and Kruskal, A., (2000), August. 'Designing story rooms: interactive storytelling spaces for children'. In *proceedings of the 3rd conference on designing interactive systems: processes, practices, methods, and techniques* (pp. 95-104). ACM.

Alderson, P. and Goodey, C., (1996). 'Research with Disabled Children: How Useful is Child-Centered Ethics?'. *Children & Society*, *10*(2), pp.106-16.

Allsop, M. J. , (2010). *Involving children in the design of healthcare technology.* PhD dissertation, University of Leeds, [Online]. Available from: http://etheses.whiterose.ac.uk/1000/1/MJAllsop_MechanicalEngineering_April2010_Thesis.pdf_(Accessed 28 August 2013).

Alrifai, A., (2010). UNFPA: *Third cycle country programme evaluation.* Occupied Palestinian Territory. Academia.edu.

Altimier, L.B., (2004). 'Healing environments: for patients and providers'. *Newborn and Infant Nursing Reviews*, *4*(2), pp.89-92.

Ananth, S., (2008). 'Building healing spaces'. *EXPLORE: The Journal of Science and Healing*, *4*(6), pp.392-393.

Asfour, O.S., (2010). 'Prediction of wind environment in different grouping patterns of housing blocks'. *Energy and Buildings*, *42*(11), pp.2061-2069.

Astorino. (no date). *Children's Hospital of Pittsburgh-Research highlights* [Online]. Available from: http://images.fastcompany.com/mba/CHP_INSIGHT_JOURNAL.pdf [Accessed 15 November 2012].

Ayyash, A. B. A., (2010). 'An example of traditional architecture in Palestine: ôbeit ummar villageö'. *Population,* 3**,** p. 1.

Baek, J.S. and Lee, K.P., (2008). 'A participatory design approach to information architecture design for children'. *Co-Design*, *4*(3), pp.173-191.

Bailey, K.A., (2002). 'The role of the physical environment for children in residential care'. *Residential Treatment for Children & Youth*, *20*(1), pp.15-27.

Barbour, A.C., (1999). 'The impact of playground design on the play behaviours of children with differing levels of physical competence'. *Early Childhood Research Quarterly*, *14*(1), pp.75-98.

Barnes, H., (2001). *Waldorf Education... an Introduction*. AWSNA.

Barnes, J., Conrad, K., Demont-Heinrich, C., Graziano, M., Kowalski, D., Neufeld, J., Zamora, J. and Palmquist, M., (2005). Generalisability and transferability. Writing@ CSU. *Retrieved July*, *10*, p.2009.

Ben-Arieh, Y., (1975). 'The growth of Jerusalem in the nineteenth century'. *Annals of the Association of American Geographers*, *65*(2), pp.252-269.

Berk, L.E. and Winsler, A., (1995). *Scaffolding children's learning: Vygotsky and early childhood education. NAEYC Research into Practice Series. Volume 7*.

National Association for the Education of Young Children, 1509 16th Street, NW, Washington, DC 20036-1426 (NAEYC catalog# 146).

Biddiss, E., McPherson, A., Shea, G. and McKeever, P., (2013). 'The design and testing of interactive hospital spaces to meet the needs of waiting children'. *HERD: Health Environments Research & Design Journal*, *6*(3), pp.49-68.

Birch, J., Curtis, P. and James, A., (2007). 'Sense and sensibilities: In search of the child-friendly hospital'. *Built Environment*, *33*(4), pp.405-416.

Bird, C.M., (2005). 'How I stopped dreading and learned to love transcription'. *Qualitative inquiry*, *11*(2), pp.226-248.

Birdwell, W., Cai, C., Cho, H., Davis, A. & Gilbert, D., (2008). Lucile Packard Children's Hospital School Learning 2013.

Bishop, K.G., (2008). *From their perspectives: Children and young people's experience of a paediatric hospital environment and its relationship to their feeling of well-being* (Doctoral dissertation, The University of Sydney).

Bjorngaard, B.J., (2010). *Enhancing patient experience through environmental design in healthcare: A case study of privacy at Thielen Student Health Center and McFarland Clinic in Ames, Iowa* (Graduate thesis, Iowa State University).

Blades, M. and Spencer, C., (2006). *Children and their environments: Learning, using and designing spaces*. Cambridge University Press.

Blumberg, R. and Devlin, A.S., (2006). 'Design issues in hospitals the adolescent client'. *Environment and Behaviour*, *38*(3), pp.293-317.

Bodrova, E., (1997). 'Key concepts of Vygotsky's theory of learning and development'. *Journal of Early Childhood Teacher Education*, *18*(2), pp.16-22.

Boeree, C., (2006). Erik Erikson. Personality theories. *Retrieved October*, *19*, p.2007.

Borrego, M., Douglas, E.P. and Amelink, C.T., (2009). 'Quantitative, qualitative, and mixed research methods in engineering education'. *Journal of Engineering education*, *98*(1), p.53.

Boyden, J. and Ennew, J., (1997). *Children in focus: a manual for participatory research with children*. Rädda Barnen.

Braun, V. and Clarke, V., (2006). 'Using thematic analysis in psychology'. *Qualitative research in psychology*, *3*(2), pp.77-101.

Bromley, E., (2012). 'Building patient-centeredness: Hospital design as an interpretive act'. *Social Science & Medicine*, *75*(6), pp.1057-1066.

Brooker, G. and Stone, S., (2010). *What is interior design?*. RotoVision.

Buisson, J., (2013). 'Gender segregation in Islam protection or destruction?' *Kufa Review| 2* (1).

Calori, C. and Vanden-Eynden, D., (2015). *Signage and wayfinding design: a complete guide to creating environmental graphic design systems*. John Wiley & Sons.

Care Quality Commission (2008). *The admission of children and adolescents to adult mental health wards and the duty to provide age-appropriate services* [Online]. Available from: http://www.chimat.org.uk/default.aspx?QN=MENT_MENTALHEALTH Care Quality Commission (Accessed 25 June 2013).

Carpman, J.R. and Grant, M.A., (2016). *Design that cares: Planning health facilities for patients and visitors* (Vol. 142). John Wiley & Sons.

Caspari, S., Eriksson, K. and Nåden, D., (2006). 'The aesthetic dimension in hospitals—An investigation into strategic plans'. *International Journal of Nursing Studies*, *43*(7), pp.851-859.

Caspari, S., Eriksson, K. and Nåden, D., (2011). 'The importance of aesthetic surroundings: a study interviewing experts within different aesthetic fields'. *Scandinavian Journal of Caring Sciences*, *25*(1), pp.134-142.

Castronovo, R., Trapani, E., Perez, F. and An-Najah National University. (2012). *My place Nablus*. *Palestine* -Yafa Center-Nablus 2012[Online]. Available from: http://www.palestine.euromedyouth.net/IMG/pdf/myplace_book.pdf (Accessed 25 August 2013).

Center for Learning Eduaction (2006). *A basic introduction to child development theories.* State of New South Wales, Department of Education and Training: Centre for learning innovation- Google search [Online]. Available from: https://www.google.com/#q=A+basic+introduction+to+child+development+theories (Accessed 3 September 2013).

Ceppi, G. and Zini, M., (1998). Children, spaces, relations. *Metaproject for an environment for young children. Milan: Domus Academy Research Center*.

Children's Hospital of Philadelphia during your child's hospitalisation [Online]. Available at: http://www.chp.edu/CHP/during+your+childs+hospitalization# (Accessed 2 March 2013).

Children's Hospital of Pittsburgh of UPMC (2012), June, 5. *Children's Hospital of Pittsburgh of UPMC Again Named One of the Nation's Best Children's Hospitals by U.S. News & World Report* [Online]. Available from: http://www.chp.edu/news/060512-best-childrens-hospitals-us-news-world-report (Accessed 10 December 2012).

Ching, F.D., (2014). *Architecture: Form, space, and order*. John Wiley & Sons.

Clark, A., (2010). *Transforming childrens' spaces: Children's and adults' participation in designing learning environments*, Routledge.

Clark, A. and Moss, P., (2011). *Listening to young children: The mosaic approach*. Jessica Kingsley Publishers.

Clift, L., Dampier, S. and Timmons, S., (2007). 'Adolescents' experiences of emergency admission to children's wards'. *Journal of Child Health Care*, *11*(3), pp.195-207.

Coad, J. and Coad, N., (2008). 'Children and young people's preference of thematic design and colour for their hospital environment'. *Journal of Child Health Care*, *12*(1), pp.33-48.

Codinhoto, R., Boyko, C., Cooper, R., Tzortzopoulos, P. and Kagioglou, M., 2009. The Physical Environment and Wellbeing: Looking Ahead. *In*: *International Built & Human Environment Research Week 2009*, 2009-01-29 - 2009-01-30

Cohen, U. and McMurtry, R., (1985). *Museums and children: A design guide*. Centre for Architecture and Urban Planning Research, University of Wisconsin--Milwaukee.

Cornwall, A. and Jewkes, R., (1995). What is participatory research?. *Social science & medicine*, *41*(12), pp.1667-1676.

Coull, A. and Cahnman, S.F., (2004). 'Kids' stuff. Features and factors driving children's hospital design'. *Health Facilities Management*, *17*(6), pp.38-40.

Coyne, I. and Kirwan, L., (2012). Ascertaining children's wishes and feelings about hospital life. *Journal of Child Health Care*, *16*(3), pp.293-304.

Coyne, C., (2006). 'Children's experiences of hospitalisation'. *Journal of Child Health Care, SAGE Publication*, Vol 10(4) 326–336.

Coyne, I. and Conlon, J., (2007). 'Children's and young people's views of hospitalisation: It's a scary place'. *Journal of Children's and Young People's Nursing*, *1*(1), pp.16-21.

Crabtree, B.F. and Miller, W.L. eds., (1999). *Doing qualitative research*. Sage Publications.

Creswell, J.W. and Clark, V.L.P., (2007). *Designing and conducting mixed methods research.* Sage Publications.

Creswell, J.W., (2013). *Qualitative inquiry and research design: Choosing among five approaches*. Sage Publications.

Creswell, J. W., (2014). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*: Thousand Oaks, Calif.; London: SAGE Publications, Inc.

Dael, M., Helmer-Petersen, J., Rasmussen, P.R., Madsen, M.C., eds., (2011). *Architecture and design for children and Youth*. The Network for Children and Culture. H.C. Andersens Boulevard 2, 1553 Copenhagen V.

Dalke, H., Little, J., Niemann, E., Camgoz, N., Steadman, G., Hill, S. and Stott, L., (2006). 'Colour and lighting in hospital design'. *Optics & Laser Technology*, *38*(4), pp.343-365.

Davey, C., Lea, J., Shaw, C. and Burke, T., (2010). Children's participation in decision-making. *Published by Participation Works for CRAE (Children's Rights Alliance England) and NCB (National Children's Bureau)*.

Day, C., (2002). *Spirit & place: healing our environment, healing environment*. Routledge.

Day, C., (2004). *Places of the soul: architecture and environmental design as a healing art*. Architectural Press.

Day, C. and Midbjer, A., (2007). *Environment and children*. Architectural Press.

Dazkir, S.S., (2009). *Emotional effect of curvilinear vs. rectilinear forms of furniture in interior settings*. Master's thesis, Oregon Sate University [Online]. Available from: http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/13713/DazkirSibelSeda2009.pdf?sequence=1 (Accessed 4 July 2016).

De Angeli, A., (2009). 'Cultural variations in virtual spaces design'. *AI and Society*, *24*(3), pp.213-223.

De Coninck-Smith, N. and Gutman, M., (2004). 'Children and youth in public: Making places, learning lessons, claiming territories'. SAGE Publications. London, Thousand Oaks and New Delhi, Vol 11(2): pp. 31–141.

De Vaus, D.A. and de Vaus, D., (2001). *Research design in social research*. London: Sage.

Del Nord, R., (2006), Environmental stress prevention in children's hospital design. Technical guidelines and architectural suggestions. Motta, Milano, pp. 1-360.

Del Nord, R., (2006). *Lo stress aAmbientale nel progetto dell'ospedale paediatrico: indirizzi tecnici e suggestioni architettoniche*: Motta Architettura.

Del Nord, R., ed., (2009). 'The culture for the future of healthcare architecture'. In *Proceedings of the 28th, International Public Health Seminar, Alinea Editrice*.

DeLoache, J.S., (2004). 'Becoming symbol-minded'. *Trends in cognitive sciences*, *8*(2), pp.66-70.

Department of Health (2003). *Getting the Right Start: National service framework for children. standard for hospital services - Google Search* [Online]. Available from: https://www.google.com/#bav=on.2,or.r_cp.r_qf.&fp=8efa42126a940e94&q=Getting+the+Right+Start:+National+Service+Framework+for+Children.+Standard+for+Hospital+Services [Accessed 15 August 2013].

Despres, C., (1989). 'Beyond theoretical purism: The search for an integrated paradigm in environmental meaning research'. In *Changing paradigms. EDRA 20, Proceedings Annual Conference of the Environmental Design Research Association, Washington, DC: Environmental Design Research Association* (pp. 82-87).

Dey, I., (2003). *Qualitative data analysis: A user friendly guide for social scientists*. Routledge.

Dictionary, C., (2016). Cambridge Dictionaries [Online]. Available from: http://dictionary.cambridge.org/dictionary/english/prioritize?q=prioritization (Accessed July, 15, 2016).

Dictionary, C., (2016). Cambridge Dictionaries [Online]. Available from: http://dictionary.cambridge.org/spellcheck/english/?q=knowlege (Accessed August, 5, 2016).

Dictionary, O.E., (1989). OED online. *Oxford University Press.* Avialable from http://www.oed.com/view/Entry/151517?redirectedFrom=prioritisation#eid28407608. (Accessed August, 15, 2016).

Dilani, A., (2001). 'Psychosocially supportive design'. *Scandinavian HealthCare Design World Hospitals and Health Services*, *37*(1), pp.20-4.

Dilani, A., (2008). 'Psychosocially supportive design: A salutogenic approach to the design of the physical environment'. *Design and Health Scientific Review*, *1*(2), pp.47-55.

Dilani, A., (2014). 'Design for paediatric health. Designing a solutogenic children's hospital'. *Health Management. Org*-Volume 14-issue 2-Cover story:Paediatrics [Online]. Available from: https://healthmanagement.org/c/healthmanagement/issuearticle/design-for-paediatric-health (Accessed 5 June 2016).

Din, H.W., (1998). *A history of children's museums in the United States, 1899-1997: implications for art education and museum education in art museums* (Doctoral dissertation, Ohio State University).

Doidge, N., (2016), 7 November. 'Piaget's model of cognitive development', [Online]. Available from: http://thebrain.mcgill.ca/flash/i/i_09/i_09_p/i_09_p_dev/i_09_p_dev.html (Accessed 15 August 2014).

Dudek, M., (2005). *Children's spaces*. Abingdon: Routledge.

Duffin, J., (2010). *History of medicine: a scandalously short introduction*. University of Toronto Press.

Dunn, N., (2013). *'Model Behaviour', in* Brooker, G. & Weinthal, L. (eds). *The handbook of interior architecture and design*. London: Bloomsbury Academic pp. 441-453. 13 p.

Eagle, A., (2009). 'All better. Striking children's hospital key to campus renewal'. *Health Facilities Management*, *22*(11), p.12.

Eisen, S.L., (2007). *The healing effects of art in paediatric healthcare: Art preferences of healthy children and hospitalised children* (Doctoral dissertation, Texas A&M University).

Eisen, S.L., Ulrich, R.S., Shepley, M.M., Varni, J.W. and Sherman, S., (2008). 'The stress-reducing effects of art in paediatric health care: Art preferences of healthy children and hospitalised children'. *Journal of Child Health Care*, *12*(3), pp.173-190.

Eklund, L., (2010). *Accessibility to health services in the West Bank, occupied Palestinian Territory* (Master's thesis, Lund University).

Engel, R.J. and Schutt, R.K., (2016). *The practice of research in social work*. Sage Publications.

Ennew, J., (1994). Street and working children: a guide to planning. United States Agency for International Development (USAID)

Eriksen, A., (2000). 'Participatory planning and design of a new children's hospital'. *Melbourne: Design & Health-The Therapeutic Benefits of Design*.

Estates, N.H.S., (2003). HBN 22 Accident and emergency facilities for adults and children. London: NHS Estates.

Estates. N.H.S, (2004a). HBN 23 Hospital accommodation for children and young people. TSO, London.

Estates. N.H.S., (2004b). Improving the patient experience-welcoming entrances and reception areas. London: The Stationery Office (TSO).

Estates. N.H.S., (2004c). Improving the patient experience: friendly healthcare environments for children and young people. London: The Stationery Office (TSO).

Estates. N.H.S., ed., (2005a). HBN 22 Accident and emergency facilities. London: The Stationery Office (TSO).

Estates. N.H.S., (2005b). Hospital accommodation for children and young people London: The Stationery Office (TSO).

Estates. N.H.S., (2005c). *Wayfinding:* Effective wayfinding and signing systems: Guidance for healthcare facilities (Supersedes Htm 65'signs'*).* London: Stationery Office.

Evans, G.W., (2006). 'Child development and the physical environment. *Annual review of psychology*, (1), pp.423-451.

Evans, M., (2010). *Design futures: an investigation into the role of futures thinking in design* (Doctoral dissertation, Lancaster University).

Faizi, M., Azari, A.K. and Maleki, S.N., (2012). 'Design principles of residential spaces to promote children's creativity'. *Procedia-Social and Behavioural Sciences*, *35*, pp.468-474.

Fine, G.A. and Sandstrom, K.L., (1988). *Knowing children: Participant observation with minors* (Vol. 15). Sage Publications, Inc.

Finn, J.R., (2003). *Rhythms of change: The Washington Waldorf School*. Master's thesis, Virginia Polytechnic institute and State University [Online]. Available from: https://vtechworks.lib.vt.edu/discover (Accessed 5 July 2014).

Flick, U., (2014). *The SAGE handbook of qualitative data analysis* [Online]. Available from: http://lib.myilibrary.com.ezproxy.lancs.ac.uk/Open.aspx?id=617244 (Accessed: 5 January 2015).

Franklin, A.W., (1964). 'Children's hospitals'. *The evolution of hospitals in Britain*, pp.103-121.

Freimane, E., (2013). 'Healing design: analysis of related term'. *Design. Experience. Challenges*, p.15.

Friedow, B., (2012). *An evidence-based design guide for interior designers*. Master's Thesis, University of Nebraska [Online]. Availabel from: http://digitalcommons.unl.edu/arch_id_theses/7/_ (Accessed 7 January 2014)

Gallagher, J. and Reid, D., (1981). *The learning theory of Piaget and Inhelder*. Monterey, CA: Brooks. Cole Publishing.

Gesler, W., Bell, M., Curtis, S., Hubbard, P. & Francis, S., (2004). 'Therapy by Design: Evaluating the UK Hospital Building Program'. *Health & Place,* 10(2)**,** pp.117-128.

Ghazalli, R. and Abbas, M. Y., (2011). 'Paediatric wards: Healing environment assessmen't. *Asian Journal of Environment-Behaviour Studies (ajE-Bs),* 2 (4)**,** pp.63-76.

Giacaman, R., Khatib, R., Shabaneh, L., Ramlawi, A., Sabri, B., Sabatinelli, G., Khawaja, M. and Laurance, T., (2009). 'Health status and health services in the occupied Palestinian territory'. *The Lancet*, *373*(9666), pp.837-849.

Gibbs, G., (2008). *Analysing qualitative data*, London: Sage.

Gorman, N., Lackney, J.A., Rollings, K. and Huang, T.T.K., (2007). Designer schools: the role of school space and architecture in obesity prevention. *Obesity*, *15*(11), pp.2521-2530.

Goswami, U., (2008). *Cognitive development: The learning brain*. New York: Psychology

Graneheim, U.H. and Lundman, B., (2004). 'Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness'. *Nurse education today*, *24*(2), pp.105-112.

Gray, D. E., (2004). *Doing research in the real world [electronic resource],* London; Thousand Oaks, CA, London; Thousand Oaks, CA: Sage Publications.

Greene, S. and Hogan, D. eds., (2005). *Researching children's experience: Approaches and methods*. Sage.

Griffin, D., (2011). *Hospitals: What they are and how they work*. Jones & Bartlett Learning.

Grove, C., (2013). *Adults'expectations and perceptions of a visit while accompanying a child to a children's museum.* (Doctoral dissertation, Oklahoma State University).

Guba, E.G. ed., (1990). *The paradigm dialog*. London: Sage Publications.

Guerin, D & Bunker-Hellmich, L., (2004). 'Design for Development: The Importance of children's environments'. *Implication- Inform Design,* 1**,** 6 [Online]. Available from: http://rs.informedesign.org/_news/Children01_02.pdf (Accessed 1 March 2013).

Guillemin, M., (2004). 'Understanding illness: Using drawings as a research method'. *Qualitative Health Research*, *14*(2), pp.272-289.

GunkeL, J. H., (2010). *Improving paediatric services. The palestinian health sector reform and developpment project (flagship Project).* USAID|West Bank|Gaza [Online]. Available from: http://pdf.usaid.gov/pdf_docs/Pnadw222.pdf (Accessed 5 December 2012).

Gupta, K. and Gupta, S. K., (2007). *Modern trends in planning and designing of hospitals: Principles and practice*, Jaypee Brothers Medical Pub.

Guy's Aan St Thomas NHS Foundation Trust (no date). *Evelina London Children's Healthcare* [Online]. Available from: http://www.evelinalondon.nhs.uk/parents-and-visitors/wards/b-forest.aspx (Accessed 12 December 2012).

Haddad, H.M., (2010). *A Framework of sustainable design for the region of Palestine.* Master's thesis, The Pennsylvania State University [Online]. Available from: https://etda.libraries.psu.edu/catalog/11551 (Accessed 15 July 2014).

Hadid, M. , (2002). 'Architectural styles survey in Palestinian territories'. *Energy Codes for Building (www. molg. pna. ps)*.

Hamdan, M. and Defever, M., (2002). 'A 'transitional'context for health policy development: the Palestinian case'. *Health Policy*, *59*(3), pp.193-207.

Hanington, B. and Martin, B., (2012). *Universal methods of design: 100 ways to research complex problems, develop innovative ideas, and design effective solutions*. Rockport Publishers.

Harris, D.D., Shepley, M.M., White, R.D., Kolberg, K.J.S. and Harrell, J.W., (2006). 'The impact of single family room design on patients and caregivers: Executive summary'. *Journal of Perinatology*, *26*, pp. S38-S48.

Harris, P.B., McBride, G., Ross, C. and Curtis, L., (2002). 'A place to heal: environmental sources of satisfaction among hospital Patients1'. *Journal of Applied Social Psychology*, *32*(6), pp.1276-1299.

Healthcare Commission (2007). Improving services for children in hospital. *London: Commission for Healthcare Audit and Inspection*.

Hill, M., (1997). 'Participatory research with children'. *Child & Family Social Work*, *2*(3), pp.171-183.

HILL, T. R,. (2008). 'Using colour to create healing environments'. *Du Pont*, pp.1-12

Hobday, R., (2011). 'Indoor environmental quality in refurbishment'. *Historic Scotland Technical Paper*, *12*.

Hogg, C., (1996). *Health services for children and young people: A guide for commissioners and providers*. London: Action for Sick Children.

Holloway, I., (2005). *Qualitative research in health care*. McGraw-Hill Education (UK).

Holloway, I. and Wheeler, S., (2013). *Qualitative research in nursing and healthcare*. Hoboken NJ: John Wiley & Sons.

Horsburgh Jr, C.R., (1995). 'Healing by design'. *New England Journal of Medicine*, *333*(11), pp.735-740.

Horton, R., (2009). 'The occupied Palestinian territory: peace, justice, and health'. *The Lancet*, *373*(9666), pp.784-788.

Hourcade, J.P., (2008). 'Interaction design and children'. *Foundations and Trends in Human-Computer Interaction*, *1*(4), pp.277-392.

Huang, T. T., Sorensen, D., Davis, S., Frerichs, L., Brittin, J., Celentano, J., Callahan, K. & Trowbridge, M. J., (2013). 'Peer reviewed: healthy eating design guidelines for school architecture'. *Preventing Chronic Disease,* 10.

Hussein, M. H., Barlet, A. & Semidor, C., (2010). 'Socio-environmental dimensions of private outdoor spaces in contemporary palestinian housing'. *Open House International,* 35 (2), pp**.**67-76.

Hutton, A., (2003). 'Activities in the adolescent ward environment'. *Contemporary nurse*, *14*(3), pp.312-319.

Hutton, A., (2005). 'Consumer Perspectives in Adolescent Ward Design'. *Journal of clinical nursing,* 14(5)**,** pp.537-545.

Hymas, M., (2008). 'Healing Space -- Can It Be Done?'. *Journal of Holistic Healthcare,* 5(1)**,** pp.28-31.

Ivic, I., (2000). 'Lev S. 'Vygotsky'. *Paris, UNESCO, International Bureau of Education*, vol, XXIV, pp.793-820.

Jabareen, Y., (2005). 'Culture and housing preferences in a developing city'. *Environment and Behaviour*, *37*(1), pp.134-146..

James, A., Jenks, C. and Prout, A., (1998). *Theorising childhood*. Teachers College Press, PO Box 20, Williston, VT 05495-0020.

Jamieson, P., Fisher, K., Gilding, T., Taylor, P.G. and Trevitt, A.C.F., (2000). 'Place and space in the design of new learning environments'. *Higher Education Research and Development*, *19*(2), pp.221-236.

Ja'afar, N.H., Sulaiman, A.B. and Shamsuddin, S., (2012). 'The contribution of landscape features on traditional streets in Malaysia'. *Procedia-Social and Behavioural Sciences*, *50*, pp.643-656.

Jeong, D.H., Chang, R. and Ribarsky, W., (2008). "An alternative definition and model for knowledge visualization". In *IEEE Visualization 2008 Workshop on Knowledge Assisted Visualization*

Johnson, G.A., Pfister, A.E. and Vindrola-Padros, C., (2012). 'Drawings, photos, and performances: Using visual methods with children'. *Visual Anthropology Review*, *28*(2), pp.164-178.

Karakurt, A.S., (2003). *Critical analysis and evaluation of hospital main entrances according to design and performance criteria in the case of Turkey* (Doctoral dissertation, Middle East Technical University).

Karlin, B.E. and Zeiss, R.A., (2006). 'Best practices: environmental and therapeutic issues in psychiatric hospital design: toward best practices'. *Psychiatric services (Washington, DC)*, *57*(10), pp.1376-1378.

Karlsberger., (2005). 'Current trends in paediatric hospital design'. *Karlsberger Knowledge Paper Series,* vol (1), n, 1. Avialable from: http://thenewchildrenshospital.ie/wpcontent/uploads/2011/09/CurrentTrendsInPedHospDesign.pdf (Accessed 12 December 2012).

Kayyali, A.W.S., (1978). *Palestine: a modern history*. Croom Helm (London).

Kenney, S.F., (1994). *Cultural influences on architecture* (Doctoral dissertation, Texas Tech University).

Knackstedt, M. V., (2012). *The interior design business handbook: A Complete Guide to Profitability*: Hoboken NJ: John Wiley & Sons.

Koller, D. & Mclaren, C., (2012). 'Children's emotional responses to a paediatric hospital atrium'. *Children & Society*, pp. 1-13.

Komiske, B.K., (2005). *Designing the world's best children's hospitals 2: the future of healing environments* (Vol. 2). Australia, Group Pty Ltd. Images Publishing.

Komiske, B.K., (2013). *Designing the World's Best Children's Hospitals III: The Future of Healing Environments* (Vol. 3). Australia, Group Pty Ltd Images Publishing.

Konigk, R., (2011). *Interior design as achitecture's' Other'*. Master's thesis, Univesity of Pretoria [Online]. Availabel from: http://www.repository.up.ac.za/dspace/bitstream/handle/2263/26721/Complete.pdf?sequence=3 (Accessed 7 January 2013).

Kraftl, P., (2006). 'Ecological architecture as performed art: Nant-y-Cwm Steiner School, Pembrokeshire'. *Social & Cultural Geography*, *7*(6), pp.927-948.

Kunders, G., (2004). *Hospitals: facilities planning and management*, New Delhi: Tata McGraw-Hill Education.

Kwasnik, B.H., (2000). 'The role of classification in knowledge represantation and discovery'. *Library Trends*, *48*(1).

Kyttä, M., (2004). 'The extent of children's independent mobility and the number of actualised affordances as criteria for child-friendly environments'. *Journal of Environmental Psychology*, *24*(2), pp.179-198.

Lamb, M. E., (2004). *The role of the father in child development*: Hoboken NJ: John Wiley & Sons.

Lambert, V., Coad, J., Hicks, P. and Glacken, M., (2014a). 'Social spaces for young children in hospital'. *Child: Care, Health and Development*, *40*(2), pp.195-204.

Lambert, V., Coad, J., Hicks, P. and Glacken, M., (2014b). 'Young children's perspectives of ideal physical design features for hospital-built environments'. *Journal of Child Health Care*, *18*(1), pp.57-71.

Lankston, L., Cusack, P., Fremantle, C. and Isles, C., (2010). 'Visual art in hospitals: case studies and review of the evidence'. *Journal of the Royal Society of Medicine*, *103*(12), pp.490-499.

Lawson, B., (2010). 'Healing architecture'. *Arts & Health*, *2*(2), pp.95-108..

Lee, B., (1985). 'Intellectual origins of Vygotsky's semiotic analysis'. *Culture, communication and cognition: Vygotskian perspectives*, pp.66-93.

Lewis, A. and Lindsay, G. E., (1999). *Researching children's perspectives.* Buckingham: Buckingham Open University Press.

Lim, B., (2004). 'Aesthetic discourses in early childhood settings: Dewey, Steiner, and Vygotsky'. *Early Child Development and Care*, *174*(5), pp.473-486.

Lindenberger, U., (2001). Lifespan theories of cognitive development. In *International encyclopedia of the social and behavioral sciences* (pp. 8848-8854). Elsevier Science.

Lindsey, S., (2011). *The impact of interior design on patient satisfaction in a hospital birthing centre*. Stephen F. Austin State University.

Linton, R., (1945). *The cultural background of personality*. Oxford, England: Appleton-Century.

Litkouhi, S., Geramipour, M. and Litkouhi, S., (2012). 'The effect of gender, age, and nationality on the personal space preferences in children's hospitals among Iranian and German children and adolescents'. *Iranian Red Crescent Medical Journal*, *14*(8), p.460.

Logan, K., (2007). 'Alberta Children's Hospital'*. Architecture Week, pB.1.1, 1 August* [Online]. Avialable from: http://www.architectureweek.com/2007/0801/building_1-1.html (Accessed 2 March 2015).

Loveridge, J., (2010). 'Involving children and young people in research in educational settings'. *Victoria: University of Wellington, Jessie Hetherington Centre for Educational Research. Accessed 23 June*, p.2012.

Lueder, R. and Rice, V.J.B. eds., (2007). *Ergonomics for children: designing products and places for toddler to teens*. CRC Press.

Macaulay, A.C., Commanda, L.E., Freeman, W.L. and Gibson, N., (1999). 'Participatory research maximises community and lay involvement'. *British medical journal*, *319*(7212), p.774.

Macnaughton, J., (2007). 'Art in hospital spaces: The role of hospitals in an aestheticised society'. *International Journal of Cultural Policy,* 13**,** pp.85-101.

Malkin, J., (1992). *Hospital interior architecture: Creating healing environments for special patient populations*, Van Nostrand Reinhold.

Mamabolo, L. R. C., (2009). *The experiences of registered nurses involved in termination of pregnancy at Soshanguve Community Health Centre*. Master's thesis, University of South Africa, Pretoria[Online]. Available fromt: http://hdl.handle.net/10500/1962 (Accessed 3 March 2016).

Mand, K., (2012). 'Giving children a 'voice': arts-based participatory research activities and representation'. *International Journal of Social Research Methodology*, *15*(2), pp.149-160.

Marcus, C. C. (2014). *Therapeutic landscapes [electronic resource]: an evidence-based approach to designing healing gardens and restorative outsdoor*

spaces. Available from: http://lib.myilibrary.com.ezproxy.lancs.ac.uk/Open.aspx?id=525197 (Accessed 3 March 2016).

Marcus, C.C., (2007). 'Healing gardens in hospitals'. *Interdisciplinary Design and Research e-Journal*, *1*(1).

Marks, D.F. and Yardley, L. eds., (2004). *Research methods for clinical and health psychology*. London: Sage.

Marshall-Baker, A., (2005). 'Knowledge in interior design'. *Journal of Interior Design*, *31*(1), pp.xiii-xxi.

Marshall, C. and Rossman, G., B. 4th ed., (2006). *Designing qualitative research*. Thousand Oaks. London. New Delhi, CA: Sage

Marshall, C. and Rossman, G.B., 5th ed., (2011). *Designing qualitative research*. London: Sage.

Mataria, A., Khatib, R., Donaldson, C., Bossert, T., Hunter, D.J., Alsayed, F. and Moatti, J.P., (2009). 'The health-care system: an assessment and reform agenda'. *The Lancet*, *373*(9670), pp.1207-1217.

Maxwell, L.E. and Evans, G.W., (2002). 'Museums as learning settings: The importance of the physical environment'. *Journal of Museum Education*, *27*(1), pp.3-7.

McCullough, C.S., (2009). *Evidence-based design for healthcare facilities*. Sigma Theta Tau.

Meyer, S., (2007). *Children's preferences for colour schematics of hospital rooms. A senior bachelor thesis, Ohio Sate University [Online].* Available from: https://kb.osu.edu/dspace/bitstream/handle/1811/28522/Thesis..?sequence=1 (Accessed 4 April, 2014)

Middle East Monitor (2014). 'UNICEF: Israel killed 500 children in Gaza'. August 23, 2014. Published in: Israel, Middle East, News, Palestine [Online]. Available from: https://www.middleeastmonitor.com/20140823-unicef-israel-killed-500-children-in-gaza/ (Accessed 15 September 2014).

Miller, B. (no date). *Children's Hospital of Pittsburgh | Barton Malow Company-Building Innovative Solutions* [Online]. Available from: http://www.bartonmalow.com/projects/childrens-hospital-pa (Accessed19 July 2013).

Miller, E. and Kuhaneck, H., (2008). 'Children's perceptions of play experiences and play preferences: A qualitative study'. *American Journal of Occupational Therapy*, *62*(4), pp.407-415.

Mills, A.B. ed., (1969). *Functional planning of general hospitals*. Blakiston Division, McGraw-Hill.

Miles, M.B. and Huberman, A.M., (1994). *Qualitative data analysis: An expanded sourcebook*. London: Sage.

Montello, D.R., (1993), September. Scale and multiple psychologies of space. In *European Conference on Spatial Information Theory* (pp. 312-321). Heidelberg: Springer Berlin.

Moore, G.T., (2002). 'Designed environments for young children: Empirical findings and implications for planning and design'. *Children and Young People's Environments*, pp.53-62.

Moore, G.T., (1987). 'The physical environment and cognitive development in child-care centers'. In *Spaces for Children* (pp.41-72). New York, United Sates: Springer US.

Morrow, S.L., (2005). 'Quality and trustworthiness in qualitative research in counseling psychology'. *Journal of Counseling Psychology*, *52*(2), pp.250-260.

Morrow, V., (2001). 'Using qualitative methods to elicit young people's perspectives on their environments: some ideas for community health initiatives'. *Health Education Research*, *16*(3), pp.255-268.

Morrow, V. and Richards, M., (1996). 'The ethics of social research with children: An overview1'. *Children & society*, *10*(2), pp.90-105.

Naderi, J.R. and Shin, W.H., (2008). 'Humane design for hospital landscapes: A case study in landscape architecture of a healing garden for nurses'. *HERD: Health Environments Research & Design Journal*, *2*(1), pp.82-119.

Naranjo-Bock, C., (2011).'Approaches to user research when designing for children'. *UXMatters*,' [Online]. Available from: http://www.uxmatters.com/mt/archives/2011/03/approaches-to-user-research-when-designing-for-children.php (Accessed 10 April 2014).

National Services Scotland, N.H.S., (2007). *Scottish health planning note 22-Accident and emergency facilities for adults and children*. Health Facilities Scotland [Online]. Available from: www.hfs.scot.nhs.uk/publications/1476434965-SHPN%2022.pdf (Accessed 3 November 2014).

NBC News (2014), 24 July. 'Storyline:Middle east unrest'[Online]. Availble at: http://www.nbcnews.com/storyline/middle-east-unrest/israeli-shell-hits-u-n-school-gaza-killing-least-15-n163896 (Accesssed 5 August 2014).

Nedučin, D., Krklješ, M. and Kurtović-Folić, N., (2010). Hospital outdoor spaces: Therapeutic benefits and design considerations. *Facta Universitatis-series: Architecture and Civil Engineering*, *8*(3), pp.293-305.

NHS Foundation Trust (2014). *Royal Free Hospital/London- Children's services* [Online]. Available from: http://www.royalfree.nhs.uk/child_services.aspx?top_nav_id=1&tab_id=920 (Accessed 17 January 2014).

Ng, C.F., (1998). 'Canada as a new place: the immigrant's experience'. *Journal of Environmental Psychology*, *18*(1), pp.55-67.

Nielsen, J., (1997). 'The use and misuse of focus groups- Research methods' [Online]. Available from: http://www.nngroup.com/articles/focus-groups/ [Accessed 17 Aprill 2014].

Nielsen, T. W., (2003). Rudolf Steiner's pedagogy of imagination*: A phenomenological case study*, *The 1st International Conference on Imagination in Education*, Vancouver, BC, Canada, 16-19 July. Available from: in conference proceedings: www.ierg.net/documents/proceedings/july2003/

Oakley, L., (2004). *Cognitive development. [Electronic Resource],* New York: Routledge.

Oja, P., Bull, F. C., Fogelholm, M. & Martin, B. W., (2010).'Physical activity recommendations for health: What should europe do?' *BMC Public Health,* 10(1), 1.

Osman, F., (1996). *Muslim Women: In the family and the society*. SIS Forum (Malaysia) Berhad.

Pain, R., Whitman, G. & Milledge, D. Lune Rivers Trust., (2012). *Participatory action research toolkit: an introduction to using PAR as an approach to learning, research and action*. Durham University/RELU/Lune Rivers Trust.

Palestinian Central Bureau of Statistics - State of Palestine [Online]. Available from: http://www.pcbs.gov.ps/site/881/default.aspx#Health (Accessed 29 November 2013).

Palestinian Central Bureau of Statistics (2011). Annual Report. Palestine Children–Issues and Statistics. Child Statistics Series (No. 14). Ramallah–Palestine [Online]. Available from: http://www.pcbs.gov.ps/pcbs_2012/Publications.aspx (Accessed 10\03\2017).

Palestinian Central Bureau of Statistics (2006). *Annual Report. Palestine*

Children–Issues and Statistics. Child Statistics Series (No. 9). Ramallah–Palestine [Online]. Available from: http://www.pcbs.gov.ps/pcbs_(Accessed 10\03\2017).

Palmer, S.E., Schloss, K.B. and Sammartino, J., (2013). 'Visual aesthetics and human preference'. *Annual Review of Psychology*, *64*, pp.77-107.

Patton, M. Q., (1990). *Qualitative evaluation and research methods*, London: Sage Publications, inc.

Petrakos, H. and Howe, N., (1996). The influence of the physical design of the dramatic play center on children's play. *Early Childhood Research Quarterly*, *11*(1), pp.63-77.

Piaget, J., (1964). Part I: 'Cognitive development in children: Piaget development and learning'. *Journal of Research in Science Teaching*, *2*(3), pp.176-186.

Pinson, M., (2011). 'The relationship between the built environment and stress relating to paediatric patients'. In *2011,* October, *Southwest Regional Conference* (p. 8). Avialble from: http://www.idec.org/files/SWIDECProceedings2011.pdf#page=8 (Accessed 12 December 2013).

Poppeliers, J.C. and Chambers Jr, S.A., (2003). *What style is it: A guide to American architecture*. Hoboken NJ: John Wiley & Sons.

Powers, T., (2009) July/August. Style and substance: 'Designing of children's hospital of Pittsburgh of UPMC relies on treatment solutions as well as aesthetics' [Online]. Available from: www.mcdmag.com (Accessed 29 October 2013).

Prior, L., (1988). 'The architecture of the hospital: A study of spatial organisation and medical knowledge'. *British Journal of Sociology*, pp.86-113.

Punch, S., (2001). 'Multiple Methods and Research Relations with Young People in Rural Bolivia'. In: Limb Melanie, Dwyer Claire (ed.). Qualitative Methodologies for Geographers: *Issues and Debates, London: Hodder Arnold*, pp. 165-180.

Punch, S., (2002). 'Research with children the same or different from research with adults?'. *Childhood,* 9(3)**,** 321-341.

Puchner, L., Rapoport, R. and Gaskins, S., (2001). 'Learning in children's museums: is it really happening?'. *Curator: The Museum Journal*, *44*(3), pp.237-259.

Qazzaz, H., (2008). 'Palestine: West Bank and Gaza Strip'. *From Charity to Social Change: Trends in Arab Philanthropy*, p.87.

Qlalweh, K., Duraidi, M. and Brønnum-Hansen, H., (2012). 'Health expectancy in the occupied Palestinian territory: estimates from the Gaza Strip and the West Bank: based on surveys from 2006 to 2010'. *BMJ open*, *2*(6), p.e001572.

Raffini, L., Huang, Y.S., Witmer, C. and Feudtner, C., (2009). 'Dramatic increase in venous thromboembolism in children's hospitals in the United States from 2001 to 2007'. *Paediatrics*, *124*(4), pp.1001-1008.

Rahim, H. F. A., Wick, L., Halileh, S., Hassan-Bitar, S., Chekir, H., Watt, G. & Khawaja, M.' (2009). 'Maternal and child health in the occupied Palestinian territory'. *The Lancet,* 373**,** 967-977. Available from: http://science.report/pub/1152654 (Accesssed 12 December 2015)

Rayman, N., (2014). 'Explosions at Gaza school kill at Least 16, health ministry Says' [Online], *Time, World Middle East*, 24 July, 2014. Available from: http://time.com/3030301/gaza-school-israel-palestine-united-nations/ (Accessed 24 December 2014).

Read, J.C., Gregory, P., MacFarlane, S., McManus, B., Gray, P. and Patel, R., (2002), August. 'An investigation of participatory design with children-informant, balanced and facilitated design'. In *Interaction design and Children* (pp. 53-64). Maastricht: Shaker.

Read, M.A., (2007). 'Sense of place in child care environments'. *Early Childhood Education Journal*, *34*(6), pp.387-392.

Read, M.A. and Upington, D., (2009). 'Young children's colour preferences in the interior environment'. *Early Childhood Education Journal*, *36*(6), pp.491-496.

Reda, N., (2004). Women in the mosque: 'Historical perspectives on segregation'(*American Journal of Islamic Social Sciences*, *21*(2), pp.77-97.

Ritchie, J., Lewis, J., Nicholls, C.M. and Ormston, R. eds., (2013). *Qualitative research practice: A guide for social science students and researchers*. London: Sage.

Rogoff, B., (2003). *The cultural nature of human development*. Oxford: Oxford University Press.

Rollins, J.A., (2009). 'The influence of two hospitals' designs and policies on social interaction and privacy as coping factors for children with cancer and their families'. *Journal of Paediatric Oncology Nursing*, *26*(6), pp.340-353.

Rooke, C.N., Tzortzopoulos, P., Koskela, L.J. and Rooke, J.A., (2009). 'Wayfinding: embedding knowledge in hospital environments'. *HaCIRIC, Imperial College Business School, London, UK*, pp.158-167.

Rice, C. R., (2010). *Observing healthcare interior environments and the effect on patient behaviour*. Asenior scholar thesis, Texas: A&M University.

Richardson, H. ed., (1998). *English hospitals 1660-1948: a survey of their architecture and design*, London: English Heritage.

Ridenour, A., (2011). *Aesthetic Inc: Interior design statment of qualification* [Online]. Available from. http://www.aesthetics.net/interior-design.html (Accessed 5 November 2013)

Ritchie, J., and Lewis J., eds., (2003). *Qualitative research practice.* London: SAGE.Publications.

Ritchie, J., Lewis, J., Mcnaughton Nicholls, C. & Ormston, R. 2nd ed., (2014). *Qualitative research practice: a guide for social science students and researchers*, London: SAGE.

Robert, H., and Riffin, G., (no date). *Culture of Palestine, West Bank, and Gaza Strip - history, people, clothing, traditions, women, beliefs, food, customs, family* [Online]. Available from: http://www.everyculture.com/No-Sa/Palestine-West-Bank-and-Gaza-Strip.html (Accessed 30 June 2014).

Rubert, R., Long, L. D. & Hutchinson, M. L., (2007). 'Creating a healing environment in the Icu'. *Critical care nursing: Synergy for optimal outcomes. MA: Jones and Bartlett Publishers*, 27-39.

Rubin, H.R., Owens, A.J. and Golden, G., (1998). Status report (1998): 'An investigation to determine whether the built environment affects patients' medical outcomes'. *Martinez, CA: The Center for Health Design*.

Ryan, G.W. and Bernard, H.R., (2003). 'Techniques to identify themes'. *Field methods*, *15*(1), pp.85-109.

SadlerBL, J., (2008). Evidence for innovation:transforming children's health through the physical environment. National Association of Children's Hospitalsand Related Institutions in collaboration with The Center for Health Design.

Saldana, J. 2nd ed., (2013). *The coding manual for qualitative researchers*, Los Angeles, Calif.; London: SAGE.

Salonen, H., Lahtinen, M., Lappalainen, S., Nevala, N., Knibbs, L.D., Morawska, L. and Reijula, K., (2013). 'Physical characteristics of the indoor environment that affect health and wellbeing in healthcare facilities': A review. *Intelligent Buildings International*, *5*(1), pp.3-25.

Sandelowski, M. and Leeman, J., (2012). 'Writing usable qualitative health research findings'. *Qualitative Health Research*, *22*(10), pp.1404-1413

Sanders, E.B.N. and Stappers, P.J., (2008). 'Co-creation and the new landscapes of design'. *Co-design*, *4*(1), pp.5-18.

Sanders, E.B.N., Brandt, E. and Binder, T., (2010), November. 'A framework for organising the tools and techniques of participatory design'. In *Proceedings of the 11th biennial participatory design conference* (pp.195-198). ACM.

Santrock, J., (2010). 'Cognitive and Lnguage Development'. *In:* In John, W. S. E. (ed.) *In Educational Psychology.* In John,w.Santrock (5/ed) ed. University of Texas at Dallas: McCraw-Hill Higher Education.

Sapsford, R. & Jupp, V. eds., (2006). *Data collection and analysis*, London: SAGE Publications in association with the Open University.

Schneider, J. W., (2010). *Family-Friendly Children's Hospitals: 9 Fresh Ideas for Addressing the Needs of Patients and Parents.* Building Design & Construction [Online]. Available from: http://www.bdcnetwork.com/family-friendly-childrens-hospitals-9-fresh-ideas-addressing-needs-patients-and-parents (Accessed 1 January 2014).

Schoenbaum, M., Afifi, A. K. & Deckelbaum, R. J., (2005). *Strengthening the Palestinian Health System*. Santa Monica, California, United Sates: RAND Corporation.

Schweitzer, M., Gilpin, L. and Frampton, S., (2004). 'Healing spaces: elements of environmental design that make an impact on health'. *Journal of Alternative & Complementary Medicine*, *10*(Supplement 1), pp.S-71.

Senan, Z.B., (1993). Political impacts on the built environment: colonisation and development of place identity: the case of the rural West Bank (Palestine) (Doctoral dissertaion, Newcastle University).

Shenton, A.K., (2004). Strategies for ensuring trustworthiness in qualitative research projects. *Education for information*, *22*(2), pp.63-75.

Sherman, S.A., Shepley, M.M and Varni, J.W., (2005). 'Children's environments and health-related quality of life: Evidence information paediatric healthcare environment design'. *Children Youth and Environments*, 15(1), pp. 186-223.

SilvaUtkan, M., (2012). 'Children hospital design in children picture'. *Procedia-Social and Behavioural Sciences*, 51, pp.110-114.

Silverman, D., (2005). *Doing qualitative research: a practical handbook*, London: SAGE.

Silverman, D., (2013). *Doing qualitative research: A practical handbook*. London: SAGE Publications limited.

Singer, D.G. and Revenson, T.A., (1997). *A Piaget primer: How a child thinks*. International University Press, INC., 59Boston Road, Madison, CT 06443-1524.

Snook, I. D. 2nd ed., (2004). 'Hospitals: What they are and how they work'.United States: Libray og Congress, Jones & Gartlett Learning.

Stevens, E. F., (1919). 'The American Hospital of the Twentieth Century'. *AJN The American Journal of Nursing,* 19(6)**,** 488.

Stilwell, B., Mashal, J., Daoud, M., Hansels, S., Sansour, N., Zatra, F., Al-Husseini, F., Ford, N., (2014), April. *Technical brief 1. Rapid assessment of health services capacity in the West Bank. Palestinian health capacity project. USAID* [Online]. Avaialable from: https://www.intrahealth.org/files/media/rapid-assessment-of-health-services-capacity-in-the-westbank/West%20Bank%20technical%20brief.pdf (Accessed 2 July 2016).

Stoecklin, V, L., (1999). *Design for all children*. Kansas: ERIC

Strauss, A.L., (1987). *Qualitative analysis for social scientists*. Cambridge: Cambridge University Press.

Tappan, M.B., (1997).' Language, culture, and moral development: A Vygotskian perspective'. *Developmental Review,* 17(1)**,** pp.78-100.

The Applied Research Institues (2003). Climatic zoning for energy efficient buildings in the Palestinian Territories (the West Bank and Gaza). *The applied research Institues-Jerusalem/Society(ARIJ)*.

The Center for Health Design., (no date) [Online]. Available from: http://www.healthdesign.org/edac/about (Accessed 06 Syptember 2013).

The Nsw Office of Child Care (Department of Community Services, D., (2002). *Abasic Introduction to Child Development Theoreis.* [Online]. NSW Curriculum framework for children aervices. Available from: http://lrrpublic.cli.det.nsw.edu.au/lrrSecure/Sites/LRRView/7401/documents/theories_outline.pdf (Accessed 27 July, 2013).

The World Health Organisation (2001). *The World Health Organisations involvement I Community Mental Health Development in the occupied Palestinian territory-A work in progress with WHO* [Online]. Available from: http://www.mhinnovation.net/sites/default/files/downloads/innovation

/reports/Report-Community-Mental-Health-Development-in-Palestine.pdf (Accessed 22 May 2016).

Thomas, N. and O'kane, C., (1998). 'The ethics of participatory research with children'. *Children & society*, *12*(5), pp.336-348.

Tivorsak, T.L., Britto, M.T., Klostermann, B.K., Nebrig, D.M. and Slap, G.B., (2004). 'Are pediatric practice settings adolescent friendly? An exploration of attitudes and preferences'. *Clinical pediatrics*, *43*(1), pp.55-61.

Tonkin, A., (2015). Exploring the impact environments have on children and young people's experience of healthcare: A Review of the Literature [Online]. Avialable from: http://cdn.basw.co.uk/upload/basw_23351-7.pdf (Accessed 26 December 2015).

Turner, T., (2004). *Landscape planning and environmental impact design*. Abingdon: Routledge.

Ullán, A.M., Belver, M.H., Fernández, E., Serrano, I., Delgado, J. and Herrero, C., (2012). 'Hospital designs for patients of different ages preferences of hospitalized adolescents, nonhospitalized adolescents, parents, and clinical staff'. *Environment and Behavior*, *44*(5), pp.668-694.

Ulrich, R., (1984). 'View through a window may influence recovery'. *Science*, *224*(4647), pp.224-225.

Ulrich, R.S., (1991). 'Effects of interior design on wellness: Theory and recent scientific research'. *Journal of health care interior design*, *3*(1), pp.97-109.

Ulrich, R.S., (2000), September. Evidence based environmental design for improving medical outcomes. In *Proceedings of the Healing by Design: Building for Health Care in the 21st Century Conference, Montreal, Quebec, Canada*..

Urlich, R., Zimring, C., Quan, X., Joseph, A. and Choudhary, R., (2004). 'The role of the physical environment in the hospital of the 21st century'. *The Center for Health Design*.

Ulrich, R.S., Zimring, C., Zhu, X., DuBose, J., Seo, H.B., Choi, Y.S., Quan, X. and Joseph, A., (2008). A review of the research literature on evidence-based healthcare design. *HERD: Health Environments Research & Design Journal*, *1*(3), pp.61-125.

Ulrich, R., Zimring, C. , Joseph, A. , Quan, X. , and Choudhary,. (2012). *Role of the Physical Environment in the Hospital of the 21st Century | The Center for Health Design* [Online]. Available from: http://www.healthdesign.org/chd/research/role-physical-environment-hospital-21st-century [Accessed 15 August 2012].

United Nations Children's Fund (UNICEF) (2010). *The situation of Palestinian children in the occupied Palestinian territory, Jordan, Syria and Lebanon –*

An assessment based on the convention on the rights of the child [Online]. Available from: http://www.unrwa.org/sites/default/files/healthdepartment annual report 2008.pdf (Accessed 6 March 2016).

United Nation Relief and Works Agency (UNRWA) for Palestine refugees in the near east (2009). *The annual report of the department of health* [Online]. Available from: http://www.unrwa.org/sites/default/files/health_department_annual_report_2008.pdf (Accessed 6 March 2016).

United Sates Agency for International Development (USAID) (2008). *Ministry of health system assessment report Palestinain health sector reform and developemnt project: "The Flagship Project"* December [Online]. Available from: http://healthsystemassessment.org/wpcontent/uploads/2012/06/WestBankHSA2.pdf (Accessed 15 June 2014).

Vaismoradi, M., Turunen, H. and Bondas, T., (2013). 'Content analysis and thematic analysis: Implications for conducting a qualitative descriptive study'. *Nursing & health sciences*, *15*(3), pp.398-405.

van den Berg, A.E. and Wagenaar, C., (2006). 'Healing by architecture'. *The architecture of hospitals. Rotterdam: NAi Publishers*, pp.254-7.

Verderber, S., (2000). *Healthcare architecture in an era of radical transformation*. Yale MI: Yale University Press.

Verschoren, L., Annemans, M., Van Steenwinkel, I. and Heylighen, A., (2015), July. 'How to design child-friendly hospital architecture? Young patients speaking'. In *Design4Health 2015* (pp. 1-9).

Vygotsky, L. S., (1966). *Development of the higher mental functions. In A. N. Leont'ev, A. R. Luria, & A. Smirnov (eds.). Psychological Research in the USSR.,* Moscow: Progress Publishers.

Vygotsky, L. S., (1982). Sobranie Sochinenii, Tom Pervyi: Voprosy Teorii I Istorii Psikhologii [Collected Works, Vol. I: Problems in the theory and history of psychology]. *Moscow: Izdatel'stvo Pedagogika*.

Wallerstein, R., S., (1996). 'Erik Erikson: 1902-1994'. *Psychoanalysis and Contemporary Thought,* 19(2)**,** pp.179-184.

Weinstein, C. S. & David, T. G., (1987). *Spaces for Children: The Built Environment and Child Development,* New York NY: University of Michigan.

White, R., (2004). 'Adults are from earth; Children are from the moon: Designing for Children: A complex challenge'. *White Hutchinson Leisure & Learning Group* [Online]. Available from:

http://www.whitehutchinson.com/leisure/articles/downloads/earthmoon.pdf (Accessed 25 September 2014).

White, A.C., (2009). 'What's in a name? Interior design and/or interior architecture: the discussion continues'. *Journal of Interior Design*, *35*(1), pp.x-xviii.

Whitehouse, D., (2009). 'Designing learning spaces that work: a case for the importance of history'. *History of Education Review*, *38*(2), pp.94-108.

Wilks, S., (2010). A Charter for children's Learning at The Royal Children's Hospital. *Parkville, Victoria: Royal Children's Hospital Education Institute, University of Melbourne, Royal Children's Hospital.* Available from: hhttp://www.rch.org.au/emplibrary/education/CharterLitReviewJune2010_final. pdf (Accessed 4 March 2016).

Woodhead, M., (1998). *Children's perspectives on their working lives: A participatory Study in Bangladesh, Ethiopia, the Philippines, Guatemala, El Salvador and Nicaragua.* Radda Baren S-107 88 Stockholm Sweden.

World Health Organisation (2012). *Guideline: daily iron and folic acid supplementation in pregnant women*. World Health Organisation

World Health Organisation (2014). *WHO handbook for guideline development*. World Health Organisation.

World Health Organisation (2013), 16 May. *Health condition in the occupied Palestinian territory, including east Jerusalem, and in the occupied Syrian Golan* [Online]. Available from: http://apps.who.int/gb/ebwha/pdf_files/WHA66/A66_INF1-en.pdf (Accessed 12 August 2016).

Worth, D., Metcalfe, S., Boyd, J., Worrall, A. and Canarutto, P., (2009). Health and human rights in the Palestinian West Bank and Gaza. *The Lancet*, *373*(9660), pp.295-296.

Yee, R., (2010). *Healthcare spaces: no. 5,* New York NY: Visual Profile Books Inc.

Yim, H.Y.B. and Ebbeck, M., (2009). 'Children's preferences for group musical activities in child care centres': A cross-cultural study. *Early childhood education journal*, *37*(2), pp.103-111.

Younis, M. Z., Jaber, S., Smith, P. C., Hartmann, M. & Bongyu, M., (2010). 'The determinants of hospital cost: A cost–volume–profit analysis of health services in the Occupied Territories: Palestine'. *International Journal of Pharmacy Practice,* 18(3)**,** pp167-173.

Zeidler, E. H., (1974). *Healing the hospital: Mcmaster health science centre, its conception and evolution*. Zeidler Partnership, Michigan US: University of Michigan.

Zeisel, J., (2006). *Inquiry by design: Environment/behaviour/neuroscience in architecture, interiors, landscape, and planning*. New York: W.W.Norton & Company Inc.
.

Zetterquist, A.G., (2009). *Healing Environments: elements of retreat* (Doctoral dissertation, Montana State University-Bozeman, College of Arts & Architecture).

Zhang, D., (2014). A Cross-cultural exploration of children's preferences of package design: The Us and China. *Journal of International Consumer Marketing,* 26(5)**,** pp. 391-404.

Zlotkowska, J. & Cassidy, T., (no date). 'Colour preferences in children. Affective graphic design for children at risk for cancer'. School of Design, University of Leeds, UK, pp.385-388.

Appendix A

1. Toolkits
2. Ethics-information sheet, invitation letter and consent forms
3. Forms for children's writing activities about their drawings and 3D models.
4. Initial data analysis

Toolkits

The toolkits that have been used in this study

Tools for cutting

Tools for drawing

Tools for tracing

Various types of views

Coloured markers

Different coloured clay

Transparent sheets

Small models

Magnetic buttons

Textured paper

Coloured pencils

Textured paper

Lego

Various shapes of buttons

Materials to represent green spaces

Several types of adhesives and Post-its

Types of fasteners

Stickers

A3 Sheets

Soft blocks with texture

Seashells

Stickers

Ethics issues

Some of the forms related to ethics issues: invitation letter for parents, information sheet for participants, and consent form related to children's workshops

A letter for Parents (for school children participation aged 6-18)

LANCASTER UNIVERSITY	**Lancaster University**	
		Faculty Art and Social Science LICA,
	Lancaster Institute of Contemporary Art, LICA **Imagination/ PhD in Design** **Rawa Abu Lawi/ Sawalhs** **PhD Student** **E-mail:** rowa@najah.edu **or** r.abulawi@lancaster.ac.uk **Mobile: in Palestine: 0595055115, in UK 07596227672**	Lancaster University Lancaster LA1 4YD United Kingdom **Tel:** +44 (0) 1524 510814 **Fax:** +44 (0) 1524 510857 **E-mail:** fass@lancaster.ac.uk http://www.ling.lans.ac.uk

May, 2014

Dear Parent,

I'm a research student from An-Najah National University, Palestine. I'm working on my PhD thesis in Interior Design and Interior Architecture at Lancaster University in the UK. My research aims to investigate, and to determine children's preferences for the interior design elements and interior architecture spaces in the main entrance / atrium areas of children's hospitals.

I would like to ask if you would give permission for your child to participate in this research. If you agree they will participate with a group of children in making drawings and simple models of their favourite places. These activities will take about 2 hours—1 hour for drawing in their regular school time art class, and 1 hour after school classes, working on models.

The benefits for your children participation is that children will have fun, they can improve their skills of drawings and creating models, and their preferences and opinions will be beneficial for a new children's hospital in Palestine.

With this letter I have added a Participant Information Statement which describes the purpose and methods of my research. I would like to ask you to read this information carefully. If you do not have any objections about this research and would like your child to participate, please sign the Consent Form and return it to……before …….. This will be a great help to me in completing my research.

If you have any questions or concerns about the research, please feel free to contact me on (Mobile: in Palestine: 0595055115, in the UK 07596227672) or via email on rowa@najah.edu.

Or contact my Supervisors at **Lancaster University, LICA/ Imagination Design Research Centre**:

- Professor **Stuart Walker**, in the UK +44 (0) 1524 510873 or email s.walker@lancaster.ac.uk
- Doctor **Christopher Boyko**, in the UK +44 (0) 1524 510876, or email c.boyko@lancaster.ac.uk

Kind regards,

Rawa Abu Lawi / Sawalha

Participant Information Sheet (Doctors, Nurses, Designers, Employees from reception and admission desk, and Parents)

	Lancaster University	
LANCASTER UNIVERSITY		Faculty Art and Social Science LICA,
	Lancaster Institute of Contemporary Art, LICA **Imagination/ PhD in Design** **Rawa Abu Lawi** **PhD Student** **E-mail: rowa@najah.edu or r.abulawi@lancaster.ac.uk** **Mobile: in Palestine: 0595055115, in UK 07596227672**	Lancaster University Lancaster LA1 4YD United Kingdom **Tel:** +44 (0) 1524 510814 **Fax:** +44 (0) 1524 510857 **E-mail:** fass@lancaster.ac.uk http://www.ling.lans.ac.uk

Research Title: Optimising the Healing Environment in the Public Reception Areas in Children's Hospitals using Interior Architecture and Interior Design. Case study: Hospitals in Nablus City, Palestine.

Investigators: Rawa Abu Lawi, PhD student, Interior Design Study, Faculty of Art and Social Science, Lancaster University.

I would like to invite you to take part in my research study. Before you decide I would like you to understand why the research is being done and what it would involve for you.

The purpose of the research: I'm a research student candidate from An-Najah National University. I continue my PhD thesis in the Interior Design and the interior Architecture at Lancaster University in the UK. My research is aims to investigate children's preferences for the interior design and Interior architecture elements in the children's hospitals, in particular, in the main entrance, atrium, and public reception areas.

Given the fact that children spend quite some time in adult hospitals, it would be beneficial if they give their opinion and preferences for a new children hospital in Palestine. What I will investigate in this research is children's views and preferences for certain aspects of their healthcare environments. Do they actually like what research has identified as being developmentally appropriate for them?

The goal of this study is to develop guidelines for the interior architecture and interior design of the public spaces of children's hospitals. The results can be used to design the main entrance, public reception areas and the atrium in children's hospitals that are both developmentally appropriate and preferred by children who use them.

Do I have to take part? It is up to you to decide to take part in the research. We will describe the study and go through this information sheet with you. If you agree to take part, we will then ask you to sign a consent form. You are free to withdraw at any time, without giving a reason.

What will happen to me if I take part?

1. **For the participants of School Children (workshops activities at schools)**. Fourteen school children aged 6-18 years will be involved in workshops. The children will be divided into four (6-7& 8-11, 11-14, 15-18) groups, each group will have 1 workshop with two activities:

    - Create drawings. The first drawings are free style drawing entitled, "My favourite places that make me feel safe, comfortable, happy, appropriate spaces-friendly, homely, playful, familiar, and can help me to feel comfortable while I'm waiting my

turn". Children will be asked to talk about their drawings. The themes that will be emerging from children's drawings will be categorized and analysed to be used as a key theme for the modelling technique that will be created by children in the second session of the workshop. This workshop will last about 1 hour and it will be recorded. The setting will be at schools in Palestine.

- Create 3D models: The participants of children will be asked to create models. Each group will create one model. Children will be provided with all the material they needed. The concept of this model will be emerging from children's drawings. After children finish the model, they will be asked to talk about it. This workshop will last for about 1 hour and it will be recorded and photos will be taken for the workshop. The setting will be at schools in Palestine.

2. **For the Participants of Parents (focus groups).** Six parents (3 males and 3 females) will participate in a focus group meeting in Palestine. The aim of this meeting to address parents' need and their young children needs in the main entrance and the atrium of children's hospitals. In this meeting, parents will be involved in two activities:

    1. Draw a flow chart. Parents will be involved to Draw a flow charts for the problems they faced when they enter the hospital with their small children (0-6) in terms of the functions, spaces, aesthetics, and facilities. They will be provided with pens, coloured pens and marker pens, and A3 sheets. This activity will last 20 minutes.

    2. Create a map. I will ask parents to make a map by using, cards, stickers, pens, and A0 sheet. In this map, the parents choose and categorize the most important spaces, activities, and preferences that can help them and their children to feel more comfortable in their journey when they enter the hospital. This activity will last 30 minutes. Parents will have a chance to present their work in a ten minute presentation to explain their ideas and I will record that. The setting for this meeting will be at A-Najah National University. The focus group meeting will take about 1 hour.

3. **For the Participants of Doctors, Nurses, and Employees from Reception and the Admission desk (focus groups).** Six participants (2 doctors, 2 nurses, 1 from the reception desk, and 1 from the admission desk) will be involved to a focus group meeting. At the beginning of the meeting, the researcher will present the outcomes from the workshops of children and designers. The doctors and nurses will be asked to discuss:

    - The functional program of the healing environment that will emerge from children visual work.
    - To determine if there are contradictions between the medical spaces and children-friendly spaces.
    - To determine the context of children's friendly spaces within the context of the hospital.

      The setting of this focus group meeting will be in the conference room at Specialized Arab Hospital – Nablus city, in Palestine. This meeting will last one hour. The participants at this case will involve audio-recording.

4. **For the Participants of Designers (workshop activities).** Eight designers will participate in a workshop to analyse the data, to draw out the findings, and develop ways of designing the spaces of the main entrance and the atrium of children's hospital. Designers will have several activities:

1. Discussing and refining the outcomes of the children's drawings and their models. Designers will be divided into 4 groups (2 architects, 2 interior designers, 2 artists, and 2 graphic designers). The designers will discuss the findings that will emerge from the analysis of the children's drawings for refining and adding any new suggestions. They will be provided with the findings printed in a form of tables and they will also be providing with the pictures of the children's drawings and models that will create in phase 1 workshop A. After that, I will ask them to talk about their new suggestions ad opinions which will be recorded. This activity will last 40 minutes. The setting will be at the faculty of Fine Art at An-Najah National University.

2. Discussing, refining, and adding the findings from the focus groups related to parents and Doctors. Designers will be provided with the findings from these focus groups in a form of tables and charts. Also, they will be provided with the toolkits that will be created in both of the focus groups (workshops A and B).I will ask them about their perspective of the features and needs that have been highlighted by parents. This activity will last about 40 minutes. The discussion will be recorded.

3. The designers will discuss together the findings and the themes that will emerge from session 1 and session 2 for prototyping, addressing, connecting and constructing these themes about the interior design and the interior architecture in terms of the functions, cultural context (i.e., gender, language, parents), and the most important considerations (i.e., privacy, paly areas, safety, scale, natural light, imagination etc.) of the main entrance and the atriums of children's hospitals. These will help to reveal issues pertaining to the 'healing environment that can be brought to bear in the design of the main entrance and the atrium of children's hospitals in Palestine *(e.g.,* thematic design charts, colour, scale, size, integration between interior architecture and interior design, technology integration, friendly interior design, healing environment that can be suitable for all ages of children). To achieve that they will be involved to create a map that addresses all the needs of the stakeholders (i.e., children, parents, doctors, nurses, people who work at the reception and admission desks). This session will be about 1 hour. The settings will be at An-Najah National University in Palestine. The workshop will be recorded.

Will my taking part in this study be kept confidential? The participants' name (i.e., children, parents, doctors, and nurses) will be known by the researcher. However, the confidentiality and anonymity of all participants will be preserved as each participant will be given a pseudonym which will be associated with their information throughout the study. Personal information and the information from methodology tools will be kept separately and no published material will contain information which allows an individual to be identified. All the data collected in this study will be kept in locked storage by the researcher for five years and will then be destroyed.

Risks/benefits of taking part. There are no risks related to the participants. According to benefits, no direct benefits for the children and young people participation in this study in terms of immediate environment improvements, however, they will be contributing and participating in developing guidelines for designing a new children hospital in Palestine, or in any children's hospital in the world.

What will happen if I don't want to carry on with the study? The participant in this research is voluntary and if you decide not to take part you can withdraw from the study at any time that will not affect on the child's care in the hospital; also will not affect on your child marks at schools; and will not affect the adult participants.

If you have any concerns about the conduct of this study, please do not hesitate to discuss them with Rawa Abu Lawi\Sawalha or contact *Debbie Knight | Research Ethics Officer Email:ethics@lancaster.ac.uk* | Phone (01524) 592605 | the secretary of the Ethics Committee which has approved this project.

This information sheet is for you to keep. You also be given a copy of the signed consent form if you choose to let your child participate in this project, please sign the consent form and return that with your child.

Who is organising and funding the research? No funding for collecting the data from the field work (that means travelling and any cost during the data collection will be on my cost). However, I'm a candidate from An-Najah University having a scholarship which covers only my cost fees tuition and accommodation at Lancaster University.

Who has reviewed the study? This study has been reviewed and given a favourable opinion by the Social Care Research Ethics Committee at Lancaster University. A Research Ethics Committee is a group of independent people who review research to protect the dignity, rights, safety and wellbeing of participants and researchers.

Consent Form for Parents (workshops with children)

	Lancaster University	
		Faculty Art and Social Science LICA,
	Lancaster Institute of Contemporary Art, LICA Imagination/ PhD in Design **Rawa Abu Lawi** **PhD Student** **E-mail: rowa@najah.edu or r.abulawi@lancaster.ac.uk** **Mobile: in Palestine: 0595055115, in UK 07596227672**	Lancaster University Lancaster LA1 4YD United Kingdom **Tel:** +44 (0) 1524 510814 **Fax:** +44 (0) 1524 510857 **E-mail:** fass@lancaster.ac.uk http://www.ling.lans.ac.uk

Research Title: Optimising the Healing Environment in the Public Reception Areas in Children's Hospitals using Interior Architecture and Interior Design. Case study: Hospitals in Nablus City, Palestine.

Investigators: Rawa Abu Lawi, PhD student, Interior Design Study, Faculty of Art and Social Science, Lancaster University.

Thank you for considering taking part in this research. If you have any questions please ask a member of the research team before you decide whether to take part. You will be given a copy of this consent form to keep and refer to at any time.

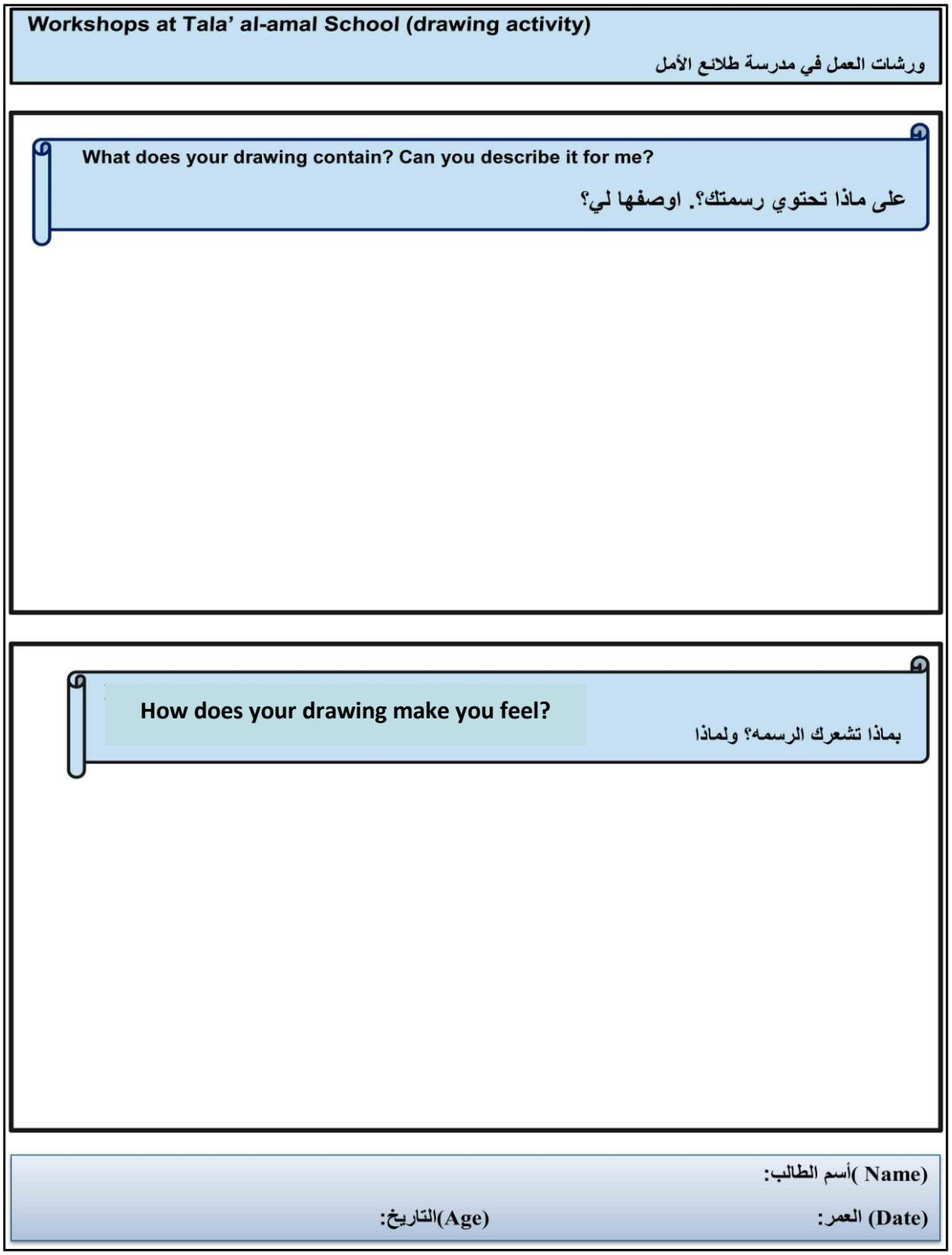
Please tick If you agree

- I confirm that I have read and understood the information sheet for the above study. ☐
- I understand that my child participation in this research is voluntary and that I am free to withdraw my child at any time without giving any reason and without my care or legal rights being affected. ☐
- I understand that any information obtained through the collecting data process, will not contain any personal information concerning the participation which enables them to be identified. ☐
- I understand that if I withdraw from the study the data collected up to that point will be destroyed. ☐
- I understand that any person with concerns about the conduct of this exercise can contact *Knight | Research Ethics Officer Email:ethics@lancaster.ac.uk* | Phone (01524) 592605 | the secretary of the Ethics Committee which has approved this project.
- I agree to take part in the study. ☐

Name of participant _____ (please print)
Signed _____ Date _____
Name of researcher _____ (please print)
Signed _____ Date _____

Forms for children's writing activity

The form is for children to write down their ideas for their drawings and 3D models before verbally recording their interpretations.



Initial Data Analysis

The table presented an example of intial analysis of data relating to colour preference.

Participants	Children's perspectives related to their drawings	The elements that are requested by children (from the sheets that have been written by children)	colours	Elements appeared in the drawing of the three participants
Participant A 		Small pool, friends. Elements for nature [garden, trees, cactus plants, mountains, birds, small lake, clouds and sky]. For colours, blue, yellow, pink (purple). For shapes, circle, festival cottage to buy things and listening to music with a shape like a tree, hoops for play, nest, paly with friends. She like to be with her mother and girl friends	**Blue Yellow Pink purple**	• **Elements of nature** • **Music** • **Play** • **Blue sky** • **water** • **Animals** • **Fish** • **Blue and green**
Participant B 		A Hotel, elements of nature [trees, birds, animals –fish, zoo, frog, cat, rabbit, pool, walking in the garden, watching birds and play hide and seek, swimming, for architecture issues, to be opened to the natural views, the main entrance having the symbol to the guitar in order the entrance to be clear for the people, a room for science, animals, he like to be with his family and friends. Colours, blue, sky, green and natural colours i.e. blue, green, mountains	**Blue green brown and natural colours**	• **Elements of nature** • **Water** • **Music** • **sky** • **Animals** • **Play** • **Fish** • **Blue and green**
Participant C 		A place to set, swing hanged on the trees sky with clouds, coastal places for picnics, toilets for boys and girls, wide spaces, places to eat, natural green grass, coconuts and cypress sky, flowers, mountain, clouds. Colours, blue, green, brown and green. The colour of nature. The shapes I noticed she used half circles for the seats, cottage style for the toilets.	**Green blue brown**	• **Views of nature,** • **Sky,** • **Play** • **Sun** • **Seats** • **Blue and green**
Participant D 		Very big swimming pool, wires to separate the pool, star or logo (way finding), for art, natural view, seats to have a rest, people who are swimming. Colours, blue, natural colour appeared in the natural view	**Blue Natural Colours**	• **Water,** • **view of nature for art** • **Seats** • **blue**
Participant E 		Nature (green area, mountains , trees, animals – birds, lion, zebra, cockroach, tiger, birds, cats, sky with clouds, sun, sky, siso to play, walking and discovering, seats, fire, tents, river, friends. Colours, light blue, light green, dark blue.	Light blue, light green, and dark blue	*Elements of nature * animals *sun, * water * walk and discover *seats *sky *blue *green

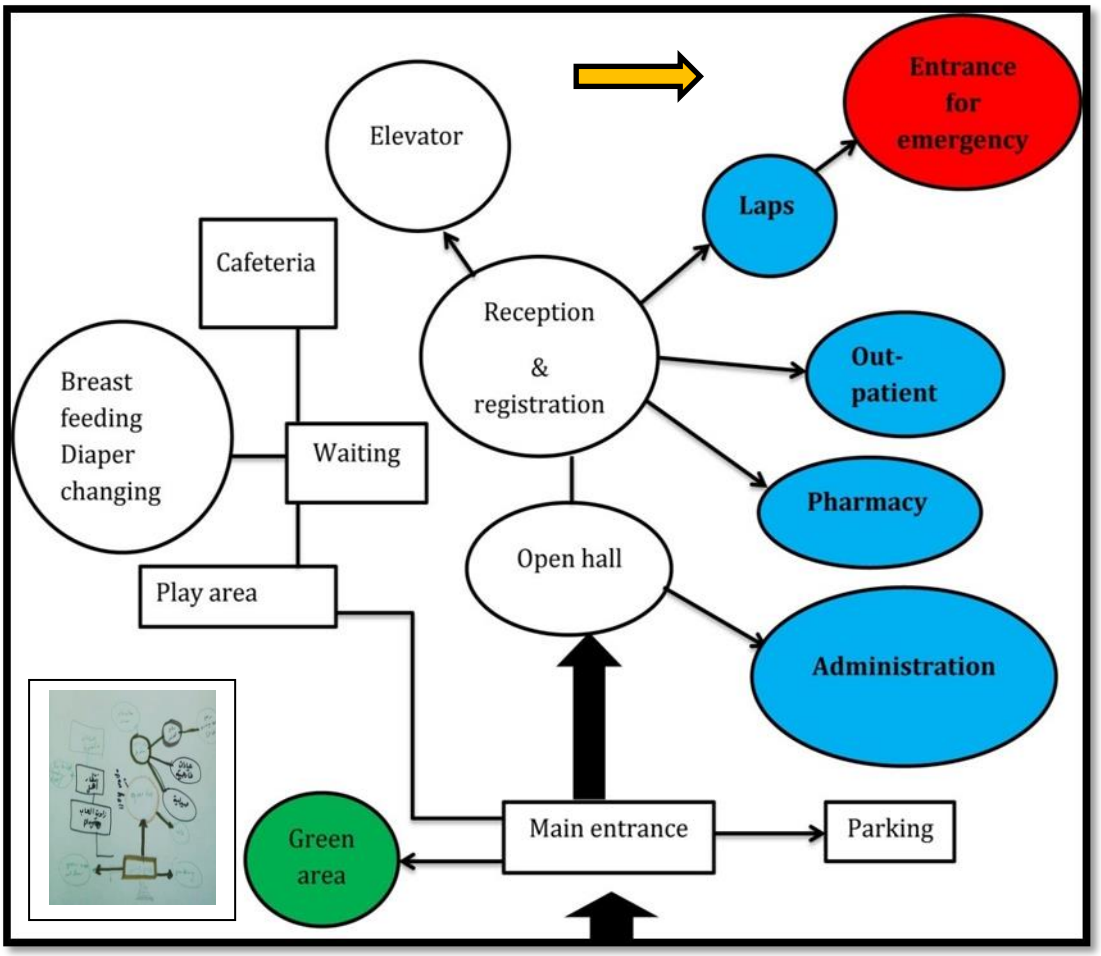
Appendix B

1. Medical staff's preferences regarding medical spaces
   1.1 Preferences of doctors
   1.2 Preferences of nurse *(female)*
   1.3 Preferences of reception and admissions staff
   1.4 Preferences of nurse (male)

2. Children's preferences regarding form, shape and style of main entrance
3. Parents', medical staff's and children's preferences regarding play areas and entertainment activities.
4. Children's preferences regarding gable forms and shapes

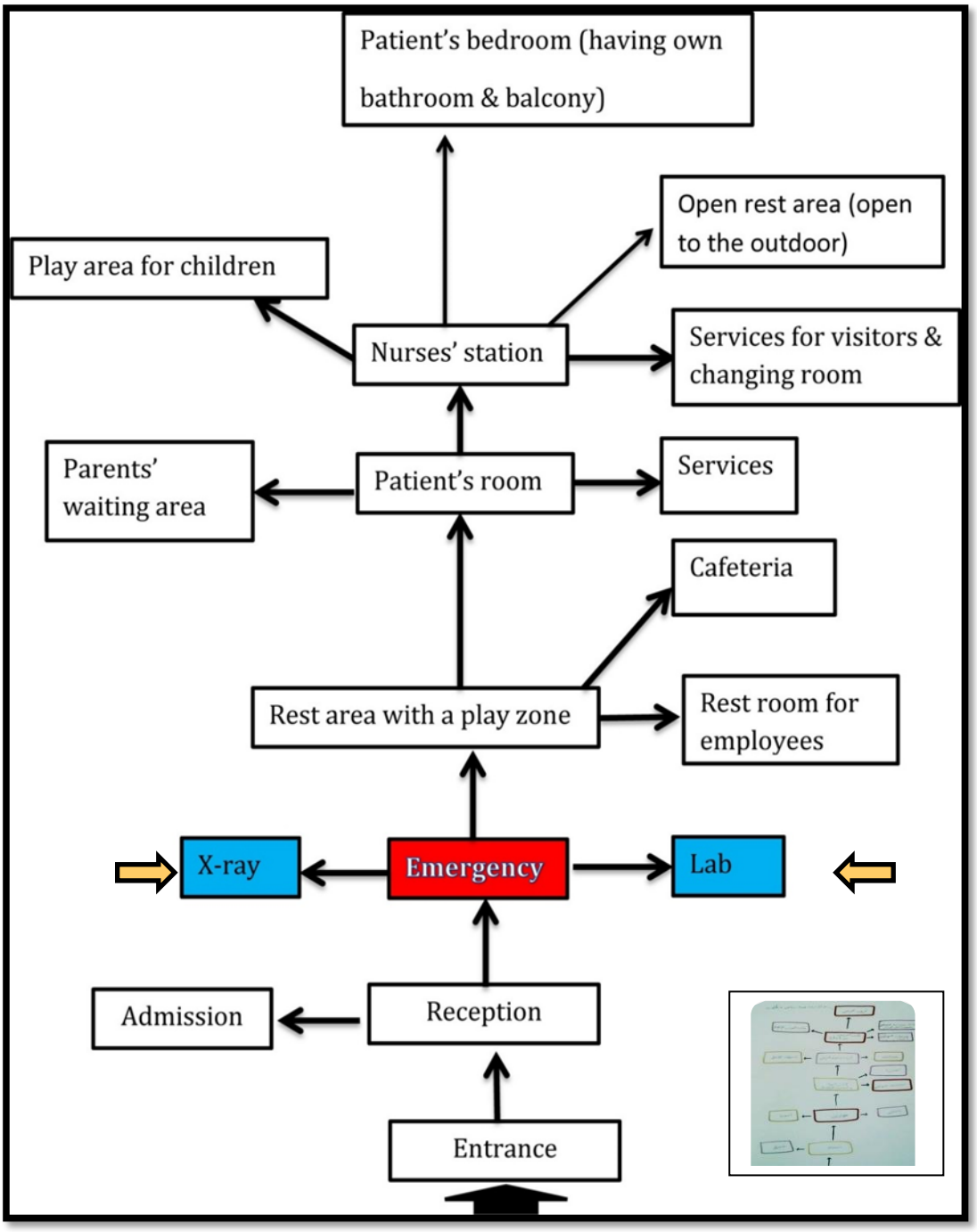
1.1 Preferences of Doctors

This chart presented the preferences of doctors in terms of the medical spaces (e.g. emergency – location and relationships with the other departments) and non-medical spaces (improved from medical staff workshop).



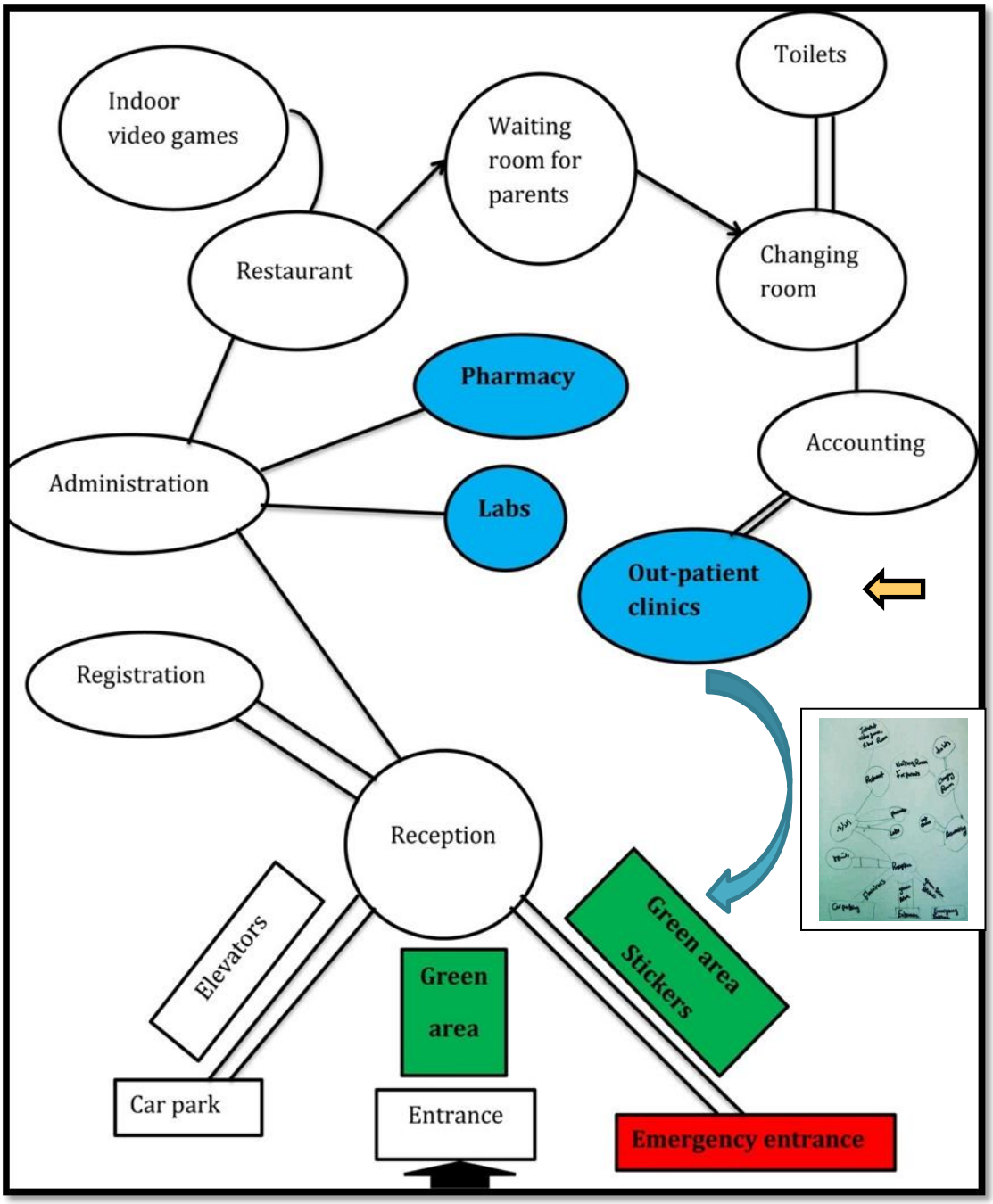
1.2 Preferences of Nurse (female)

This chart presented the preferences of nurses regarding medical spaces (e.g. x-ray room and labs) and non-medical areas in the main entrance and atrium (improved from medical staff workshop).



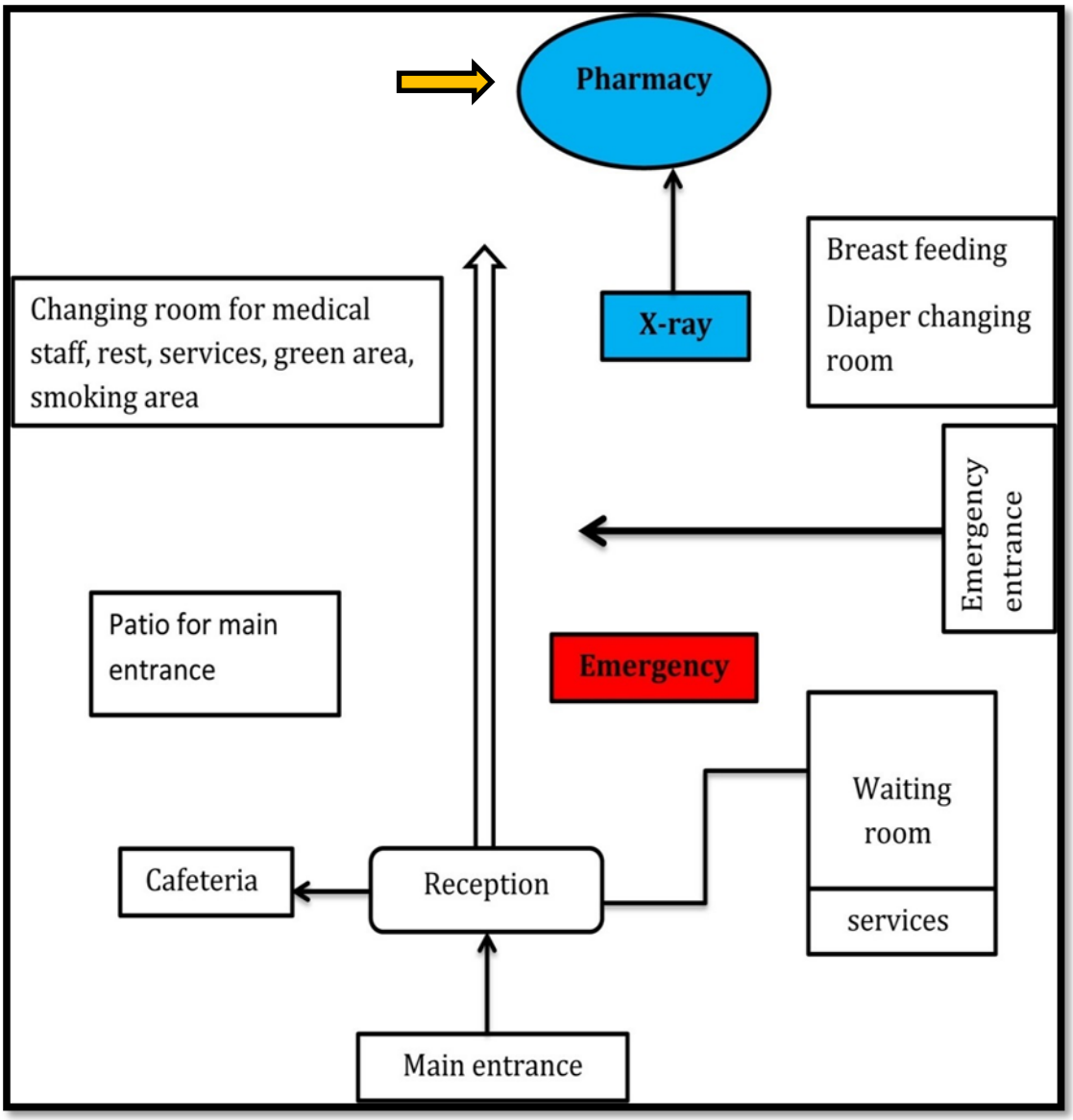
1.3 Preferences of Reception Staff

This chart presented the preferences of the reception staff regarding the location and types of medical spaces (e.g. outpatient) and non-medical spaces in the main entrance and atrium (improved from medical staff workshop).



1.4 Preferences of Nurse (male)

This chart presented the preferences of the nurse (male) regarding the location and types of medical spaces (e.g. pharmacy) and non-medical spaces in the main entrance and atrium (improved from medical staff workshops).



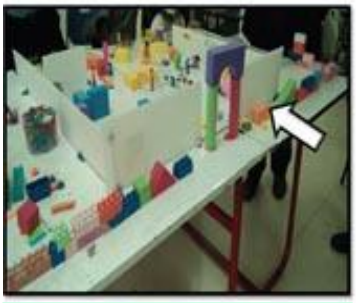
Children's Preferences Regarding Forms and Shapes of the Main Entrance

Children's models illustrating preferred traditional architectural elements – notice the prevalence of arches and half domes, which are considered traditional elements in Palestinian architecture.

Boy, 7-8 years

Boy 9-11 years

Boy, 15-16 years



Fathers' model

Girls, 8-11 years

Girl, 16-17 years

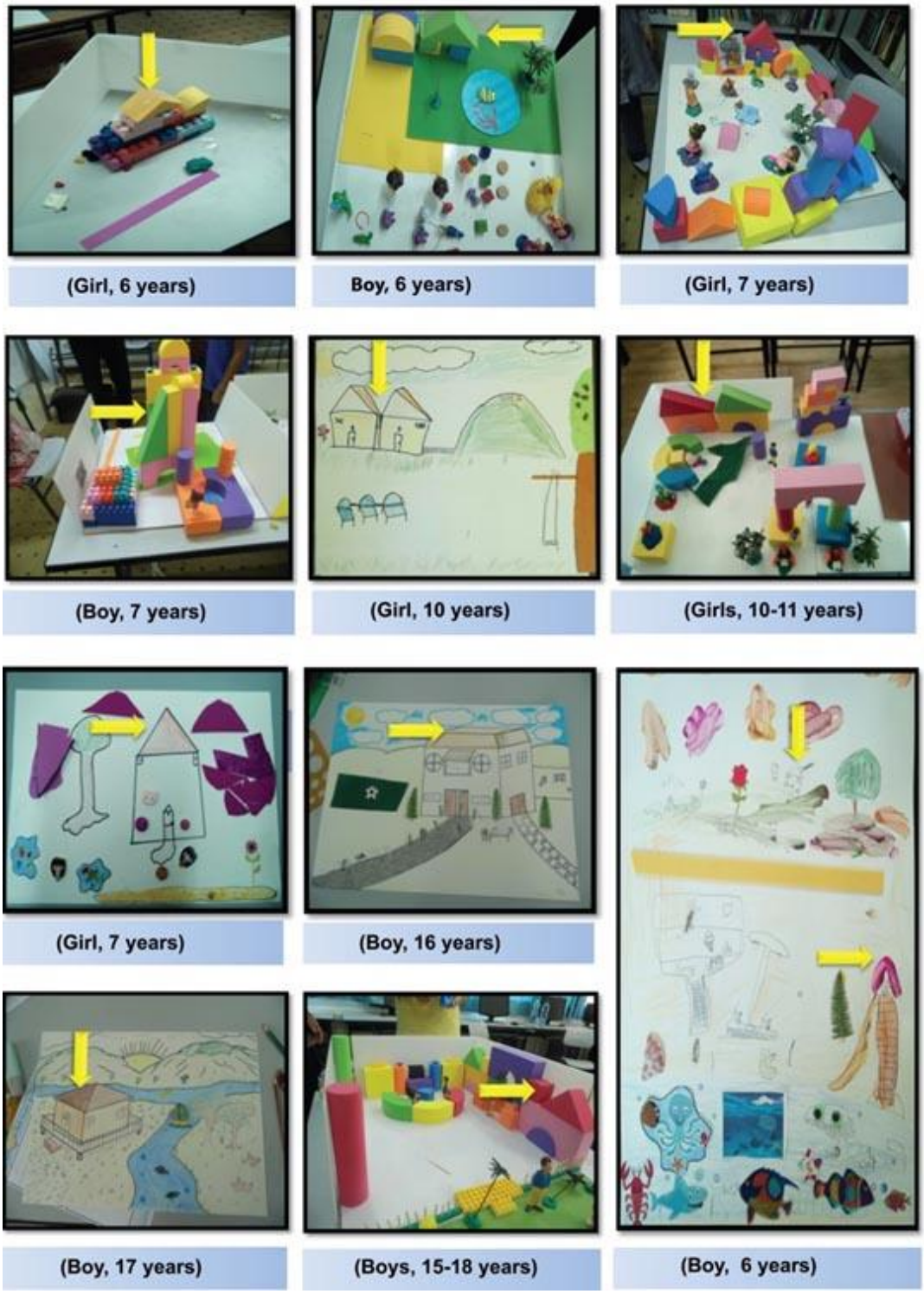
Different types of Games and Entertainment Activities

Cross analysis between participants' preferences regarding types of games and entertainment activities showing diversity and differences between the preferences.

Entertainments games and activities	Participants								Total 41
	3-6 years	6-8 years	8-11 years	12-14 years	15-18 years	Total number of children	Parents	Medical staff	
• Television			1G	1G	3B	5	2M,2F	7	16
• listen to music		2B, 2G	1G	1G	1B, 1G	8	4M, 4F	8	24
• Festivals			1G						1
• Looking at aquarium	2f, 1M	2F, 2M	2B, 1G		1G	11	4M, 4F	3	22
• Visiting museums				1G	1M	2	4M	2	8
• Cinema								4	4
• Playing music		1B			1G	2		6	8
• Reading					1G	1	1F		2
• Toys	2G	2B				4	1M, 1F		6
• Fishing	1B, 1G				1B	3	2M, 2F		7
• Sand	1B, 4G	2B, 2G				9	1M, 1F	6	17
• Internet					1G	1	4M, 4F	8	17
• Lap Tops, computers					1G	1	3M, 3F	8	15
• Stickers	3G, 1B		3B, 1G			7	2F	6	15
• Drawing	1G	1B				2	4M, 4F	8	18
• Lego							1M, 1F		2
• Technology games (i.e. play station, x-box, I-Pads, Video games)							2F. 2M	7	11
• Ball games (e.g. basketball, volley ball, football)		2G, 2B	2G		1B, 2G	9	2F	6	17
• Swimming		2B	2B		1M, 2G	7	2M, 3F	5	17
• sliding			2G			2	1M, 3F		6
• Dancing			1G			1			1
• Hoops			1G			1			1
• Seesaw			2G			2	2M, 3F		7
• Police games			3B			3			3
• Climbing			1B, 1G			2			2
• Games made of rubber for jumping		2G				2			2
• Balloons	1G					1	1M, 4F		6
• Swing	1B, 1G		1G			3	1M, 2F		6
• Skating							1M, 3F		4
• Game of cages							1M, 1F		2
• Balls							2F	6	8
• Jumbling in the outdoors			2G			2			2
• Discover nature and have picnic			1B, 2G			3	1M	3	7
• Learn (i.e. Science)	1G	1B	1B			3	1M		4
• Learn music				1F	1F	2			2
• Mental and linguistic development							3F		3
• Walking in the outdoors	1B			1G		2			2
• Camping	1B		1B	1G		3			3
• Jumping	1G	2G	1B	1G		5	1F		6
• Personal toys							1M, 1F		2
• Animals (i.e. a zoo)		1B	1B			2	2M		4

Children's Preferences Regarding Gable Forms and Shapes

Children's preferences regarding gable forms and shapes in their favourite spaces while they are waiting.



Appendix C

1-Design consideration for public spaces/ reception area

2-Image and thematic design connected to nature

Design Considerations for Public Spaces

Interior designers' suggestions regarding the interior design of the main entrance and atrium of children's hospitals – ensure the reception area is visible and in the centre of the other areas (developed from interior designers' workshop)

Image and Thematic Design Connected to Nature

Children's models and drawings illustrating preferred image design connected to nature – notice the differences between all age groups of children in terms of how they depict nature themes.