

**A Qualitative Exploration of Nigerian Offshore
Oil Field Workers' Eating Habits and Physical Activity**

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**I declare that this thesis is my own work and has not been submitted
for the award of a higher degree elsewhere**

ABSTRACT

Unhealthy eating habits and physical inactivity have been associated with overweight and obesity (Yoshioka et al., 2005; Chourdakis et al., 2010; Parkes, 2002; Froom et al., 1996) and identified as risk factors for illnesses, accidents, occupational injuries and disorders, including among offshore oilfield workers (Parkes, 1998; Gibson Smith et al., 2018a; Kong et al., 2012; Chau et al., 2004; Froom et al., 1996). The above evidence raises concern for the offshore oilfield population (Gibson Smith et al., 2018a) among whom unhealthy eating, physical inactivity, overweight and obesity have been found (Oshaug et al., 1992; Light and Gibson, 1986; Gibson Smith, et al., 2015; Gibson Smith, 2016; Gibson Smith, 2018b; Chen, Wong, and Yu, 2008; Mearns, Hope, and Reader, 2006), and highlights the need for a strong evidence base on eating and physical activity behaviours among that population, with a view to understanding them better and proffering more effective behaviour change interventions.

This research study aimed to explore Nigerian offshore oilfield workers' eating habits and physical activity, the work-related and socio-cultural factors that underpin the behaviours and, the workers' perception of the concepts of healthy eating and physical activity. It utilised a qualitative research design and the sample consisted of twenty-two Nigerian offshore oilfield workers recruited through snowball sampling. Data were collected through semi-structured interviews conducted face-to-face or through Skype and thematically analysed. Data collection and analysis was conducted between August 2017 and April 2019. The research work drew on the social determinants of health model (Dahlgren and Whitehead, 1991) as a theoretical framework and was underpinned by the social constructionist philosophical perspective.

The findings reveal a high consumption of carbohydrates, red meat, fatty and sugary foods, overeating and a general pattern of low participation in physical activity among the participants. The study also shows that offshore oilfield workers' eating habits and physical activity are determined by organisational and national cultures, free access to abundant food, lack of food portion control, the physical offshore living and working environment and, the offshore social environment. It further reveals that while several of the participants associate healthy eating with nourishment of the body, others perceive it as eating food that helps them perform their work efficiently.

Key Terms: Culture, Body Mass Index, Eating Habit, Health Behaviour, Healthy Eating, Obesity, Oil Field, Organisational Culture, Overweight, Physical Activity.

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CHAPTER 1: INTRODUCTION

1.1 Introduction

This section introduces the research problem and relates it to work, organisations and offshore oilfield workers. It also discusses the background, including the geographical context, aims and objectives of the study, as well as the research questions.

Eating habits and physical activity have been identified as two modifiable behaviours that constitute an important aspect of disease causation and prevention, with significant consequences for both the quality and length of life (Conner, 2015). Baum & Posluszny (1999) argue that one's diet and physical activity can influence their health and wellbeing either positively or negatively. Therefore, the two behaviours are critical to the maintenance of offshore oilfield workers' safety, health and wellbeing (Gochman 1988, cited in Janowski et al., 2013).

1.2 Physical Activity

Physical activity has been defined as “any bodily movement produced by skeletal muscles that results in energy expenditure” (Caspersen, Powell, & Christenson, 1985, p.126). Being physically active has been found to be beneficial while physical inactivity on the other hand has been linked with negative outcomes. This has implications for the offshore oilfield population among whom low engagement in physical activity has been identified (Gibson Smith, 2018b; Gibson Smith, et al., 2015; Chen, Wong, and Yu, 2008; Mearns, Hope, and Reader, 2006).

For example, being physically active is linked to lowering of body mass index which is defined as “body weight divided by standing height squared” (Lukaski, 2014, p.669), and reduction in cases of stroke and other cardio-vascular diseases (Yoshioka et al., 2005; Lee & Paffenbarger, 1998; Lee, Folsom & Blair, 2003; Mannocci et al., 2015), cancer and diabetes (Le Marchand et al., 1997), thus improving health and wellbeing. A cross-sectional study of the association of physical activity with overweight and obesity in Japanese men and women carried out by Yoshioka et al. (2005) found that participation in moderate to vigorous physical activity resulted in significantly lower body mass index. Also, a meta-analysis of 23 epidemiological studies of physical activity and stroke carried out by Lee, Folsom & Blair (2003) showed a 27% reduction of stroke incidence and mortality among highly active individuals, as well as a positive effect on moderately active individuals, when compared to low-active individuals.

Conversely, overwhelming evidence suggests a link between physical inactivity and overweight, obesity (Yoshioka et al., 2005; Pietilainen et al., 2008; Iloh et al., 2011), stroke (Lee & Paffenbarger, 1998; Gorelick et al., 1999; Lee, Folsom & Blair, 2003), diabetes mellitus, cancer (Le Marchand et al., 1997), anxiety and depression (Lindwall et al., 2014). The above evidence suggests that offshore workers who do not participate in physical activity are at risk of these diseases and occupational illnesses due to their lifestyles. However, it is interesting to note that some studies have found no evidence of a link between the phenomena. For instance, Luke and Cooper (2013) claim that evidence from observational studies and clinical trials does not support the linking of physical inactivity with obesity. Critiquing the above claim, Blair, Archer and Hand (2013, p. 1836) argue that Luke and Cooper (2013) “misrepresent and/or ignore an extensive evidence base of observational and experimental studies that clearly support

an effect of PA on obesity”. They point to numerous evidence from multiple observational and experimental studies linking physical inactivity with obesity.

Beyond predisposition to disease conditions, physical inactivity has also been implicated as a causal factor for accidents, injuries and occupational disorders, including on offshore oilfield installations. For instance, Riethmeister et al. (2015) argues that it can lead to reduced fitness levels among the population. Furthermore, a study of 880 male construction workers carried out by Chau et al. (2004) and another by Ratzlaff, Gillies and Koehoorn (2007) revealed that engaging in physical activity reduces the risk of upper-body occupational repetitive strain injuries, also referred to as upper-limb disorders (Health and Safety Executive, 2002), which account for a high number of occupational disorders in the offshore oil and gas industry (Jensen and Laursen, 2014).

These research findings linking physical inactivity to upper-limb occupational disorders are critical for offshore oilfield workers in view of the fact that most offshore operations are high risk (Sutherland and Cooper, 1996), require high levels of mobility and fitness, regular handling of materials and equipment, and repetitive and monotonous work (McCabe, 2014) which involves the use of the upper-limbs. This is especially so for drilling, maintenance, production and catering personnel (Morken, Mehlum & Moen, 2007). Such evidence suggests that engaging in physical activity will likely reduce the rates of upper limb disorders among offshore oilfield workers and lead to improvements in their health and wellbeing.

Kong et al. (2012) argue that physical inactivity is also a risk factor for impaired balance with increased likelihood of slips, trips and falls, while participating in physical activity is linked to reduction in such incidents (Suzuki et al., 2004; Gillespie, et al., 2012; Sherrington, et al., 2017; Skelton, 2001; Caban-Martinez et al. (2014). The above evidence highlights the concern in the offshore oil and gas industry (Health and Safety Executive, 2014) where the offshore technology report reveals that incidents categorised as slip, trip and fall accounted for 30% of all UK offshore accidents in the year 2000-2001, as well as 30% of all injuries reported in that industry in the year 2013/14 (Health and Safety Executive, 2014). Sevin et al. (2016) argue that the consequences of slip, trip and fall incidents offshore can be high as the victim can potentially fall overboard, resulting in death by drowning or hypothermia. This demonstrates the importance of physical activity in the prevention of slip, trip and fall incidents, and the maintenance of offshore oilfield workers' safety, health and wellbeing.

Being physically active is also linked to sickness absence reduction. The Health, Work and Wellbeing Programme (2008) notes that physically active employees take 27% fewer sick days off work than physically inactive ones. Therefore, sickness absence can significantly impact the productivity of offshore oilfields (Parkes, 1998), considering that the operations are run on a twenty-four-hour basis, requiring full availability of the workforce (Gibson Smith et al., 2019). A study by Cadilhac et al. (2011) on the economic benefits of reducing the prevalence of physical inactivity among Australian adult population showed that a 10% reduction in the prevalence of physical inactivity could reduce the number of annual new cases of physical inactivity related diseases by 13% and potentially add about AUD12 million in workforce production. Offshore

oilfield operating companies can invest such savings into research on healthier and safer operating systems and likely improve the workers' safety and wellbeing.

1.3 Eating Habits

The term eating habits refers to the way people eat. It includes what, when and how they eat, the quantities of their food and the composition of their diets (Itatiro, 2014). Eating habits can be either healthy or unhealthy. Healthy eating is positively linked to the prevention of most common diseases and confers health and occupational safety benefits (Axelsen et al., 2012). On the other hand, unhealthy eating is associated with adverse health conditions including overweight and obesity (Le Marchand et al., 1997; Chourdakis et al., 2010). Obesity is described as 'the slow-moving epidemic' (McTigue, Garrett & Popkin, 2002: p.863) and a risk factor for diabetes, cardiovascular diseases, sleep apnea, depression, and certain types of cancers (McTigue, Garrett & Popkin, 2002; Mazzochi & Traill, 2011; Mannocci et al., 2015).

Studies have revealed that unhealthy eating, overweight and obesity are sources of concern among offshore oilfield workers (Gibson Smith, et al., 2018a; Gibson Smith, 2016; Riethmeister, et al., 2016; Iwot, 2009) and this has significant occupational health and safety implications for the population. For instance, Parkes (1998) points to the likelihood of increases in incidences of cardiovascular diseases among the offshore oilfield population, due to their increasing BMI. In their longitudinal study which examined 3801 industrial workers, Froom et al. (1996) found that a high body mass index (BMI) is a risk factor for accidents among the workers, thus highlighting another implication of high BMI for offshore workers. In furtherance, Stewart et al. (2015) found that increased body size affects passing ability in restricted spaces offshore.

Overweight and obese individuals may also find it difficult to fit into offshore rescue equipment (Stewart et al., 2015) or to egress from helicopter windows during offshore flight emergencies (Stewart et al., 2016). These situations can delay emergency response and rescue arrangements, thus putting the workers at risk (Mearns and Fenn, 1994).

1.4 Justification for This Study

Although some studies have been carried out on the eating and physical activity behaviours of offshore oilfield workers, such studies have not identified and addressed the influence of national culture on offshore oilfield workers' eating habits and physical activity despite evidence linking national culture with eating habits and physical activity, among the general public (National Health Committee, 1998; Masood, Aggarval and Reidpath, 2019; Singer et al., 2016; Mackenbach, 2014). For example, National Health Committee (1998) argues that people's food habits are deeply influenced by their cultural contexts while a study by Masood, Aggarval and Reidpath (2019) found that country-level culture affects how, when, what, and the quantities of food people eat.

Variations in culture have been recognised as accounting for differences in health behaviours even between neighbouring countries (Mackenbach, 2014; Short and Mollborn, 2015). Therefore, the findings of studies conducted in one cultural setting may not always be applicable to another culture, due to the variations. For example, considering their cultural differences, Parkes (1998) questions the extent to which studies on psychological factors and health among the Norwegian sector of the North Sea can be applicable to the UK sector. The same argument can be made of studies on offshore workers' eating habits and physical activity conducted outside the Nigerian setting.

Although the participants of some of the existing studies were said to have come from a global workforce, the nationalities of the participants are not indicated. For example, Gibson Smith (2016) indicates that the participants to their study on promoting and implementing self-care of offshore workers and remote healthcare practitioners were from a global workforce 0.9% of whom were Africans. However, the study does not indicate the nationality of such African participants and it is therefore not known if Nigerians were included. Moreover, Africa is a continent of fifty-four (54) countries (Dotchin, et al., 2013) with diverse cultures (Binns et al., 2012). Thus, in line with Parkes (1998) assertion above, the extent to which the findings of such studies are applicable to the Nigerian population is arguable. In view of the foregoing, the evidence base on offshore oilfield worker's eating habits and physical activity cannot be complete without the national cultural underpins of the behaviours.

At present there is limited evidence on Nigerian offshore oilfield workers' eating habits and physical activity. The only evidence available is contained in the study by Iwot (2019) which examined the risk factors for coronary heart diseases among the Nigerian onshore and offshore population. Although that study is described as an overview (Iwot, 2019) and therefore not in-depth in that it did not focus primarily on the two health behaviours and also did not identify their determinants, its findings suggest that the Nigerian offshore oilfield population is especially at risk of poor diet and inactivity.

Also, due to their high earnings (Oviasuyi and Uwadiae, 2010), these workers are part of the general urban, professional or high socio-economic status Nigerian adults two thirds of whom are either overweight or obese (Akarolo-Anthony et al., 2014). Therefore, a study focusing specifically on Nigerian offshore oilfield workers is

needed, in order to capture the unique cultural underpins of the population's eating and physical activity behaviours.

Additionally, it is interesting to note that no study has addressed the relationship between offshore physical space limitations and offshore oilfield workers' eating habits. That population's perception of the concepts of healthy eating and physical activity has also not been explored recently. The only study that attempted to capture offshore oilfield population's perception of good food is dated, having been conducted by Ostgard (1990) more than thirty years ago.

Furthermore, most of the studies on the offshore population's eating habits and physical activity utilised a quantitative research design (Gibson Smith, et al., 2015) which is more concerned with the discovery of objective reality and does not consider the context of behaviours (Darlaston-Jones, 2007). However, as Faltermaier (1997) argues, to better understand behaviours, one needs to appreciate their contextual underpins. Therefore, by not containing the contextual foundations of offshore oilfield workers' eating habits and physical activity, the existing studies which utilised the quantitative research design do not elicit a deeper understanding of the two behaviours.

In view of the above gaps, the present research study adopted a qualitative research design and explored the underlying reasons and motivations for Nigerian offshore oilfield workers' eating habits and physical activity, with the aim of bridging the gaps, adding to the existing body of knowledge and contributing to the improvement of offshore workplace nutrition and physical activity policy and practice.

1.5 Background

Considering the evidence linking unhealthy eating and physical inactivity with illnesses, incidents, occupational disorders and the potential for compromised emergency response among offshore workers (Parkes, 1998; Froom et al., 1996; Stewart et al., 2015; Stewart et al., 2016), there is the need for enquiries into the behaviours, in order to properly understand them and to develop appropriate interventions aimed at improving them (Conner, 2015).

The present enquiry is an observational study into Nigerian offshore oilfield workers' eating habits and physical activity. It is important to distinguish between observational or epidemiological studies and intervention studies. In observational studies, the researcher observes participants without any active intervention and documents a naturally occurring relationship between the exposure and the outcome they are studying (Gilmartin-Thomas, Liew and Hopper, 2018; Ranganathan and Aggarwal, 2018; Song and Chung, 2010). Researchers can also carry out observational studies when it would be unethical to undertake intervention studies like randomised controlled trials (Gilmartin-Thomas, Liew and Hopper, 2018). On the other hand, interventional studies involve the active performance of an intervention in some or all members of a group of participants (Ranganathan and Aggarwal, 2018).

Intervention and observational studies have unique strengths which they bring to the research process (Thiese, 2014). While one of the unique values of intervention studies is that they help to “evaluate direct impacts of treatment or preventive measures on disease” (Thiese, 2014, p. 199), observational studies can make distinctive contributions to research by providing the foundation data needed for planning of future research,

including intervention studies and for hypothesis generation (Tleyjeh et al., 2021). The studies included in the literature review of the present research work are observational and in agreement with Tleyjeh et al. (2021) argument, they have made novel contributions to the current knowledge on offshore oilfield population's eating and physical activity behaviours. For instance, the included study by Gibson Smith (2016) on promoting and implementing self-care among offshore workers and remote healthcare practitioners generated data which can aid the development of an intervention to promote self-care behaviours among the offshore population. The data also furnish an evidence-base which can be utilised for future research on the behaviours. Furthermore, the study by Stewart et al. (2015) provided previously lacking data on the recent size of UK offshore oilfield workers, thus highlighting the increasing weight of the population, its implications for the health and safety of the workers and, the significance of healthy food intake and regular strength training by the population.

This study is set within the Nigerian offshore oil industry. Nigeria is Africa's largest oil producer and a member of the Organization of Petroleum Exporting Countries (Odularu, 2008). Oil production commenced in Nigeria in the year 1958 and increased phenomenally in the years following the commencement, accounting for over 95% of the country's export (Udosen, Etok and George, 2009; Akinlo, 2012) and 90-95% of the foreign exchange earnings (Yusuf, 2015). Nigeria has both onshore and offshore oilfields (Fajana, 2005). Figure 1 below shows the increase in Nigeria's annual crude oil production following the commencement of production while figure 2 depicts the percentage contribution of crude oil to Nigeria's total export.

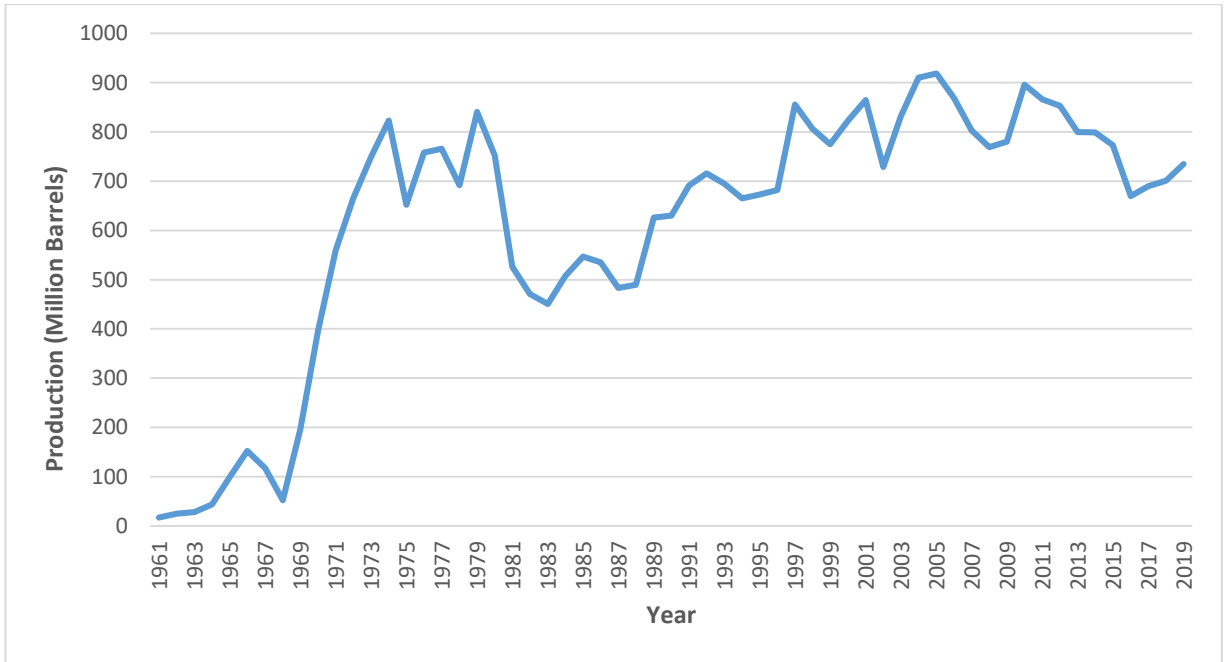


Figure 1: Nigeria's annual crude oil production in million barrels (1961 – 2019)

Source: NNPC Annual Statistical Bulletins, 2000, 2010 and 2019

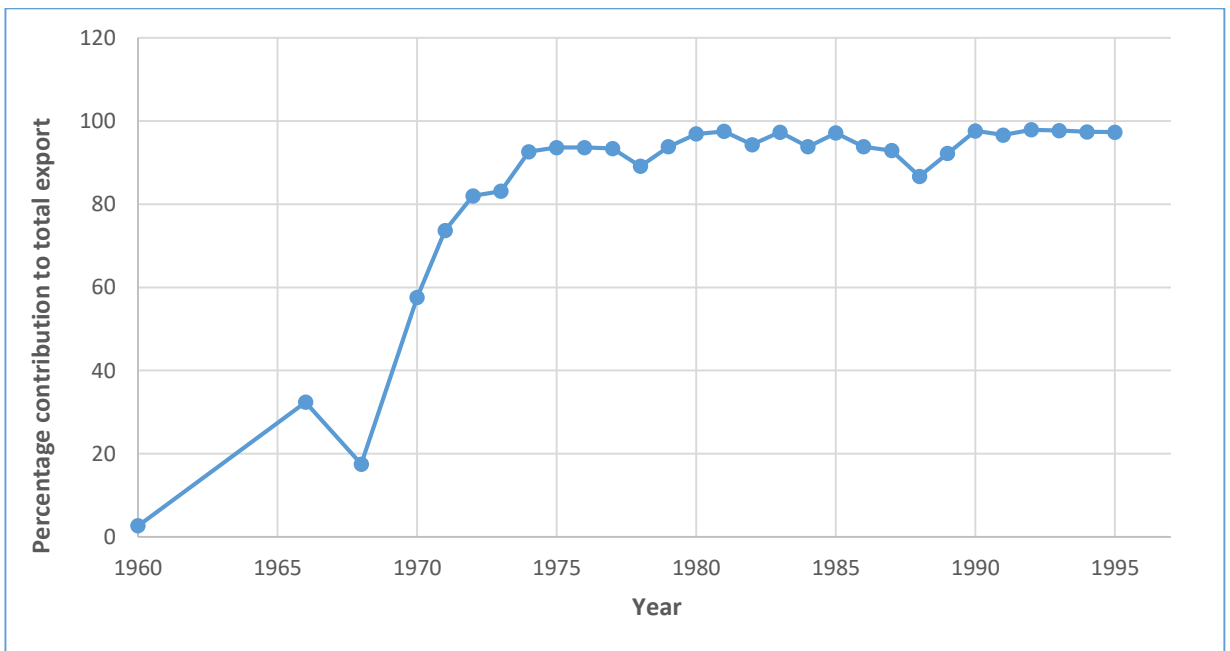


Figure 2: Percentage contribution of crude oil to Nigeria's total export from 1960-1995

Source: 2007 CBN Annual Report, cited in Udosen, Etok and George (2009)

The offshore oilfield environment is portrayed as dangerous or high risk, arduous, socially isolating (Gatlin and Alvarez, 1987; Mearns and Fenn, 1994; Gibson Smith et al. 2018a) and characterised by constant noise and activity (Sutherland and Cooper, 1996). Offshore oilfield workers carry out a wide range of hazardous duties in restricted and awkward spaces where hydro-carbon-related incidents have the potential to escalate very quickly (Sutherland and Cooper, 1996; Parkes, 2012), resulting in well blowouts, fires and structural failures, with loss of lives and assets, as well as damage to the environment. They also contend with other hazards which include vessel motion, harmful chemicals, heavy physical work, lack of privacy (Parkes, 2012) and capricious sea conditions (Parkes, 2012). Collinson (1998, p.597) encapsulates the hazardous nature of offshore work by describing it as “living on a time-bomb”.

Offshore workers usually work day and night shift rotations of 12 hours followed by 12 hours of rest but the tour-of-duty patterns vary globally and crews work for either 7, 14, 21 or 28 days offshore followed by a similar amount of time-off onshore (Sutherland and Cooper, 1996). In Nigeria, most offshore oil and gas companies operate the 14 days on (offshore) and 14 days off (at rest onshore) duty tour pattern although a few operate the 7 days on and 7 days off pattern (Fajana, 2005). Expatriate workers may however work longer rotations of about 28 days on and 28 days off in order to reduce the travel time to and from their homes (Health and Safety Executive, 2010).

1.6 Aim, Objectives & Research Questions

1.6.1 Aim:

The aim of this study was to explore Nigerian offshore oilfield workers’ eating habits and physical activity.

1.6.2 Objectives:

The following were the objectives of the study;

- (1) Explore eating habits and physical activity of Nigerian offshore oilfield workers
- (2) Explore the work-related and socio-cultural factors that underpin the eating habits and physical activity of Nigerian offshore oilfield workers.
- (3) Examine Nigerian offshore oilfield workers' perception of the constructs 'healthy eating' and 'physical activity'.

1.6.3 Research Questions:

The study addressed the following questions:

1. What are the eating habits and physical activity patterns of Nigerian offshore oilfield workers?
2. What socio-cultural and work environment factors determine the eating habits and physical activity of Nigerian offshore oilfield workers?
3. How do Nigerian offshore oilfield workers perceive the constructs 'healthy eating' and 'physical activity'?

1.7 Overview of the Chapters

This thesis is divided into six chapters. Chapter one contains the introduction which includes the research problem, background, geographical context, aims and objectives of the study, as well as the research questions. Chapter two contains the literature search strategy, an overview of existing reviews, and the review of relevant literature on offshore oilfield workers' eating habits and physical activity. Chapter three presents the study methodology, including the research design, the philosophical and theoretical perspectives, recruitment and sample information, data collection and analysis methods,

ethical considerations, steps taken to ensure anonymity and confidentiality of the participants, and the plans for dissemination of the study findings. Chapter four presents the findings of the study. Chapter five discusses the study findings and limitations while chapter six contains the study conclusions and recommendations.

CHAPTER 2: LITERATURE REVIEW

Introduction

This chapter presents the literature search strategy adopted by this study, an overview of existing reviews and the review of relevant literature on offshore oilfield workers' eating habits and physical activity. Section 2.1 presents the literature search strategy. Section 2.2 presents an overview of the existing reviews, section 2.3 captures the included studies, section 2.4 discusses physical activity among offshore oilfield workers while section 2.4.1 discusses the factors that influence the workers' physical activity. Additionally, section 2.5 reviews the literature on offshore workers' eating habits and section 2.5.1 discusses the factors that underpin the behaviour. The chapter concludes with section 2.6 which summarises the reviewed literature and presents the identified gaps in the knowledge about offshore oilfield workers' eating habits and physical activity, based on the reviewed literature.

2.1 Search Strategy

The search for relevant literature on offshore oilfield workers' eating habits and physical activity was carried out by the researcher. A scoping search was first carried out on some databases (Booth, Papaioannou and Sutton, 2016), to assess the size and scope of literature on the research topic (Rathbone et al., 2017). From the search, it was determined that the available literature was enough to enable a robust review on the research topic. The scoping search also gave the researcher an idea of the search terms that are being used to retrieve information on the research topic thus making the search easier. A full search was then conducted in the following databases: ACADEMIC SEARCH ULTIMATE, CINAHL, PsychINFO, MEDLINE Complete, BioMed Central, PubMed, Web of Science (All Databases) and, National Institute for Health

and Care Excellence (NICE). Titles of literature were searched using the terms shown in Table 1 below, including the following combination of keywords and texts: “Offshore” AND “Physical Activity or “Exercise” AND “Nutrition or Diet or Food or Nourishment or Food Intake or Eating” OR “Eating Behaviour*”, “offshore workers eating habits and physical activity” and, “Offshore” AND Healthy eating or healthy diet or healthy nutrition”. Free text search of literature was conducted in Google Scholar as well as in OneSearch in the Lancaster University Library, while the search for relevant dissertations was carried out in ProQuest Dissertations & Theses Global, and EThOS.

The search yielded 1, 593, 223 hits out of which only five hundred and nineteen (519) had titles that were close to the research topic. Forty-one (41) of these were duplicates and were therefore removed. The abstracts of the remaining four hundred and seventy-eight (478) papers were extracted and read by the researcher and three hundred and eighteen (318) non-relevant abstracts were removed. Following this, the researcher retrieved and read the full texts of the remaining one hundred and sixty (160) papers, to determine their relevance to the research topic and if they met the inclusion criteria, as suggested by Briner and Denyer (2012). Furthermore, the references and bibliographies of the retrieved full text papers were hand searched and also assessed, as suggested by Briner and Denyer (2012). Figure 3 depicts the literature search strategy, Table 1 shows the search results while Figure 4 is the PRISMA flow chart which demonstrates how the articles were screened and selected for inclusion.

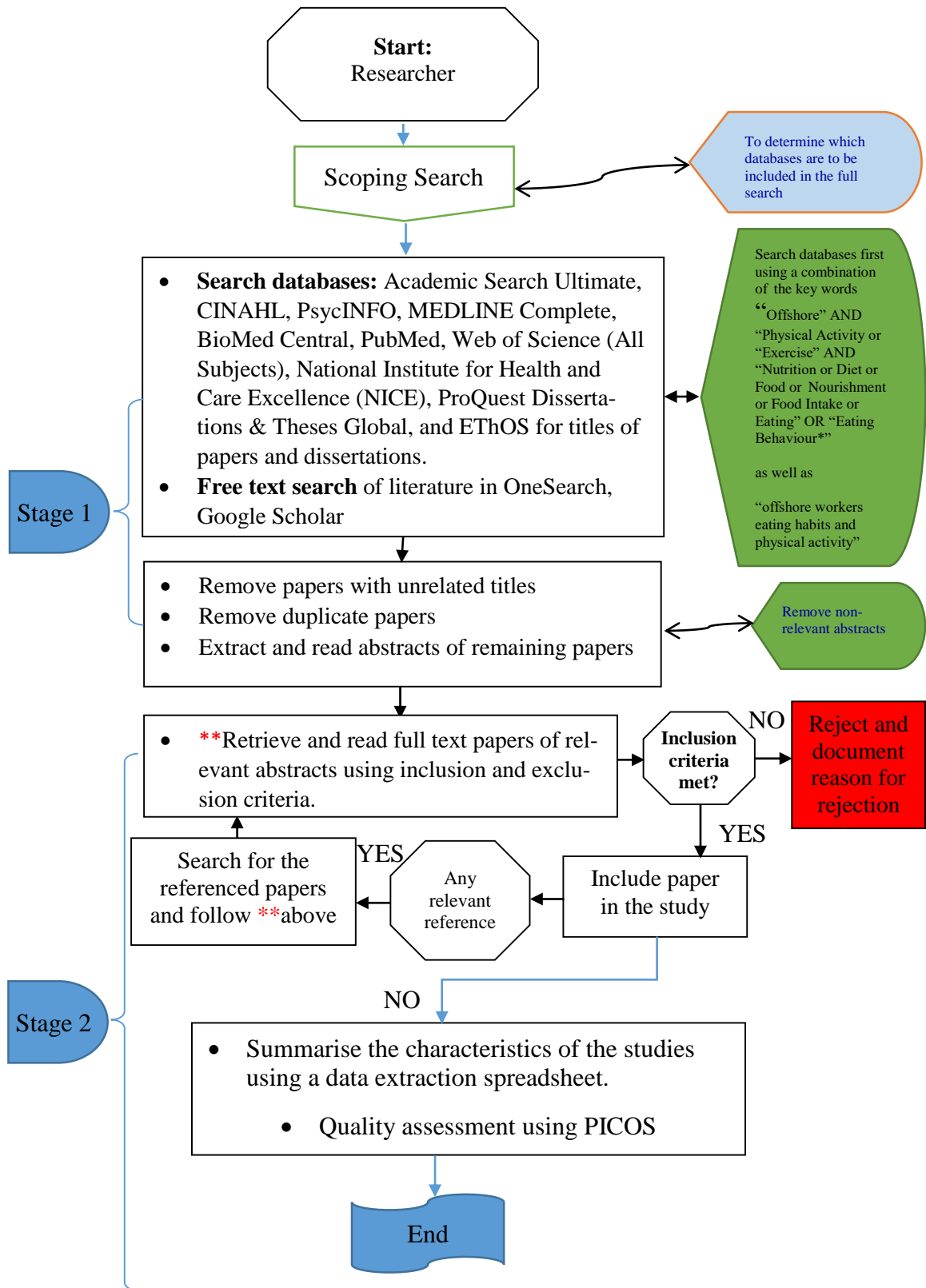


Figure 3: Literature Search Strategy Flow Chart

Table 1: Literature Search Results

Search Term	Database	Number of Hits
“Offshore” AND “Physical Activity or “Exercise” AND “Nutrition or Diet or Food or Nourishment or Food Intake or Eating” OR “Eating Behaviour*”	ACADEMIC SEARCH ULTIMATE	3,045
	CINAHL	765
	PsychINFO	44,605
	MEDLINE Complete	41,830
	BioMed Central	5
	PubMed	5847
Offshore AND Physical Activity or Exercise AND Nutrition or diet or food or nourishment or food intake or eating OR eating behaviour * without quotation marks	Web of Science (All subjects)	1,404,368
Offshore AND (Physical Activity) AND Exercise	ProQuest Dissertations & Theses Global	20,613
Offshore AND (eating habits)	ProQuest Dissertations & Theses Global	6,532
Offshore workers eating habits and physical activity	Google Scholar	23,800
	OneSearch	248
Offshore workers’ health behaviours	OneSearch	12,879
	EThOS	2
Lifestyle and Wellbeing – Physical Activity	National Institute for Health and Care Excellence (NICE)	12
“Offshore” AND “Healthy eating” or “healthy diet” or “healthy nutrition”	Academic search ultimate	7
	CINAHL	2
	MEDLINE Complete	4
Healthy eating	National Institute for Health and Care Excellence (NICE)	5302
Offshore oilfield workers' perception of Healthy eating	Google scholar	17,800
	One Search	8
Offshore AND (healthy eating, eating well)	ProQuest Dissertations & Theses Global	5,549
Total Hits		1,593,223

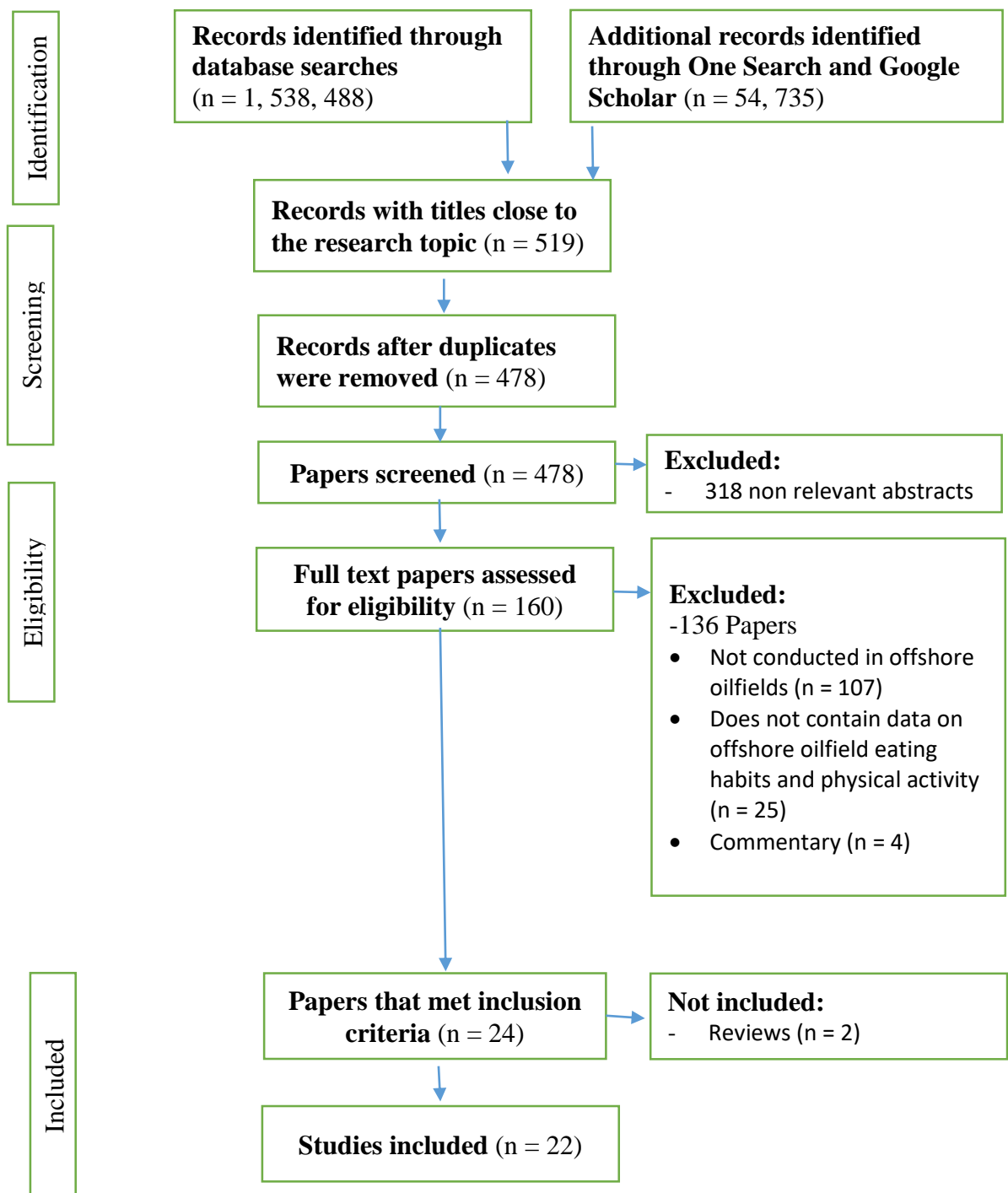


Figure 4: PRISMA Flow Chart

A total of twenty-four (24) papers met the inclusion criteria. However, two of these are previous reviews and therefore were not included in the present literature review. Nonetheless, a critical appraisal of the two reviews was carried out and is presented in section 2.2. The remaining twenty-two papers that met the inclusion criteria were included in the study while those that did not meet the criteria were excluded. Table 2 below shows the details of the inclusion and exclusion criteria for the papers.

Table 2: Paper Inclusion and Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
Written in English	Not written in English
Focuses on adults (eighteen years and above)	Focuses on people below eighteen years of age
Focuses on physical activity outside of work	Focuses on physical activity as part of Work
Note: The date of publication of a paper was not considered an exclusion criterion	

The researcher proceeded to assess the quality of the included papers using PICOS, as suggested by Booth, Papaioannou and Sutton (2016). In assessing the quality of the papers, other elements were added to PICOS and values were assigned to each element. The maximum assessment score achievable by a paper was 14 while the minimum was 0. Four of the reviewed papers each achieved a score of 13 or above while the scores of the remaining eighteen papers ranged between 9 and 11. In the discussion chapter of this thesis, the researcher cited the higher quality papers more often, in comparison to the lower quality ones, when highlighting the congruence between some of the findings of the present study and existing evidence. The data on the quality assessment of the studies are shown in appendix 1 while the characteristics of the included studies are presented in Table 3 below.

Table 3: Characteristics of Included Studies

		POPULATION/ PARTICI- PANTS	INTEREST	CON- TEXT	OUTCOME	STUDY DE- SIGN	
Study Author/Year	Title						Theory
Gibson Smith, K. et al. (2018a)	Health, self-care and the offshore workforce: opportunities for behaviour change interventions, an epidemiological survey.	352 offshore workers (Participants' nationalities are not indicated)	To assess offshore workers' health, self-care, quality of life and mental wellbeing, and to identify associated areas requiring behaviour change.	UK Continental shelf	74.4% of the participants were identified as overweight/ obese (51.1% overweight, 23.3% obese). 54.9% of the participants adhered to 5-a-day fruit and vegetable guidelines although a large proportion of offshore workers did not achieve consumption targets 70.7% adhered to the guidelines for physical activity while 29.3% did not adhere to the	Quantitative (Cross sectional epidemiological survey)	The Seven Pillar Framework

					guidelines although a large percentage of participants did not achieve the moderate to vigorous physical activity guidelines		
Gibson Smith K. et al. (2018b)	Offshore workers and health behaviour change: an exploration using the Theoretical Domains Framework	Global workforce 16 offshore workers and 12 health care professionals from a global workforce. (Participants' nationalities are not indicated)	To identify selfcare behaviours perceived to require behaviour change within the offshore workforce, and their perceived determinants.	Global focus	Eating healthily and increasing physical activity are the principal behaviours requiring change among the offshore workforce. Healthy eating and physical activity are determined by knowledge; beliefs about capabilities; beliefs about consequences; intentions; goals; memory, attention and decision pro-	Qualitative Qualitative (semi-structured one-to-one telephone interviews)	Theoretical Domains Framework (TDF)

					cesses; environmental context and resources; social influences; emotion; and behavioural regulation.		
Riethmeister, V. et al. (2016)	Work, eat and sleep: towards a healthy ageing at work program offshore	19 semi-structured interviews of supervisors, six focus-group sessions among 49 offshore workers and, a questionnaire completed by 450 offshore workers.	To identify the needs of offshore workers with regards to healthy aging at work and to define suitable programme objectives for future healthy aging at work programme.	Dutch Continental Shelf	Offshore workers had a high BMI with 46 % classified as overweight (BMI 25–30) and 21 % classified as obese (BMI >30). 73% of offshore workers reported prolonged fatigue, with long shifts identified as a contributing factor Dutch offshore workers were heavier and more obese than the UK offshore workforce.	Mixed- methods	Grounded Theory

					Food and nutrition were major health concerns among the workers, with easy access to unhealthy food and unhealthy eating identified among the population.		
Gibson Smith, K. L. (2016)	Promoting and implementing self-care: a mixed methods study of off-shore workers and remote healthcare practitioners	Global workforce 352 attendees of an FOET course completed the questionnaire. 16 participants were interviewed. Participants included a worldwide work force. However, only 3% of them were from Africa and their nationalities are not indicated.	To assess off-shore workers' health, quality of life, mental wellbeing, and self-care behaviours.	Global focus	73.8% of the participants were classified as either overweight or obese while 49.9 % achieved five-a-day fruit & vegetable guidelines. 71% of the participants achieved the recommended MVPA guidelines. The participants were engaged more in Physical	Mixed methods	Theoretical Domains Framework

					<p>Activity when onshore.</p> <p>Healthy eating is determined by nutritional knowledge, social influence, control over food preparation, reward, predetermined goals, willpower, offshore environmental stressors, knowledge of negative outcomes of unhealthy eating, availability of food.</p> <p>PA is determined by time management, goal & target setting, environmental conditions, social influence, associating PA</p>		
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					with positive health outcomes.		
Stewart, A. et al. (2015)	Body Size and Ability to Pass Through a Restricted Space: Observations from 3D Scanning of 210 Male UK Offshore Workers	210 male UK offshore workers had a 3D body scan for shape.	3D Scanning of 210 male UK offshore workers.	United Kingdom	<p>The participants (210 male offshore workers) were an average of 2.02 kg heavier than the 2009 workforce weight, but the weight distribution of the sample was not significantly different from the 2009 workforce.</p> <p>The UK offshore workforce appear to be larger than the UK population, and also larger than a reference US population.</p> <p>Offshore workers are 28% and 34% less likely to pass face to face and face to side respectively</p>	Quantitative	Not indicated

					through a restricted space of 100 cm and 80 cm, as compared with UK adults,		
Civil Aviation Authority (2011)	CAP 789 Requirements and Guidance Material for Operators	UK offshore sample data are not available.	To compare the weight estimates of offshore workers from one time period to another.	UK continental shelf	The average weight of a male passenger (whilst not wearing an immersion suit) had increased from 79.4 kg to 87.6 kg between 1984 and 2005.	Quantitative	Not indicated
Newson-Smith, M.S. (2010)	Importing Health Conditions of Expatriate Workers into the United Arab Emirates	1037 expatriate offshore oil company workers in the United Arab Emirates (UAE).	To review the data on the medical assessment of fitness of 1037 offshore oil company workers in UAE regarding hypertension, obesity, diabetes and hepatitis B and C.	United Arab Emirates offshore	The levels of obesity among each of the offshore worker nationalities were higher than the average adult prevalence of obesity in the workers' respective countries and reflect the impact of the working and living environment on underlying ethnic predispositions to the condition.	Quantitative	Not indicated

Iwot, I.A. (2009)	A comparison of coronary heart disease risk factor prevalence among offshore and onshore workers in the petroleum industry in Nigeria	231 male Nigerian onshore and offshore oilfield workers	To compare the prevalence of risk factors for coronary heart disease among offshore workers in Nigeria to their onshore counterparts.	Nigeria	<p>56% of the offshore workers were overweight while 25% were obese.</p> <p>Male workers in the Nigerian petroleum industry are more obese than the comparative Nigerian population.</p> <p>30% of offshore workers participated in exercise for at least 3 days a week, 56.4% engaged in exercise for less than 3 days a week, while 13.6% did not engage in any exercise at all.</p> <p>28.3% of the offshore participants indicated that they ate fruits/vegetables as snacks in between</p>	Quantitative (cross-sectional survey)	Not indicated
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					meals, 51.8% ate biscuits, 16.4% ate bread, and 3.6% ate cakes as snacks.		
Chen, W., Wong, T.W. and Yu, I. (2008)	Association of Occupational Stress and Social Support with Health-Related Behaviours among Chinese Offshore Oil Workers	561 offshore oil-field workers of a Chinese state-owned oil company.	To explore the relationship between Occupational Stress and Social Support with smoking, alcohol usage and physical activity among Chinese Offshore Oil Workers.	China	63.1% of the respondents were physically inactive in their leisure time. Physical inactivity was significantly positively associated with perceived stress from organisational structure and lack of instrumental/emotional support from colleagues and friends.	Quantitative (Cross sectional survey)	Not indicated
Mearns, K., Hope, L., and Reader, K. (2006)	Health and well-being in the offshore environment: The role of the organisational support	703 workers from 18 offshore oil installations in the UK.	To assess health climate offshore and to evaluate its impact upon the health behaviour, organisational citizenship behaviours, safety behaviour	UK continental shelf	52% of respondents were classified as overweight and 15% as obese. Only 29% of respondents reported healthy	Quantitative (Cross-sectional survey)	Not indicated

			and organizational commitment of offshore workers on the UKCS.		<p>eating habits at every meal on the installation</p> <p>27% of the respondents exercised 3 times per week, 48% reported never exercising or exercising rarely or occasionally (8% rarely, 20% occasionally and 10% never) and 25% felt they received enough exercise from their work.</p>		
Mearns, K., and Hope, L. (2005)	Health and well-being in the offshore environment: The management of personal health	1,928 workers from 31 offshore installations.	To examine health behaviours and health management practices on offshore installations on the UK continental shelf.	UK continental shelf	<p>52% of the respondents had a BMI classified as overweight while 12% were classified as obese.</p> <p>49% indicated that they find it difficult to eat a healthy diet offshore.</p>	Quantitative (Cross-sectional survey)	Not indicated

					<p>While offshore, 31% of the workers engaged in no or little exercise while offshore, 50% engaged in light to moderate exercise while 18% engaged in heavy exercise.</p> <p>The most common reason for non-participation in exercise was being too tired after work. (43% of those who stated they did no or very little exercise when offshore were too tired after work and 25% disliked using gyms).</p>		
Parkes, K.R. (2003)	Demographic and lifestyle predictors of body mass index among offshore oil industry	1598 male workers on 17 North Sea oil installations in 1995 (follow-up data obtained in 2000)	To examine BMI levels in a sample of UK offshore personnel, and to evaluate demographic factors,	UK sector of the North Sea	7.5% of the participants were obese while 47.3% were overweight.	Quantitative (Cross-sectional and longitudinal survey)	Not indicated

	workers: cross-sectional and longitudinal findings	from 354 of the initial sample).	smoking and work-related physical activity as predictors of BMI, and 5-year change in BMI		<p>No general increase in age-adjusted BMI levels in the male offshore workforce between 1984 and 1995 was observed. However, there was a significant increase in mean BMI from 1995-2000.</p> <p>There was a significant positive change in the eating habits of the offshore workers between 1984 – 1995.</p> <p>*The physical activity data reported by this study were entirely on work related physical activity. Therefore, they were not included in the pre-</p>		
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					sent study, in accordance with the exclusion criteria.		
Parkes, K.R. (2002)	Shift work and age as interactive predictors of body mass index among offshore workers	1598 male workers on 17 North Sea oil installations.	To investigate shift pattern and its interactions with age, and with years of shiftwork exposure, as predictors of body mass index (BMI).	UK sector of the North Sea	7.5% of the participants were obese while 47.2% were overweight. Significant differences in BMI were found between the day shift and day-night shift personnel.	Quantitative (Cross-sectional survey)	Not included
Collinson, D. (1998)	Shifting lives: Work-home pressures in the North Sea oil industry	98 interviews of North Sea oil workers.	To explore the power relations and inequalities that characterise the offshore industry	UK sector of the North Sea	There are gendered divisions, cultures and practices on North Sea oil facilities. There are inequalities between contractors and operators with respect to access to recreation facilities	Qualitative	Not indicated

Ulleberg, P. & Rundmo, T. (1997)	Job stress, social support, job satisfaction and absenteeism among offshore oil personnel	1137 oilfield workers in Norway.	To examine how job stress in the offshore working environment may affect workers' experience of strain. Stress	Norway	The offshore work environment is stressful	Quantitative (Survey questionnaire)	Not indicated
Horsley, H. and MacKenzie, I.G. (1997)	Lifestyle survey amongst North Sea oil workers. Paper presented at the HSE/UKOOA Conference	507 North Sea offshore workers	To evaluate the self-perception of lifestyle patterns amongst North Sea offshore workers in relation to coronary heart disease (CHD).	UK sector of the North Sea	41% of the respondents claimed to participate in some type of physical activity while offshore. 49% claimed to do so while onshore. More workers indicated that their onshore diet was healthier than their offshore diet. Widespread availability of diets rich in fats and sugars, no re-	Quantitative (questionnaire survey)	Not indicated

					straints on the access to foods, and absence of individual self-control.		
Sutherland, V.J. & Cooper, C.L. (1996).	Stress Prevention in the Offshore Oil and Gas Exploration and Production Industry	Not provided	A working paper that provides information on how to identify stress among different groups of offshore workers	United Kingdom Offshore	Offshore oilfield work and living environment is cramped and restrictive. Work overload results in stress	Mixed methods	Not indicated
Oshaug, A. et al. (1995)	Nutrition Promotion and Dietary Change at Off-shore Oil Installations in the Norwegian Sector of the North Sea	Sample of 194 male offshore workers in Norway (interviewed in 1985. Followed by 336 offshore workers also in Norway, interviewed and completed a questionnaire in 1993).	To examine whether diet had changed at platforms in the Norwegian sector of the North Sea between 1985 and 1993 and if this was caused by nutrition promotive activities, including the use of a health handbook (HHB).	Norwegian Sector of the North Sea.	The mean energy percentage from fat was 12% lower in 1993 than in 1985. 56% of the workers said they had changed their diet since 1985. About 70% of those who had received the HHB had changed their diet, against 50% of those who had not.	Mixed methods (cross-sectional surveys)	Not indicated

Mearns, K. and Fenn, C.E. (1994)	Diet, Health and the Off-shore worker: a pilot study.	102 offshore medical directors, nurses and rig medics	To investigate the number and types of health promotion programmes on oil and gas installations in the Norwegian and UK continental shelf.	UK & Norwegian sectors of the North Sea	Considerable amount of food is available offshore and there is minimal control over issue and intake of food on the facilities.	Quantitative (Survey)	Not indicated
Oshaug, A., Ostgård, L.I. and Trygg, K.U. (1992)	Diet among Oil-workers on Offshore Oil Installations in the Norwegian Sector of the North Sea	203 oilfield workers on 3 offshore installations.	To examine whether diet is an independent determinant for total homocysteine (tHcy) levels.	Norwegian sector of the North Sea	The average daily intake of energy by the workers comprised of 17% protein, 44% fat, 39% carbohydrates, 8% sugar, indicating a high energy contribution from fat, carbohydrates, protein and low intake of fibre. Many participants indicated that they eat more healthily offshore than when on-shore.	Mixed methods	Not indicated

Ostgård, L.I. (1990)	Food habits among Norwegian offshore oil-workers: Adaptation to spectrum and abundance of food choice	203 workers on 3 offshore oilfield platforms.	To examine the food habits of workers on Norwegian offshore platforms.	Norwegian sector of the North Sea	<p>30% of the workers were overweight.</p> <p>Only 1/3 of the workers exercised on a regular basis offshore</p> <p>Fat constituted 45-47% of the energy intake by the workers. Carbohydrate constituted 37-38%, protein 16-17% and sugar 10%.</p>	Qualitative	Not indicated
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<p>Light, I.M. and Gibson, M. (1986)</p>	<p>Percentage body fat and prevalence of obesity in a UK offshore population</p>	<p>419 caucasian males in UK North Sea workers.</p>	<p>To estimate the body fat content and the prevalence of overweightness among offshore workers and to compare this to other studies of onshore populations.</p>	<p>UK sector of the North Sea</p>	<p>Very few participated in active leisure time physical activity while offshore.</p> <p>40.1% of the sample were considered overweight while 5.5% were obese.</p> <p>The prevalence of overweight in the offshore age groups 20-29,30-39 and 40-49 years was 31.6, 50.0 and 66.2% respectively, compared to the age-matched onshore population which had a 26, 40 and 50% prevalence respectively</p>	<p>Quantitative</p>	<p>Not indicated</p>
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2.2 Existing Reviews

This section provides an overview of the research evidence as highlighted by two existing reviews namely, a narrative review of literature on offshore workers' health and wellbeing carried out by Gibson Smith et al. (2015) and, a review of literature on psychosocial stress and wellbeing among oilfield workers in the North Sea conducted by Parkes (1998).

2.2.1 Eating Habits and BMI

Gibson Smith et al. (2015) identified only three studies that focused on diet among offshore oilfield workers operating in the UK continental shelf. The studies revealed unhealthy eating among the population, with less than one third of the workers reporting that they eat healthily each day. The review included four studies that focused on body mass index in the offshore industry and which revealed a prevalence of overweight and obesity among the population. Two of the studies reported that the average weight of UK offshore workers had risen from 79.4 kg to 87.6kg, with a significant increase in their BMI between 1995-2002. The review further showed that the weight of 64-67% of the workers was in the upper limits of BMI range and also revealed that sedentary work is one of the predictors of BMI.

The review by Parkes (2016) focused on stress, sickness absence, health behaviours and medical evacuations among offshore workers on North Sea installations. The included studies revealed unhealthy eating patterns and excessive consumption of fats, with intake nearly 50% more than the recommended value among the workers 40.1% of whom were overweight and 5.5% obese.

2.2.2 Physical Activity

The review by Gibson Smith et al. (2015) included four studies that focused on physical activity among the offshore population. The studies revealed poor uptake of physical activity among offshore workers and showed that only 27% of the population engaged in physical activity three or more times per week, with the workers more likely to engage in physical activity when onshore than when offshore. The review by Parkes (2016) also suggests that offshore workers are less likely to follow advice on exercise than their onshore counterparts. Gibson Smith et al. (2015) concluded that there are concerns over the workers' physical activity.

2.2.3 Determinants of the Behaviours

The barriers to participation in physical activity among offshore workers as identified by some of the studies reviewed by Gibson Smith et al. (2015) include being too tired after work, dislike for working out in the gym, the sense of inequality between operating and company workers and, perceived gendered environment whereby female workers see the gyms on the facilities as masculine places. In their review, Parkes (2016) identified the demands of the offshore environment, the nature of offshore work, separation from family and using meal times as occasions for socialising as some of the factors that may drive offshore oilfield workers to engage in unhealthy lifestyles.

The Gibson Smith et al. (2015) review identified some gaps in literature and these include; dated data on BMI, physical activity and diet among the offshore population considering that the last study on those areas was published a decade earlier, the focus on workers from specific geographic locations by some of the reviewed studies and, the use of quantitative research methods by most of the studies. They therefore concluded

that there is a dearth of relevant high-quality research in the area of offshore health and wellbeing,

2.2.4 Gaps in the Existing Reviews

An appraisal of the two (2) existing reviews has revealed gaps with respect to their coverage of offshore workers' eating habits and physical activity. Having been conducted about six (6) and over twenty-one (21) years ago respectively, the reviews by Gibson Smith et al. (2015) and Parkes (1998) and the studies they covered, are dated. For example, the latest of the studies on the offshore population's BMI and diet included in the Gibson Smith et al. (2015) review was published in 2011, about ten (10) years ago. Similarly, the most recent study on diet, obesity and exercise included in the Parkes (1998) review was published about twenty-five (25) years ago, having been conducted in 1996. Therefore, the reviews do not include recent published literature on offshore oilfield workers' eating habits and physical activity. Additionally, besides highlighting sedentary work as a predictor of BMI, the Gibson Smith et al. (2015) review did not identify and examine any other determinant of unhealthy eating and high BMI among the offshore population. Also, neither of the two reviews by Gibson by Smith et al. (2015) and Parkes (1998) identified and examined the organisational, environmental, personal and, goals and target setting related factors that underpin the offshore population's eating habits and physical activity, thus highlighting the need for further reviews. The present literature review, presented in sections 2.3 to 2.5.1.6 of this thesis, includes recently published literature on the offshore population's eating and physical activity behaviours and captures the determining factors of the two behaviours of focus, which are lacking in the two existing reviews.

2.3 Overview of the Included Studies

This section provides an overview of the studies included in the present enquiry. Fourteen (63.6%) of the studies are quantitative studies, five (22.7%) utilised mixed methods, while three (13.6%) are qualitative enquiries. Analysis of the studies by geographical location of focus shows that eleven (50%) were carried out in the United Kingdom, four (18%) were conducted in the Norwegian sector of the North Sea, two (9%) included a global workforce while one (4.5%) each focused on both UK and Norway, the Dutch sector of the North Sea, Nigeria, China and the United Arab Emirates. Table 4 below depicts the types and geographical locations of the included studies.

Table 4: Types and Geographical Locations of Included Studies

Types of Included Studies		Geographical Locations of Included Studies	
Quantitative	14	United Kingdom	11
Mixed Methods	5	Norway	4
Qualitative	3	United Kingdom and Norway	1
Total	22	Nigeria	1
		China	1
		Dutch	1
		United Arab Emirates	1
		Global Workforce	2
		Total	22

Also, only four (18%) of the studies are underpinned by a theoretical framework while the remaining eighteen (82%) papers do not mention the theoretical perspectives of the studies, suggesting that they are not undergirded by any theory.

2.4 Physical Activity Among Offshore Workers

Evidence from the included studies points to higher-than-average levels of physical inactivity among offshore oilfield workers. For example, a study of the UK offshore workers carried out by Light and Gibson (1986) highlights the inconsistent uptake of leisure-time physical activity even when gyms are made available on offshore oil facilities. Many of the workers did not feel like engaging in any physical activity after their shift duty. Available evidence shows that ten years on there was no change in the pattern of low participation in physical activity by the workforce as a later study by Horsley and MacKenzie (1997) also found that only 41% of UK offshore workers claimed to participate in some type of physical activity while offshore and 49% claimed to do so while onshore.

Two subsequent studies on the population also made similar findings. Mearns and Hope (2005) found that 50% of the respondents in their study on health behaviours and health management practices on offshore installations in the UK engaged in light to moderate exercise, 31% engaged in very little or no exercise at all and only 18% engaged in heavy exercise while offshore. This is followed by a study carried out one year later by Mearns, Hope and Reader (2006) and which showed that 48% of the participants reported that they never exercised or exercised rarely or occasionally (8% rarely, 20% occasionally and 10% never), 25% felt they received enough exercise from their work and only 27% exercised 3 times per week.

It is imperative to note that there are inconsistencies in the scale items used by each of the included studies to measure participation in physical activity by offshore workers. For example, Light and Gibson (1986) used the expression “very few” in the item that described the number of workers that participated in physical activity while offshore and Horsley and MacKenzie (1997) used the term “some type” to describe the type of activity. However, they do not provide any information on the frequency or intensity of the participation. Mearns and Hope (2005) on the other hand describe the intensity of the physical activity by using the terms “heavy”, “moderate” or “very little” and Mearns, Hope and Reader (2006) provide information on the frequency but not the intensity of participation. Therefore, due to the inconsistencies in the scale items, it is difficult to determine from the data provided by the four studies, whether there was a decline or an improvement in UK offshore workers’ physical activity participation between the years 1996 and 2006. Nonetheless, the conclusions of the four studies consistently point to a low uptake of physical activity among that population.

Data from other included studies suggest that the low participation in physical activity is not limited to the UK offshore population as studies conducted in other parts of the world found similar patterns among the Norwegian, Chinese and Nigerian offshore population. A mixed methods study carried out by Oshaug, Ostgård, & Trygg (1992) in the Norwegian sector of the North Sea revealed that only one third of the workers exercised. Similarly, an exploration of the relationship between occupational stress, social support and health related behaviours among 561 offshore oilfield workers of a Chinese state-owned oil company revealed that 63.1% of them were physically inactive in their leisure time (Chen, Wong, and Yu, 2008). Both studies show that only about one third of the Norwegian and Chinese offshore population exercised.

The results of the Iwot (2009) study on coronary heart disease risk factor prevalence among offshore and onshore workers in Nigeria revealed that only 30% of the offshore workers participated in exercise for at least 3 days a week. This is similar to the findings made by Mearns, Hope and Reader (2006) among the UK population. Iwot (2009) also found that 56.4% of the study participants engaged in physical activity for less than 3 days a week, while 13.6% did not engage in it at all. The above available evidence highlights that the issue of low participation in physical activity affects offshore oilfield workers in the European, Asian and African continents.

However, the Gibson Smith (2016) study on promoting and implementing self-care among offshore workers and remote healthcare practitioners revealed that 71% of the participants achieved the recommended moderate-to-vigorous physical activity guidelines. The study further showed that the participants engaged more in physical activity when onshore than when offshore. Also, a subsequent study of health, self-care, quality of life and mental wellbeing carried out by Gibson Smith et al. (2018a) and which sampled 352 offshore workers attending a course at a training facility in Scotland, found that the participants had a comparatively higher level of physical activity than had previously been estimated in the offshore workforce as 70.7% of them adhered to the guidelines for physical activity. However, Gibson Smith et al. (2018a) advise that the results of the study should be interpreted with caution since a large percentage of the participants did not achieve the moderate to vigorous physical activity guidelines.

Additionally, seven of the nine studies reviewed in the preceding paragraphs provide evidence of a general pattern of physical inactivity among offshore oilfield workers. It is worth noting that seven (77.7%) of them utilised a quantitative research design in

their enquiry. Krefting (1991) and Faltermaier (1997) argue that to effectively generate a vivid understanding of behaviours, enquiries into them should take into account the contexts of the behaviours, as well as the individual's social world. However, unlike the qualitative research design, the quantitative design does not allow that (Darlaston-Jones, 2007). Therefore, by not considering the contexts of their participants' physical activity, by not providing a lens into the subjects' social world, and by restricting access to their subjective and multiple experiences of the behaviour, these quantitative studies do not adequately capture offshore oilfield workers' physical activity and thus do not contain the elements needed to ensure a deeper understanding of the behaviour.

In the light of the evidence linking physical inactivity with overweight and obesity (Yoshioka et al., 2005), occupational injuries and disorders (Chau et al., 2004), impaired balance (Kong et al., 2012), some of the studies included in the present research have highlighted the existence of negative health and safety outcomes of physical inactivity among the population. For instance, the study by Riethmeister et al. (2015) on future healthy aging at work links the decreased fitness levels among offshore workers in the Dutch continental shelf to physical inactivity. Additionally, Gibson Smith (2016), Gibson Smith et al (2018a) and Gibson Smith et al. (2018b) all identify physical activity as a behaviour of concern among offshore oilfield workers and which needs improvement.

2.4.1 Factors That Influence Offshore Workers' Physical Activity

The studies included in the review suggest that several factors influence offshore oilfield workers' physical activity. They include stress, exercise facilities, organisational culture, social support, as well as factors related to goal and target setting,

weather, time management, and associating physical activity with positive health outcomes. These are examined in the following sections.

2.4.1.1 Stress

Stress is recognised as a determinant of physical activity among the offshore population. Due to the twenty-four-hour continuous mode of operation and the twelve-hour shift work pattern adopted on oilfield installations (Collinson, 1998), offshore oilfield work is generally regarded as stressful (Chen, Wong, and Yu, 2008). The stress from long working hours can be exacerbated by inherent stressors in the offshore physical work environment (Parkes, 2010) such as noise, vibration, inadequate ventilation, confined living accommodation and adverse weather conditions which can result in vessel motion and sea-sickness (Parkes, 2007; Parkes, 2010; Chen, et al. 2003; Gibson Smith, 2016).

Evidence from three of the included studies points to stress as a determinant of physical activity among offshore workers while two other included studies only allude to that evidence. Light and Gibson (1986) found that UK offshore oilfield workers were often too tired to participate in any form of leisure time physical activity after a 12-hour work shift. Also, the study by Mearns and Hope (2005) revealed that 43% of UK offshore workers who do not exercise indicated that they were too tired after work to use the gym. The study concluded that the most common reason for non-participation in physical activity among offshore workers was being too tired after work. Additionally, Gibson Smith (2016) found that tiredness and stress reduce the likelihood of engaging in physical activity while studies by Chen, Wong, and Yu (2008) and Parkes (1998) also associate stress with physical activity among offshore workers, although Chen, Wong, and Yu (2008) acknowledge that the findings of their study may have been

biased by their use of self-administered questionnaire as a data collection method, suggesting that the findings should be taken with caution.

The above studies by Light and Gibson (1986), Mearns and Hope (2005), Chen, Wong, Yu (2008), Parkes (1998) and Gibson Smith (2016) are congruent regarding the association between stress and physical activity among the offshore oilfield population. Nonetheless, there are inconsistencies in the findings of studies among the non-offshore population, as regards the relationship between the two phenomena. For instance, while a systematic review of prospective studies investigating the influence of stress on physical activity (Stults-Kolehmainen and Sinha, 2014) shows that the majority of the included studies (76.4 %) associate stress with reduced physical activity, Wu and Porell (2000) found a link between the two phenomena for only white-collar workers but not for blue-collar workers. Also, studies by Steptoe, Lipsey and Wardle (1998) and Ali and Lindstrom (2006) found no association between stress and physical activity.

The limited number of studies that have explored the relationship between stress and physical activity among the offshore population, the methodological concerns over the Chen, Wong, and Yu (2008) study and, the inconsistencies in the findings of the studies on the non-offshore population suggest that there is need for more studies to further explore the relationship between stress and physical activity among the offshore population.

2.4.1.2 Exercise Facilities

Abundant evidence suggests that availability and quality of exercise facilities influence workers' engagement in physical activity generally (Geving et al., 2007). For instance, in their survey which involved 987 employed adults in six North Carolina counties, USA, Lucove, Huston and Evenson, (2007) found that on-site fitness facility at work is a critical determinant of physical activity participation among the participants. However, presently, the evidence available on the relationship between exercise facilities and physical activity among offshore oilfield workers is limited. The search for literature carried out for this study found only four studies that explored the relationship between the phenomena, among that population. They are the Sutherland and Cooper (1996) study on stress prevention in the offshore oil and gas exploration and production industry, the Mearns and Hope (2005) study which examined health behaviours and health management practices on offshore installations in the UK continental shelf, the Gibson Smith (2016) study on promoting and implementing self-care among offshore workers and remote healthcare practitioners and, the Gibson Smith et al. (2018b) study on selfcare behaviours perceived to require behaviour change among the offshore workforce.

Both Sutherland and Cooper (1996) and Mearns and Hope (2005) found that UK offshore oilfield workers' participation in physical activity is adversely affected by inadequate or poor gym facilities. Later studies by Gibson Smith (2016) and Gibson Smith et al. (2018b) also reveal that lack of or inadequate exercise facilities offshore can negatively impact the willingness to engage in physical activity. Interestingly, none of the four studies discussed the pathways through which inadequate exercise facilities affects physical activity participation. This highlights the need for further studies, to

broaden the evidence base on the relationship between exercise facilities and engagement in physical activity among the offshore oilfield population.

2.4.1.3 Organisational Culture

Organisational and national cultures play a modulating effect on offshore oilfield workers' physical activity. Evidence from four of the included studies suggest that offshore oilfield workers' engagement in physical activity is influenced by offshore organisational culture. For instance, the study carried out by Collinson (1998) found that the organisational culture on UK offshore oilfield installations creates inequalities between contractor and operator employees with respect to access to offshore recreation facilities like the gyms. Operator employees are granted more and easier access to the facilities than their colleagues who are employed by the contractor companies. This discourages the contractor employees from engaging in physical activity as much as they would like to and sometimes, dissuades them from participating in it at all. The Collinson (1998) study as well as another enquiry by Gibson Smith (2016) also reveal that offshore oilfield organisational culture creates a gendered environment. Due to the macho work mentality among the workers (Riethmeister et al., 2015) most of whom are males (Collinson, 1998), the gyms on the facilities are often perceived to be exclusively for males. As a result, the female crew members often do not feel comfortable going to the gyms and this negatively impacts their participation in physical activity while offshore.

Furthermore, Chen, Wong, and Yu (2008) found that physical inactivity is significantly positively associated with perceived stress from elements of the offshore organisational culture, including high job demand, long working hours and shift work. Gibson Smith

(2016) and Gibson Smith et al. (2018b) identified environmental context as one of the factors that influence offshore workers' health behaviours. Although both studies make no direct reference to offshore organisational culture as a determinant of physical activity participation, evidence suggests that high job demand, stress and other elements of the offshore work environment and context referred to by Gibson Smith (2016) and Gibson Smith et al. (2018b) are outcomes of the offshore organisational culture (Collinson, 1998; Chen, Wong, and Yu, 2008). Therefore, it could be argued that acting through the elements within the offshore work environment, offshore organisational culture indirectly influences offshore workers' physical activity.

It is noteworthy that while the findings of the above studies suggest that offshore organisational culture is linked to physical activity, the existing studies neither identify nor link national culture to physical activity among offshore workers and there is presently no research evidence on that aspect of the population's physical activity. Although Iwot (2009) argues that leisure time physical activity is not conventional in Africa and in so doing alludes to the relationship between African national cultures and engagement in physical activity, the study neither makes a reference to nor discusses the association between national culture and physical activity among the Nigerian offshore population.

Interestingly, evidence from studies carried out on the public suggests that national culture is a critical determinant of physical activity (Swierad, Vartanian and King, 2017). For example, Warbrick, Wilson and Boulton (2016) found that national culture influences men's physical activity among the Maori indigenous people of New Zealand, as the cultural responsibilities of being a father, husband, and provider prevents them

from being physically active. Additionally, studies by Al-Nakeeb et al. (2002) and Al-Hazaa (2018) also attribute the low physical activity among Saudi youths and females to cultural barriers. The above evidence suggests that there is an urgent need for enquiries focusing on national culture and physical activity among offshore workers. Such a study will close the existing knowledge gap in that area. One of the objectives of the present study was to address that gap in knowledge by exploring the cultural factors that underpin the physical activity of Nigerian offshore oilfield workers.

2.4.1.4 Social Support

Evidence from the included studies carried out in the UK and Dutch continental shelf, as well as in China, demonstrates that offshore worker physical activity is also influenced by the level of social support. In their cross-sectional survey carried out among 1, 928 workers sampled from 31 UK offshore installations, Mearns and Hope (2005) utilised a standardized scale to measure the social support for healthy behaviours among the sample population. The scale was piloted and then modified to suit the offshore environment and, the study revealed that social support from work colleagues helps to improve health behaviours. The findings also show that participants on the installations with high management commitment and investment in health promotion had higher levels of perceived social support from their colleagues, compared to other participants. Although Mearns and Hope (2005) make no connection between management commitment and investment in health and physical activity, the above finding suggests that there is a link between the two phenomena, considering that the elevated perceived social support due to management commitment and investment can potentially result in enhanced engagement in physical activity.

The findings of later studies by Gibson Smith (2016) and Gibson Smith et al. (2018b) associate social influence and support with increased engagement in physical activity, thus confirming the findings of the earlier study by Mearns and Hope (2005). However, Gibson Smith et al. (2018b) found that some workers who do not like to exercise in a group may find some gym goers intimidating and that could negatively impact their willingness to go to the gym.

Two other included studies carried out in the Dutch continental shelf and China made similar findings. Commenting on the findings of their study, Riethmeister et al., (2015) argue that as offshore work locations are remote and the workers are often away from their families for extended periods of time, they tend to form strong social ties amongst themselves, influencing and supporting each other as they work, eat and live together. The Chen, Wong, and Yu (2008) study found a significant positive association between physical inactivity and lack of emotional support from colleagues and friends. They aver that offshore workers who received higher social support from their supervisors, colleagues and friends engaged in more physical exercise than their colleagues with no social support.

The included studies suggest that offshore workers provide the needed social support to their colleagues through several means, including by encouraging, motivating and providing positive feedback on their physical activity efforts, by participating in physically activity themselves thus proving to be good role models and, by avoiding ridiculing anyone that fails to meet their physical activity targets (Mearns, Hope & Reader, 2006; Gibson Smith, 2016).

2.4.1.5 Other Determinants of Physical Activity.

Existing studies have identified other factors that may influence the offshore population's engagement in physical activity. These include time management and, goal and target setting. For example, Gibson Smith (2016) found that when workers managed their time well and/or set goals associated with exercising, they were able to improve their physical activity participation. Furthermore, associating physical activity with positive health outcomes was identified as a driver for improved engagement in physical activity (Gibson Smith, 2016) while weather conditions were also found to be associated with physical activity among the offshore population (Riethmeister et al., 2015; Gibson Smith, 2016).

2.5 Eating Habits

The reviewed literature shows that food and nutrition are major health and safety concerns on offshore oilfield installations (Riethmeister et al., 2015) and that there is significant unhealthy eating among the population. Oshaug, Ostgard and Trygg (1992) and Mearns and Fenn (1994) found overeating, high intake of meat, fat and cholesterol, fruit juices, soft drinks, non-alcoholic beer, and too little fibre among the workers. Interestingly, despite the above findings, Oshaug, Ostgård and Trygg (1992) noted that many of the Norwegian study participants indicated that they ate more healthily offshore than when onshore. Conversely, Horsley and MacKenzie's (1997) found that more workers on North Sea oil installations consider their onshore diet healthier than their offshore diet and the study by Gibson Smith et al. (2016) revealed that only 49.9% of the respondents achieved five-a-day fruit and vegetable guidelines while 50.1% did not.

Evidence from the included studies links unhealthy eating with overweight and obesity, among offshore workers, highlighting the urgent need for a change in the population’s eating habits (Gibson Smith et al., 2018b). For instance, Ostgard (1990) found that 30% of the workers in the Norwegian sector of the North Sea were overweight and the Light and Gibson (1986) study on the percentage of body fat and prevalence of obesity in a UK offshore population revealed a prevalence of overweight in that population, compared to the age-matched onshore population, as shown in table 5 below.

Table 5: Prevalence of Overweight Among UK Offshore and Age-matched Onshore Population as found by Light and Gibson (1986)

Age Group	Prevalence of Overweight Among the UK Offshore Population	Prevalence of Overweight Among the UK Age-matched Onshore Population
20-29 years	31.6%,	26%,
30-39 years	50%	40%
40-49 years	66.2%	50%

Overweight and obesity among the offshore population appear to be on the increase as the findings of some of the included studies conducted years later suggest that there was a progressive increase in the body weight of the workers between the years 1984 and 2009. For instance, a survey carried out in 2005 showed that the average body weight of UK offshore male passengers had increased from 79.4kg to 87.6kg between 1984 and 2005 (Civil Aviation Authority, 2011). This represents a 10.3% increase. However, another study involving 3D Scanning of 210 male UK offshore workers revealed that there was actually a 19% increase in the weight of male UK offshore workers between 1985 and 2009 (Stewart et al., 2015). The study also found that the participants of the 2015 study were an average of 2.02 kg heavier than the 2009 UK offshore population,

as well as larger than the UK and reference United States populations, further confirming the increasing trend of overweight and obesity among UK offshore workers.

The findings of an included study by Parkes (2003) which examined Body Mass Index (BMI) levels in a sample of UK offshore personnel appear to be incongruent with the above evidence. Parkes (2003) argues that Body Mass Index (BMI) in the offshore population had remained stable between the years 1984 and 1995 and that this was due to increased emphasis on health promotion, especially among UK and Norwegian offshore oilfield workers. If Parkes' (2003) assertions were true, the reported heightened health promotion efforts should have expectedly resulted in a downward trend in the levels of overweight and obesity among the offshore population in the years beyond 1995. Available evidence suggests the contrary. For example, 67% of the respondents to a study of UK offshore workers conducted by Mearns, Hope and Reader (2006) were classified as overweight or obese. The results of later studies carried out by Iwot (2009), Riethmeister et al. (2015) and Gibson Smith (2016) made similar and even worse findings. For instance, Riethmeister et al. (2015) found that 67% (46% overweight and 21% obese) of the Dutch workers were either overweight or obese. This is similar to the findings made among the UK population by Mearns, Hope and Reader (2006).

The results of studies by Iwot (2009) and Gibson Smith (2016) are even more dire. While 81% (56% overweight and 25% obese) of the participants of the Iwot (2009) study among Nigerian offshore and onshore workers were either overweight or obese, the Gibson Smith (2016) study revealed that 73.8% of the participants were above the normal weight. This indicates that rather than remain stable as suggested by Parkes

(2003), overweight and obesity are on the increase among the offshore oilfield population.

The outcomes of unhealthy eating among the offshore population go beyond overweight and obesity as Parkes (1998) associates high BMI with accidents and injuries at work. Work spaces and access ways on offshore facilities are often confined and restricted in size (Ledingham and Stewart, 2013; Chau et al., 2008). As evidence from the included studies points to an increasing trend in the body weight of offshore workers over time (Civil Aviation Authority, 2011; Stewart et al. 2015), some of the studies have highlighted the negative safety and health outcomes of that trend. For example, Stewart et al. (2015) argue that offshore workers who become overweight or obese run the risk of having the clearance access between them and the offshore equipment or facilities reduced, due to their abnormal body size. This places such workers at risk of contact with moving machinery, hot surfaces and other physical hazards, while working in or passing through the facilities, thus resulting in serious accidents. Additionally, the study by Stewart et al. (2015) also reveals that two randomly selected UK offshore workers are 28% and 34% less likely to pass face-to-face and face-to-side respectively within a restricted space of 100 cm and 80 cm compared to other UK adults. This suggests that overweight or obese workers will likely not be able to pass each other through the offshore facility access ways within the required time frame, during emergencies that may require immediate and urgent evacuation of personnel, thus highlighting another negative outcome of unhealthy eating among the offshore population.

Stewart et al. (2015) also found that overweight and obese individuals may find it difficult to fit into normal seats on helicopters, life boats and life rafts. The implication

of this is that even when such individuals succeed in passing through the restricted access ways, they will struggle to fit into offshore evacuation and life-saving vessels such as life boats and life rafts. Mearns and Fenn (1994) argue that during emergencies, the health and fitness of the workers is very important and could determine whether or not they survive or succumb to the emergency situation. Therefore, when workers are not able to fit into evacuation vessels, they delay or even jeopardise emergency response arrangements, thus putting both themselves and their colleagues at risk. The following sections discuss some of the factors that influence offshore oilfield workers' eating habits.

2.5.1 Factors That Influence Offshore Workers' Eating Habits

The research evidence reviewed suggests that offshore oilfield workers' eating habits are influenced by several factors which include culture, work environment, access to food, food portion control, social environment, and nutritional knowledge.

2.5.1.1 Culture

Organisational culture can exert influence on workers' eating habits. Collinson (1998) argues that there is a work culture of continuous production on offshore oil installations as operations are run on a twenty-four-hour basis, thus requiring most people to work 12-hour shifts. Some of the included studies conducted by Riethmeister et al. (2015), Oshaug, Ostgård, & Trygg (1992), and Ulleberg and Rundmo (1997) among Dutch and Norwegian offshore workers reveal that as a result of the work culture of twenty-four-hour continuous operations, offshore oilfield work is characterised by long shifts, high work demand, stress, and exhaustion. Gibson Smith (2016) identified that offshore environmental stressors increase the likelihood of unhealthy eating among the workers

while also highlighting that other organisational factors like financial constraints resulting from industry downturn may negatively affect health promotion and consequently engagement in healthy behaviours.

Furthermore, Booth et al. (2001) and Shepherd (1999) argue that dietary and physical activity behaviours are influenced by personal life experiences, learned values and beliefs, as well as ethnic and cultural identity. This suggests that national culture can influence an individual's dietary behaviour. Although none of the included studies examined or explored the influence of national culture on offshore workers' eating habits, Riethmeister et al. (2015) alluded to that influence while commenting on the weight difference between the UK and Dutch offshore workers. Studies carried out by Riethmeister et al. (2015) and Parkes et al. (2002) respectively, found that 46 % of offshore workers in the Dutch continental shelf were overweight and 21 were % obese while 47% of the British workers were overweight and 8% were obese. This suggests that the Dutch offshore workers were heavier and more obese than their British counterparts. Riethmeister et al. (2015) suggests that culture could be one of the reasons for the difference in weight between the two offshore worker groups, thus lending support to the argument by Booth et al. (2001) and Shepherd (1999).

The influence of national culture on eating habits is also brought out by the nuance in the perceptions of diet and catering quality between the Norwegian and UK offshore oilfield workers, as shown by two of the included studies. While the study by Oshaug, Ostgard and Trygg (1992) shows that oil workers in the Norwegian sector of the North Sea perceived their offshore diets to be healthier when compared to their home diets, Mearns and Hope (2005) on the other hand found that the UK offshore workers

considered their onshore diet significantly healthier. The studies did not capture the reasons for the differences in the perceptions and feelings of the two worker groups about diet and catering quality on their offshore installations. Therefore, nothing is known about the national cultural underpinnings of the nuanced perceptions. However, considering the argument made by Booth et al. (2001) and Shepherd (1999) on the influence of national culture on dietary behaviours, the nuanced perceptions could be attributed to cultural differences. This further highlights the need for the relationship between national culture and offshore oilfield workers' eating habits to be explored.

2.5.1.2 Work Environment

The included studies suggest that offshore oilfield workers' eating habits are also impacted by the work environment. For instance, the survey of 1037 medical assessments of fitness-to-work carried out in an offshore oil company based in the United Arab Emirates (UAE) showed that obesity levels among the offshore workers differed according to their nationalities. This reflected the different ethnic dispositions to obesity. Interestingly, in all cases, the levels among each of the worker nationalities in the survey were higher than the average adult prevalence of obesity in the workers' respective countries (Newson-Smith, 2010). The study found that the workers from Pakistan had obesity level of 13.2% as opposed to a value of 4% for Pakistani adult males while the Philipino workers had an obesity value of 7.9% as against a national value of 1.1% for adult males. Additionally, the Egyptian offshore workers in the UAE had a level of 27% against an average national obesity level of around 22% and the workers from India had a value of 6.3% as opposed to a national value of 1% for males, although this was up to 4% in the Punjab area of the country. The difference in the obesity levels between each worker nationality and the equivalent reference adult male

population in their respective countries suggests that overweight, obesity and eating habits among the workers are likely influenced by elements within the offshore work environment.

One of the environmental factors that influence offshore workers' eating habits is the marine nature of the environment. The included study by Riethmeister et al. (2015) indicates that due to the nature of the environment and bad weather condition, vessel motion is constantly present on the facilities. Gibson Smith (2016) also identified weather conditions as one of the determinants of the offshore oilfield population's eating behaviours. Although none of the included studies explored the influence of the constant motion on the workers' eating habits, Lackner (2014) and Bos et al. (2007) argue that the constant movement of offshore vessels often results in sea sickness to the workers, with consequent health outcomes like nausea and vomiting, which interrupt and adversely affect their food consumption.

Another environmental factor identified by the included studies as impacting the population's eating habits is the cramped and limited spaces on the facilities which give rise to restriction of movements. Collinson (1998) found that due to the restricted movement, workers are often confined to their accommodation areas after work, leading to high levels of boredom among them. Furthermore, studies by Gibson Smith (2016) and Gibson Smith et al. (2018b) found that boredom was associated with increased likelihood of eating unhealthily among offshore oilfield workers. Therefore, in an effort to cope with boredom, the workers resort to eating in-between meals.

The cramped offshore work and living environment can also result in the workers seeing food regularly and this can encourage unhealthy eating. To date, no study has explored

the influence of regular sight of food on offshore oilfield workers' eating habits. However, in their study of the environmental factors that increase the food intake and consumption volume of unknowing consumers, Wansink (2004) found that regular sight of food creates a longing for food and triggers meal initiation, even when one is not hungry. This suggests that offshore workers' eating habits may be influenced by the constant sight of food occasioned by the cramped and limited space on the facilities. Therefore, to better understand the association between the two phenomena among offshore workers, further studies focusing on that population are required.

2.5.1.3 Easy Access to Food and Lack of Food Portion Control

Evidence suggests that offshore workers' eating habits are also influenced by easy access to food and lack of food portion size control on the facilities. The included studies by Oshaug et al. (1995), Oshaug, Ostgard and Trygg (1992), Horsley and MacKenzie (1997) and Parkes (2003) indicate that a substantial amount of food is readily available on the Norwegian and UK offshore installations, with large buffet meals provided every 6 hours round the clock and snacks also readily available and accessible at all times. Evidence suggests that this fuels the longing for food among the workers, thus impacting their eating habits. For example, Ostgard (1990) found that due to the abundant quantity and variety of food on Norwegian offshore facilities, the workers are under pressure to overeat. Additionally, in their study on the percentage of body fat and prevalence of obesity among UK oilfield population, Light and Gibson (1986) found that the constant availability of food on the facilities induces over-eating among the population. Furthermore, Mearns and Hope (2005) attributed the unhealthy eating among workers in the UK continental shelf to excess availability of food, among other factors. Studies by Riethmeister et al. (2015) and Gibson Smith (2016) also reveal that

the abundance of unhealthy food on offshore facilities encourages unhealthy eating by the workers.

Furthermore, Parkes (2003) found that large amounts of food are served on UK North Sea offshore installations and Light and Gibson (1986) revealed that there is no control on the food portion size. This contributes to unhealthy eating among the population (Gibson Smith, 2016) and is made worse by the absence of individual self-control among the workers, as highlighted by Horsley and MacKenzie (1997) and Gibson Smith (2016). Although the above studies do not explore that identified link between food portion control and unhealthy eating, some studies conducted outside the offshore environment have done so, thus reinforcing the implications of lack of food portion control for offshore workers' eating behaviour. For example, Rolls, Morris, and Roe (2002) found that larger food portions resulted in greater energy intake, irrespective of the serving method. Nonetheless, there are inconsistencies in the findings of the studies as another study by Edelman et al. (1986) which examined the effects of changes in portion size and social condition on food intake of normal-weight and overweight men and women found that while the overweight subjects ate more than their normal-weight colleagues, changes in food portion size did not yield any significant effects on food intake. The existence of the possibility that food portion size influences offshore workers' eating habits and the inconsistencies in the findings of existing studies outside the offshore environment highlight the need for the exploration of the relationship between food portion size and eating habits among the offshore oilfield population.

2.5.1.4 Social Environment

Some studies included in this enquiry highlight the influence of social environment on offshore workers' eating habits. For example, Gibson Smith (2016) and Gibson Smith et al. (2018b) found that social influences are one of the determinants of the workers' eating habits. The studies suggest that more often, social environment has a negative impact rather than a positive one, on the workers' eating behaviours, as they are often under pressure from their colleagues to engage in unhealthy eating. The impact of the offshore social environment is further highlighted by Riethmeister et al. (2015) who argue that due to the remoteness of offshore work locations, the workers form social bonds amongst themselves, influencing each other's eating habits as they eat and live together. Also, considering that offshore work is arduous (Gatlin and Alvarez, 1987) and most of the workers work twelve-hour shifts, occasions for relaxation and social activities are limited. Evidence from the included studies shows that one of such few occasions is meal times (Riethmeister et al., 2015; Light & Gibson, 1986) during which the workers tend to indulge in unrestrained eating (Parkes, 2003) and some use it as a coping mechanism for stress and boredom (Mearns and Hope, 2005; Gibson-Smith, 2016).

2.5.1.5 Nutritional Knowledge and Control Over Food Preparation

The included studies by Oshaug et al., (1995), Parkes (2003), Gibson Smith (2016) and Gibson-Smith et al. (2018) highlight an association between nutritional knowledge and healthy eating. For example, the participants to the Gibson Smith (2016) study pointed out that workers lack information on the nutritional contents of foods prepared offshore and suggested that increasing knowledge on what foods are healthy will enhance positive eating behaviour among the population. The study also revealed that the

participants are likely to make healthy food choices if they had control over what foods are prepared on the facilities.

2.5.1.6 Other Determinants of Offshore Workers' Eating Habits

The included study by Gibson Smith (2016) on promoting and implementing selfcare revealed that having predetermined goals, knowledge of the negative outcomes of unhealthy eating and, having the will power to eat healthily can also encourage healthy eating. For instance, the participants indicated that setting goals and targets related to physical activity helped them to eat healthily.

2.6 Chapter Summary

Twenty-two studies were included in this review of literature. The review revealed a low uptake of physical activity and significant unhealthy eating among offshore oilfield workers. The included studies also show that the unhealthy eating and physical inactivity have resulted in decreased fitness levels, overweight and obesity, and increased risk of accidents among the population. They further reveal that emergency response arrangements on offshore oilfield facilities could be compromised due to outcomes of unhealthy eating, thus highlighting the need for change in the population's dietary and physical activity behaviours (Gibson Smith et al., 2018b).

Additionally, the review has shown that offshore oilfield workers' physical activity is underpinned by environmental factors such as stress, exercise facilities, organizational culture and social support, while their eating habits are determined by several factors which include organisational culture, work environment, free access to abundant food, nutritional knowledge and, the offshore social environment.

This literature review has identified significant gaps in the existing literature on offshore oilfield workers' eating habits and physical activity. First, none of the existing studies identified, explored or discussed national culture as a determinant of offshore oilfield workers' eating habits and physical activity, although overwhelming evidence from outside the offshore environment suggests that dietary and physical activity behaviours are influenced by national culture (Booth et al., 2001; Shepherd, 1999). Also, no study has identified the relationship between offshore physical space limitations, the size of the canteens and offshore oilfield workers' eating habits. Therefore, there is a lack of evidence on those aspects of offshore oilfield population's eating habits and physical activity. Without the present study, they may have remained unnoticed and unexplored.

Additionally, the literature review has revealed that only one (4.5%) of the twenty-two included studies was conducted in Nigeria. Even so, that study leaves some critical knowledge gaps in its coverage of Nigerian offshore oilfield workers' eating habits and physical activity in that it did not focus primarily on the two behaviours but rather, on the risk factors for coronary heart diseases among both the onshore and offshore population. Therefore, its enquiry into the behaviours is not deep seated. Also, the study did not explore or discuss the factors that determine the Nigerian offshore oilfield workers' eating habits and physical activity and as such, it does not elicit an appreciation of the underpins of the behaviours. In recognition of the shortcomings of the study, Iwot (2009, p.25) states that it "constitutes an overview, which introduces the need for more in-depth study, especially into more details of lifestyle, particularly diet and exercise". The present enquiry provides the details that Iwot (2009) called for.

In furtherance, most (63%) of the included studies, including the one by Iwot study (2009) which was carried out in Nigeria, utilised the quantitative research design which focuses on objective realities without taking into account the participant's social world (Darlaston-Jones, 2007). Therefore, they do not provide any insight into the specific social and cultural contexts within which the population's eating habits and physical activity are situated. Consequently, they do not allow a deeper understanding of the behaviours. Also, although theory is a very critical aspect of research study since it undergirds and gives it direction (Rasmussen, 2017), only four of the twenty- two included studies are underpinned by a theoretical framework.

Evidence demonstrates that an individual's perception of healthy eating can influence their eating habit (Paquette, 2005). However, none of the included studies explored or captured offshore oilfield worker's perception of the construct 'healthy eating'. The only effort towards this focused on the population's perception of good food and was made by Ostgard (1990) over three decades ago. An understanding of how the population perceives healthy eating will give an insight into the motivations that drive their identified eating patterns. Therefore, the absence of such a critical piece of knowledge on the offshore oilfield workers' dietary behaviour represents a gap that needs to be closed and the present study aimed to achieve that.

CHAPTER 3: METHODOLOGY

This chapter first presents the reasons for my adoption of a qualitative research design for this study which bridges the identified gaps in knowledge, as highlighted in chapter 2 of this thesis. It also lays out the underpinning philosophical perspectives and the theoretical approach of the study, followed by a section outlining the data collection and analysis strategy.

3.1 Philosophical paradigms

There are various philosophical paradigms that influence research (Vasilachis, 2009) and every paradigm is premised upon ontological and epistemological assumptions (Scotland, 2012). Ontology is concerned with the essence and nature of reality, while epistemology is concerned with how knowledge is acquired, that is, how we know what we know (Goduka, 2012; Levers, 2013). Relating the philosophical assumptions of a research to its methods is critical to achieving a meaningful inquiry (Darlaston-Jones, 2007). Therefore, it is important that researchers identify and make clear their philosophical worldviews very early in the research process (Creswell, 2014a). The philosophical worldview that underpins the present enquiry is examined in section 3.1.2. However, to put that worldview into perspective, some of the other existing philosophical paradigms are discussed in section 3.1.1.

3.1.1 Some Existing Philosophical Paradigms

This section discusses four of the existing philosophical paradigms namely positivism, post-positivism, interpretivism, and pragmatism

3.1.1.1 Positivism

Positivism holds the stance that reality exists independently of the researcher and is discoverable. Therefore, the researcher and the researched are independent entities with the aim of the researcher being to discover absolute reality in a value neutral way (Scotland, 2012). Researchers that hold this worldview often utilise quantitative research methods (Allsop, 2013), relying on empirical data collected through direct experience and observation (Scotland, 2012).

3.1.1.2 Post-positivism

Post-positivism emerged from positivism and both have similar ontological and epistemological beliefs (Scotland, 2012). Creswell (2009, p.7) argues that this worldview “is also called positivist/post-positivist research”. However, post-positivists challenge the notion of absolute truth of knowledge as held by positivism (Phillips and Burbules, 2000, cited in Creswell, 2009) and argue that although truth and universal laws exist, it is near impossible to discover absolute truths through sciences (Levers, 2013) as evidence from research is always tentative and imperfect (Creswell (2009). Post-positivists utilise experimentation and correlational studies to understand causal relationships. However, they argue that to do that, more than empirical data is needed and participants’ perspectives should often be sought (Scotland, 2012).

3.1.1.3 Interpretivism

The interpretivist philosophical paradigm arose from a dissatisfaction with positivism and is often linked with qualitative research methods (Allsop, 2013). Researchers who hold this philosophical worldview argue that positivists are wrong to claim objectivity and the existence of social laws regarding the nature of social reality (Allsop, 2013).

Interpretivism has a subjective perspective and the context of a research is treated as unique and important (Alharahsheh and Pius, 2020). It focuses primarily on “understanding and accounting for the meaning of human experiences and actions” (Fossey et al., 2002, p. 720). Humans are considered different from physical phenomena and therefore not explored the same way as physical phenomena (Scotland, 2012).

3.1.1.4 Pragmatism

Pragmatism is not committed to any single system of philosophy or reality but rather focuses on the research problem and how to understand it using all available approaches. Although pragmatists believe in the existence of both an external world independent of the mind as well as that in the mind, they argue that questions about reality and the nature of laws are not necessary and should not be asked (Creswell, 2009). To the pragmatist, whatever works at the time constitutes truth. So, researchers are free to choose the research methods, techniques and procedures that will help them meet their needs and objectives rather than subscribe to only one way of doing research (Creswell, 2009).

3.1.2 The Philosophical Perspective of the Current Research

In carrying out this study, I adopted the moderate form of social constructionist philosophical worldview propagated by Gergen (2015) and other writers like him. Social constructionism is multidisciplinary in nature (Burr, 2003) and is concerned with how knowledge about reality is acquired. It believes that rather than being innately imprinted or created, our knowledge about reality is socially constructed as individuals engage in social processes with each other (Creswell, 2009) within their cultural and historical contexts. As Berger & Luckman (1966, p.15) put it, “all human 'knowledge'

is developed, transmitted and maintained in social situations”. Therefore, individuals have varying experiences of reality and multiple accounts of it, all of which are equally valid, depending on their contexts (Burr, 2003). To the social constructionist, knowledge is not based upon objective and unbiased observations of the world and therefore not a direct reflection of reality (Burr, 2003). This position is at variance with the positivist stance which sees reality as universal, quantifiable, and therefore identifiable through objective observation (Darlaston-Jones, 2007).

There are different views of social construction and several forms of social constructionism, each taking a different position on the relativism-realism ontological continuum (Elder-Vass, 2012 and Gergen, 2015). Elder-Vass (2012) identifies an extreme or radical form of social constructionism, as well as a moderate form. While the extreme form takes a relativist anti-realist stance and holds the position that everything is a social construction and there is nothing else we can know of the world, the moderate form of social constructionism posits that concepts correspond to something real in the world, although they are constructed rather than discovered. From the position of this later form of social constructionism, what we take to be reality is constructed from our relationships and interactions with others but “this is not to say that we should abandon all that we take to be real and good because it is socially constructed” (Gergen, 2015, p.20). Meaningful realities exist only because we socially construct.

Social constructionism has often been criticized for its view of knowledge as a social construction. For example, Elder-Vass (2012) argues that in holding this view, social constructionism erodes the reliability of all knowledge and ethical claim since it

provides no basis on which to make judgements about alternative constructions and no platform for the defence of our moral choices. This portrays social constructionists as moral relativists who “tolerate everything and stand for nothing” (Gergen, 2015, p. 258). I would associate Elder-Vass’s (2012) critique above with Craib’s (1997) argument that in holding the position that all accounts of truth are valid, social constructionism comfortably avoids having to defend one position against the other or to justify its position on anything. I would also argue that the assertion by Craib (1997) is not justified considering that Gergen (2015) and so many other social constructionists have often justified and defended their position. Equally flawed is Elder-Vass’s (2012) assertion that social constructionism provides no basis on which to make judgements. Social constructionists themselves do make judgements about alternative constructions but they neither characterise their judgements as objectively correct and their positions as supreme, nor do they discredit opposing arguments by comparing them with objective reality (Burningham & Cooper, 1999).

Additionally, Murphy et al. (1998) contend that holding the stance that all accounts of truth are legitimate and that there is no basis to prefer one against the other would mean that the conclusions of all research are equally legitimate. If this were true, there would be no need for quality assessment of research. Such a view puts social constructionism in a self-defeating position whereby its own claims of knowledge are eroded (Elder-Vass, 2012). Social constructionism is also often associated with an anti-realist relativist ontological perspective, the denial of knowledge as a direct reflection of reality and the refusal of the existence of objective reality (Craib, 1997; Burr, 2003). To ensure a fuller understanding of this argument, I consider it apt to provide a brief description of realism and relativism. Realism assumes the position that reality exists independent of the ways

we come to know or represent it. On the other hand, relativism argues that reality is inaccessible to us, if at all it exists. Relativists believe that we only have access to our various representations of the world and cannot verify the accuracy or truthfulness of these representations when they are judged against reality (Burr, 2003).

Craib's (1997) and Burr's (2003) arguments above associating social constructionism with an anti-realist position are misleading (Burningham & Cooper, 1999) as they are based on a misunderstanding of the underpinning philosophical considerations of social constructionism since it limits itself to how knowledge is acquired and makes no ontological claims about the nature of reality (Andrews, 2012). Social constructionists do not necessarily deny the existence of reality. Rather, they condemn the 'out there to be discovered' stand on reality (Burningham & Cooper, 1999) and aver that when people describe reality, they do so from a particular prism of understanding which may be different from other people's standpoints (Gergen, 2015). This is clearly brought out by Berger and Luckmann (1966) who hold that everyday life in itself is a reality but that that reality results from the subjective interpretations of people based on their socio-cultural formations. Therefore, taking a social constructionist position does not make one an opponent of every opinion associated with realism since one can believe that knowledge is constructed rather than created and still maintain that it corresponds to something real in the world (Andrews, 2012). To use Gergen's (2001, p.2) analogy, "The capacity to perform well at chess does not necessitate the exclusion of bridge or poker".

While being aware of the arguments put forward by critics of social construction, I recognise that all authoritative views of the world are subject to ideological critique

(Gergen, 2015). Therefore, I adopted the moderate social constructionist stance for this study due to its view that concepts exist as reality, although they are socially constructed rather than created, and that individuals have multiple and varied experiences of reality (Creswell, 2009). Taking this philosophical position on knowledge and reality allowed me to contextually situate offshore oilfield workers' eating habits and physical activity, and to look for the complexity of views and meanings on the two health behaviours, rather than narrowing meanings into a few categories. Therefore, in keeping with this philosophical stance, I propose that the constructs eating habit and physical activity exist in the real world and that offshore oilfield workers' subjective experiences, perceptions, views and meanings of them are constructed as the workers engage in social interactions, mediated by their cultural, work and historical environment.

3.2 Theoretical Perspectives

Like the philosophical perspectives of a research, theories and models are critical to the research process because they aid the planning, design and carrying out of research (Rasmussen, 2017). Although there is no agreement regarding the classification of health behaviour theories and models, Glanz, Rimer & Viswanath (2015) hold that they can be classified based on the level at which they seek to understand or predict behaviour. Thus, there are individual level behaviour theories which focus on individuals, such as the Theory of Planned Behaviour/Theory of Reasoned Action, the Health Belief Model, and the Transtheoretical Model (Brewer and Rimer, 2018). The following paragraph discusses the Theory of Planned Behaviour, as an example of individual level behaviour theories.

The Theory of Planned Behaviour has been used by researchers for predicting human social behaviour (Ajzen, 2011; Morris et al., 2012). The theory has at its core the prediction of intentions and posits that the performance of a behaviour is best predicted by the intention to perform that behaviour (Ajzen, 2011; Gulley & Boggs, 2014). In other words, intentions encapsulate the motivational factors that drive a person to engage in a behaviour and are an indicator of how hard the individual will try to perform that behaviour. Therefore, the stronger the intention, the more likely the individual will perform the behaviour (Ajzen, 1991). The TPB further postulates that intention is determined by attitude towards the behaviour, subjective norms and, perceived behavioural control (Plotnikoff et al. 2012). Despite its use, the Theory of Planned Behaviour has been criticised for lacking depth in its explanation of human behaviour (Ajzen, 2011). For example, Mullen, Hersey & Iverson (1987) argue that it is almost entirely rational and does not take adequate consideration of cognitive and affective processes (Ajzen, 2011). Furthermore, Aarts & Dijksterhuis (2000) argue that contrary to the assumptions of the TPB, some behaviours are performed automatically and are not subject to deliberate and conscious processes. Additionally, Morris et al. (2012) contend that the TPB focuses squarely on the individual as the locus of behaviour. Therefore, it could be argued that it is very much about using individual constructs as a vehicle for understanding and changing behaviour. In view of the numerous criticisms of the TPB, Sniehotta, Pesseau and Araújo-Soares (2014, p.4) assert that it has lost its utility and therefore “is no longer a plausible theory of behaviour or behaviour change and should be allowed to enjoy its well-deserved retirement”.

The theories discussed in the preceding paragraphs emphasise individual agency, knowledge, beliefs and self-concept. They hold that behaviour is the result of decisions

made solely by the individual, with little, if any, external influence (Morris, et al., 2012). However, evidence shows that health behaviours are influenced not just by individual factors, but by multiple factors, many of which are outside the control of the individual (Short & Mollborn, 2015). For example, an individual's socio-economic status may positively or negatively affect their ability to access the knowledge, resources and incentives needed to perform new behaviours (Kwasnicka et al., 2016; Short & Mollborn, 2015). This is illustrated by the findings of a study on income and health behaviours among Finish adults carried out by Laaksonen et al. (2003) and which found that men and women with less income smoked more and used vegetables less frequently while women with more income used alcohol more and engaged less in physical activity. Also, a systematic review of the relationship between socio-economic position and physical activity carried out by Gidlow et al. (2006) revealed that people at the top of the socio-economic strata engage more in leisure-time activity than those at the bottom. Therefore, health behaviour research that is based on theories that overemphasise individual choice and personal responsibility is not likely to identify the multi-level factors that undergird health behaviours. Such studies have been criticized in recent years for being narrow and for not recognising the broad contexts of health behaviours, including the social and economic backgrounds of such behaviours (Short and Mollborn, 2015).

There are also interpersonal theories that highlight the influence of social interactions and social experiences on people's health behaviours such as, the Social Cognitive Theory and the Social Network Theory (Viswanath, 2008). Such theories posit that behaviour is a product of complex inter-relationships and shared social practices, and that individuals engage in health behaviours dictated by the interactions and relationships

within their social networks (Morris et al., 2012). The social connections include their family members, friends, peers and work mates. Evidence shows that social connections do indeed exert influence on people's health behaviours (Short and Mollborn, 2015). For instance, a study conducted by Haas and Schaefer (2014) revealed that social influences were strongly associated with smoking uptake among adolescents. Also, Ashida, Wilkinson and Koehly (2012) found that social network influences encouraged Mexican-origin adults to eat more fruits and vegetables and, to engage in regular physical activity. However, while interpersonal factors are important, it is pertinent to point out that the concepts and constructs within interpersonal theories do not encapsulate the entire spectrum of factors that determine health behaviours. Therefore, health behaviour studies based solely on such theories tend to overlook some of the implicit determinants of health behaviours like culture, income and the physical environment. This has often led to disappointing research results and calls for the use of theories which factor in the multiple settings and contexts that shape health behaviours (Richard, Gauvin and Raine, 2011).

In support of such calls, Short & Mollborn (2015) argue that health behaviours are multidimensional and that an individual's lifestyle is determined not only by personal and inter-personal factors, but also by a variety of other factors and contexts, including the broader cultural and environmental factors (Norman and Conner, 2005). This is corroborated by existing research evidence. For example, in their study of the socio-cultural factors that influence food consumption patterns in the black African population in South Africa, Puoane et al. (2006) found that consumption of meat on a daily basis is associated with a high socio-economic status while serving someone fatty meat is a sign of generosity. They aver that these food practices are learned during socialisation

processes within the individual's culture and therefore linked eating habits to socio-cultural factors. Also, the Waterworth et al. (2015) study on the factors that influence health behaviours of indigenous Australians revealed that as a result of kinship system, there was a very strong cultural obligation to provide for one's kit and kin, regardless of one's own circumstances. Waterworth et al. (2015) argue that this placed enormous psychological, physical and financial demands upon the individual, thus affecting their ability to either participate in some health behaviours like physical activity or to access the resources needed to engage in the behaviours. No doubt, health behaviours are multi-dimensional and should be seen as so.

In recognition of the multi-dimensions of health behaviours, Watt (2005) argues that in order to better understand them, it is essential to comprehend the broader contexts which determine their patterns. Therefore, the individual and interpersonal level theories highlighted earlier are limited in scope in that they concentrate on specific levels of influence and do not capture the broader contexts which are necessary for a full comprehension of the patterns that underlie health behaviours. Although they are important to the study of health behaviours, their limited scope means that they do not provide the broader theoretical base needed to carry out the present study which explored the social, cultural and work-environment factors that underlie Nigerian offshore oilfield workers' eating habits and physical activity. Considering that these factors lie at different levels of influence on health behaviour, the study required the use of a multi-level, broad theoretical framework in order to meet its objectives.

Unlike the theories and models discussed in the preceding paragraphs, there are models which seek to understand or predict health behaviours from a broader perspective. These

are referred to as ecological models (Kothari et al., 2007). They are broad in scope and have multi-layered constructs that span across the individual, interpersonal, environmental levels (Glanz, Rimer & Viswanath, 2015). Also, they integrate the varied layers of influence on health behaviours and recognise the role of normative structures in the shaping of behaviour. Additionally, they highlight the complex interplay of personal, interpersonal, cultural and environmental factors in the determination of health behaviours (Short & Mollborn, 2015) and as a result, they enable the researcher to capture the multidimensional factors that underlie the behaviours. Therefore, they provide a better theoretical base for enquiry into and understanding of health behaviours (Sallis & Owen, 2015).

There are several ecological models of health behaviour (Sallis and Owen, 2015). However, for the theoretical framework of this study, I drew on the ‘Social Determinants of Health’, a socio-ecological model (Driscoll, Dotterrer & Brown II, 2013) developed by Dahlgren and Whitehead (1991) who used it to explain the inequalities and inequities in health. Short & Mollborn (2015, pp.78) argue that taking the “social determinants” approach to health behaviour research “shifts the lens from individual attribution and responsibility to societal organization and the myriad institutions, structures, inequalities, and ideologies undergirding health behaviours”. The model, shown as figure 5, integrates and emphasises multiple levels of influence. It highlights the main influences on health in four layers diagrammatically presented in the form of a rainbow (Jinks, Ong & O’Neill, 2010), with one layer on top of the other. The core of the model is made up of age, gender and the genetic makeup of each individual. These are fixed factors over which people have minimal control. Following this is the inner layer which consists of individual lifestyle choices (Dahlgren and

Whitehead, 1991), including behaviours such as physical activity and eating habit. This layer is enveloped by social and community networks and, living and working conditions (Popay et al., 1998), which constitute the second and third layers of the model. Finally, Socio-economic, cultural and environmental conditions constitute the fourth and outermost layer of the model (Dahlgren and Whitehead, 1991).

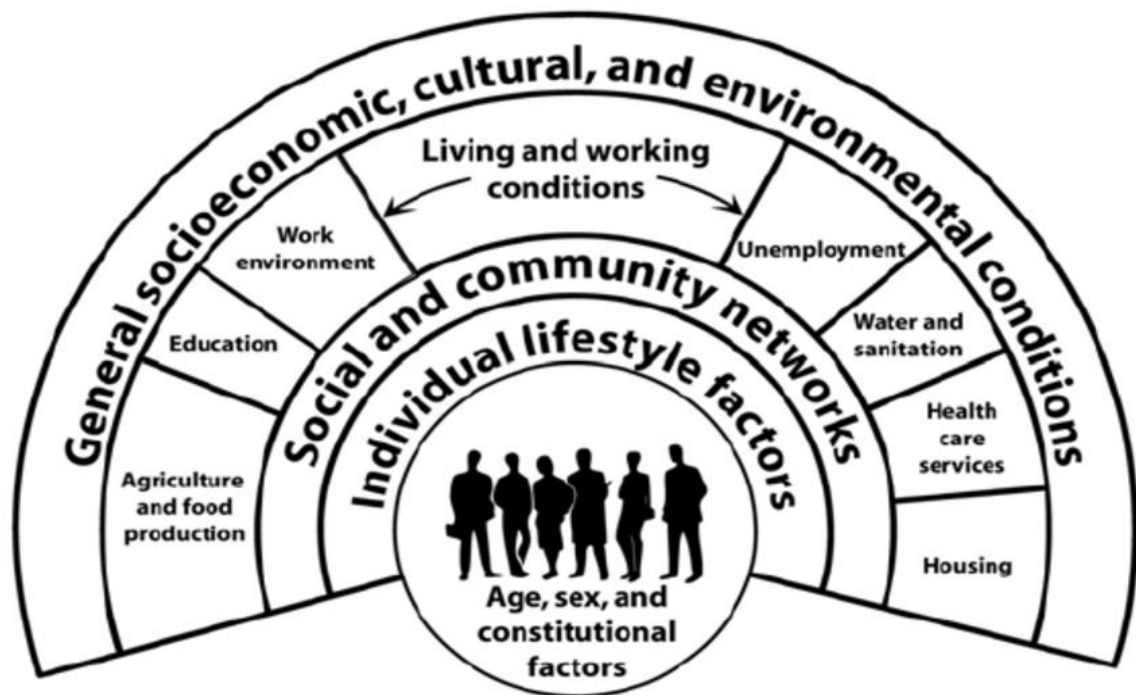


Figure 5: Dahlgren and Whitehead's Social Determinants of Health Model

Source: Dahlgren & Whitehead, 1991

The layers of the model interact both within and across each other (Agwu, 2014) and as Dahlgren and Whitehead (2006, p.21) argue, “individual lifestyles are embedded in social norms and networks, and in living and working conditions, which in turn are related to the wider socio-economic and cultural environment”. As individuals interact with their peers, family, work mates and immediate community members, the interactions influence and shape their personal health behaviours (Jinks, Ong & O’Neill, 2010). For instance, Chen, Wong, and Yu (2008) found that offshore workers who

received higher social support from their supervisors and friends engaged in more physical exercises. However, as highlighted in the preceding paragraphs, health behaviour is also determined by other factors. The outer layers of the model situate the social and community networks within a broader context of living and working conditions as well as, socio-economic, cultural, and environmental conditions, thus recognising them as influencers of health behaviour.

One other theory that is often used for health behaviour research is the Theoretical Domains Framework (TDF). Although the TDF can be used to investigate a wide range of behaviours in various healthcare settings, a principal drawback of the framework is that non-psychologists experience difficulty in operationalising it, considering that it is informed in part by psychological theories (Phillips et al., 2015). It has also been argued that the TDF is a descriptive framework rather than a theory in that it does not specify relationships between its domains (Francis, O'Connor and Curran, 2012) and, that an interview topic guide based on the framework is too focused, too constraining and therefore would lead participants to select only the views and opinions about the topic that fit into the framework (Francis, O'Connor and Curran, 2012). Other criticisms of the TDF include the perceived overlap of the domains which results in repetition and, the view by some that the framework is time consuming and resource intensive (Phillips et al., 2015).

I chose the social determinants of health model over other ecological models because it's constructs are easy to understand and apply in an enquiry. Furthermore, the constructs are not restrictive in their scope. For example, its outer layer is composed of general socio-economic, cultural and environmental conditions. The generalness of the construct 'culture' for example, was of advantage to this study in that it allowed the

coverage of the different aspects of culture, including the national and organisational, without restricting the research to one or the other.

The “social determinants of health’ model is also suited to this study for several other reasons. First, it recognises the relationship between the broader social, cultural and environmental factors and the lifestyle choices of individuals (Owens, 2012). Second, the model’s elements such as social and community networks, work environment, and cultural conditions helped the researcher to conceptualise offshore oilfield workers’ eating habits and physical activity within the social, cultural and work environment contexts. It therefore laid the theoretical foundation for exploring the multiple and varied social, cultural and work environment factors that underpin the two health behaviours.

Third, the social determinants of health model is widely used in health research (Montero, 2015). For example, Agwu (2014) utilised it as a theoretical framework for the cross-sectional study which investigated the health status and lifestyle behaviours of university students in Nigeria. Among other findings, the study revealed that ethnicity and culture influence lifestyle behaviours. Bambra et al. (2010) also utilised the model as a theoretical pedestal for their umbrella review of systematic reviews of interventions around the wider social determinants of health, thus enabling them to identify the range of social determinants upon which health interventions could be based.

Ecological models, including the Social Determinants of health model by Dahlgren and Whitehead (1991), have often been criticized for not specifying clearly “the variables

and processes at each level expected to be most influential on behaviour” (Sallis, & Owen, 2015, p.44). As Sallis, & Owen (2015) further argue, it may not be feasible for behavioural interventions to be targeted at all levels or even all variables and processes within a level. Therefore, specifying the ones that are expected to influence behaviour most will enable intervention efforts and resources to be properly directed, so as to achieve the best possible results. Furthermore, although Dahlgren & Whitehead (2006) indicate that the model emphasises interactions, it is not clearly spelt out how the constructs interact across the layers (Agwu, 2014). For example, the model does not clearly show how social and community networks interact with environmental conditions. The model also does not provide guidance on the starting point for its use. This has often resulted in the selective use of the layers by some researchers. For instance, Bambra et al. (2010) used the Dahlgren & Whitehead’s model as a framework for their umbrella review mentioned earlier, but concentrated on the outer layers of the model and excluded the innermost layers namely, social and community networks and individual lifestyles. As a result, they did not include as part of their study, systematic reviews that only examined interventions based on the innermost layers of the rainbow. Also, in their study on the social determinants of young people’s health, Hagell, et al. (2018) concentrated on economic, social & community networks layers of the Dahlgren & Whitehead model, placed less emphasis on illness and use of health services, and excluded the broader environmental elements such as water & sanitation, agricultural and food production. In furtherance, the Dahlgren & Whitehead (1991) model does not contain elements related to technology, although health behaviour today has been recognised to occur within the context of rapid technological change (Glanz, 2008). For example, in their study which explored adolescents’ perspectives on using technology for health behaviour change, Radovic et al. (2017) found that adolescents utilise

technology to gather health information as well as to track their health behaviours and goals. However, it is imperative to note that despite the above criticisms, the Dahlgren and Whitehead (1991) ‘social determinants of health’ model is widely cited and used in health research (Bambra, et al. 2010).

In adopting the “social determinants of health’ model for this research, I considered the objectives of the study and concentrated on the following elements of the model: individual lifestyle factors, social and community networks, living and working conditions with emphasis on work environment and general cultural conditions, as was done by other researchers such as Bambra et al. (2010) and Hagell, et al. (2018). Nonetheless, where data revealed any potential items of interest outside the aforementioned elements of the model, such items were also included in the data analysis and interpretation process. This proved to be very useful as consideration of the cultural and environmental conditions element enabled this study to identify organisational culture, national culture and, the remote and marine offshore environment as determinants of offshore oilfield workers’ eating and physical activity behaviours. Furthermore, the use of the living and working conditions element as a theoretical platform elicited the identification of free access to abundant food, lack of food portion control and, the confined and cramped offshore work conditions as additional determinants, while using the social and community networks element as a lens enabled the revealing of the socially isolating offshore locations and social affiliations, as additional factors that influence the population’s eating habits and physical activity.

3.3 Qualitative Design:

Constructionist enquiries require the use of methods that recognise and accept the role of the subjective rather than the objective. Therefore, a social constructionist position necessitates the use of qualitative research methods (Darlaston-Jones, 2007). Additionally, understanding an individual's behaviour requires going beyond what is observed (Krefting, 1991) and appreciating the contexts of the behaviour (Faltermaier, 1997). This cannot be achieved with quantitative research methodologies. McCusker and Gunaydin (2015) argue that the positive features of quantitative methodologies include that they allow the accessing of large amounts of quantifiable information and data in short periods of time, make possible the repetition of quantification of data using the same formula or method and, enable the presentation of data in the form of numbers and statistics. However, they often seek to discover objective reality and hence employ investigation methods that do not allow for understanding of the participant's social world. On the other hand, the qualitative research approach considers the context of the behaviour under study, acknowledges the varied and subjective meanings of the participant's experiences, and allows the researcher to have an insider view of the participants' social world, thus eliciting a deeper understanding of the behaviour of interest (Darlaston-Jones, 2007). It is pertinent to mention that one of the features of quantitative methodologies highlighted by McCusker and Gunaydin (2015) was useful to this study as the results of analysis of the types, locations and other characteristics of papers included in the literature review are presented in numbers and percentages in section 2.3 of this thesis.

A qualitative research design was adopted for this study because it allowed the researcher to be immersed in the research process, thus capturing, understanding and

interpreting the varied, subjective and multiple experiences, views and meanings of Nigerian Offshore oilfield workers on eating habits, healthy eating and physical activity, recognising that the participant and the researcher co-construct knowledge (Darlaston-Jones, 2007).

Critics of qualitative research approach have argued that the methodology is too subjective and therefore prone to bias, too anecdotal, lacking in transparency and generates ungeneralisable findings (Bryman, 2012). However, these criticisms have been challenged and there are now criteria for ensuring the quality of qualitative research. For instance, some writers like Lincoln and Guba (1985, cited in Bryman, 2012) have proposed models which when followed, will ensure the quality of qualitative research, including the contextual transferability of its findings.

3.4 Reflexivity

Several factors can introduce overt bias into the research process, adversely influence it and result in wrong conclusions (Simundic, 2013). These factors include the researcher's prior experiences, biases, beliefs, feelings, gender, relationships with the researched, and generally, the researcher's position within the research context. Therefore, Palaganas et al. (2017) argue that qualitative researchers have a duty to make clear their reflexivities. This involves being reflexive about the possible sources of bias in their research and how these can be managed (Bryman, 2012). That will ensure research rigor and quality (Teh and Lek, 2018), enhance the credibility of the research findings (Berger, 2015; Cutcliffe, 2003) and deepen the understanding of the research work (Berger, 2015).

My social constructionist philosophical leaning may have evoked my interest in exploring the social and cultural reasons that underpin offshore workers' eating habits and physical activity. Also, as someone who worked in offshore oil fields for about three years and has worked in the oil and gas industry for over 28 years, I acknowledge that I have firsthand experience of offshore oilfield work conditions and that I am also familiar with some Nigerian offshore oil field workers. These may have had positive effects on the research process. For instance, while my prior experience possibly shaped the depth of my probing for answers to questions during the interviews and also allowed me to perceive the participants' nuanced reactions (Berger, 2015), my familiarity with some of the workers likely helped me to recruit the initial set of respondents through whom I reached the rest of the respondents. However, it was important that I recognised that these could overtly bias the research and its findings.

Raheim et al. (2016) argue that familiarity between the researcher and the respondent can negatively impact the research process. Therefore, I was aware that if I did not manage the familiarity properly, especially during the interview process, I ran the risk of not probing or following up on responses in order to clarify them and this could dilute the richness of the collected data. On the other hand, I could leverage on the familiarity and begin to ask intrusive questions that could potentially erode the respondents' confidentiality and privacy. Being conscious of the above, I made a predetermined effort to be consistent during the interviews, asking probing questions and following up on unclear responses in order to clarify them, but refraining from asking intrusive questions.

Additionally, the respondents could leverage on their familiarity with me and use the interview as an occasion to tell unrelated personal stories, believing that as “one of their own”, I would be obliged to listen. Raheim et al. (2016) contend that telling such unrelated stories could change the direction of the interview and negatively impact the research findings. Therefore, I reflected on how this could affect my research, decided on how to redirect the interview to the research topic, should that happen, and wrote these down in my research diary.

My prior experience in the research area could potentially cause me to choke out the ‘voices’ of the respondents (Cloke et al., 2000) or overlook certain aspects of their experiences (Daly and McDonald, 1992), thus imposing my experience on the research process, believing that I already knew what the respondents were saying and the meanings they gave to the data. With this in mind, it then follows that I needed to exercise restraint during the interviews and allow the participants to give full and unencumbered answers to the interview questions. I also pondered over how I could analyse data thoroughly and not arrive at a hasty interpretation of the data. As a result of this reflection, I sent the interview transcripts to the respondents for their validation, consulted my research journal repeatedly during the data analysis and interpretation process, and also sent the report to some of the respondents for their validation before it was submitted for approval, as suggested by Torrance (2012).

In furtherance, considering that the oil and gas industry is generally male dominated (Williams, Kilanski, & Muller, 2014; Collinson, 1998), most of the participants for this study were males. Therefore, as a male researcher carrying out an investigation in a male dominated industry, I was aware that gender bias could infiltrate the research

process and colour my interpretation of the few female participants' accounts of the issues being studied. In view of this, I was careful not to consider the female participants' accounts inferior to those of their male counterparts, but to ensure an open minded, unbiased analysis and interpretation of all data sets, while recognising that gender norms can shape an individual's health behaviour (Fleming & Agnew-Brune, 2015).

3.5 Co-construction of Knowledge

One of the factors that distinguish a qualitative research design from the quantitative approach is that the qualitative researcher is "intimately involved" in the research process and product (Horsburgh, 2003, p.309). This allows them to play an insider role, working in partnership with the participants to co-construct knowledge on the subject of the investigation (Darlaston-Jones, 2007). The researcher plays that role in several ways. For instance, the fact that researchers are required to be reflexive about their prior experiences, biases, relationships, personal values, feelings and gender implies that they bring their personal baggage into the research. In doing so, they overtly or covertly influence the research process and product, participating in the creation of whatever knowledge that results from it.

The researcher also participates in the co-construction of knowledge during the data analysis and interpretation processes. They personally observe and document the striking details of the interview setting and process and use these details when making their analytical and interpretive decisions. Furthermore, Braun & Clarke (2012) argue that researchers always bring something to the data when analysing and interpreting them. Therefore, I would argue that by observing and documenting such interview

details, by bringing their personal baggage into the research and, by using all these in data analysis and interpretation, the researcher is injecting themselves in the research process, thus participating in the construction of the knowledge.

Participants themselves are empowered agents (Bell, 2011) who are actively involved in the construction of knowledge on the subject of inquiry. First, the research data are an encapsulation of the participant's personal experiences of the subject and therefore could be said to belong to them. Second, participants determine what information is volunteered to the researcher during the data collection process and can withhold certain aspects of it, should they choose to do so. Third, Torrance (2012) suggests that the initial data collected during a research and, the draft reports of the study, can be sent to the respondents for their verification, to ensure that they reflect what was said during the interview. Therefore, by giving out the research data, determining what information is given to the researcher and, by validating the data and draft research reports, the participant is constructing knowledge in partnership with the researcher.

3.6 Methods

3.6.1 Recruitment:

Participants were recruited from among Nigerian offshore oilfield workers through snowball sampling, thus allowing the researcher to initially contact a small group of people with the characteristics relevant to the research topic and then to reach other participants through these initial contacts (Bryman, 2012).

Using a Lancaster University e-mail address, the researcher approached ten offshore oilfield workers whom he already knew and invited them to participate in the study.

Following Bryman's (2012) suggestion, an introductory message (Appendix 3) was sent to these initial contacts, providing them with a study participant information pack (Appendix 4) which contained detailed information on the research topic, aim, objectives, data collection, analysis, storage and disposal methods, a consent form (Appendix 5) and their rights of voluntary participation and withdrawal from the study. At the same time, the contacts were asked to pass on the details of the study to other offshore oilfield workers, requesting such persons to contact the researcher directly, should they be willing to participate

Informed consent is an essential part of research ethical procedures (Ferreira & Serpa, 2018). Therefore, all persons who agreed to participate were asked to date, sign and return a consent form to the researcher within two weeks of receipt of the research information pack. Subsequently, the researcher sent one follow-up e-mail to each individual who showed interest in the study but failed to return a signed consent form after two weeks. This was to confirm the individual's decision regarding participation in the study. All prospective participants were informed of their rights of voluntary participation, withdrawal and confidentiality, as contained in the participant information pack. Figure 6 below shows the recruitment sequence while table 6 depicts the recruitment summary.

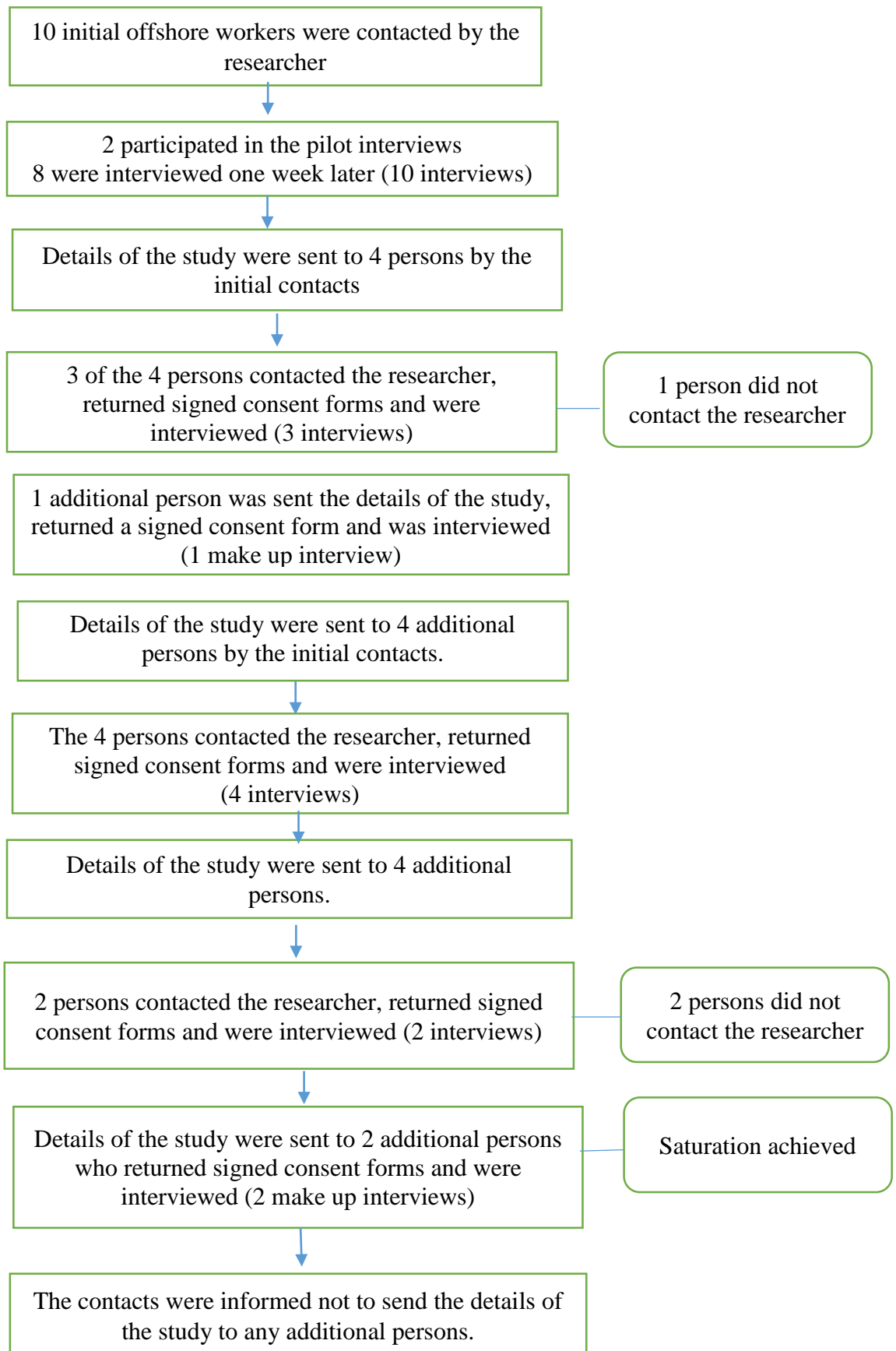


Figure 6: Recruitment Sequence

Table 6: Recruitment Summary

Total number of offshore workers contacted initially	10
Total number of offshore workers reached through the initial contacts	15
Total number of contacted offshore workers that did not contact the researcher or return signed consent forms	3
Total number of offshore workers that returned signed consent forms and were interviewed	22

3.6.2 Sample:

Twenty-two participants who met the inclusion criteria and had the characteristics of interest that would best answer the research questions were strategically sampled (Bryman, 2012). The participant inclusion and exclusion criteria and the justification for the criteria are presented in Table 7 below:

Table 7: Participant inclusion criteria

Participant Inclusion Criteria	Justification
Adult male and female Nigerian offshore oilfield workers aged between twenty (20) and sixty (60).	Eighteen (18) years is the minimum work age as stipulated by the Labour Act (1990) and sixty (60) years is the statutory retirement age in Nigeria (Garba and Mamman, 2014). Since the participants needed to have worked offshore for a minimum of 2 years, the participants ought to be at least 20 years of age.
Completed primary school education as a minimum	This ensured that the participants could communicate in English so as to effectively participate in the interviews.
Worked in Nigerian offshore oilfields continuously for a minimum of two (2) years	This ensured that only individuals who have worked long enough to have been fully integrated into the offshore oilfield environment participated in the study.

The participants were adult Nigerians aged between 29 and 52 years. Majority of them (n = 19) were males, had at least an undergraduate university degree (n =18) and were

married (n = 19). Furthermore, the participants reflect the diverse professions that work within an offshore oil field and had between four and twenty-three years of offshore work experience. Table 8 depicts the participants' demographics.

Table 8: Participants' Demographics

PT No	Gender	Age	Nationality	Marital Status	Profession	Highest Level of Education	Offshore Work Experience
1.	Male	35	Nigerian	Married	Field Operator	Bachelor's Degree	4 Years
2.	Male	36	Nigerian	Married	Field Operator	Bachelor's Degree	4 Years
3.	Male	50	Nigerian	Married	Field Superintendent	Master's Degree	4 Years
4.	Male	35	Nigerian	Married	Field Operator	Diploma	7 Years
5.	Male	37	Nigerian	Married	Technician/Operator	High School Certificate	11 Years
6.	Male	50	Nigerian	Married	Field Superintendent	Bachelor's Degree	6 Years
7.	Male	33	Nigerian	Married	Regulatory Staff	Bachelor's Degree	2 Years
8.	Male	32	Nigerian	Married	Regulatory Staff	Master's Degree	3 Years
9.	Male	45	Nigerian	Married	Construction Worker	Master's Degree	15 Years
10.	Male	49	Nigerian	Married	Field Superintendent	Bachelor's Degree	20 Years
11.	Male	35	Nigerian	Married	Regulatory Staff	Bachelor's Degree	4 Years
12.	Male	31	Nigerian	Married	Regulatory Staff	Master's Degree	4 Years
13.	Male	39	Nigerian	Married	Health & Safety	Master's Degree	5 Years
14.	Male	36	Nigerian	Married	Maintenance Technician	High School Certificate	6 Years
15.	Female	30	Nigerian	Single	Drilling Engineer	Master's Degree	4 Years

16.	Male	50	Nigerian	Married	Health & Safety Officer	Master's Degree	8 Years
17.	Male	40	Nigerian	Married	Production Engineer	Bachelor's Degree	4 Years
18.	Male	48	Nigerian	Married	Health & Safety Officer	Bachelor's Degree	23 Years
19.	Male	52	Nigerian	Married	Health & Safety Engr.	Bachelor's Degree	7 years
20.	Female	42	Nigerian	Married	Medic	Bachelor's Degree	3 years
21.	Female	29	Nigerian	Single	Steward	High School	4 years
22.	Male	32	Nigerian	Single	Marine Officer	Bachelor's Degree	3 Years

3.6.2.1: Sample Size

The argument about sample size in qualitative research is nuanced and there is no agreement as to the minimum number of interviews required (Dworkin, 2012). For example, Bertaux (1981, cited in Guest, Bunce & Johnson, 2006) suggests fifteen as the minimum acceptable sample size in qualitative research while Creswell (2014b) recommends that sample size be based on the qualitative design being used. Sample size is also often determined by the budget and time allocations of a study (Lenth, 2001; Bryman, 2012). In their study of healthy eating practices and physical activity among adolescent girls in rural South Africa, Sedibe et al. (2014) conducted 14 semi-structured interviews. Buttigies et al. (2011) also interviewed 14 participants in their exploratory study of the causes and consequences of work place bullying and discrimination, while adopting a constructionist epistemological approach. They argue that a sample size of 14 participants was adequate for their study as it enabled them to have an in-depth focus on the participants within their context. As Dworkin (2012) indicates, the concern of qualitative research methods is often to gather an in-depth understanding of a phenomenon.

Furthermore, Fusch and Ness (2015) suggest that rather than focus on sample size, qualitative researchers should think of the thickness and richness of data. Data are rich when they include the striking and contextual details of the interview setting and process, thus going beyond a superficial account. To achieve this, researchers should capture virtually everything that they see and hear during the interview, including the environment, participants' intentions, motivations, expressions and the emotions accompanying the expressions (Schultze & Avital, 2011). Rich data enable thick description (Schultze & Avital, 2011) which then makes thick interpretation possible (Ponterotto, 2006). I collected rich data and provided thick description of the study setting and context as described in section 3.8 (Ensuring quality).

3.6.2.1.1: Saturation

Another factor that often determines sample size is data saturation, the point where new data does not necessarily lead to more information (Mason, 2010). This number of interviews will give a substantive but manageable data set for analysis. Francis et al. (2010) proposed principles for deciding when data saturation has been achieved. This involves specifying a minimum sample size which will be initially analysed. Thereafter, the batch of subsequent interviews to be conducted without new ideas emerging is also specified. For the present study, the initial minimum sample size was ten (10) while the subsequent interviews were conducted in batches of four (4) until saturation was achieved.

From the analysis of the third batch of four interviews following the initial sample size of ten (ten), no new themes were emerging from the data and thus it was concluded that data saturation had been achieved. Therefore, having collected rich data from the

twenty-two (22) participants recruited from the different professions that work in an offshore field and within the limits of my study budget and time and, having reached data saturation, I made a decision to stop sampling. The initial contacts were then asked not to send the details of the study to additional offshore oilfield workers.

3.6.3 Ethics

Ethical approval, a critical part of research process (Ells, 2011), was obtained from Lancaster University Faculty of Health and Medicine Research Ethics Committee. Additionally, since the research involved interview procedures whereby personal details of participants were kept confidential, the researcher requested and received exemption from the Nigerian National Health Research Ethics Committee, in line with section B (Exemption), sub-section (b) of the National Code of Health Research Ethics (National Health Research Ethics Committee of Nigeria, 2007). Informed consent was obtained from each participant before they took part in the study. Each participant signed and returned a consent form directly to the researcher. Information obtained during data collection was anonymised as soon as it was collected. Also, each participant was assigned a non-identifying number and any information that may identify them was removed, in order to ensure anonymity of all participants, as suggested by Bazeley (2013). This also ensured that any disclosure from participants was highly unlikely to place them at risk of criminal or civil liability or be damaging to their financial standing, employability or reputation.

Participation in the study was voluntary and participants had the right to withdraw from the research at any time before and up to two weeks following the interviews without giving any reason. It was made clear that a request to withdraw the information provided

might not be possible after two weeks as the data would have been anonymised and analysis started, and it was likely that the data intended to be withdrawn would already have been analysed, though every attempt would be made to extract the data, up to the point of publication. Participants were provided with all necessary information on the study as indicated in section 3.6.1 (Recruitment).

Furthermore, the researcher and participants reviewed the research information pack before the interview commenced, while the researcher re-emphasised the anonymisation of the interview data, the substitution of participants' names with non-identifying numbers, the fact that participation in the study was voluntary and also informed the participants of the limits of confidentiality. Basic refreshment like non-alcoholic beverages and water was provided to make the participants comfortable, although this was not intended as inducement for participation in the interview. The researcher made all efforts to answer any question(s) which the participants raised, with a view to clarifying grey areas and also sought the participants' approval to use the interview data in published works in the researcher's thesis and in academic journals. Although it was not anticipated that participants would suffer discomfort or inconvenience during the interviews, contacts of the Nigerian Mental Health Foundation which offers free counselling to the public, were made available to the participants.

The interview recordings were transferred and stored on the Lancaster University secure server as soon as possible. The initial nine interview recordings were saved in an encrypted USB flash drive and transmitted to an independent professional transcriber based in Lagos, Nigeria, by recorded delivery. The transcriber signed a confidentiality agreement consenting to non-disclosure of any data related to the interviews to any third

party, either before or after the transcription (see appendix 6). The nine transcripts and the USB flash drive containing the anonymised interview recordings were returned to the researcher by recorded delivery. The USB flash drive was destroyed immediately it was returned. Verbatim transcription of the remaining thirteen (13) interviews was carried out by the researcher. The audio recordings and copies of the interview transcripts will be retained on the Lancaster University secure server for ten (10 years in case they need to be consulted post-dissertation examination and/or be used for published journal articles in the future. They will be permanently destroyed thereafter, following Wei et al. (2011), thus ensuring compliance with the United Kingdom General Data Protection Regulation. The details of the interview setting and process, as well as the arrangements made to ensure the safety of the researcher and participants are shown in sections 3.6.4 (Data collection) and 3.7 (Researcher and Participant Safety).

3.6.4 Data Collection (Interviews):

Data for this study were collected through semi-structured interview which is characterised by a flexible structure, with open-ended questions organised around an interview guide rather than a rigid script (Lewis-Beck, Bryman & Liao, 2004; Creswell, 2009). Semi-structured interview is often the most effective means of data collection (Qu & Dumay, 2011) and as Darlaston-Jones (2007) indicates, there is a natural relationship between a social constructionist position and the use of interview techniques for data collection. It enables the researcher to ask questions in a way that elicits the fullest responses from participants (Creswell, 2009), allowing their individual experiences to emerge (Darlaston-Jones, 2007). Unlike other methods of qualitative data collection, semi-structured interview also allows the researcher to probe or follow

up on questions and to clarify respondents' responses, thus eliciting more information on the issues being studied (Qu & Dumay, 2011). The use of semi-structured interview allowed the participants in this study to relate their nuanced experiences of eating habit, healthy eating and physical activity and the subjective meanings of those experiences. With the longest of the interviews lasting for about one hour and fifteen minutes and the shortest lasting for about fifty minutes, the interviews were of adequate length and therefore enabled the collection of rich data.

An interview guide (Appendix 8) which contains the indicative questions was developed. The questions in the guide were framed in accordance with the three constructs within the Social Determinants of Health model (Dahlgren and Whitehead, 1991) that were relevant to the objectives of the study namely; Social & Community Networks, Living & Working Conditions and, Cultural & Environmental Conditions. For example, to explore the determinants of offshore oilfield workers' eating habits and physical activity, the participants were asked the following questions; (1) in your opinion what socio-cultural and work environment factors would you say encourage, reinforce or discourage you from maintaining a healthy eating habit while offshore? (2) In your opinion, what socio-cultural and work environment factors would you say encourage, reinforce or discourage you from participating fully in physical activity while offshore?

The interview guide was reviewed by the student's research supervisors who provided comments, including a suggestion that some of the questions be reframed to enable them elicit enough details that will meet the study objectives. It was also recommended that more questions be included in the guide to widen its coverage of the two behaviours of

interest. The guide was revised accordingly and then piloted on two of the initial participants, to determine its appropriateness to the study aims and objectives. Following the piloting, no changes were made to the questions.

The interviews were carried out both face-to-face and through Skype. The face-to-face interviews were held in private rooms located in public venues in Nigeria. This was to ensure privacy and the safety of the researcher, and also, to minimise extraneous noise, in order to achieve high quality recording of the interviews (Bryman, 2012). The interview venues and dates were discussed and agreed with the participants ahead of time. Before starting the interviews, the researcher reviewed the research information pack with the participants and reminded them that participation was voluntary while they had the right to withdraw from the research at any time before and up to two weeks following the interviews, without giving any reason.

For the Skype interviews, a Skype account was set up solely for the purpose of the interviewing, as suggested by Cater (2014). To ensure participant privacy, the participants were connected in the privacy of their homes and they were advised not to use public internet connection places (cyber cafes) or devices as these are not secure means of communication. Both the audio and video features of Skype were used during the interviews and the researcher could observe the participants' body language, posture and visual cues. Therefore, there was no difference in the data collected through Skype and face-to-face means. The specific actions taken to ensure the safety of the researcher and the participants are presented as appendix 8 (Researcher and Participant Safety).

The interviews were recorded with a digital audio recorder after obtaining consent from the participants. Mero-Jaffe (2011) argues that certain factors can influence the quality

of a transcript. They include the researcher's attitude to and assumptions about the data, interviewer's knowledge of the research project, the transcriber's professional knowledge and awareness of the research topic, the quality of the recording and recording equipment, as well as the place of transcription. Therefore, it is important that transcripts are sent to the participants for validation (Bryman, 2012). Hagens, Dobrow and Chafe (2009) indicate that this upholds research ethic and helps to avoid significant errors that may impact the quality of the transcript, although they also argue that sending transcripts to participants has negative dimensions, as the participants can decide to delete some data, thus biasing the research. After the transcription, I provided each participant with a transcript of their interview and requested them to give me a feedback if they found any disagreement between the contents of the transcript and what they said during the interview. All participants agreed that the transcripts represented true accounts of the interview.

3.6.5 Data Analysis

Data for this study were analysed thematically. Thematic analysis is a flexible (Braun and Clarke, 2006) and systematic data analysis method that helps to identify, organise and analyse patterns (themes) across a data set, thus allowing the researcher to make sense of collective or shared meanings and experiences found within the data set (Braun and Clarke, 2012). It can be used with many epistemological approaches and is well suited to social constructionism since it helps to highlight the process of social construction (Joffe, 2012). The use of thematic analysis in this study allowed the researcher to identify and extract the critical elements in the Nigerian offshore oilfield workers' individual accounts of their experiences, views and perceptions of eating habit, healthy eating and physical activity, as well the social, cultural and work environment

factors that underpin them. It also allowed the extraction of the shared meanings in those accounts and their crystallisation into related themes, in order to create a meaningful account that answered the research questions.

Following Braun and Clarke (2012), I adopted the following six phase approach to thematic analysis. First, I familiarised myself with the data, to build a sense of the whole, with a view to capturing the nature of what the respondents were saying (Bazeley, 2013). I started by reading through each transcript three (3) times, first in a rapid way and then slowly and meticulously. I also listened to the interview recordings for each transcript, reflecting on the interview context, what was said, how this might relate to the participant's body language, posture and visual cues, as recorded in my interview journal. As I did this, I continued to take note of potential items of interest and what they meant, and to write these down in my research journal (Braun and Clarke, 2012). I paid particular attention to the nine interviews transcribed by the professional transcriber, in order to ensure that what was transcribed represented what was said by the participants. Second, using the NVivo 11 Pro software as a support tool rather than as a driver of the coding process, I exported the interview transcripts and an excel sheet containing the participants' demographics data into the software.

I personally generated initial codes by going through each line of the transcript, identifying aspects of the data that were potentially relevant to the research questions (Joffe, 2012). Driven by the social constructionist epistemological paradigm which holds that individuals have varying experiences and accounts of reality, all of which are considered valid (Burr, 2003), the coding was mostly inductive in approach. That allowed me to intensively immerse myself in the data, developing from them codes that

reflected the nuanced, varied and subjective perspectives of the participants on the research topic. However, as Braun & Clarke (2012) argue that it is impossible for coding and analysis to be purely inductive since we always bring something to the data when we analyse them, some of the codes were underpinned by the study's theoretical perspective, the social determinants of health model.

Third, I carried out an examination of the initial codes within each node, merging related ones into new nodes, eliminating any overlaps and writing down the reasons for the mergers in my research journal. This resulted in thirty-four (34) codes. Using NVivo 11 Pro software, I organized the codes, linking them to each other and to the data sources, developed a coding summary, retrieved and exported it to my computer. I then searched for themes by comparing the codes to the data, the interview transcripts, and my research journal notes. Based on this, I developed some descriptive themes. Fourth, I reviewed the descriptive themes, interrogating them to determine their relationships and their fit within the constructs of the Social Determinants of Health model (Dahlgren and Whitehead, 1991), as well as merging them where necessary, thus resulting in twelve (12) basic or descriptive themes that are aligned with the SDH constructs, as shown in Table 9 below.

Table 9: The 12 basic/descriptive themes and their fit within SDH Constructs

Basic/Descriptive Theme	SDH Construct
High consumption of carbohydrates, red meat and fatty, and sugary foods	Individual lifestyle factors
Large portions of food servings	Individual lifestyle factors
Low participation in physical activity	Individual lifestyle factors
Considerable level of awareness	Working conditions
Free access to abundant food	Living and working conditions
Lack of food portion control	Living and working conditions
Offshore physical work and living environment	Living and working conditions/ Environmental conditions
Offshore social environment	Social and community networks
Organisational culture	Cultural conditions
National culture	Cultural conditions
Eating for nourishment	Living and working conditions
Eating for work	Living and working conditions/Cultural conditions

Fifth, I then interrogated the descriptive themes further, comparing them to the research questions to determine their essential meanings to the research topic. By so doing, I generated three (3) analytical themes that formed a coherent and meaningful pattern needed to answer the research questions (Braun & Clarke, 2012). I also identified quotes or expressions from the data that could be used to support my analytical statements as suggested by Bazeley (2013). Finally, I wrote down exhaustive contextualised analytical statements about each analytical theme, using the identified quotes or expressions as support. Figure 7 below shows the coding schema.

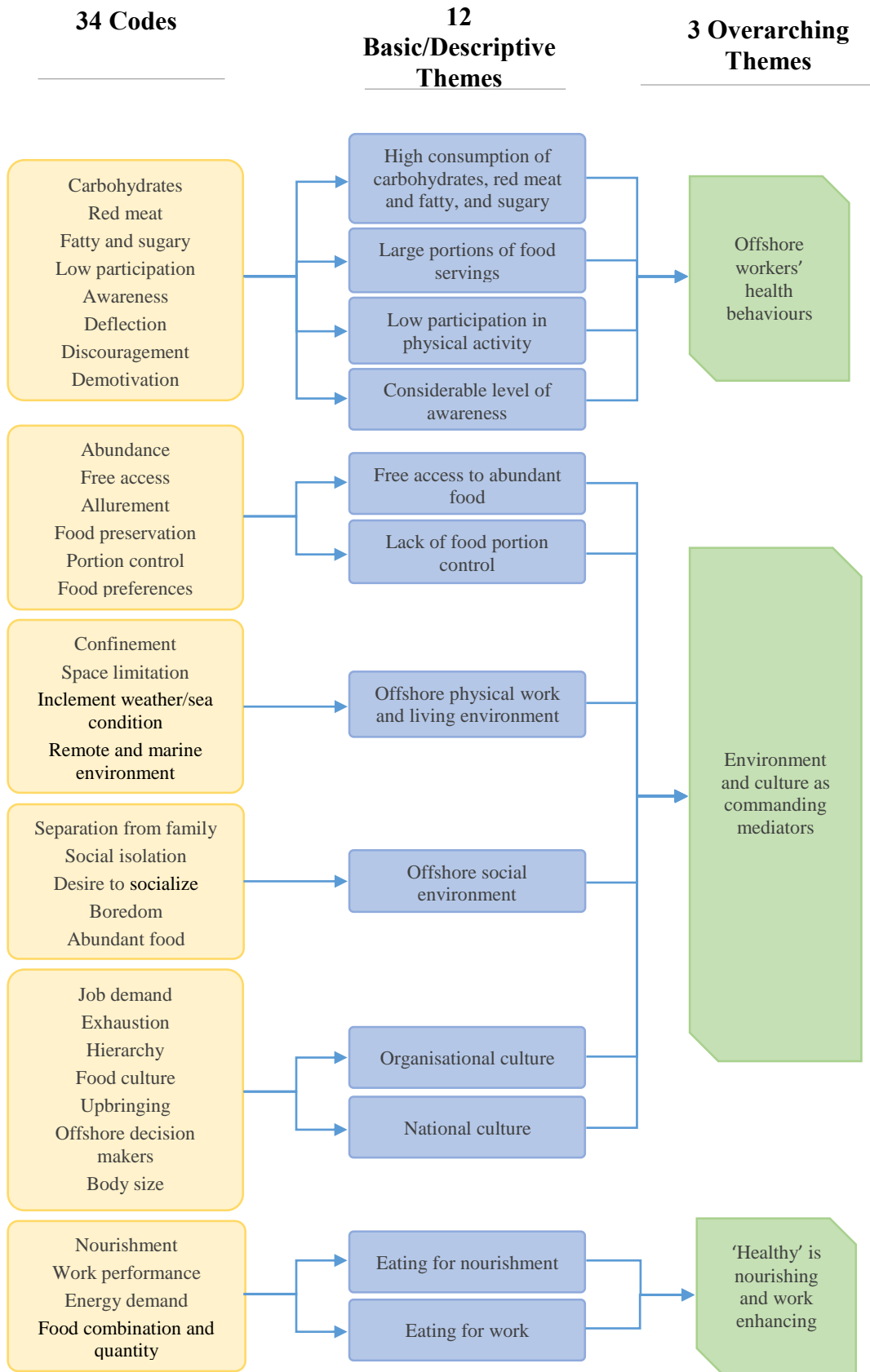


Figure 7: Coding Schema

3.7 Researcher and Participant Safety

Although no potential risks to the researcher and the participants were anticipated, I followed policies advocated in the Guidance on Safety in Fieldwork (University Safety and Health Association/Universities and Colleges Employers Association, 2011) and took steps to ensure my safety and that of the participants. These are presented in appendix 7.

3.8 Ensuring Quality

Although there are no “absolute and agreed standards” against which the quality of all research is judged, researchers certainly need to assure readers of the quality of their research work (Bazeley, 2013, p. 402) as failure to do so could result in serious consequences (Long and Johnson, 2000). The evaluation of the quality of research had traditionally centered on the concepts of reliability and validity (Long and Johnson, 2000). Bryman (2012) indicates that reliability is the consistency or constancy with which an instrument measures a concept, while validity is concerned with finding out if the research instrument truly measures what it was intended to measure. Golafshani (2003) argues that this traditional definition of reliability demands replicability of research results, a requirement which is not in consonance with the qualitative research paradigm and Stenbacka (2001) contends that it has no relevance to qualitative research. Golafshani (2003) further argues that validity is positivist and represents an attempt to compare research findings to objective reality in order to judge their quality. While some qualitative researchers have contended that the two concepts are associated with the quantitative research paradigm and therefore not applicable to qualitative research (Long and Johnson, 2000; Golafshani, 2003; Noble and Smith, 2015, p.34), others have attempted to apply the concepts to qualitative research (Bryman, 2012).

Despite the arguments about the applicability of reliability and validity to qualitative research, there is an agreement on the need for qualitative researchers to establish the quality and credibility of their studies (Creswell and Miller, 2000). Therefore, several systems of quality criteria for qualitative research have been put forward (Treharne and Riggs, 2014). These include the criteria put forward by Lincoln and Guba (1985, cited in Bryman, 2012) and the ‘consolidated criteria for reporting qualitative research (COREQ)’ by Tong, Sinsbury and Craig (2007). For the present study, I adopted trustworthiness proposed by Lincoln and Guba (1985, cited in Bryman, 2012), as a quality assessment criterion. Trustworthiness is made up of five components namely; credibility, transferability, dependability, confirmability and authenticity (Treharne and Riggs, 2014). These are explained below.

Bryman (2012) argues that if there are several accounts of reality then the acceptability of the account that a researcher arrives at will depend on its credibility. This can be achieved through respondent validation which involves providing the respondents with an account of what was said during the interview, as well as an account of the researcher’s findings, for their validation (Bryman, 2012; Krefting, 1991). To ensure the credibility of this study, I provided each respondent with the transcript of their interview, to make certain that what was transcribed actually represented what the participants said during the interviews. I also provided the respondents with accounts of the research findings. This was to certify that the findings represented accurate descriptions of their experiences of the issues studied, thus ensuring credibility.

Transferability is the applicability of the research findings to other contexts. The responsibility for transferability lies more with the person who wants to transfer the

findings of the research to other contexts or population than with the researcher of the initial study (Lincoln and Guba, 1985, cited in Bryman, 2012). In so far as the initial researcher provides thick descriptive data, he has sufficiently addressed the issue of applicability (Bryman, 2012). Thick description refers to “detailed account of a social setting that can form the basis for the creation of general statements” (Bryman, 2012, p. 717). It encapsulates the participants’ thoughts and feelings and the relationships among them (Ponterotto, 2006) and gives others a good database to make informed judgement about the transferability of findings to other contexts (Lincoln and Guba, 1985, cited in Bryman, 2012).

Following Bryman (2012), I provided a thick description or detailed account of the setting and context of the study, which includes a clear and detailed description of the philosophical perspectives that underpin the study, the social and environmental conditions inherent in Nigerian offshore oilfields, detailed memos on the attitudes, body languages, postures and visual cues of the participants during the interviews and how these relate to the analytical and interpretive decisions I made to arrive at the study findings, in order to aid transferability.

Confirmability requires the researcher to show that he or she has “acted in good faith” by not allowing personal values, experiences and biases to overtly influence the research and its findings (Bryman, 2012, p. 392-393). This also involves maintaining an audit trail (Krefting, 1991). As indicated in the preceding paragraph, I maintained an audit trail of all the steps I took and decisions I made throughout the process of the research and also kept a reflective note the details of which are indicated in section 3.4 on reflexivity. Additionally, I discussed my data with my supervisors.

Authenticity has to do with ensuring that the research represents “a fair range of differing viewpoints on the topic” of the research (Treharne and Riggs, 2014. P. 58). Therefore, to achieve authenticity, I captured the differing views and perspectives expressed by the participants on their eating habits and physical activity, as well as on the concepts of healthy eating and physical activity. As indicated in an earlier paragraph, I also provided the participants with an opportunity to verify their varied and nuanced accounts of the research topic and reflected these differing views in this thesis.

3.9 Data Management

The interview recordings were transferred and stored on the Lancaster University secure server as soon as possible. The audio recordings and copies of the interview transcripts were retained on the Lancaster University secure server for 10 years in case they need to be consulted post-dissertation examination and/or be used for published journal articles in the future. They will be permanently destroyed thereafter, following Wei et al. (2011) thus ensuring compliance with the United Kingdom General Data Protection Regulation. The responsibility for storage and deletion of the recordings and transcripts will be handed over to my research supervisor once the research has been examined as a PhD dissertation.

3.10 Dissemination of Research Findings

The research work will be submitted to the Faculty of Health and Medicine of Lancaster University for approval and will likely be retained in the university’s library for reference and knowledge sharing, when approved. Furthermore, the results of the study will be shared with the participants and may be submitted for publication in professional

and academic journals on health and wellbeing. I will also seek opportunities to present the findings of the research at conferences and seminars on health, safety and wellbeing.

CHAPTER 4: FINDINGS

4.1 Introduction

This chapter presents the findings of this study which are based on semi-structured interview of twenty-two (22) Nigerian offshore oilfield workers. Three overarching themes were identified. They are; Offshore worker eating habits and physical activity (4.2), Environment and culture as commanding mediators (4.3) and, 'Healthy' is nourishing and work enhancing (4.4). The findings are presented in three sections that correspond to the three overarching themes of the study.

4.2. Theme 1: Offshore worker eating habits and physical activity

This theme explores the 'What' of this study and discusses Nigerian offshore oilfield workers' eating habits and physical activity. The interviews with the participants suggest a high consumption of carbohydrates, sugary foods and drinks, red meat and fatty foods, large portions of food servings and low participation in physical activity, by Nigerian offshore oilfield workers. These are discussed in sections 4.2.1 to 4.2.3 of this chapter.

4.2.1 High consumption of carbohydrates, red meat, fatty and sugary foods.

This study found that meals served on Nigerian offshore oilfield facilities consist mainly of carbohydrates. The participants spoke about the dominance of carbohydrates on offshore meals and highlighted that it is a prominent feature of all the meals of the day on the facilities. They also expressed knowledge of the health outcomes of high consumption of carbohydrates, as is evident in below excerpts from PT6 and PT13 who suggested that Nigerian offshore oilfield workers suffer from abdominal obesity due to high consumption of carbohydrate-based foods.

In the morning, bread and these are majors that basically, most of them are carbohydrate and that's why we have lots of people with pot bellies, (PT6).

For dinner, we have basically, we are served 90% of the time we are being served with rice for dinner so that's what we go for (PT13).

The participants also noted that a typical dinner on an offshore oilfield facility is composed almost entirely of rice and that that is what they eat, despite being aware that high carbohydrate meals are unhealthy. Theme 2 of this thesis explores and examines the reasons underpinning such 'dietary contrariness' exhibited by the participants.

The study also revealed a daily pattern of high consumption of beef, fatty and sugary foods, among the study population, as shown in the responses by PT10, PT11 and PT14. It was highlighted by the participants that offshore workers tend to prefer such foods over healthier ones. As is the case with carbohydrate-based foods, the participants expressed awareness of the negative impact of high consumption of beef and fatty foods on their health. For example, PT 14 noted that high consumption of such foods can lead to weight gain with negative health outcomes. This reveals an obvious contradiction between the participants' dietary knowledge and their eating habits. It also highlights that they face a dilemma between making the right food choices that are informed by knowledge and knowingly eating foods that are unhealthy.

Fatty food is readily available and people that prefer and like it, they consume more on a daily basis, you know during lunch, during dinner, it's readily available. (PT 10).

Well, the crackers are there along with the sugary ones but I have noticed that the crew members in general will always go for the sugary ones (PT11).

People eat a lot of beef, stuff that can make them add a lot of weight and which can in turn affect their health, (PT14).

4.2.2 Consumption of large portions and repeated servings of food

The responses to the study interview questions revealed that Nigerian offshore oilfield workers consume large portions and repeated servings of food. For example, PT13 highlighted that the workers tend to overeat when offshore than when they are onshore. They described overeating as a ‘culture’, suggesting that it is a dominant behaviour among the study population. Furthermore, PT5 reported that the culture of overeating is underpinned and reinforced by the practice of allowing workers to take as much food quantity and servings as they like. They suggested that such a practice is common on offshore oilfield facilities. These findings provide further evidence that factors within the offshore work environment impact the participants’ eating habits.

I’m trying to trim myself because unfortunately I’ve joined the offshore culture of also eating a lot than when I’m at home so over time I have cautioned myself not to even go for the tea breaks (PT13).

For the fact that the food is provided all the time, and it’s not regulated. You will go and take as much as you feel you can finish, so everybody is just like having an open end time, just go and take as much, so you are tempted to take,

when you finish, you feel like taking again you go again, you know, no restriction (PT5).

Participants described the size of food consumed by some of the workers as excessive. The seriousness of the overeating problem among the study sample is illustrated in the responses given by some of the participants. For example, while relating an experience about the unhealthy eating behaviour of a certain offshore oilfield worker who had so much red meat in his plate during a meal, PT4 compared the behaviour to self-destruction and suggested that such behaviour often evoked long-lasting feelings of surprise by others. Interestingly, despite expressing surprise and indignation at the excessively large food portion sizes often consumed by their colleagues, the participants still engaged in the consumption of large and repeated quantities of food, as suggested in below response by PT1.

I can't forget in a hurry, an elderly man.....that man should be approaching 60, should be about 58 or thereabouts, people were queuing behind him, this man was busy..... when I mean serving red meat What? Somebody asked him that look, do you want to kill yourself?, how many pieces of meat? Almost eight, what are you going to do with it? (PT4).

I try to eat three meals in a day aside from the tea breaks. So most times three three large meals (PT 1).

The preceding section of this chapter (4.2.1) highlighted the existence of considerable knowledge of healthy eating among the study sample. Participants attributed such knowledge to a regular regime of health awareness talks on Nigerian offshore oilfield

facilities. They indicated that external consultants are brought in to the facilities on a regular basis, to support the resident medical and industrial safety personnel who conduct the health talks.

They have nutritionists and other people that come offshore and you know these personnel, professionals are provided to come and create the awareness offshore (PT19).

Recently, the awareness is becoming on the increase. The medical personnel onboard recently in the last four, five months, they have taken a drastic measure to increase the number of times they give this talk (PT4).

The participants acknowledged the need for change in their eating habits and some have taken personal actions to effect such change, as illustrated in the following responses by PT13 and PT19.

Over time I have cautioned myself not to even go for the tea breaks (PT13).

You know like I told you I started with it the first 3 years that I was offshore. I started with it. I was flowing seriously. I don't miss my tea times but after spending 3 years I had to, you know, reduce this. Like I said, it was having some effects on me (PT19)

However, the findings of this study show that such personal efforts and actions have often not yielded the desired results. This has led to feelings of discouragement among the

participants and a tendency for them to blame the offshore system which created an environment that enables unhealthy eating by providing an abundance of free food. For example, PT11 argued that they would be forced to eat healthy if unhealthy foods were not made readily available on offshore facilities.

If the snacks are not readily accessible, the sugary snacks, I would be forced to eat the right things (PT11)

The failure of the participants to achieve the desired change in their eating habits through personal efforts highlights the need for health behaviours to be examined, understood and managed not just from an individual perspective, but more importantly, from a broader socio-cultural and environmental perspective, as espoused by the ‘social determinants of health’ model (Dahlgren and Whitehead, 1991), recognising that those broader contexts exert significant influence on health behaviours.

4.2.3 Low participation in physical activity

This study revealed a general pattern of low participation in physical activity among the participants, as is evident in the following statements by PT7 and PT 15.

I don't really do exercise, I don't really do exercise (PT7).

I guess a lot of people don't work out on the rigs so you find out that a lot of times you're the only person using gym equipment (PT15).

Despite the general low level of physical activity among the participants, it was noted that some make personal efforts to work out, although a number of them do so on an irregular basis. However, the study shows that such participants are in the minority.

I particularly use the treadmill. I do so at least 3 times in a week. In no particular order, but I try to make sure that in every one week, at least I am in the gym for 3 days and I work out on the treadmill (PT13).

Sometimes I make an effort go to the gym maybe 2 times a week. Most times I'm back from work and tired but I make an effort (PT17).

The data analysis suggests that the participants were concerned by the non-participation in physical activity by the majority of their colleagues. For example, PT18 suggested that being the only person or one of a few people that engage in physical activity offshore can be a problem and a source of discouragement.

There is no time I go to the gym and see all the equipment are being used. So, most times, people don't even care to go to the gym. So, that is the problem we actually face offshore (PT18).

It was interesting to find that many times, the participants that engaged in physical activity were enthusiastic about it while onshore and as a result, they often made advance personal plans while preparing for their two-week offshore tour of duty. However, as illustrated by PT 2 below, in many cases, such plans were not carried

through once the participants arrived offshore, likely due to the pervading environment of discouragement and demotivation offshore as highlighted above by PT18.

I try toam going offshore on Wednesday.....am going for two weeks. I have a mindset that for the first seven days am going to get so physical but when I arrive there I just get to calm down and it doesn't come up until maybe just few days to when I leave so its more personal (PT2).

The findings presented in this section of the thesis relate to the individual efforts made by some of the study participants to engage in physical activity and the challenges they face in the midst of an environment of discouragement and demotivation occasioned by non-participation by majority of the sample population.

4.3 Theme 2: Environment and culture as commanding mediators

This overarching theme explores the “Why” of Nigerian offshore oil field workers’ health eating habits and physical activity and discusses the work-related and socio-cultural factors that underpin the identified eating habits and physical activity patterns among the study participants. Using the “social determinants of health” model (Dahlgren and Whitehead, 1991) which emphasizes the influence of living and working environment, social and community networks and cultural conditions on individual lifestyles as a theoretical base, the study identified several factors within the offshore work environment and the Nigerian national culture, as possibly impacting on the eating behaviours and physical activity patterns reported by the participants. They include; free access to abundant varieties of food, lack of food portion control, the physical offshore living and

working environment, the offshore social environment, and national culture. These are examined in the proceeding sections, as sub-themes of overarching theme 2.

4.3.1 Free access to abundant varieties of food

This study found that several varieties of foods are abundantly available and freely accessible at all times on offshore facilities. Participants indicated that four meals are provided per day during which workers are served as much quantity of food as they want. There are also several tea breaks in-between the meals during which sugary snacks and soft drinks (soda) which the participants described as unhealthy, are made available, with the participants given free access to such snacks and drinks.

I must be honest, they have a lot of carbonated soft drinks, you have em.. because alcohol is not allowed on board so its basically those carbonated drinks that we have available (PT1).

Offshore the.... the mess room is always open may be for some small chops but em..... it is open four times for big meals a day. at least 4 times in a day the mess room is open but in between you can easily go and grab a snack and soft drinks (PT11).

Participants described the amount of free food and drinks available on offshore oilfields as excessive. PT8 put it succinctly and indicated that they see food at every turn in the galley and in the accommodation area. This suggests that the participants encounter food regularly and feel overwhelmed by it. The participants reported that the regular encounter with excess food encourages the workers to overeat.

Food is always available, sometimes I think to an excess because sometimes they bring things during tea breaks that you know are not healthy (PT1).

Once you are in the galley and in the accommodation area, you turn left you see a kind of food, you turn right you see another kind of food and all that. So in my own opinion, there so much food offshore (PT8).

Yes, that alone would encourage a lot of people to actually....., of course because they have access to it and it's not restricted so people can eat as much as they want and they, to be frank with you, that encourages a lot of people to actually eat more than they should. (PT13).

Despite their good knowledge of what constitutes healthy eating, participants found it challenging to overcome the temptation to overeat in an environment where free food is abundantly available at all times. Thus, they are faced with the dilemma of either choosing to eat healthily based on their good knowledge of healthy eating or succumb to the strong allurements to engage in unhealthy eating. PT19 suggested that the workers succumb to the allurements and often engage in unhealthy eating.

I discovered that because this food is available so there is that push to want to consume, you know, at every available time that I have (PT19).

It was however interesting to find that one participant had a different opinion on the availability of food on offshore facilities. PT2 held that while snacks are available at all times, food is not.

You don't have food available all the time but you have access to snacks.....you have access to snacks and when I mean snacks I mean your drinks in the fridge, you have access to coffee, tea or beverages as you may call it. You also have access to little snacks like biscuits (PT2).

The above response by PT2 suggests that snacks and drinks are not foods. This perspective represents a different but equally valid experience and account on the availability of food on offshore oilfields. It thus reinforces the social constructionist philosophical stance adopted for this study and which accommodates peoples varying experiences and accounts of reality without discounting any or considering it invalid.

4.3.2 Lack of food portion control

Analysis of the study interviews revealed a lack of food portion control on Nigerian offshore oilfield facilities. Participants indicated that workers often go for several servings of food during meal times and without restriction. For example, PT12 and PT13 indicated that workers are free to eat as much as they can, while PT 5 noted that food is abundantly available and that there is a total lack of control or restriction over the quantity of food or the number of food servings that an individual can take at a given meal time.

The quantity..... we have as much as we can eat. In fact food is in good supply (PT13).

For most of the terminals it is how much you can eat that is given to you. I don't know the volume but every mealtime if you want a particular amount of meal, you get it without any issues (PT12).

For the fact that the food is provided all the time, and it's not regulated. You will go and take as much as you feel you can finish, so everybody is just like having an open end time, just go and take as much, so you are tempted to take, when you finish, you feel like taking again you go again, you know, no restriction (PT5).

The allurement to overeat which arises from availability of abundant and free food could be tempered by food portion control. In other words, although free food is abundantly available on the facilities, the participants could be forced to limit the quantity they consume if food portion control strategies were implemented. However, as noted by PT5 above, there is a lack of such control, thus exacerbating the allurement felt by the participants, resulting in an increase in their level of unhealthy eating to the extent that some engage in secret eating, as reported by PT4:

Outside the normal program designed to observe this meal time, you know Nigerians they have a way of abusing something....., I am telling you because this is something we observe. People will just sneak out and want to have access to.....because these things are there, so that is that (PT4).

In the later part of the above statement, PT4 blames the workers' unhealthy eating on availability of food and implies that the participants would not engage in unhealthy eating

if abundant food was not readily available. This reinforces a response in section 4.2.2 of this thesis where another participant, PT11, also blamed their consumption of sugary snacks on ready availability. This suggests that the workers tend to deflect the blame for their unhealthy behaviours.

4.3.3: The physical offshore work and living environment

The Dahlgren & Whitehead (1991) model of the social determinants of health highlights the significance of working conditions to health. In this study, analysis of the interview data suggests that the physical offshore work environment exerts a strong influence on workers' eating habits and physical activity. Participants pointed to two attributes of that environment which affect their eating habits and physical activity. These are; the remote and marine nature of offshore locations and, the confined and cramped living and working conditions. They are discussed in sections 4.3.3.1 and 4.3.3.2.

4.3.3.1 The remote and marine nature of offshore work locations

The study found that due to the remote and marine nature of offshore locations, food supplies to the locations are made by boats.

Normally we have a boat run that usually comes every seven days (PT6)

Participants indicated that in determining the frequency of food supplies to offshore facilities, the management of the facilities consider the logistical costs.

Now that oil companies are trying to cut costs, our supply that used to be every seven days is now every 10 days, just to reduce the cost of logistics (PT10)

One participant showed understanding and appreciation of the logistical challenges associated with delivering foods offshore. They expressed that understanding by noting

that for an offshore facility that is probably 100 kilometers away from shore, one cannot decide to walk to a grocery shop at any time to buy groceries, in contrast to what obtains on onshore oilfield facilities where it is possible to receive food deliveries extemporaneously.

You're, you know, 100km from town so it's not like you can always go and get vegetables when you feel like making soup. So you have to preserve your food
(PT15)

It is interesting to note that as a Rig Superintendent, PT15 spoke from the context of a management representative who has the responsibility of planning and coordinating logistical arrangements for the supply of foods offshore and is therefore expected to support, rather than criticize, the food supply decisions made by management.

Expectedly, several participants had a different view from PT15, on the food supply strategies adopted by management. For example, PT14 noted that food supplies to most offshore locations are made once in two or three weeks or in some instances on a weekly basis, rather than more frequently. PT2 indicated that this is done to limit logistical costs and suggested that management put a premium on economics over the workers' health.

You know, everything offshore has to do with the cost.the way offshore they.. management look at the benefits vis-a-vis the cost and once they find out that you have to supply just because you need to supply fruits, fresh fruits and you have to be supplying them every other day, you know cost wise it doesn't make sense to them (PT2).

They are foods that you get like maybe, once in two weeks if you are lucky, they

bring them once in two weeks and they are stored in the refrigerator for a long time and for some locations it can be up to 3 weeks before you can get a fresh food (PT14).

Additionally, it was found that participants who hold senior offshore positions tend to be more accepting of management decisions and policies on food related issues than their colleagues who occupy junior positions. That is evident in the difference of opinion expressed by PT5, a senior member of staff and, PT2 and PT14 who are junior staff members. It highlights that workers' views on dietary matters are influenced by their organisational hierarchical positions.

The responses to the interview question "as an offshore worker, what challenges might you have maintaining a healthy eating habit or engaging in physical activity as much as you would like, while offshore?" revealed that the participants expressed different opinions on their capacity to make free and independent dietary and physical activity choices while they are offshore. Several of them contended that deciding what to eat and whether or not to engage in physical activity depends solely on self-discipline. For example, in the following responses PT3 and PT6 imply that the participants in this study lacked self-control and self-discipline, and that the unhealthy eating and low participation in physical activity found among them is attributable to these factors.

Discipline yourself to know that you don't need this.... This. Take what you need to eat so that you eat healthy. Its under your control. Its that discipline that is the challenge to offshore workers (PT3).

Self-discipline needs to come in. Despite the fact that you are very busy, you have to create time for yourself, to make sure that you don't skip your exercise (PT6).

However, other participants dissented with their colleagues' arguments above. For instance, PT6 and PT22 suggested that the workers' exercise of agency is limited by the subsisting arrangements and environmental conditions offshore. These include, a lack of control by the workers over the way food is prepared and served offshore and, the inclement physical offshore environmental factors, including the effects of turbulence and sea sways, which hinder participation in physical activity.

Unlike in the field where you have to abide with the food being provided for you, but at home, you can eat whatever you want to eat (PT6).

Many people don't have control over the way the food is prepared and served (PT22).

When you are being tossed about because of the turbulence and the sways, em sometimes it makes you feel a little less healthy than you normally will, so that affects trying to go to the gym after the days work (PT11).

4.3.3.2 Confined, cramped and restrictive environment

Participants described the offshore work and living environment as confined, restrictive and with limited space. This results in the careful management of the available space on the facilities, with negative impact on the participants' eating habits.

We stay in an environment where you have limited movement (PT6).

Offshore things are cramped together so you have limited space to walk around (PT3).

We all know that we try to manage space as much as possible on FPSOs, so that's a challenge (PT11).

On the deck there are pipelines everywhere, so people who really do not take [inaudible 00:40:31] know about the environment can have...slip and fall.

It was highlighted that the confinement and restriction of movement inherent in the offshore environment poses a challenge to the participants. Bored and with nowhere else to go to at the end of each days' job, participants are confined to their living quarters where food is freely available. PT5 and PT16 suggested that in an effort to overcome the boredom in an environment of free and abundant food, the participants resort to snacking and eating in-between meals, thus using food as a coping mechanism.

Being that you are at a particular place, you are seeing the food, you have access to it without restriction, you don't have even much places to move around, it's just within the ship environment. The challenge is, you can't move away from these things, they are staring at you each time you go there and come back and you are tempted to taste, even if you want to abstain from it completely you are tempted to taste, (PT5).

The offshore environment where you are more like let me use the word partially confined, from work to the mess room to your room. In your room you have food in the fridge stocked, you are bored and so, a way of trying to provide solution or proffer solution to being bored is by eating. You start eating in between meals (PT16).

Below excerpts from the responses by PT11 and PT17 show that it is common to see some participants eat up to their bed time and others wake up at night to eat, highlighting the seriousness of the eating problem among the population.

Maybe in the night you wake up and you are hungry you know the kitchen is always open and you go and grab and eat. And sometimes you are bored and the only thing you can think of let me just eat something (PT11).

It is a confined environment, you really don't have much doing after work, you go to the t.v room, watch t.v, play games, and take a bite of snacks with your friends before you go to sleep. So I guess the constraint in a confined environment makes you eat more than you usually do (PT17).

The restriction and confinement experienced by the participants while offshore also influence their eating habits in another way. Participants revealed that due to space limitations, the dining areas are often not large enough to accommodate all the workers during meals. Therefore, as indicated by PT7, workers eat in groups and each group eats very fast in order to leave the dining area and make room for another group.

The mess hall is not that big so there is a limited time for a particular meal. Maybe as you are eating you see some persons, they are looking for where to sit, so you will just have eat as fast as you can, make space for others as well (PT7).

The findings also show that the confined offshore environment impacts the participants' physical activity behaviours. Participants identified two ways in which this occurs. First, they noted that due to the cramped environment, there is limited space for workers to walk and run on the facilities. This discourages participants from engaging in those types of physical activity while offshore. Second, they highlighted that in most cases, the space available for citing of gymnasia is inadequate and therefore cannot accommodate all the necessary physical activity equipment. This in turn limits the types of exercises that participants can engage in while in the gymnasia.

Offshore things are cramped together so you have limited space to walk around (PT3).

Space is always a problem on platforms, so the spaces for gym are not really big enough (P11).

Let me be very particular as regards my own location where I work. They...they keep telling us it is possible they can bring in gym equipment but they don't have the space to be able to do so (PT13).

4.3.4 The offshore social environment.

The offshore social environment was found to be a determinant of the workers' eating and physical activity behaviours. The participants portrayed the offshore environment as both dangerous and socially isolating. For example, PT4 described it as '*the middle of nowhere*' and a place no one would ordinarily want to be in except for the purpose of earning a living.

The offshore environment is not a place you want ordinarily....., the only thing driving us there is to make ends meet. You're in the middle of nowhere (PT 4).

The participants indicated that they have the need for social support and to meet that need, they often try to socialise after work, despite being in a socially isolating environment. As PT15 indicated, the socialising only takes place in the galleys and television rooms where free food is abundantly available, thus creating an error-enforcing condition, that is, a condition in the workplace or that relates to an individual, which can cause them to engage in unsafe acts or behaviours (Fyhr, Ternov and Ek, 2017), thereby increasing the allurements to snack and eat in-between meals. Evidently, the participants succumb to the allurements most of the times, as highlighted by PT15 and PT17.

Most of the social activity is done in the galley so if you said to somebody I have this story to tell you, I'll tell you when I'm at the galley..... if I know there's somebody I like to gesticulate with in the galley I'll go sit down there for 30 minutes and I'm not going to sit down for 30 minutes doing nothing, I'm going to sit down there for 30 minutes eating something. (PT15).

The need to socialise because it's a restricted environment, you want to socialise and there are no alcohols, so the best you can do is grab a bottle of soda and snacks and chat with friends after work (PT17).

The data analysis suggested that the participants like to eat in groups while offshore. That is evident in the response by PT1, as shown below. Clusters of friends, often from the same work group, would go to the galley together and in the process, they influence each other's food choices. For example, PT8 related an experience where the type of food selected by the first member of a group to arrive at the galley was also selected by other members of that group. It was reported that the participants feel a sense of belonging when their dietary choices converge with those of members of their social group. This highlights that social connections exert strong influence on the participants' eating habits.

We go as a group. Most time people will come and then chat So most times I go with people around my office, we... we go and grab a bite and then go back (PT1).

It's interesting when I see it happening you know, you go to the galley, one of your friends goes through, the first person to take, whatever the first person takes the second, the third, and the fourth will most likely take the same thing. It's almost like they think, you want to belong (PT8).

Social connections also influence the participants' physical activity. The study found that by associating with their colleagues who worked out in the gymnasium offshore, some participants were positively influenced and started working out. For example, PT8 related an experience where they started going to the gymnasium while offshore, due to the

encouragement they received from their gymnasium-going friends. Conversely, PT17 suggested that participants who associate with a social group whose members do not engage in physical activity often do not see the need for physical activity.

If you have a circle of friends that go to the gym and look fit, you would want to do that, even if you don't normally do and I know there are some platforms I have been to where I had one or two friends that try to go to the gym and when they want to go they call on you "guy are you going today?" and stuff like that and it's encouraging (PT8).

Offshore the colleagues would rather gist and crack jokes with a bottle of soda and snacks than go to the gym and so that can discourage you as well (PT17).

The above findings confirm the influence of social connections and networks on health behaviours and validate the social determinants of health model (Dahlgren & Whitehead, 1991).

4.3.5: Culture

One of the layers of the social determinants of health model (Dahlgren and Whitehead, 1991), depicts culture as a determinant of health behaviour. In agreement with the model, this study found that organisational and national cultures exert influence on Nigerian offshore oilfield workers' eating habits and physical activity. The pathways of the influence are discussed below.

4.3.5.1 Offshore oilfield organisational culture

This study found that the offshore work culture exerts influence on the workers' physical activity. In order to meet the production targets, offshore oilfield operations are normally run on a twenty-four-hour continuous basis. This demands continuous physical and psychological effort on the part of the workers, resulting in high levels of job stress and exhaustion. The participants indicated that in some cases, the level of exhaustion they experience after work can be so high that they barely manage to eat and shower before sleeping off.

Maybe the job is such that it takes a long time to complete, you must have been exhausted, tired, let me just go and eat, shower and sleep (PT9).

You will work from morning till 5 o'clock by the time you come back, you are, in terms of strength, you just want to go and sleep (PT16).

It was clear that some of the participants have the desire to engage in physical activity while offshore. PT6 expressed that desire when they stated, *"I can do a lot of exercise and even when there is gym there"*. However, as the response by PT5 indicates, many times such desires are not met because the participants are often too exhausted at the end of each day, to engage in any physical activity.

To be honest with you, anytime I have hectic job, I do serious maintenance job, I don't have the time and the strength to go to gym (PT5).

I can do a lot of exercise and even when there is gym there, see because of the work pressure, you may not even have time to go to the gym (PT6).

The participants described the offshore operating environment as “*extremely risky*” and “*a place anything can happen*”, suggesting that incidents can occur unexpectedly and escalate rapidly.

It's a place anything can happen and you're in the middle of nowhere (PT4).

The nature of offshore platforms, I mean you are sitting on a platform that produces oil and gas, that flares gas, it's extremely volatile, extremely risky (PT8).

The participants spoke about the offshore hierarchical structure and how it impacts the workers' eating habits. It was reported that it is common to see senior and junior mess halls, separated from each other, on offshore oilfield facilities, as indicated by PT4.

Mess halls yes we have senior... senior mess for senior staff and management.

We also have another one for junior staff and contractors (PT4).

Discussing the separation of junior and senior mess halls on offshore oilfields, PT6 spoke about the need for management to visit the junior mess halls regularly, in order to assess what and how the workers eat and to engage them in discussions on healthy eating. This suggests that less attention is given to the junior mess halls, compared to the senior ones, likely due to the segregation. It also shows that there are more concerns

over the eating habits of the participants that fall into the ‘junior worker’ category, when compared to their senior colleagues.

Most times, in our management meeting, we always say that rather than always going outside, please let's also try and go to the junior mess and see how we can actually engage them, see what they eat (PT6).

Furthermore, the findings show that due to the hierarchy culture in place on Nigerian offshore oilfields, senior members of the work crew often enjoy certain informal privileges which are not extended to other categories of workers. For example, PT15 was able to have a special meal prepared for them, as a result of occupying a senior position on a rig.

As the company representative, you get to have certain perks and if you're friends with the chef, I don't see why he wouldn't make concessions for you. So, I mean, I used the fact that I was the company rep on that location to get fish cooked for me every day (PT15).

The above response by PT15 shows that one's hierarchical position on the offshore oilfield accords them special privileges, including having meals that are not on the menu. It also suggests that certain categories of workers can pick and choose what food they eat while the rest of the workers are bound to eat whatever is served. This highlights the influence of the offshore oilfield hierarchy culture on the participants' diets and dietary behaviours.

4.3.5.2 National Culture

This study found that the Nigerian national culture exerts influence over the participants' eating habits and physical activity. The participants spoke about how the Nigerian culture emphasises the consumption of carbohydrate-based foods. They described most of the traditional crops grown by Nigerians as being very rich in carbohydrates and noted that it is common place to see carbohydrates as a major part of all the meals of the day in a typical Nigerian home. For example, PT13 noted that Nigerians look forward to meal times with assured expectation of having carbohydrate-based foods on the menu.

Up till of recent, the highest occupation had always been farming.... farming of yam, cassava, corn.....something physical (PT8).

We Nigerians, we have some typical foods which we expect to be on our menu almost on a daily basis which is carbohydrate based and that is it (PT13).

If you look at Nigeria, we are used to more of taking garri, amala, eba, yam, rice, that's what we are used to (PT10).

The participants further highlighted the link between the Nigerian national culture and the consumption of carbohydrate-based foods by Nigerians. For example, in their responses below, PT12 and PT6 indicated that as the participants grew up eating carbohydrate-based foods, they eventually developed an enduring liking for such foods so much so that even when they are offshore where other types of food are provided, their food choices still reflect a preference for carbohydrate-based foods.

For most people it's what they were brought up on, so even though one is working offshore, they are still able to relate with the meals you've had growing up and you continue to feed on those ones like the cassava, yam, plantain and all that. People still tend to eat what they were brought up on (PT12).

Our beliefs and customs and what we eat offshore go along. Normally, you know, it's just the environment we come from, people believe you can eat eba, garri, akpu, three times in a day (PT6).

Further evidence of the influence of national culture on the participants' eating habits is brought out in the following responses by PT13 and PT17 who suggested that Nigerians culturally associate good health with curviness, the consumption of large portions of food and for men, having a pot belly. Therefore, the participants have a good attitude, rather than a negative one, towards overweight and obesity. Such an attitude encourages the eating of large portions of food.

Culture plays a prominent role. you know, traditionally Africans believe if you are fat (curvy) then you are probably wealthy, you know if you're thin then you are poor (PT13).

Basically, it is not seen as anything wrong to eat as much as you can in my culture. The more you eat, the more healthy you look. You look fat and you look fresh that's healthy and it's something that's welcome so the culture doesn't see it as anything bad if your waistline is big and your tummy is protruding, as a man (PT17).

The findings also reveal another pathway through which the Nigerian national food culture exerts influence on the participants' eating habits. PT16 acknowledged that most decision makers on Nigerian offshore oilfields are Nigerians who also have liking for carbohydrate-based foods. Therefore, their decisions regarding the foods provided for Nigerians on offshore facilities reflect these food preferences which are mediated by the Nigerian national food culture.

Most of the food we take (as Nigerians) are carbohydrate that is why this has also been replicated offshore because offshore those people taking decisions in the office are Nigerian, okay (PT16).

Additionally, the study shows that the Nigerian national culture does not encourage participation in physical activity. As PT8 commented earlier, until recently, the major occupation in Nigeria was subsistence farming which involves vigorous activity. Also, PT5 noted that there is a feeling among Nigerians that their daily struggles are more than enough physical exercise. Therefore, they do not see the need for them to engage in additional physical activity after exerting themselves vigorously on the farms and in their other daily life activities. In view of the foregoing, PT5 and PT8 suggested that there is a general apathy towards physical activity among Nigerians.

In Nigeria to be precise, we don't have natural time for recreation, we don't have natural time for exercises. We feel our labour and struggles for the day is even more than enough exercise for us (PT5).

Basically, Nigerians we don't consider physical activity an issue, and I think too that stands from the fact that over the years, before now, we've always had a very physical lifestyle and so the demerits of not being physical had not been felt. So, we don't have a culture of physical activities and that's why till today when you see people on the street jogging, it looks alien to us, it's not a normal thing (PT8)

PT6 indicated that such feelings of apathy to physical activity appear to be changing gradually. However, the response by PT5 below suggests that apathy to physical activity still pervades among many of the participants of this study.

So, the mentality about physical activity is changing. So, I'll say people are beginning to see the value of physical activity even walking 30 minutes in a day is very good for the body (PT6).

Most times I walk round the plant three times in a day doing my job, why do you expect me to go to the gym again, that is more than enough exercise (P5).

The findings examined in section 4.3.5.2 of this thesis reveal that national culture exerts a strong influence over the participants' eating habits and physical activity behaviours thus validating Dahlgren and Whitehead's (1991) depiction of culture as a determinant of lifestyle behaviours.

4.4: Theme 3: ‘Healthy’ as nourishing and work enhancing

Theme 3 encapsulates and explores Nigerian offshore oilfield workers’ perception of healthy eating. The findings of this study show that the participants perceive healthy eating through a bi-focal lens. While some associate it with nourishment of the body, others perceive it from the work perspective and see it as eating food that helps one perform their work efficiently.

4.4.1: Eating for nourishment

Several participants associated healthy eating with the consumption of food that nourishes the body. When talking about what constitutes nourishing food, they identified two important attributes namely; composition and quantity. For example, PT10 suggested that healthy eating means eating the “right stuff” at the right quantity and the right time. Although timing of meals was mentioned as another aspect of healthy eating, it did not come out as strongly as composition and quantity, during the conversation with the participants.

In summary, it means eating the right stuff at the right time and at the right quantity (PT10).

Other participants elucidated what constitutes “the right stuff” referred to by PT10. For example, PT1, PT2 and PT11 indicated that healthy eating refers to eating meals that are balanced or that contain the right combination of all the food classes, that is, protein, carbohydrates, vegetables, fats, fruits, etcetera. This highlights the concept of food combination as an element of healthy eating, suggesting that healthy eating involves much

more than eating meals that contain all the classes of food, but also includes combining the food classes in a way that ensures that the maximum amount of nutrients is derived from the food.

I think it means eating em.... the right combination of em...of all the....the food classes, vegetables, fats, fruits, proteins, carbohydrates, in moderation. (PT1)

Its going to be balanced carbohydrates, protein, eeeh, your fruits, vegetables You know..., at different..... I know it as proportionals, so that's the way I define healthy eating (PT2).

Though the foods are in abundance you have to eat right, eat the right quantity and the right combination of the meals (PT11).

Food portion control was also recognised as an element of healthy eating. For example, both PT13 and PT19 used the expressions “the right quantity of food” and “the right amount of food” when describing healthy eating. This is indicative of a perception among the participants that for eating to be healthy, the right quantity of food needs to be eaten. PT19 reinforced that understanding by suggesting that eating the right quantity of food helps to prevent overweight and obesity.

Healthy eating, to me, is eating the right quantity of food and choosing the right nutrients that can actually help you function (PT13).

Healthy eating means eating the right amount of food at least to be active and that would not make me obese or overweight (PT19).

4.4.2: Eating for work

Other participants perceived healthy eating from a work perspective. They associated it with the eating of food that enhances work performance, as highlighted in below comment by PT12.

Many people know how much energy they actually need to expend at work so they eat to have the right amount of energy generated from the meals. So the quantity they take may not be in line but is adequate to give them the strength they need to work (PT12).

PT5 and PT16 suggested that participants with this view of healthy eating are driven by the desire to achieve efficiency in their work and often consume heavy meals, in preference to vegetable meals and fruits, in the belief that a heavy meal gives them more energy to perform their work, than other foods like vegetables.

We have been made to believe that you must eat heavy meals, not veggies, for you to perform your job well (PT5).

There's this perception, if you eat light you won't have the energy to work very well and it's going to affect the company's overall production (PT16).

Similarly, PT15 highlighted the participants' preference for beef and chicken as opposed to fish. It was suggested that beef and chicken are "stronger protein" than fish, that is, that

they provide more energy than fish. This group of participants focus on work performance while offshore. Therefore, any food that helps them maintain or enhance their level of productivity is considered healthy. These findings suggest that there is an association between the participants' perception of healthy eating and their high consumption beef and large portions of food. In other words, the consumption of beef and heavy meals is premised on the perception that they provide the right amount of energy the participants need to work efficiently and are therefore considered healthy. PT21 suggested that such a view is underpinned by the nature of offshore work which is arduous, requiring strenuous effort and the exertion of a high amount of energy.

For some reason I've come to know that a lot of Nigerians, offshore anyway, seem to prefer eating beef and chicken. They feel those are stronger protein than your actual fish (PT15).

Because of the nature of the work that a lot of the guys do which requires a lot of heavy lifting, a lot of movement, most people seem to just eat a lot of food that they think will provide energy for them (PT21)

The findings presented in this section lend credence to the suggestion that work environment influences offshore workers' eating habits and further validate the Dahlgren and Whitehead (1991) model of social determinants of health.

4.5 Summary of Chapter 4:

Analysis of data collected during this study revealed a predominance of unhealthy eating and poor physical activity among the study population. It showed a pattern of high consumption of carbohydrates, red meat, sugary and fatty foods, large and repeated

servings of foods, as well as low participation in physical activity, by the participants. Interestingly, the study found that there is a considerable level of dietary knowledge among the participants, as well as unsuccessful efforts by some of the participants to change their health behaviours. The failure to achieve the desired change often leads to discouragement, resignation and the use of deflection as a coping mechanism.

The study also found that the unhealthy behaviours are underpinned by free access to abundant food, lack of food portion control, the remote, confined, cramped and socially isolating nature of offshore environment which creates a strong allurements for unhealthy dietary habits and discourages participation in physical activity. Other factors that influence the participants' eating and physical activity behaviours include; the offshore organisational culture which leads to high levels of stress and exhaustion, the dominant hierarchical structure which emphasises segregation by job classification, and the Nigerian national culture which encourages the consumption of high carbohydrate foods and apathy to physical activity. The study findings reveal that the participants perceive healthy eating from two prisms namely; eating to nourish the body and eating to enhance work efficiency.

CHAPTER 5: DISCUSSION OF THE FINDINGS

5.1 Introduction

This chapter first discusses the contributions made by this study to the body of knowledge on offshore oilfield workers' eating habits and physical activity. It then proceeds to discuss the key findings of the study (5.3), the Nigerian offshore oilfield workers' eating habits (5.4.1) and physical activity (5.4.2), the determinants of the two health behaviours among the study population (5.5) and, the population's perception of the concept of healthy eating (5.6). Furthermore, section 5.7 addresses the absence of significant discussions on overweight and obesity from the study participants' responses, while 5.8 discusses the issue of agency and structure among the study participants. The chapter also discusses how the population's eating habits and physical activity are theorised in this study (5.9). Finally, section 5.10 presents the limitations of the study.

5.2 Contribution to knowledge

This study has made original contribution to the body of knowledge on offshore oilfield workers' eating habits and physical activity, with benefits for future health behaviour research, theory and practice. To the best of my knowledge, the study is the only one to highlight the influence of national culture on offshore oilfield workers' eating habits and physical activity as none of the existing studies has identified or addressed the relationship between national culture and these two health behaviours, among that population. The study is also the only one to identify that space limitations offshore affects the size of dining areas, resulting in hurried eating by the participants and leading to overeating amongst the population. In addition, this study is the first to reveal that the offshore

oilfield population perceives healthy eating as eating food that nourishes the body or eating to enhance work efficiency.

In furtherance, the present study is also the first to explore the eating habits and physical activities of Nigerian offshore oilfield workers, using a qualitative research design. By utilising a qualitative research design which allowed the capturing of the subjective and multiple experiences and views of Nigerian offshore oilfield workers on their eating habits and physical activity, this study has revealed the multi-layered factors that underpin the behaviours among that population. Additionally, the study is the only one to utilise the social determinants of health model (Dahlgren and Whitehead, 1991) as a theoretical framework for the study of offshore oilfield workers' eating habits and physical activity. Its findings have shown that eating habits and physical activity, represented as individual lifestyle factors in the social determinants of health model, interact with and are influenced by social networks, living and working conditions, and culture. In so doing, the study provides further evidence of the interaction between the model's constructs, thus addressing one of the criticisms of the model, bridging the knowledge gap and establishing that the model can be effectively utilised as a theoretical framework for the study of offshore oilfield worker health behaviours. It therefore sets the groundwork for its use in similar studies in the future.

The findings of this study will enable enhanced understanding of offshore worker eating habits and physical activity, with benefits for offshore health behaviour management. Managers of offshore oilfield installations and health behaviour change practitioners can now improve offshore worker eating behaviour and physical activity change programmes and interventions by incorporating the novel cultural and other factors identified by this

study, thus making them more effective, with a view to maintaining a safe and healthy workforce and positively impacting work performance.

5.3 Key Findings

This study found that there is a high consumption of carbohydrates, red meat, fatty and sugary foods, overeating and, a general pattern of low participation in physical activity, among the participants. The study also shows that there is a considerable level of nutritional knowledge among the participants although such knowledge has not resulted in healthy eating and physical activity behaviours by the participants. Furthermore, the study has revealed that the unhealthy eating and physical activity behaviours found among the participants are underpinned by the following factors: (1) free access to abundant food, (2) lack of food portion control, (3) the remote and marine nature of offshore work locations, (4) the confined, cramped and socially-isolating offshore work environment, (5) the oilfield organisational culture and, (6) the Nigerian national culture. The study further reveals that the participants perceive healthy eating as either eating food that nourishes the body or that enhances work efficiency.

These findings are subsumed under the three overarching themes identified during data analysis and are discussed in detail in this chapter, within the context of the existing literature and the underpinning theoretical perspective of this study. It is imperative to note that the conversations around the concept of physical activity did not elicit responses that would enable an appreciation of the participants' perception of the construct, despite the researcher's follow up questions. Therefore, future studies should focus on this aspect of the population's physical activity, in order to enable an understanding of their perception of the construct 'physical activity'.

5.4 Offshore worker eating habits and physical activity

The first objective of this study was to explore eating habits and physical activity of Nigerian offshore oilfield workers. The study found a pattern of unhealthy eating and physical activity behaviours among the study population.

5.4.1 Eating habits

The participants were asked to describe their eating habits while offshore. The findings show that there is a high consumption of carbohydrates, red meat, fatty and sugary foods and drinks, overeating, as well as consumption of large portions of food, among the participants. Carbohydrate-based foods like rice, bread, yam, garri and amala (powdery food flour made from the roots of cassava in the case of garri and yam in the case of amala) constitute a dominant part of meals eaten by the participants. These findings are consistent with the findings of earlier studies on health behaviours of offshore oilfield workers. For example, in their study on diet among oilfield workers in the Norwegian sector of the North Sea, Oshaug, Ostgard and Trygg (1992) found high intake of meat, fat and cholesterol, and soft (sugary) drinks among the workers, although a subsequent study suggests a positive change in the dietary behaviours of the workers between 1985 and 1993 (Oshaug et al., 1995). Other studies conducted in the UK (Mearns and Hope, 2005), the Dutch continental shelf (Riethmeister, et al., 2015) and in Nigeria (Iwot, 2009) reveal a similar pattern of unhealthy eating among offshore oilfield workers while the study by Gibson Smith K. et al. (2018b) identified eating healthily as a principal behaviour requiring change among the offshore population.

A considerable level of nutritional knowledge was found among the participants of the present study. This is at variance with the findings of the Gibson Smith (2016) study on

promoting and implementing selfcare among the offshore population which revealed a lack of nutritional knowledge among the participants. Furthermore, although studies by Oshaug et al., (1995), Parkes (2003), Gibson Smith (2016) and Gibson-Smith et al. (2018) assert that having dietary knowledge is associated with healthy eating, the participants to the present study continued to eat unhealthily despite having good dietary knowledge. This is congruent with findings made by Perron and Endres (1985), Worsley (2002) and Ekeagwu (2017), suggesting that there are inconsistencies in the evidence regarding the influence that nutritional knowledge exerts on dietary habits. For instance, Perron and Endres (1985) found no significant correlation between nutritional knowledge and dietary intake among female athletes. Also, while acknowledging the role of nutritional knowledge in dietary behaviour change, Worsley (2002) argues that nutritional knowledge alone is insufficient to bring about the change, as the recipients of such knowledge would need to translate it and do what they like with it within the context of other factors like the social, physical, internal and external environment. Therefore, the present study further sheds light on the nuance in the evidence on the relationship between nutritional knowledge and dietary behaviour and in doing so, it demonstrates that other factors, apart from nutritional knowledge, exert influence on offshore oilfield workers eating habits. The finding has implications for offshore worker dietary behaviour change in that it illustrates that in order to be effective, dietary behaviour change programmes on offshore oil installations need to incorporate such other factors that exert influence on dietary behaviour, rather than focus entirely on nutritional awareness. The reasons why good nutritional knowledge does not always lead to healthy eating could be explored by future studies.

This study also reveals that the participants often express surprise and indignation at the excessively large food portion sizes often consumed by their colleagues. The inability of the participants to eat healthily despite such expressions and irrespective of their considerably high level of nutritional knowledge suggests that the workers do not have the capacity to make free and independent food choices while offshore, as factors outside their control exert overbearing influence on their eating habits. This finding is similar to that reported by Gibson Smith (2016) who highlighted the influence of will power on eating habits.

5.4.2 Physical activity

This study found a general pattern of low participation in physical activity among the study population as majority of the participants do not engage in physical activity. This is consistent with the findings of earlier studies of offshore oilfield workers in both Europe and Asia. For example, studies by Light and Gibson (1986) and Mearns and Hope (2005) highlight the inconsistent uptake of leisure-time physical activity by UK offshore workers. Similarly, Oshaug, Ostgård, & Trygg (1992) found that only one third of workers on offshore oil installations in the Norwegian sector of the North Sea exercised. Studies on the Asian offshore oilfield population show the same pattern as Chen, Wong, and Yu, (2008) found that 63.1% of the participants in a study of Chinese offshore oil workers were physically inactive in their leisure time.

Furthermore, the present study found that despite the low or non-participation in physical activity by most of the participants, a limited number of them made personal efforts to work out, some on an irregular basis. For such participants, the low or non-participation by the majority of their colleagues was discouraging and demotivating, making it more difficult for them to maintain their physical activity routine. This finding

is in consonance with the existing evidence which suggests that the physical activity habits of friends and colleagues impact motivation and that offshore workers are more likely to engage in physical activity if their peers and colleagues are also physically active (Riethmeister et al., 2015; Gibson Smith, 2016 and Gibson Smith et al., 2018b). Evidence from outside the offshore environment also highlights the influence of social support on physical activity participation as studies by Bennie, Salmon and Crawford (2010), Dunton et al. (2012) and Darlow and Xu (2011), Tamers et al. (2011) and Booth et al. (2000) link higher social support with increased engagement in physical activity. In reinforcing the importance of co-worker support as a determinant of physical activity participation among offshore oilfield workers, this study's finding will further encourage oilfield installation managers to identify ways of increasing co-worker support as a means of improving their employees' participation in physical activity.

5.5 Determinants of Nigerian offshore oilfield workers' eating habits and physical activity

The second objective of this study was to explore the work-related and socio-cultural factors that underlie Nigerian offshore oilfield workers' eating habits and physical activity. The study found that the workers' eating habits and physical activity are determined by free access to abundant variety of foods, lack of food portion control, the physical offshore living and working environment, the offshore social environment, and culture. These factors exert considerable influence on the workers, shaping and influencing their eating and physical activity behaviours.

5.5.1 Free access to abundant variety of foods

The findings of this study have revealed that an abundant variety and quantity of food is made available on offshore oilfield installations, by the management of the facilities. Meals are of the buffet type, with large quantities and varieties of food served four times a day. There are also tea breaks in between the major meals during which sugary snacks are served. In addition, snacks are made available at several locations and workers have free access to them at all times. It was interesting that the participants described some of the food as unhealthy and the quantity available as excessive. This confirms that the participants have good nutritional knowledge, as discussed in section 5.4.1 of this thesis. Similar findings were made on offshore oilfield installations in the United Kingdom (Light and Gibson, 1986; Parkes, 2003; Gibson Smith, 2016 and Gibson-Smith et al., 2018), the Dutch continental shelf (Riethmeister, et al., 2015) and the Norwegian sector of the North Sea (Oshaug, Ostgard and Trygg, 1992), suggesting that free access to an abundant variety and quantity of food may be a global phenomenon on offshore oilfield installations.

The free access to an abundant variety and quantity of food constitutes an allurements to the participants, such that although they have a good knowledge of healthy eating, they are not able to resist the urge to engage in unhealthy eating. Evidence suggests that easy access to large amount of food can lead to overeating among offshore oilfield workers. For example, studies by Light and Gibson (1986), Parkes (2003), Riethmeister et al. (2015), Gibson Smith (2016) and Gibson-Smith et al. (2018) show that the large amount of food made available on the UK and Dutch oil installations makes it difficult for the workers to eat healthily. Also, dietary variety has been implicated as one of the underpinning factors for overeating. In their study on the association of dietary variety

with energy intake and body fatness in men and women, McCrory et al. (1999) found that dietary variety, especially from energy dense foods like sweets, snacks and carbohydrates, was positively associated with energy intake. Additionally, Temple, et al. (2008) found that dietary variety disrupts habituation, thus resulting in increased energy intake. Habituation is defined as a behavioural phenomenon in which there is a decrease in the response to a stimulus due to repeated presentation of the stimulus (Raynor and Epstein, 2001).

Although the participants to this study have good nutritional knowledge, the easy access to abundant food and, the disrupted habituation due to constant exposure to dietary variety, act as barriers to the use of the acquired nutritional knowledge in the making of dietary choices. This finding has theoretical and practical implications for health behaviour management. First, it sheds light on the influence of socio-environmental factors on dietary choices in particular and, health behaviours in general, thus highlighting the need for health behaviour research to adopt theoretical frameworks such as the social determinants of health model (Dahlgren and Whitehead, 1991) that integrate and emphasize multiple levels of influence on health behaviours. Second, it provides support and impetus for the development of dietary advice such as the reduction of the quantity and variety of food provided on offshore oilfield installations, as this will likely help in the management of the overeating problem found among the study population.

5.5.2 Lack of food portion control

Lack of food portion control was found to be another factor that determines the study population's eating habits. The present study found that there are no limits on the

quantity of food or the number of food servings that an individual can take at a given meal time. The participants take as much food as they want and many indicated that they were often surprised at some of their colleagues' food portion sizes which they considered excessively large.

In consonance with the above finding, the studies by Light and Gibson (1986) and Gibson Smith (2016) revealed that large portion size encourages unhealthy eating among the offshore population. Existing evidence outside the offshore oil industry also shows that large food portion size impacts the quantity of food consumed. For instance, a meta-analysis of 86 independent comparisons from 58 studies, carried out by Hollands et al. (2015) found evidence that exposure to larger food portion sizes increases quantities of food consumed among children and adults. Also, in a study of the effects of food portion size on chronic energy intake carried out by Jeffery et al. (2007), daily lunch boxes of identical meals but different portion sizes (large and small) were given to the participants for two months, with the sizes switched from large to small and vice versa, after the first month. The results showed that the mean 24-hour energy intake was higher by 278 kcal/day in the large, as compared to the small, lunch periods. It is therefore evident that the lack of food portion control on Nigerian offshore oilfield installations induces the participants of this study to overeat, perhaps exacerbating their urge for food and resulting in other unhealthy eating behaviours, including secret eating, which the participants suggested is widespread among the study population.

Although a study carried out by Edelman et al. (1986) found no significant effects on food intake with portion size changes, overwhelming evidence suggests that controlling food portion by reducing the portion size, that is, the amount of food served (Herman et

al. 2015), is effective in reducing the amount of food consumed (Rolls, Morris, and Roe, 2002; Hollands, et al., 2015; Herman et al., 2015; Robinson and Kersbergen, 2018). For example, the results of an experimental study on food portion size and later food intake carried out by Robinson and Kersbergen (2018) show that reducing food portion sizes may change an individual's perceptions of what a normal amount of food to eat is and therefore decrease how much they choose to eat, without resulting in later compensatory eating. Furthermore, Rolls, Morris, and Roe (2002) reported that 30% more energy (676 kJ) was consumed when participants to their study on portion size effect on energy intake were given the largest portion, compared to when they were given the smallest portion.

The above evidence points to the importance and effectiveness of food portion size control as a means of managing the amount of food consumed. Therefore, although food is freely and abundantly available on Nigerian offshore oilfield facilities, the workers could be encouraged to limit the quantity of food they consume if food portion control strategies were implemented. The effect of the food portion control could be optimised by also reducing the food variety provided, as suggested in section 5.5.1 of this chapter. However, the downstream impact of implementation of these suggestions, including on workers' morale, needs to be determined.

5.5.3 The physical offshore living and working environment

In line with the layers of influence on health behaviours as espoused by the Dahlgren & Whitehead (1991) model, this thesis highlights two attributes of the physical offshore living and working environment which influence offshore oilfield workers' eating

habits and physical activity. These are; (1) the remote and marine nature of offshore locations and, (2) the confined and cramped living and working conditions.

5.5.3.1 The remote and marine nature of offshore locations

The study population's eating habits and physical activity are impacted by the nature of the offshore oilfield locations. Most offshore oilfield facilities are remotely located, many nautical miles away from shore. Food deliveries to the facilities are therefore made by boats, at high financial costs to the management of the facilities. This study found that in determining the frequency of food supplies to the facilities, management consider the logistical costs. This is consistent with the findings of a study on health and wellbeing in the offshore environment which revealed that the management of offshore facilities in the UK continental shelf place a premium on financial costs, when making catering related decisions (Mearns and Hope, 2005). Evidently, to limit the associated logistical costs, food supplies to most offshore locations in Nigeria are made once in two or three weeks or in some instances, on a weekly basis, rather than more frequently.

There was a significant debate by the participants over the adequacy and the justifications for the frequency of food deliveries to offshore oilfield locations. They held nuanced opinions on the issue, based on their positions on the organisations' hierarchy. Employees in senior positions were more accepting of and tended to justify management decisions and policies on food related issues, including food deliveries. Understandably, as management representatives on the offshore facilities, these employees are normally expected to support, rather than criticize, management decisions. On the other hand, the junior and middle level employees do not approve of the food delivery frequency and the

justification adduced by management. They suggested that management puts a premium on economics, over the health and wellbeing of the workers.

Two important issues are highlighted by the above finding. First, there is a perceived lack of management commitment and support for healthy eating, among the junior and middle ranks of the Nigerian offshore oilfield workforce. Mearns, Hope and Reader (2006) argue that perceived organizational support is significantly associated with employee behaviours. This suggests that employees are more likely to engage in healthy dietary behaviours when they perceive that their management supports and is committed to healthy eating initiatives. Therefore, this study sheds light on the perceived lack of management support for and commitment to healthy eating behaviours on Nigerian offshore oilfields. By doing so, it creates awareness on the problem and provides opportunities for management to take actions to correct the negative perception and possibly, improve the workers eating behaviours. The finding also suggests that an individual's position on an organisation's hierarchical structure, often a critical determinant of remuneration and socio-economic status, influences their views on dietary matters and ultimately their eating habits. It therefore shows that as espoused by the 'social determinants of health model' (Dahlgren and Whitehead, 1991), socio-economic factors exert a measure of influence on lifestyle behaviours.

Data analysis revealed that the participants' eating and physical activity behaviours are also impacted by the marine nature of offshore oilfields. Wind and sea conditions offshore are unpredictable (Parkes, 2012). Therefore, rigs, vessels and other offshore facilities are often affected by turbulence and sea sways, sometimes resulting in erratic motion on the facilities (Lackner, 2014). This may cause sea sickness, a form of motion

sickness, to the employees, resulting in drowsiness, headache, sweating, stomach discomfort, nausea, fatigue and vomiting (Bos et al., 2007; Murdin, Golding and Bronstein, 2011). The participants suggested that under such conditions, it is difficult if not impossible, to eat or engage in physical activity. Lackner (2014) argues that in some cases of the sickness, an individual may experience profound drowsiness and persistent fatigue referred to as “sopite syndrome”, and that this may last for hours or even days if the exposure to erratic motion is prolonged. During this period, eating and physical activity patterns are altered. Although some studies have examined the eating and physical activity behaviours on some offshore oilfields, they made no attempt to explore the link between the two health behaviours and exposure to sea sickness. For example, Gibson Smith (2016) identified weather condition as a determinant of eating behaviours. However, this was in reference to how cold or warm the weather is and not with respect to the turbulence and erratic motions resulting from sea conditions.

5.5.3.2 The confined, cramped and restrictive living and working environment

The offshore working and living environment is cramped and restrictive (Sutherland and Cooper, 1996; Parkes, 2012). The participants to the present study suggested that at the end of each day’s job, workers are confined to their living quarters where free food is constantly available. The restriction often results in boredom and this study found that the participants use snacking and eating in-between meals as a coping mechanism for the boredom. Similar findings have been made by previous studies. For instance, both Parkes (1998), Gibson Smith (2016) and Gibson-Smith et al. (2018b) found that boredom was associated with increased likelihood of eating unhealthily among offshore oilfield workers. Consequently, the implementation of boredom management strategies such as

the provision of indoor games on Nigerian offshore oilfield installations, may confer the added benefit of helping to control food intake among the study population.

Aside from the use of food as a coping mechanism for boredom, the findings of this study suggest that due to the cramped and restrictive work and living environment, participants see food regularly and this influences their eating habits. McCrickerd and Forde (2016) argue that the sensory properties of foods start working even before an eating event. In line with that argument, Wansink (2004) found that seeing food close by triggers meal initiation. Although Lattimore and Mead (2015) found that individual differences may account for variations in the desire to eat following exposure to food and food cues, the finding by Wansink (2004) suggests that the regular sight of food creates a condition of allurements and a longing for food by this study's participants, thus negatively impacting their inhibitory control over food intake. The reduced inhibitory control over food intake appears to be significant among the participants as the present study found that some would eat up to their bed time and others would wake up at night to eat. This link between regular sighting of food and reduced control over food consumption among offshore workers is not highlighted by any of the existing studies.

This study identified another pathway through which the cramped environment on offshore oilfield installations affects the workers' eating habits and physical activity. Due to space limitations on the installations, the dining areas are often small in size and do not accommodate all the workers during meal times. Therefore, workers eat in groups and in rotation, thus resulting in each group taking their meals hurriedly, in order to make room for other groups, with implications for their food intake. Evidence on the effects of eating rate on food intake is inconsistent. For example, while Spiegel and

Jordan (1978), Andrade, Greene and Melanson (2008), Zandian et al. (2012) and Karl et al. (2013) either found that eating faster results in more food intake or that eating slower results in decreased food intake, Yeomans et al. (1997) found that slower eating rate is associated with greater food intake. A systematic review and meta-analysis of twenty-two studies on the effects of eating rate on food intake carried out by Robinson et al. (2014) found inconsistencies in the results of the studies and attributed them to differences in the eating rate change interventions employed by the studies. Nonetheless, Robinson et al. (2014) concluded that a slower eating rate is associated with lower energy intake. In consideration of the available evidence therefore, the findings of the present study suggest that the hurried eating by Nigerian offshore oilfield workers may increase their food intake, impacting their eating habits. This aspect of offshore oilfield workers' eating habits had remained unexplored by previous studies.

The present study has demonstrated that the cramped offshore environment also impacts the participants' physical activity behaviours. The participants suggested that due to the cramped environment, the space available for physical activities like jogging and leisure walking is inadequate. They further noted that the deck areas of most installations are small in size, with process pipes and equipment which may constitute trip hazards. This discourages the participants from engaging in such types of physical activity. Therefore, study participants' experience of the offshore environment is that of a workplace where the facilities are designed for maximal oil and gas production, with minimal provisions for facilities that encourage and promote effective engagement in physical activity. This experience agrees with Light and Gibson (1986, p103) argument that the nature of the offshore environment does not encourage "active dynamic exercise". Also, the participants of the present enquiry noted that as a result of the limited space availability,

gymnasias on board the installations are often small and cannot accommodate all the necessary physical activity facilities. This in turn limits the types of exercises that the workers can engage in while in the gymnasias and acts as a discouragement to physical activity participation. Consistent with this finding, Mearns and Hope (2005) and Gibson (2016) found that poor gym facility is an impediment to physical activity participation on UK offshore installations, although the studies do not discuss the pathway through which the impediment occurs. Gibson-Smith et al. (2018b) contend that improving gymnasium facilities on the installations will improve participation. Therefore, interventions to improve offshore gymnasium facilities may be effective in encouraging and improving participation in physical activity among the offshore oilfield population.

5.5.4 The offshore social environment

Drawing on the concepts in the social determinants of health model (Dahlgren & Whitehead, 1991), evidence provided in this section of the thesis confirms the influence of social environment on health behaviours. Participants in this study described the offshore social environment as exerting influence on their eating and physical activity behaviours. The environment is recognised as being socially isolating (Gatlin and Alvarez, 1987; Collinson, 1998). While on duty, participants are away from home, separated from their families, friends and significant others for extended periods of time (Collinson, 1998). The situation is aggravated by the limited occasions for social activities on the installations and the high emphasis on work by offshore management. Therefore, workers experience a disruption of their social life while on duty offshore. However, as the seeking of social affiliation is an essential part of human existence (Eger et al., 2013), the participants feel the need for social support, despite being in a socially isolating environment. This study found that to meet that need, they often try to socialise after work and most of such socialising takes place in the galleys and television

rooms, where free food is abundantly available. The availability of food in these social venues presents a challenge to the participants in that it results in an increased temptation to eat. Zhang et al. (2019) argue that the temptation of food can be suppressed with a self-control strategy. However, the present enquiry found that due to the structures in place on offshore oilfield installations, including the social, physical and environmental elements, the workers appear to have a reduced agentic capacity, as well as a decreased inhibitory control over food intake. Similarly, Gibson Smith (2016) found that the ability or lack of it, to resist the temptation to eat unhealthily is a determinant of eating behaviours. Data analysis shows that the present study participants often succumb to the temptation to eat, thus snacking and eating in-between meals, while engaged in social activities.

The participants commented that arising from the need to socialise in a socially isolating environment, they establish social connections with their colleagues. Such connections exert strong influence over Nigerian offshore oilfield workers' eating habits. Similar findings were made by Gibson Smith (2016) and Gibson Smith et al. (2018b). Data analysis shows that the Nigerian offshore oilfield workers like to eat in groups while offshore. So, clusters of friends, often from the same work group, would go to the galley together, to eat. As Higgs and Thomas (2016) argue, people's dietary choices tend to converge with those of their close social connections and there is a feeling of belongingness that comes from eating with members of one's social group.

van den Boer and Mars (2015, p.25) define modeling as "the process during which food intake is affected by the intake of an eating companion". Evidence from this study suggests that as the participants eat together in their social groups, food modelling takes

place, resulting in the convergence of their dietary choices. Higgs and Thomas (2016) argue that people tend to eat larger amounts when they eat in a group than when they eat alone. Also, a meta-analytic review of thirty-eight (38) studies on the effects of modelling on food intake carried out by Vartanian et al. (2015) showed that people eat more when their companions eat more and less when their companions eat less. They concluded that modelling exerts compelling influence over food intake. This study has revealed that the participants not only adjust the types of food they eat, but also the amount, possibly eating larger quantities, as a result of eating with their offshore social group. This is the first study to identify how food modelling occurs among offshore oilfield workers. However, it should be noted that there was no evidence from the participants' responses to suggest that the influence exerted on the workers' eating habits differed from one group to another or from one individual to another depending on who or what group they were eating with. Therefore, it may be useful to examine this in future studies.

Evidence from this study shows that besides influencing their eating habits, the offshore social environment also impacts the participants' physical activity. Section 5.4.2 of this chapter has explored the evidence relating to how that occurs. Therefore, a further examination of the evidence in this section is not considered necessary.

5.5.5 Culture

Culture is defined by Mironenko and Sorokin (2018, p.338) as “a multidimensional phenomenon that encompasses processes, products and results of human activity, material and spiritual, transmitted from generation to generation in a non-biological way”. In the social determinants of health model, Dahlgren and Whitehead (1991)

conceptualise culture as a critical determinant of health behaviour. In a validation of that conceptualisation, this study found that organisational and national cultures exert significant influence on Nigerian offshore oilfield workers' eating habits and physical activity thus determining what and how they eat, whether or not they participate in physical activity, as well as to what extent they do so. The pathways of influence are discussed in the following two sections (5.5.5.1 and 5.5.5.2) of this thesis.

5.5.5.1 Organisational culture

Several definitions of organisational culture exist. However, this thesis relies on the definition by Hemmelgarn, Glisson and James (2006) who describe it as the shared norms, beliefs, and behavioural expectations of an organisation which determine among other things, the content and objectives of the work accomplished in that organisation. There are several models of organisational culture (Yu and Wu, 2009). This thesis adopts and focuses on one of the models, the competing values framework model, which has been described as “one of the most influential and extensively used models in the area of organisational culture research” (Yu and Wu, 2009, p.37). The model conceptualises four culture types, namely; clan, adhocracy, market and hierarchy (Melo, Silva and Parreira, 2014). It describes the hierarchy culture as having an internal focus. A workplace with the hierarchy culture has a clear structure, with standardised rules, procedures and strict control. Emphasis is often on coordination, efficiency, consistency, and leaders act like monitors and coordinators (Yu and Wu, 2009; Melo, Silva and Parreira, 2014).

The findings from this study suggest that the hierarchy culture is dominant on Nigerian offshore oilfields and a person's position on the hierarchical structure determines the

level of influence they wield. Participants described the offshore operating environment as “*extremely risky*” and “*a place anything can happen*”. This suggests that there is a high potential for rapid escalation of incidents. Therefore, to ensure incident prevention, a critical condition for continuous and consistent oil and gas production, there is a low tolerance for mistakes and strict compliance with institutional procedures is required of all persons. Enforcing these requirements demands a formalised setting, with emphasis on strict control and efficiency. As can be seen from the brief overview of the competing values framework model, these are all elements of the hierarchy culture.

This study has revealed that due to the pre-eminence of the hierarchy culture, senior members of the offshore oilfield crew are influential and often enjoy certain informal dietary privileges which are not extended to other categories of workers. The findings further show that there is an assured certainty that one’s senior position will accord them such special privileges. For example, analysis of data shows that such employees can pick and choose what meals they eat. They can also request that special and healthier meals be prepared for them while the rest of the workers eat whatever is on the menu. This suggests that what and how the participants eat while offshore depends on their position on the hierarchical structure. Therefore, it could be argued that the subsisting hierarchy culture on Nigerian offshore oilfields influences the workers’ eating habits. However, further research is needed, to explore the association between organisational culture and offshore oilfield workers’ eating habits.

Furthermore, the nature of offshore oilfield operations requires consistency, an element of the hierarchy culture. The operations are normally run on a twenty-four-hour continuous and consistent basis, with a 12-hour shift work pattern (Collinson, 1998).

This demands continuous physical and psychological effort on the part of the workers, resulting in high levels of job stress (Chen, Wong, and Yu, 2008). Riethmeister et al. (2015) argue that the offshore oilfield workforce has a macho work mentality and that workers are seen as tough people who should not report weaknesses. Therefore, they continue to exert themselves even when they are stressed. This often leads to high levels of exhaustion among the workers.

The participants of the present study indicated that their jobs were physically demanding and that they often felt very tired at the end of each day's job. Although they did not discuss the extent to which the jobs were physically demanding, the study found that due to the resulting exhaustion, many become apathetic and passive to physical activity and ultimately, they are discouraged from engaging in it. This is consistent with the findings of existing studies. For example, in their study which focused on offshore drilling workers, Mehta et al. (2019) found that the population generally experienced mental or cognitive and physical fatigue or a combination of both, due to the characteristics of their jobs or roles. Parkes (2012) also argues that the physically demanding nature of offshore work and the intensive shift patterns create a potential for fatigue among the workers. Furthermore, studies by Light and Gibson (1986), Mearns and Hope (2005) and, Gibson Smith (2016) reveal that offshore oilfield workers are often too tired to participate in any form of leisure time physical activity after a 12-hour shift.

Evidence from outside the oilfield sector also points to a link between job stress and physical inactivity. Although some of the studies (Steptoe, Lipsey and Wardle, 1998; Ali and Lindstrom, 2006) found no association between the two phenomena and Wu

and Porell (2000) found association among white-collar workers and males but none among blue-collar workers and females, several other studies (Oshio, Tsutsumi and Inoue, 2016; Fransson, et al., 2012; Payne, Jones, and Harris, 2002) provide abundant evidence associating job stress with physical inactivity. For instance, a meta-analysis of individual participant data of 170,000 Men and Women (Fransson, et al., 2012) and a review of literature on 55 prospective studies on the effects of stress on physical activity (Stults-Kolehmainen and Sinha, 2014) associate job stress with less physical activity or increased risk of physical inactivity. A similar finding was made by Oshio, Tsutsumi and Inoue (2016) in their study among a Japanese occupational cohort. From the findings of the present study and the wealth of existing evidence as shown above, it is reasonable to argue that by engendering an environment of high job stress and exhaustion, the hierarchy culture on Nigerian offshore oilfields acts as a barrier to the population's participation in physical activity. Therefore, efforts should be made to identify and manage the job stressors in the organisations, as this will likely improve physical activity participation among the population.

5.5.5.2 National Culture

One of the novel contributions made by the present study to the body of knowledge is the revelation that national culture exerts a strong influence over offshore oilfield workers' eating habits and physical activity behaviours. National culture has been defined and operationalised in different ways. Hofstede (1980, p.21) defines it as "the collective programming of the mind which distinguishes the members of one human group from another..... culture in this sense includes systems of values". Hofstede, Hofstede and Minkov (2010, p.520) indicate that people acquire national culture while "growing up in a particular country". The above renderings of national culture imply that it is

made up of values acquired and shared by people in a particular country and that the values guide and determine the people's actions and attitudes towards objects, persons, and situations (de Mooij, 2017).

Norman and Conner (2005) and Swierad, Vartanian and King (2017) argue that national culture exerts influence on people's health behaviours. Furthermore, Reddy and Anitha (2015) assert that food is often culturally classified as some foods may be classified as either edible or inedible by human beings while others may be classified as either food that gives energy or that is consumed as luxury. This cultural classification of food has a bearing on what food is consumed by a people. Existing evidence from outside the offshore environment support the arguments by Norman and Conner (2005), Swierad, Vartanian and King (2017) and, Reddy and Anitha (2015). For instance, a study conducted by Puoane et al. (2006) among black African population in South Africa revealed that consumption of meat on a daily basis is associated with a high socio-economic status while serving someone fatty meat is a sign of generosity. The researchers assert that these food practices are learned during socialisation processes within the individual's culture. Also, Roudsari et al. (2017) found that culture plays a major role in determining the food choices of adult Iranians.

The participants of the present study identified the Nigerian national food culture as a determinant of the Nigerian offshore oilfield workers' eating habits. They indicated that Nigerians are a very hard-working people and up until recently, the highest occupation among the people had been subsistence farming which involves vigorous activity necessitating the eating of high calorie foods or food that is classified as "energy giving". Birabi, Dienye and Ndukwu (2012) confirm the high physical demands of

farming processes in Nigeria in their study on the prevalence of low back pain among peasant farmers in a rural community in South Nigeria. The participants of the present study also suggested that the Nigerian culture emphasises the consumption of carbohydrate-based foods and noted that such foods constitute a major part of meals in a typical Nigerian home. This is consistent with the assertion by Oboh and Olumese (2010) who described a typical Nigerian diet as a combination of a carbohydrate based meal with soup or stew cooked in palm oil and very small amount of protein. The offshore workers in this study further reported that they grew up eating heavy and carbohydrate-based foods, promoted by their national food culture. Therefore, over time, they developed an enduring affinity for such foods so much so that even while offshore, their food choices reflect a preference for carbohydrates. Additionally, analysis of the responses shows that the preference for carbohydrates by Nigerian offshore workers is also underpinned by the believe by several of the participants that carbohydrate-based foods provide the amount of energy they need to perform their jobs efficiently, compared to other types of food.

This study also found that cultural perceptions of body size exert influence on the population's food intake. The participants highlighted that Nigerians culturally associate good health with curviness, the consumption of large portions of food and for men, having a pot belly. They noted that a man is seen as wealthy when they have a pot belly and a woman is considered more attractive when they have a heavy body. This is consistent with the results of several studies outside the offshore environment (Furnham and Baguma, 1994; Cogan et al., 1996; Tovee et al., 2006; Puoane et al., 2005; and Mvo, Dick and Steyn, 1999) which show that women with larger and curvy body shapes are seen as being more attractive in Africa, although the findings of Kruger et al. (2020) study in a rural village of Botswana indicate a preference for women with leaner images.

As related by the participants of this study, that perception of the concept of good health engenders a good attitude, rather than a negative one, towards overweight and obesity, thus encouraging the eating of large portions of food by the study population.

It is important to note that the consumption of carbohydrate rich foods is not peculiar to Nigeria as such dietary habits have been found in some other countries. For instance, evidence indicates that carbohydrate-rich foods are the main sources of energy in Chinese diets (Yang et al., 2019) and among Czech and Polish populations (Boylan et al., 2009). However, the underlying reasons for the consumption of such foods may differ from one country to the other. As discussed in the preceding paragraphs, the Nigerian offshore oilfield workers' preference for carbohydrates is underpinned by the population's cultural perceptions of 'good health' and by the prevailing farming methods which create the perceived need for consumption of high energy foods, in order to achieve efficient work performance.

National culture also impacts Nigerian offshore oilfield population's eating habits through the decisions made by offshore oilfield managers. The workers that participated in this study indicated that most decision makers on Nigerian offshore oilfields are Nigerians. They also highlighted that such individuals often bring their national food cultural biases to bear on the decisions they make regarding the provision of foods on the facilities, with the result that most of the foods provided for Nigerian offshore oilfield workers on offshore facilities ultimately reflect the Nigerian national food culture.

The impact of culture extends to the participants' physical activity as it has been found to have a modulating effect on physical activity participation. Iwot (2009) asserts that the African culture, including that of Nigeria, views exercising as a childhood pastime rather than an important consideration for the health and wellbeing of adults. The present study reveals the reason for such perception. As discussed in the preceding paragraphs, the participants of the present enquiry indicated that until recently, the major occupation in Nigeria was subsistence farming which involves vigorous activity. They further stated that Nigerians often argue that there is no need for them to engage in additional physical activity after exerting themselves vigorously on the farms and suggested that this tends to lead to a general feeling of apathy towards physical activity among the Nigerian population. Although the participants noted that such feelings of apathy to physical activity appear to be changing gradually, they also indicated that it still pervades among many Nigerian offshore workers, thus leading to low or no participation in physical activity.

These findings, which were not highlighted by previous studies, validate the social determinant of health model's (Dahlgren and Whitehead, 1991) depiction of culture as a determinant of lifestyle behaviours. The findings also highlight that an understanding of the interaction between national culture and nutrition may be of benefit in the design of nutrition intervention programmes on offshore oilfields.

5.6 Offshore oilfield workers' perception of healthy eating

This study made another novel finding regarding the concept of healthy eating among the offshore oilfield population. Paquette (2005) argues that an individual's perception of healthy eating can influence their eating habit, highlighting the importance of a study

population's perception of the concept. In this study, healthy eating was perceived from a bi-focal lens. Therefore, there was a divide among the study population with regards to their understanding of the concept. While a proportion of them associated it with nourishment of the body, others perceived it from a work prism, that is, they saw it as eating food that helps one perform their work efficiently. This finding is unique in that no other study has explored offshore oilfield workers' perception of the concept of healthy eating.

5.6.1 Eating for nourishment

There was an association of healthy eating with the consumption of food that nourishes the body. Within this perspective of healthy eating, nourishing food is conceptualised as having two important attributes namely; composition and quantity of meals. Although a third attribute, timing of meals, was mentioned, it did not come out as strongly as composition and quantity. Nonetheless, the mere mention of timing of meals by the participants suggests a recognition of that concept as being an element of healthy eating. Composition of food as an attribute of healthy eating was highlighted by the study findings. There was a perception among these workers that for eating to be healthy, meals need to be balanced, that is, they need to contain the right combination of all the food classes, including, protein, carbohydrates, minerals, vitamins, fats and oils, etcetera. This suggests an understanding of healthy eating as involving much more than eating meals that contain all the classes of food, but also, combining the food classes in a way that ensures that the maximum amount of nutrition is derived from the food. Next, portion control was recognised as an element of healthy eating. The expressions, "the right quantity of food" and "the right amount of food" were used repeatedly by the study participants when describing healthy eating. They acknowledged that eating the right

quantity of food helps to prevent overweight and obesity, thus suggesting that for eating to be healthy, not only do meals need to contain all the classes of food at the right combination, but also, the right quantity needs to be eaten. This perception of healthy eating is in consonance with the views expressed by participants of many studies outside the offshore oilfield who perceive the concept of healthy eating as involving nutrient balance, variety of food and moderation in terms of the quantity consumed (Correa et al., 2017; Falk et al., 2001; Margetts et al., 1997; Banna et al., 2016).

Furst et al. (1996) argue that an individual's perception of healthy eating is a critical determinant of their food choice and hence, their eating habits. Following the Furst et al. (1996) argument, one would expect that most of the participants of the present study would eat healthily, based on their perception of healthy eating. Interestingly, that was not the case, as significant unhealthy eating was found among them. This suggests that an individual's dietary actions may not always align with their perception of healthy eating. Other elements such as the social, cultural and environmental factors espoused in the 'social determinants of health model' (Dahlgren and Whitehead, 1991), may exert a stronger influence on an individual than their perception, thus determining their eventual food choice and eating habits. For example, Brown et al. (2015) study on perceptions and attitudes towards food choice in adolescents in Gaborone, Botswana, revealed that the ability to act on one's perceptions is influenced by external factors, including food availability, location, social and cultural influences. Other studies have found that there is a gap between perceptions and practices with regards to food choice (Falk, Bisogni and Sobal, 1996; Paquette, 2005).

5.6.2 Eating for work

Another group of participants perceived healthy eating from a work prism. The view among this category of participants is that a person eats healthily when they consume foods that enhance their work performance. As has been shown by this study and existing evidence (Gatlin and Alvarez, 1987), offshore work is physically demanding, requiring the exertion of high levels of energy. Data from the present study suggest that the participants that hold the ‘work performance’ view of healthy eating are work focused, driven by the offshore organisational culture which emphasises efficiency and consistency, and by their desire to achieve efficiency in their work performance. Therefore, to achieve that desire, they believe that they require high levels of energy supply and often consume heavy and carbohydrate- based meals, in preference to vegetable and fruits, in the belief that such foods will give them more energy to perform their work.

The findings also suggest that such a belief is rooted in the cultural history of Nigerians. As discussed in section 5.5.5.2 of this thesis, Nigerians are a very hard-working people, and in the past, subsistence farming which involves vigorous activity and the exertion of high levels of energy, was the primary occupation of most Nigerians. This necessitated the eating of high calorie foods or “energy giving” foods, with the primary purpose of enhancing one’s work performance at the farms. Therefore, based on their cultural leanings, these participants view heavy and carbohydrate-based foods as providing the level of energy they need for efficient work performance and the consumption of such foods as healthy. This perspective on healthy eating is consistent with the findings of a study by Banna et al. (2016) among Chinese and American undergraduate students,

which show that in addition to other elements, the Chinese students associated healthy diet with increasing strength.

The nuance in the present study's participants' perspectives on healthy eating and the multiplicity of perspectives held by the participants of existing studies is congruent with the assertion by Paquette (2005) that perceptions of healthy eating are varied and multiple. Such differences highlight the relevance to this study, of the social constructionist philosophical paradigm, which recognises that the meanings people assign to phenomena are varied and multiple but equally valid. They also validate the assertion in the 'social determinants of health' model (Dahlgren and Whitehead, 1991) that broader socio-cultural and environmental factors exert influence on people's lifestyles. Therefore, to achieve better results, offshore oilfield dietary behaviour interventions should explore and incorporate the varied perceptions of healthy eating among the workers, as well as the broader factors that impinge on those perceptions.

5.7 Overweight and Obesity

Exploration of the participants' understanding of the concepts of overweight and obesity was not one of the objectives of this study. However, in view of the relevance of overweight and obesity as health outcomes of unhealthy eating and poor physical activity, it is pertinent to highlight their absence from the discussions by the participants and thus from the findings of this study. Although, PT6 and PT14 noted that high consumption of carbohydrates and beef can result in weight gain and PT19 linked healthy eating with prevention of obesity or overweight, the responses do not convey any understanding of obesity or overweight by the participants. Future studies may

explore offshore oilfield workers' understanding of the concepts of overweight and obesity.

5.8 Agency and Structure

The issue of Nigerian offshore oilfield workers' agency, that is, their capacity to make free and independent food and physical activity choices while offshore came up strongly during the interviews with the participants. Although there was agreement among the participants that as humans, they all possess agency, there was however a disagreement regarding the exercise of such agency. Several of the participants of this study argued that offshore oilfield workers have the capacity to make dietary and physical activity choices for themselves and should therefore exercise such agency, irrespective of the factors external to the individual. They therefore attributed the unhealthy eating and physical activity behaviours found among the participants to a lack of self-control and self-discipline, rather than to a lack of agency. Gibson-Smith et al (2018b) had found that a higher level of will power was associated with increased engagement in positive behaviours among offshore oilfield workers. This perspective is based on the individualistic approach to health-related behaviours which places most, if not all, of the responsibilities for health-related practices on individuals (Morris, et al., 2012), without giving recognition to the place of structure in the determination of such practices.

However, in difference to their colleagues, other participants expressed feelings of powerlessness and diminished agentic capacity in respect of their dietary and physical activity choices. They suggested that while they do indeed possess agency, its exercise is bound by the limits imposed by the structures in place on Nigerian offshore oilfields. Such participants averred that elements of the structures such as; the offshore organisational culture with its emphasis on control, efficiency and continuous

production, the catering arrangements which do not allow workers to participate in the decision making process regarding what foods are prepared and served offshore, the inclement physical and environmental factors offshore which include the effects of turbulence and sea sways, stifle and restrict agency, resulting in their not being able to make dietary and physical activity choices freely and independently. In other words, these participants situated their capacity to make free and independent dietary and physical activity choices within the envelope of the subsisting offshore living, working and environmental conditions, factors which the 'social determinants of health model' (Dahlgren and Whitehead, 1991) recognises as determinants of health behaviours. Previous studies identified that environmental factors impact offshore workers eating habits and physical activity. For example, Gibson Smith (2016) found that having control over how food is prepared determined the population's eating habits while weather conditions and availability of resources influenced their physical activity participation.

The participants' nuanced perspectives on their capacity, or the lack of it, to make free and independent dietary and physical activity choices, as shown above, highlight the relevance to this study, of the social constructionist philosophical worldview which recognises that people's experiences and accounts of realities are multiple and varied yet valid. It also highlights the ongoing debate about the roles of agency and structure in the determination of health behaviours (Choby and Clark, 2014), which debate is rooted in theoretical and ontological differences. Therefore, there are the individualist and structuralist positions, as well as what I would describe as a middle-ground position. It is not the intention of this thesis to join that debate or to analyse the theoretical and ontological underpins of the debate as such does not fall within the scope of this study.

However, in an attempt to locate this study's participants' views on the agency-structure continuum, a brief description of the positions on both sides of the agency-structure divide is presented below.

There are several variants of the definition of agency and structure (Choby and Clark, 2014). This thesis adopts the definitions by Glanz, Rimmer & Viswanath (2015, p.220) who describe agency as 'a personal sense of control' and by Montero (2015, p47) who render structure as 'the context in which human action takes place' For this thesis, such context includes those elements of the offshore work, living and socio-cultural environment external to the individual.

The individualist position on health behaviours stands on the side of agency. It holds that behaviour, in this case health behaviour, is practised and solely controlled by the individual, who is seen as independent of their surroundings (Crawford, 1977), divorced, unperturbed and unconstrained by any factors in the social context (Frohlich et al., 2001). Behavioural health choices are perceived as based on individual judgement and reflection, and responsibility for health behaviours is placed entirely on the individual. For researchers that hold this view, health behaviour change comes through knowledge, self-control, self-discipline and self-regulation (Frohlich et al., 2001). Therefore, behaviour change interventions that are underpinned by the individualist view tend to target the individual. However, Choby and Clark (2014) argue that such an approach to health behaviours has often failed to elicit the desired change.

The structuralist position on the other hand, holds that health behaviours are determined by structure. Following Max Weber's conceptualisation of lifestyles as involving

“choices and chances”, Frohlich (2001) argues that rather than being unrelated to structure as depicted by individualists, people’s choices are socially determined, being influenced by structure. Montero (2015) argues that for the structuralist, structure exerts influence on agency by marking out the boundary within which agency is exercised thus suggesting that whatever agency individuals have are exercised within the context of the operation of the elements in the existing structure. In other words, this perspective gives more impetus to structure than to agency. Therefore, in acknowledging that they have agency but arguing that their exercise of it is determined by the offshore living, working and environmental conditions, several of the participants of the present study take the structuralist position on the agency-structure continuum and I would argue that such a position aligns with the concepts in the ‘social determinants of health model’ (Dahlgren and Whitehead, 1991).

The third position on the agency-structure debate takes a middle ground and holds that agency and structure interact with and influence each other, leading to the desired change in both the individual and the environment (Glanz, Rimmer & Viswanath, 2015). Archer (1995, cited in Montero, 2015), a prominent proponent of this position on the agency-structure debate, conceptualises agency and structure as having a reciprocal relationship whereby neither of them can exist independently of the other. Therefore, they interact with and influence each other, with structure establishing the necessary context and space wherein human actions develop and take place, while the actions themselves set the necessary conditions for structure to continue existing. Hence, Choby and Clark (2014) argue that when an agent undertakes a course of action, it is based in some part on individual judgment or reflection, while also being constrained by structural elements that condition what choices are possible for any

individual. Similarly, discussing the temporal self-regulation theory, Hall and Fong (2007) acknowledge that self-regulatory capacity, defined as “an individual’s ability to exert control over their behaviour, thoughts, and feelings” (Ozhiganova, 2018, p.259), is an important aspect of individual health behaviour. However, they argue that the social and physical environment which they refer to as ambient temporal contingencies, can, along with other factors such as intention and self-regulatory capacity, simultaneously moderate the amount of effortful self-regulation required and an individual’s ability, to translate intention into action, thus determining the eventual outcomes of a decision to engage in a healthy behaviour. Those structural elements or ambient temporal contingencies are what the ‘social determinants of health model’ (Dahlgren and Whitehead, 1991) conceptualises as the broader social, cultural and environmental factors which influence the lifestyle choices of individuals.

5.9 Theorising offshore oilfield workers’ eating habits and physical activity: the social determinants of health model

This study utilised the ‘social determinants of health’ model, a multi-level, broad theoretical framework that provided a broader theoretical base for the study. The identification and extraction of the critical elements in the participants’ accounts of the factors that influence their eating habits and physical activity and, the interpretation of those accounts, were carried out at the backdrop of the social determinants of health model, thus enabling the multilayering of the influences on the two behaviours of interest, making possible the nuanced findings made by this study and helping to explain them.

While recognising that the participants make dietary and physical activity choices, this study found that such choices are not made freely and independently, but are influenced

by several factors that fall within the layers of the model and which are external to and uncontrolled by the participants. The factors and the layers they represent are examined below.

5.9.1 ‘Social and community networks’ layer

The impact of social and community networks on health behaviours was brought out in this study. The offshore social environment is located within the social and community networks element of the ‘social determinants of health’ model. This layer of the model determines dietary and physical activity behaviours among the study participants through several pathways. First, the socially isolating offshore environment forces participants to socialise in locations that create the temptation to overeat and decreases their inhibitory control over food intake. Second, the social affiliations that occur among the workers result in food modelling, the adjusting of the types and quantities of foods consumed by the participants, and the convergence of their dietary choices. Third, social support or the absence of it, encourages or discourages participation in physical activity.

5.9.2 ‘Living and working conditions’ layer

Free access to an abundant variety of foods, lack of food portion control and, the confined living and working conditions offshore operate at the living and working conditions layer of the ‘social determinants of health’ model. It is evident from this study that these factors create an allurements to overeat, thus impacting the participants’ eating habits. Also, the confined living and working conditions result in inadequate space for physical activity, thus discouraging participation in it. This study and its findings contribute to the social determinants of health model in that they confirm the interaction between individual lifestyles and living and working conditions.

5.9.3 ‘Cultural and environmental conditions’ layer

The remote and marine nature of offshore locations and, organisational and national cultures were conceptualised as behavioural determinants within the ‘cultural and environmental conditions’ layer of the ‘social determinants of health’ model. The remoteness of offshore locations impacts the frequency of food deliveries, with a secondary impact on the quality of meals provided on the facilities. The adverse weather conditions on offshore facilities affect the health conditions of the participants, subsequently influencing their eating and physical activity patterns, while the dominant organisational and national cultures were found to influence the participants eating habits and physical activity.

5.9.4 Bringing it all Together Within the SDH Model

This section brings together the findings of the present study and highlights their interactions within the context of the Social Determinants of Health model. As offshore oilfield workplaces are located in remote and marine environments where conditions are confined and cramped, the workers are socially isolated from their family members, friends and significant others. To meet the need for social support therefore, they form social bonds with each other, socialising in galleys and television rooms where free food is abundantly available and there is a lack food portion control, thus determining how they eat. The confined and cramped living and working conditions also directly impinge upon and influence the population’s eating and physical activity behaviours, further mediated by the weather conditions and the subsisting organisational and national cultures which themselves also shape how the workers’ perceive the construct ‘healthy eating’. These findings and their interactions within the social determinants of health model are depicted in a new version of the model which is presented as figure 8 below.

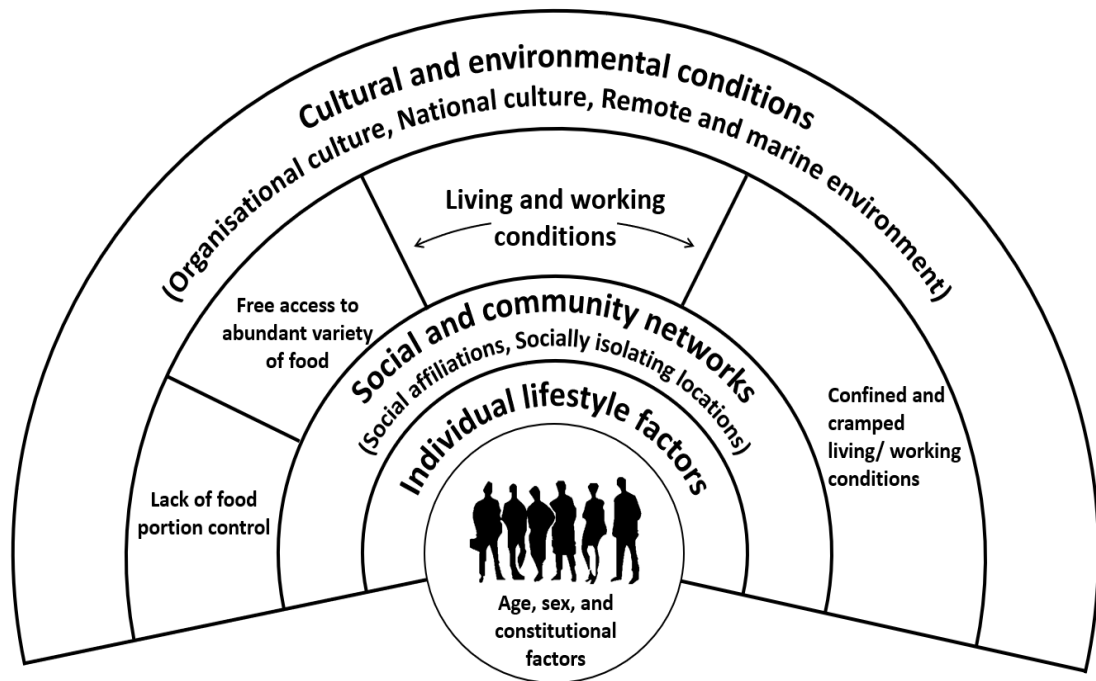


Figure 8: New version of the Social Determinants of Health model based on the findings of the present study.

5.10 Limitations of the study

The section presents the limitations of this study. They include the sample limitations, the recruitment limitations, the limitations related to the participants' perception of the concept of physical activity and those related to the theoretical perspectives of this study. These are discussed below.

5.10.1 Sample Limitations

The sample for the present study comprised twenty-two Nigerian offshore oilfield workers. Therefore, the findings might not completely reflect the experiences of all Nigerian offshore oilfield workers with respect to their eating habits and physical activity. However, to address this limitation, the researcher ensured that the participants' occupations reflected the diverse professions that work within a typical offshore oil field. Furthermore, as the offshore workforce is male dominated, it was not possible to

recruit an equal number of males and females with the relevant characteristics to participate in the study. In view of this, only three of the twenty-two participants are females. Therefore, the participants' gendered experiences of the studied phenomena may not have been fully captured. Consequently, there may be need for more female participation in future studies on Nigerian offshore oilfield workers' eating habits and physical activity.

5.10.2 Recruitment limitation

Furthermore, the initial participants for this study were recruited through snowball sampling, from among offshore workers whom the researcher was already familiar with. Due to the familiarity, such participants may have given socially desirable answers to the interview questions, rather than provide honest answers. This could potentially bias the study and its findings. This was anticipated and a predetermined effort was made to be consistent during the interviews, with probing questions asked and unclear responses followed up, in order to clarify them.

5.10.3 Limitations related to the participants' perception of the construct 'physical activity'

Another limitation of this study is that it does not capture the participants' perception of the construct 'physical activity'. Therefore, that aspect of the study's objective was not met. In view of the above, there may be need for future studies on Nigerian offshore oilfield workers' physical activity to further explore the population's perception of the construct.

5.10.4 Limitations related to the theoretical perspective of this study

Although health behaviour has been recognised to occur within the context of rapid technological change (Glanz, 2008), the theoretical framework that underpins this study, the social determinants of health model (Dahlgren & Whitehead, 1991), does not contain elements related to technology. Therefore, any technological factors that may influence the study population's eating habits and physical activity were not explored. This may have impacted the diversity of the study findings.

CHAPTER 6: CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

This study has generated new knowledge on offshore oilfield workers' eating and physical activity behaviours. It has revealed that national culture influences the population's eating habits and their engagement in physical activity. The study has also identified that space limitations offshore affect the size of dining areas, leading to hurried eating and resulting in overeating by the offshore population. In addition, it has shown that food modelling occurs among the offshore population and also revealed that the population perceives the construct 'healthy eating' as either eating food that nourishes the body or one that enhances work performance. These novel findings will help offshore oilfield installation managers and health behaviour change practitioners to improve the effectiveness of health behaviour change programmes and interventions, thus maintaining a healthy workforce and positively impacting work performance.

Other findings made by this study have reinforced the findings made by previous studies. They include high consumption of carbohydrates, red meat, fatty and sugary foods, overeating and, a general pattern of low participation in physical activity by the offshore population. Also, in consonance with the existing studies, the present study shows that the unhealthy eating and physical activity behaviours found among the participants are also underpinned by free access to abundant food, lack of food portion control, the remote and marine nature of offshore work locations, the confined, cramped and socially-isolating offshore work environment and the offshore oilfield organisational culture.

6.2 Recommendations

6.2.1 Offshore worker health behaviour change programmes and interventions

Based on the findings of this study, it is recommended that offshore oilfield worker health behaviour change programmes and interventions incorporate the socio-cultural and work environment factors revealed by this study, in order to give them a broader spectrum and thus make them more effective. These may include strategies to control food portion size and access to food, the location of venues for socialising away from food storage and vending areas, the provision of adequate spaces and facilities for physical activity on the installations and, the design and implementation of dietary and physical activity behaviour awareness programmes that highlight the influence of socio-cultural and environmental factors on health behaviours and the population's perspectives on healthy eating.

6.2.2 Catering related decisions

Management puts a premium on economics in determining the frequency of food supplies to offshore oilfield locations. This has an adverse secondary effect on the quality of meals served at the locations and consequently, the study population's eating habits. Management should look beyond economics, but rather, prioritise the health and wellbeing of workers when making catering related decisions, including food deliveries. This will yield benefits to the organisation, including a healthier workforce, lowered absenteeism and increased productivity (Wright, Cropanzano and Bonett, 2007).

6.2.3 Job stress management

It is further recommended that the management of Nigerian offshore oilfield installations identify ways to effectively manage job stress among the workers. This

may include managing the job demand, counselling and relaxation training (Sutherland and Cooper, 1996). This will likely reduce the rate of exhaustion, apathy and passivity to physical activity among the population, with the possibility of improving their physical activity participation.

6.2.4 Use of the social determinants of health model as a theoretical framework for future studies

This study has reconfirmed that the constructs in the social determinants of health model (Dahlgren and Whitehead, 1991) interact and influence each other thus suggesting that it is fit for use as a framework for the study of offshore oilfield worker health behaviours. It is therefore recommended that the model be used to theoretically underpin similar studies in the future. That will enable effective identification, exploration and examination of the broader socio-cultural and environmental factors that underpin the study population's health behaviours.

6.2.5 Further research

Arising from one of the limitations of this study regarding the limited number of female participants, it is recommended that where possible, future studies on offshore oilfield worker eating habits and physical activity should have more female participation, in order to better capture the gendered experiences of the phenomena. Also, in view of the findings of this study and the paucity of research on the influence of organisational culture and offshore weather conditions on workers' eating habits and physical activity, there is need for further studies in these areas, since that will add to what is known about the determinants of offshore oilfield worker health behaviours.

Furthermore, the present study did not examine the relative influence of the identified determinants on different health outcomes, nor did it examine the interaction of the determinants over time. Therefore, longitudinal studies could be carried out in future, to examine the interaction of the determinants over time, as well as investigate the association between the determinants and different health outcomes. Also, considering that this study did not reveal how the offshore population perceives the construct 'physical activity', it is recommended that future studies on Nigerian offshore oilfield workers further explore that population's perception of the construct. Additionally, it may be useful for future studies to explore the types and levels of influence exerted on the population's eating habits by different individuals and social groups.

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Appendix 1: Included Studies Quality Assessment

Assessment Elements	Possible Score	Assigned Score					
		Study No 1	Study No 2	Study No 3	Study No 4	Study No 5	Study No 6
Population/Participants properly described?	2	2	2	2	2	2	2
Interest of study sufficiently defined?	2	2	2	2	2	2	2
Context of study described and appropriate?	2	1	1	1	2	1	1
Outcome or result of study well reported and sufficiently meets the study interest?	2	2	2	2	2	2	2
Study design evident and appropriate?	2	2	2	2	2	2	2
Study underpinned by theory?	2	2	2	2	2	0	0
Study conducted within the last 10 years?	2	2	2	2	2	2	2
Total score:	14	13	13	13	14	11	11

Assessment Elements	Possible Score	Assigned Score					
		Study No 7	Study No 8	Study No 9	Study No 10	Study No 11	Study No 12
		Population/Participants properly described?	2	2	2	2	2
Interest of study sufficiently defined?	2	2	2	2	2	2	2
Context of study described and appropriate?	2	1	1	1	1	1	1
Outcome or result of study well reported and sufficiently meets the study interest?	2	2	2	2	2	2	2
Study design evident and appropriate?	2	2	2	2	2	2	2
Study underpinned by theory?	2	0	0	0	0	0	0
Study conducted within the last 10 years?	2	2	1	1	1	1	1
Total score:	14	11	10	10	10	10	10

Assessment Elements	Possible Score	Assigned Score					
		Study No 13	Study No 14	Study No 15	Study No 16	Study No 17	Study No 18
Population/Participants properly described?	2	2	2	2	2	2	2
Interest of study sufficiently defined?	2	2	2	2	2	2	2
Context of study described and appropriate?	2	1	1	1	1	1	1
Outcome or result of study well reported and sufficiently meets the study interest?	2	2	2	2	2	2	2
Study design evident and appropriate?	2	2	2	2	2	2	2
Study underpinned by theory?	2	0	0	0	0	0	0
Study conducted within the last 10 years?	2	1	0	0	0	0	0
Total score:	14	10	9	9	9	9	9

Assessment Elements	Possible Score	Study No 19	Study No 20	Study No 21	Study No 22
Population/Participants properly described?	2	2	2	2	2
Interest of study sufficiently defined?	2	2	2	2	2
Context of study described and appropriate?	2	1	1	1	1
Outcome or result of study well reported and sufficiently meets the study interest?	2	2	2	2	2
Study design evident and appropriate?	2	2	2	2	2
Study underpinned by theory?	2	0	0	0	0
Study conducted within the last 10 years?	2	0	0	0	0
Total score:	14	9	9	9	9

Appendix 2: Introductory Message to Subjects Already Known to the Researcher

Dear [title and name]

I am a student in the PhD Organisational Health and Wellbeing programme at Lancaster University, Lancaster, United Kingdom. I am writing to invite you to participate in a research study which will explore Nigerian offshore oilfield workers' health behaviours. The information from the study will be used for my PhD dissertation and future publications. I have attached the participant information pack to this letter. The pack contains detailed information on the research topic, aim, objectives, data collection (interview), analysis, storage and disposal methods, a consent form and your rights of voluntary participation and withdrawal from the study.

If you have any questions, please contact me by email at c.ihesiulo@lancaster.ac.uk. Should you be interested in participating in the study, kindly sign, date and return the attached consent form to me within two weeks.

Please forward this information pack to other Nigerian offshore oilfield workers you may know that you think may like to participate in this study and request them to contact me if they are interested in participating.

Yours sincerely,

Chukwuemeka Ihesiulo

Appendix 3: Study Participant Information Pack

Study Title: A Qualitative Exploration of Nigerian Offshore Oil Field Workers' Health Behaviours

My name is Chukwuemeka Ihesiulo and I am conducting this research as a student in the PhD Organisational Health and Wellbeing programme at Lancaster University, Lancaster, United Kingdom.

What is the study about?

The aim of this study is to explore Nigerian offshore oilfield workers' eating habits and physical activity.

The objectives of the study are to;

- (1) Explore eating habits and physical activity of offshore oilfield workers in Nigeria
- (2) Explore the work-related and socio-cultural factors that underpin the eating habits and physical activity of offshore oilfield workers in Nigeria
- (3) Examine Nigerian offshore oilfield workers' perception of the concepts of healthy eating and physical activity.

Why have I been approached?

You have been approached because the study requires information from people who work in the Nigerian offshore oil fields and have done so continuously for a minimum of two years.

What role will I have in the study?

If you decide you would like to take part, you will be requested to participate in a semi-structured interview where you will be asked some questions related to your physical activity and eating habits as an offshore oil field worker. The interview will be conducted mainly through Skype and will last for about 1 hour. Some interviews may however be conducted face-to-face where possible or where it is preferred by the participant.

Will my data be Identifiable?

No. Your name will be substituted with a non-identifying number and the information obtained during data collection anonymised as soon as it is collected, in order to ensure that you are not identifiable. Although direct quotes from you may be used, your identity will not be known since the data will have been anonymised at the collection stage. The data collected for this study will be stored securely and only the researcher conducting this study and the research supervisors will have access to the data: The data will be permanently destroyed after the study, using the following methods;

- Audio recordings will be transferred and stored on the Lancaster University secure server as soon as possible and deleted from the digital audio recorder.
- Audio recordings and copies of the interview transcripts will be stored by Lancaster University for 10 in case original recordings need to be consulted post-dissertation examination and/or be used for publishable journal articles in the future.

They will be permanently destroyed thereafter, ensuring compliance with the United Kingdom General Data Protection Regulation.

- An independent professional transcriber will transfer (transcribe) the audio interview recordings into a written form (transcript). Although the interview recordings will not have your name, the transcriber will be required to sign a confidentiality agreement consenting to non-disclosure of any data related to the interviews to any third party, either before or after the transcription and to return the transcripts and the audio recordings to the researcher.
- Anonymised copies of the interview transcripts will be stored on the researcher's personal computer until the research is completed, after which they will be permanently deleted following Wei et al (2011), thus ensuring data security
- The typed version of your interview will also be anonymous since your name will be substituted with a non-identifying number. Anonymised direct quotations from your interview may be used in the reports or publications from the study, so your name will not be attached to them.
- All your personal data will be confidential and will be kept separately from your interview responses, in a locked cabinet accessible only to the researcher and the research supervisors.

There are some limits to confidentiality: if what is said in the interview makes me think that you, or someone else, is at significant risk of harm, I will have to break confidentiality and speak to my research supervisors about it. If possible, I will tell you if I have to do this.

Will the name of my employing organisation/company be known?

No. The interview indicative questions will not require you to provide any information about your employing organisation/company.

How will the information collected from me be analysed?

Data analysis will be carried out using the thematic analysis approach which involves the extraction of key themes from data through coding.

How will the information collected from me be stored and disposed of?

Please see answers to the question; *will my data be identifiable?* Above.

What will happen to the results?

The results will be summarised and reported in a thesis and may be submitted for publication in an academic or professional journal. They may also be presented at conferences and seminars.

Are there any risks?

There are no risks anticipated with participating in this study. However, if you experience any distress following participation you are encouraged to inform the researcher and contact the resources provided at the end of this sheet.

Are there any benefits to taking part?

Although you may find participating interesting, there are no direct benefits in taking part. However, following participation in the study, you are likely to become more aware of your

health behaviours, the implications of health behaviours in the promotion or impairment of health, safety and wellbeing, as well as the socio-cultural and work environment factors that underpin health behaviours.

Who has reviewed the project?

This study has been reviewed by the Lancaster University Faculty of Health and Medicine Research Ethics Committee, approved by the University's Research Ethics Committee and the Nigerian National Health Research Ethics Committee.

Must I have to take part in the study?

Participation is voluntary and it is completely up to you to decide whether or not you take part.

Also, you will have the right to withdraw from the research study at any time before and up to two weeks following the interviews without giving any reason. However, a request to withdraw the information you provided might not be possible after two weeks as the data will have been anonymised and analysis started, and it is likely that the data intended to be withdrawn would already have been analysed, though every attempt will be made to extract the data, up to the point of publication.

Where can I obtain further information about the study if I need it?

If you have any questions about the study, please contact the main researcher:

1. Chukwuemeka Ihesiulo, e-mail: c.ihesiulo@lancaster.ac.uk

Or research supervisors:

2. Professor Elizabeth McDermott e-mail: e.mcdermott@lancaster.ac.uk
Phone: +44 1524 510847
3. Dr Sabir Giga e-mail: s.giga@lancaster.ac.uk Phone: +44 1524 594033

Complaints

If you wish to make a complaint or raise concerns about any aspect of this study and do not want to speak to the researcher, you can contact:

Professor Bruce Hollingsworth Tel: (01524) 594154
Head of Department Email: b.hollingsworth@lancaster.ac.uk
Faculty of Health and Medicine
(Division of Health Research)
Lancaster University
Lancaster, LA1 4YG

If you wish to speak to someone outside of the Organisational Health & Wellbeing Doctorate Programme, you may also contact:

Professor Roger Pickup Tel: +44 (0)1524 593746

Associate Dean for Research Email: r.pickup@lancaster.ac.uk
Faculty of Health and Medicine
(Division of Biomedical and Life Sciences)
Lancaster University
Lancaster
LA1 4YG

Resources in the event of distress

Should you feel distressed either as a result of taking part, or in the future, you are encouraged to contact your doctor or the Nigerian Mental Health Foundation at helpdesk@mentalhealthnigeria.org and telephone +234-8022445506.

If you decide to participate in the study, kindly date, sign and return the consent form directly to me within two weeks. If I do not receive a signed consent form from you after two weeks, I will send one follow-up e-mail to you, to confirm your final decision regarding participation in the study.

Thank you for taking the time to read this study information pack.

Yours sincerely,

Chukwuemeka Ihesiulo

Appendix 4: Consent Form

Study Title: A Qualitative Exploration of Nigerian Offshore Oil Field Workers' Health Behaviours

We are asking if you would like to take part in a research project exploring health behaviours of offshore oil field workers in Nigeria with respect to physical activity and eating habits.

Before you consent to participating in the study, we ask that you read the study participant information pack above (appendix 4) and mark each box below with your initials if you agree. If you have any questions or queries before signing the consent form, please speak to the principal investigator: Chukwuemeka Ihesiulo.

Please initial each statement

1. I confirm that I have read the information sheet and fully understand what is expected of me within this study
2. I confirm that I have had the opportunity to ask any questions and to have them answered.
3. I understand that my name will be substituted with a non-identifying number during the interview which will be audio recorded and then made into a written transcript.
4. I understand that audio recordings will be retained on the Lancaster University secure server for 10 years after the research project has been examined.
5. I understand that my participation is voluntary and I am free to withdraw at any time before and up to two weeks after the interviews without giving any reason.
6. I understand that interview data can be withdrawn for up to two weeks after the interview. However once my data have been anonymised and incorporated into themes, it might not be possible for it to be withdrawn, though every attempt will be made to extract the data, up to the point of publication.
7. I understand that the information from my interview will be anonymised, then pooled with other participants' responses, and may be published.
8. I understand that full anonymity will not be possible should direct quotes be used which may identify me indirectly

9. I consent to information and quotations from my interview being used in reports, conferences and training events.

10. I understand that any information I give will remain strictly confidential and anonymous unless it is thought that there is a risk of harm to myself or others, in which case the principal investigator may need to share this information with his research Supervisors.

11. I consent to Lancaster University keeping written transcripts of the interview for 10 years after the study has finished.

12. I understand that the researcher will share and discuss data with his supervisors.

13. I understand that if I choose to do the interview over Skype, the internet is not guaranteed to be a completely secure means of communication.

14. I consent to take part in the above study.

Name of Participant _____ **Signature** _____ **Date** _____

Name of Researcher _____ **Signature** _____ **Date** _____

Appendix 5: Sample Inclusion & Exclusion Criteria

Inclusion Criteria

- Adult male and female Nigerian offshore oilfield workers
- Aged between twenty (20) and sixty (60) years
- Completed primary school education as a minimum
- Worked in Nigerian offshore oilfields continuously for a minimum of two (2) years.

Inclusion Criteria Justification

- ✓ The age bracket was chosen because eighteen (18) years is the minimum work age as stipulated by the Labour Act (1990) and sixty (60) years is the statutory retirement age in Nigeria (Garba and Mamman, 2014).
- ✓ The 2 year minimum work experience ensured that only individuals who have worked long enough to have been fully integrated into the offshore oilfield environment participated in the study.
- ✓ The minimum education inclusion criterion ensured that the participants could communicate in English so as to effectively participate in the interviews.

Exclusion Criteria

- Aged less than twenty years (20) or more than sixty (60) years
- Worked less than two (2) years continuously in Nigerian offshore oilfields
- Has not completed primary school education as a minimum

Appendix 6: Confidentiality Agreement for the Transcription of Qualitative Data

Name of Study:	A Qualitative Exploration of Nigerian Offshore Oil Field Workers' Eating Habits and Physical Activity
Study PI:	Chukwuemeka Ihesiulo

In accordance with the Research Ethics Committee at Lancaster University (UREC), all data collected from participants in the above named study will be anonymised. Therefore, any personal information or any of the data generated or secured through transcription will not be disclosed to any third party.

By signing this document, you are agreeing:

- not to pass on, divulge or discuss the contents of the audio material provided to you for transcription to any third parties
- to ensure that material provided for transcription is held securely and can only be accessed via password on your local PC
- to return transcribed material and the encrypted USB flash drive containing the anonymised interview audio recording to the research team when completed and do so by recorded delivery
- to destroy any audio and electronic files held by you and relevant to the above study at the earliest time possible after transcripts have been provided to the research team.

Your name (block capitals) _____

Your signature _____

Date _____

Appendix 7: Researcher and Participant Safety

The following steps were taken to ensure my safety and that of the participants, in accordance with the Guidance on Safety in Fieldwork advocated by the University Safety and Health Association/Universities and Colleges Employers Association, particularly the sections that address lone working, part of which required the researcher to designate a friend or family member as a 'buddy'.

1. Designate a friend or family member as a 'buddy'.
2. Give a sealed envelope containing the details of the interviewee, the location and time of the interview to that person.
3. Phone the 'buddy' after the interview, to let them know the researcher is safe.
4. If the researcher does not contact the 'buddy' at the agreed time, the 'buddy' will open the envelope and know where to look for the researcher.
5. If researcher contacts 'buddy' and returns safely, he will retrieve the envelope from the 'buddy' and destroy it.

Additionally, Cater (2014) argues that snowball sampling can be used to verify a participant's identity before starting a Skype interview, in order to ensure confidentiality and security, as well as the authenticity of data. All participants for this study were reached through snowball sampling, thus ensuring their identities. However, as a further layer of protection, I verified the identities of the participants by asking them some previously agreed questions.

Appendix 8: Interview Guide

The following indicative questions will guide the interview process. The researcher will use supplemental questions to clarify answers given by the participants or to obtain more information on the questions:

1. Kindly describe your understanding of the concepts of healthy eating and physical activity, as an offshore oilfield worker.
2. How would you describe your eating habits while offshore?
3. How, if any, does workers' choice of food influence the type of food provided offshore?
4. As an offshore worker, what challenges might you have maintaining a healthy eating habit as much as you would like, while offshore?
5. How do you think the challenges can be overcome?
6. In your opinion, what socio-cultural and work environment factors would you say encourage, reinforce or discourage you from maintaining a healthy eating habit while offshore?
7. If you were to change certain things about your eating habits while offshore, what would they be and why do you say so?
8. How would you describe your participation in physical activity offshore?
9. As an offshore worker, what challenges might you have engaging in physical activity or maintaining a healthy eating habit as much as you would like while offshore?
10. How do you think the challenges can be overcome?
11. In your opinion, what socio-cultural and work environment factors would you say encourage, reinforce or discourage you from participating fully in physical activity while offshore?
12. If you were to change certain things about your physical activity while offshore, what would they be and why do you say so?
13. In your opinion, how can offshore oilfield workers better manage their eating habits and physical activity while offshore?

Appendix 9: Participant Follow-up Letter

Dear (title & name),

I am writing to follow up on your mail of (insert date) in which you expressed interest in participating in a research study which will explore Nigerian offshore oilfield workers' health behaviours.

Our records show that you have not returned a signed copy of the consent form which was included in the study information pack. If you are still interested in participating in the study, please date, sign and return the form to me at c.ihesiulo@lancaster.ac.uk.

Yours sincerely,

Chukwuemeka Ihesiulo

Appendix 10: FHMREC Ethics Approval Letter



Applicant: Chukwuemeka Ihesiulo
Supervisors: Sabir Giga and Alison Collins
Department: Health Research
FHMREC Reference: FHMREC16059

11 July 2017

Dear Emeka,

Re: A Qualitative Exploration of Nigerian Offshore Oil Field Workers' Health Behaviours

Thank you for submitting your research ethics application for the above project for review by the **Faculty of Health and Medicine Research Ethics Committee (FHMREC)**. The application was recommended for approval by FHMREC, and on behalf of the Chair of the Committee, I can confirm that approval has been granted for this research project.

As principal investigator your responsibilities include:

- ensuring that (where applicable) all the necessary legal and regulatory requirements in order to conduct the research are met, and the necessary licenses and approvals have been obtained;
- reporting any ethics-related issues that occur during the course of the research or arising from the research to the Research Ethics Officer at the email address below (e.g. unforeseen ethical issues, complaints about the conduct of the research, adverse reactions such as extreme distress);
- submitting details of proposed substantive amendments to the protocol to the Research Ethics Officer for approval.

Please contact me if you have any queries or require further information.

Tel:- 01542 592838

Email:- fhmresearchsupport@lancaster.ac.uk

Yours sincerely,

A handwritten signature in black ink that reads "Diane Hopkins". The signature is written in a cursive, flowing style.

Dr Diane Hopkins
Research Integrity and Governance Officer, Secretary to FHMREC.

Appendix 11: National Health Research Ethics Committee Exemption Letter



National Health Research Ethics Committee of Nigeria (NHREC)

Promoting Highest Ethical and Scientific Standards
for Health Research in Nigeria



Federal Ministry of Health

NHREC Protocol Number NHREC/01/01/2007-24/05/2017

NHREC Approval Number NHREC/01/01/2007-15/06/2017

Date: 15 June, 2017

RE: A QUALITATIVE EXPLORATION OF NIGERIAN OFFSHORE OIL FIELD WORKERS' HEALTH BEHAVIORS

Health Research Ethics Committee (HREC) assigned number: NHREC/01/01/2007

Name of Student Investigator: Chukwuemeka Uzoamaka Ihesiulo

Address of Student Investigator: Riyadh Area Loss Prevention Division
Saudi Arabia Oil Company
Building 910, Najd Janoub
B.O .Box 111,Riyadh, Saudi Arabia,
11383

Date of receipt of valid application: 24-05-2017

Date when final determination of research was made: 15-06-2017

Notice of Research Exemption

This is to inform you that the activity described in the submitted protocol/documents have been reviewed and the Health Research Ethics Committee has determined that according to the National Code for Health Research Ethics, the activity described there-in meets the criteria for exemption and is therefore approved as exempt from NHREC oversight.

The National Code for Health Research Ethics requires you to comply with all institutional guidelines, rules and regulations and with the tenets of the Code. NHREC reserves the right to conduct compliance visit your research site without previous notification.

Signed

**Professor Zubairu Iliyasu MBBS (UniMaid), MPH (Glasg.), PhD (Shef.),
FWACP, FMCPH Chairman, National Health Research Ethics Committee
of Nigeria (NHREC)**

Coding Summary By Node

Interviews

12/10/2019 08:11

Aggregate	Classification	Coverage	Number Of Coding References	Reference Number	Coded By Initials	Modified On
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Node

Nodes\\Access to food

Document

Internals\\Participant No 10

No		0.0072	1			
				1	CUI	09/07/2019 16:18

it tells you that irrespective of where you are, you can eat better stuff, quality stuff at any time, whether you're at home or you're not at home. So it saves you from the psychological, "oh, I'm going to work now and food will now be a problem" so food shouldn't be a problem, that's what you know from the equation, so if you want to go offshore, food shouldn't be a problem, and what that means, because if it's not readily available, then people start looking for alternatives

Internals\\Participant No 11

No		0.0075	2			
				1	CUI	15/07/2019 06:14

offshore the.... the mess room, the mess room, yes, is always open.....maybe for some small chops but em.... it is open four times for big meals a day.

				2	CUI	15/07/2019 06:14
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So for..... at least 4 times in a day the mess room is open but in between you can easily go and grab a snack and soft drinks.

Internals\\Participant No 12

No		0.0050	1			
				1	CUI	17/07/2019 13:01

For most of the terminals it is how much you can eat that is given to you. I don't know the volume but every mealtime if you want a particular amount of meal, you get it without any issues.

12/10/2019 08:11

Aggregate	Classification	Coverage	Number Of Coding References	Reference Number	Coded By Initials	Modified On
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Internals\Participant No 13

No		0.0092	1			
				1	CUI	21/07/2019 07:48

Yes, that alone would encourage a lot of people to actually, of course because they have access to it and it's not restricted so people can eat as much as they want and they, to be frank with you, we have 4 meal times offshore, apart from the 3 morning, afternoon and evening meals we have one additional meal at night so that encourages a lot of peo-

Internals\Participant No 18

No		0.0015	1			
				1	CUI	05/10/2019 13:36

all these foods are available 24 hours depending on the shift,

Internals\Participant No 19

No		0.0318	3			
				1	CUI	06/10/2019 12:14

you know, when it comes to food supply it's every hour because I think...and this is part of the things that you know, I mean make people to work offshore because you have, I mean the food available and it's part of the things that even make you happy when you're offshore. So the food is just available at any time.

				2	CUI	06/10/2019 12:15
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I discovered that because this food I available so there is that push to want to consume, you know, at every available time that I have and I discovered that I was getting too heavy, you know, about the...it was really affecting me as I was getting too heavy because like I said Nigerian food are heavy food and we cannot do without it.

				3	CUI	06/10/2019 12:17
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You know like I told you I started with it the first 3 years that I was offshore. I started with it. I was flowing seriously. I don't miss my tea times but after spending 3 years I had to, you know, reduce this. Like I said, it was having some effects

Internals\Participant No 2

No		0.0108	1			
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1 CUI 14/04/2019 18:41

You don't have food available all the time but you have access to snacks.....you have access to snacks and when I mean snacks I mean your drinks in the fridge, you have access to coffee, tea or beverages as you may call it. You also

Internals\\Participant No 4

No 0.0187 3

1 CUI 15/04/2019 17:27

like I said, if it's all about food, they make sure...if it's possible, you always have something to eat at any point you go there

12/10/2019 08:11

Aggregate	Classification	Coverage	Number Of Coding References	Reference Number	Coded By Initials	Modified On
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2 CUI 15/04/2019 17:29

Now in between breakfast and lunch, there is a global practice, tea break, it's observed by 10 o'clock, where you just take snacks, lipton, cup of tea and all that, then by 12, you go for your lunch. Then in between lunch and dinner, there is another tea break observed around 3.30, although it's just five, ten minutes thing. Between that time, if you wish to go and take, they bake something like snacks, cake and all those things to be taken with tea and all, so there is an in-be-

3 CUI 15/04/2019 17:30

Outside the normal program designed to observe this meal time, you know Nigerians they have a way of abusing something, I am telling you because this is something we observe. People will just sneak out and want to have access to...be-

Internals\\Participant No 6

No 0.0209 3

1 CUI 13/06/2019 14:28

But a lot of people that stay there, because they are not exposed to this free food, they abuse it, taking more than enough meat or eggs, that's what they eat in a day, and so, though you will be trying to educate them about the implication of what they're eating but then, I will say in the field there are healthy food and there are also unhealthy food.

2 CUI 15/06/2019 12:06

How readily available are these snacks and drinks?

P6: They're always there, at least those of them on night duty, they are always abundant so that they can keep themselves busy in the night. So they are always there.

3 CUI 15/06/2019 12:11

a lot of people will take maybe these three, four meals per just the day that it's there, at least, it's free food. So, but it's an abuse of food in the first place, but this is where the medical personnel, the safety person onboard have to enlighten

Internals\\Participant No 7

No 0.0173 3

	1	CUI	15/06/2019 14:55
The quantity, it depends on the individual, they give whatever you ask for, if you ask them to give you everything, they give you.			
	2	CUI	15/06/2019 15:08
let's talk about availability of snacks, and I would imagine drinks, soft drinks			
	3	CUI	15/06/2019 15:08
It all depends on the individual, it's available, so it is left for the individual. If you want to pick it every now and then they will not stop you, but if you know when you are supposed to pick it, so it's available there, but it depends on the individ-			

Appendix 13: Definition of Key Terms

Term	Definition	Source
Body Mass Index (BMI)	Body weight <i>in kilograms</i> divided by standing height squared.	Lukaski, H.C. (2014)
Culture	A multidimensional phenomenon that encompasses processes, products and results of human activity, material and spiritual, transmitted from generation to generation in a non-biological way.	Mironenko, I.A. & Sorokin, P.S. (2018)
Eating Habit	The way people eat. It includes what, when and how they eat, the quantities of their food and the composition of their diets.	Itatiro, J. (2014)
Health Behaviours	Patterns, actions, and habits that are connected to health maintenance, restoration and improvement.	Gochman 1988, cited in Janowski et al. (2013)
Obesity	Body Mass Index (BMI) of >30 kg/m ²	Riethmeister, V. et al. (2016)
Oil Field	The surface area above a subsurface oil accumulation. It consists of a reservoir in a shape that will trap hydrocarbons and that is covered by an impermeable or sealing rock. Typically, industry professionals use the term with an implied assumption of economic size.	Schlumberger Oilfield Glossary. Retrieved from https://glossary.oilfield.slb.com/en/Terms/o/oil_field.aspx
Organisational Culture	The shared norms, beliefs, and behavioural expectations of an organisation which determine	Hemmelgarn, A.L., Glisson, C. & James, L.R. (2006)

	among other things, the content, and objectives of the work accomplished in that organisation.	
Overweight	Body Mass Index (BMI) of between 25–30 kg/m ²	Hemmelgarn, A.L., Glisson, C. & James, L.R. (2006)
Physical Activity	Any bodily movement produced by skeletal muscles that results in energy expenditure.	Caspersen, C. J., Powell, K. E., & Christenson, G. M. (1985).