

# Health service-delivery factors that affect Tuberculosis (TB) treatment adherence in Ghana

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## ABSTRACT

Almost ninety percent of the global tuberculosis is found in Asia, Africa, and other continents. This is largely due to deficient educational information, myths, beliefs, and sub-optimal service delivery as a result of inadequate infrastructure. Even though proper treatment of TB can cure the disease, the bureaucratic difficulties and customer care issues have raised concerns that the procedures put in place to ensure that patients with TB receive and complete treatment now stifle the treatment regime. This paper looked at the service-delivery factors that affect TB treatment adherence while seeking to explore good practices to develop improving support for the care of TB patients.

The study adopted a qualitative interpretive descriptive design using interviews, across health facilities in one district in Ashanti Region, Ghana. Ten participants made up of (5 men; 5 women; median age 36) were recruited in 2014 and interviewed. Patients revealed varying degrees of challenges and facilitators that affected their adherence to TB treatment. Three

main themes were identified: good institutional support, unpleasant patient-staff encounters, and unmet care needs. Staff commitment, proper supervision of TB patients and individualising care encourages adherence while organisational challenges, poor supervision of patients and unfriendly staff attitude discourage the continuity of treatment.

## KEYWORDS

Non-adherence; institutional support; unmet need; customer care; adherence counselling

## INTRODUCTION

Tuberculosis affects many people globally and about ninety percent of worldwide tuberculosis is found in Asia, Africa and other low-income countries (World Health Organisation, 2014). The role of the hospitals and clinics in the management of Tuberculosis cannot be overemphasised. The health system plays a central role in TB treatment adherence behaviour by instituting measures such as home visits, follow-ups, Directly Observed Therapy (DOT), and treatment supporters (Nglazi, Bekker, Wood, Hussey, & Wiysonge, 2013). The concept of DOT encompasses someone usually healthcare providers or a nominated family member directly observing that TB patients take their anti-TB drugs to increase the chances of treatment success.

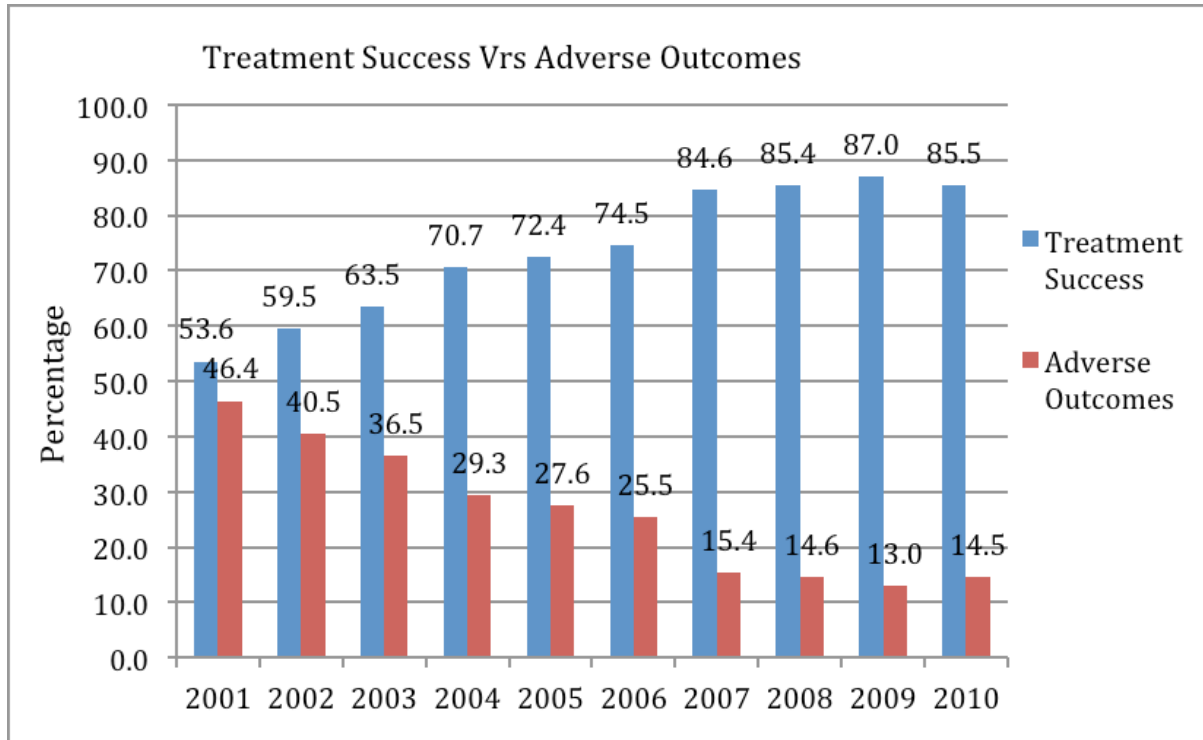
Treatment adherence to TB treatment persists to be a challenging issue in most developing countries (Atkins, 2011). Some service-related factors such as inconvenient treatment arrangements, the bureaucratic difficulties, and poor customer care issues that exist in the healthcare settings have raised concerns that the procedures put in place to ensure that patients with TB receive and complete treatment now stifle the treatment regime (Gebremariam, Bjune, & Frich, 2010; Munro et al., 2007).

In Ghana, all TB treatment is expected to take 6-month uninterrupted daily drugs (National TB Control Programme Ghana [NTP], 2013). Previously, patients who are newly diagnosed are put on the treatment for six months while patients who have had previous unsuccessful TB treatment are put on eight months treatment consisting of tablets and injection streptomycin. The treatment regimen for TB usually consist of a combination of potent antibiotics given to the patient based on weight. All patients are, therefore, required to take two months of a combined tablet consisting of Isoniazid, Rifampicin, Pyrazinamide, and Ethambutol and followed by 4 months of Isoniazid and Rifampicin (2HRZE/4HR). The 8-month regimen treatment that 2 months streptomycin treatment has been phased out.

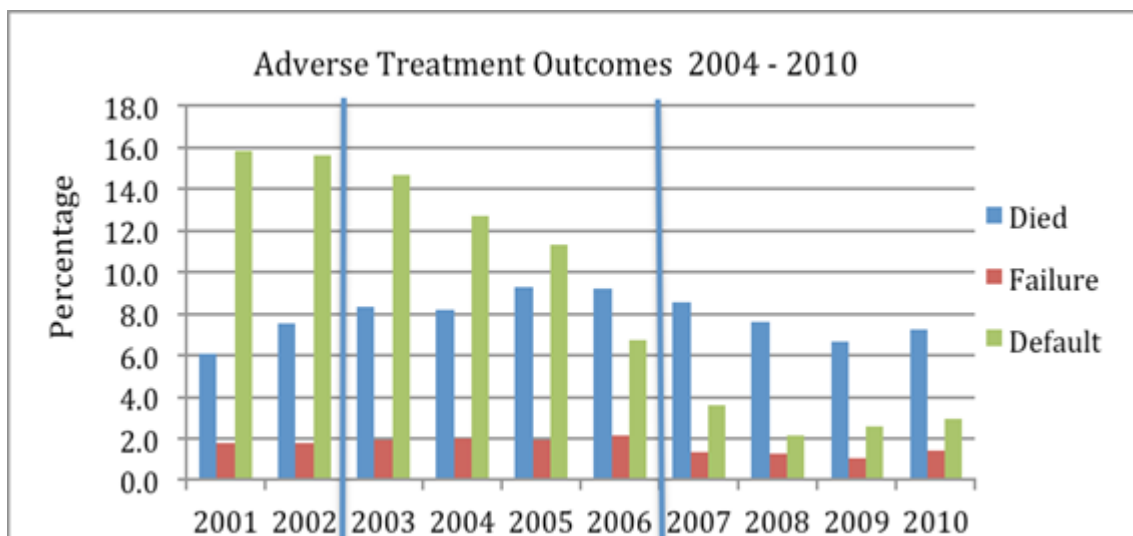
However, most patients interrupt their treatment and this has dire consequences on the treatment outcome leading to treatment failure and development of complications. Studies conducted in countries such as Brazil, Ghana, Nepal, South Africa, and other countries; higher-, middle-, and lower-income countries have all commented on the role good communication by health care providers play in TB treatment adherence. Better communication between patients and health workers and improved understanding of the treatment regime empower patients and increase their confidence in completing the drugs (Buregyeya et al., 2011; Dodor & Kelly, 2010; Lewis & Newell, 2009). In the context of this study, health care workers refer to workers such as nurses, counsellors or institutional TB coordinators who are directly involved in the drug administration and supervision of TB patients.

In Ghana, TB clinics are run usually as separate units at the health facilities and headed by a coordinator, Institutional TB Coordinator. Their functions are among others to directly supervise that patients take their drugs or indirectly through trusted family member or friend (treatment supporter), the supply of '*enablers' package*' such as toasted cornmeal (for porridge), chocolate drinks, milk, and some amount of money to patients (NTP, 2013).

The figures below indicate the TB treatment success rate in Ghana. Although the number of people with TB who are successfully treated seem to increase, there is also correspondence increase in people who are dying from TB and those with treatment failure due to non-adherence to treatment.



**Figure 1: National TB Treatment Success Rates versus Adverse Outcomes**



**Figure 2: Adverse Treatment Outcomes for the period 2001-2010**

Source: Ghana Health Service Annual Report, 2011 pg. 73

Sekyere South District one of the 27 Districts in the Ashanti Region of Ghana with an estimated population of 94,009 (2010 Population and Housing Census). Sekyere South district has a high number of farming communities with few and isolated number of six (6) health centres. There are three (3) Hospitals (two community-level Hospital and one District Hospital). Most health facilities are relatively far from the villages nevertheless; the health facilities are accessible by road.

Despite the cause of TB been A biomedical disease (Brunner, Smeltzer, Bare, Hinkle, & Cheever, 2010), some patients still have some socio-cultural factors that affect patients' compliance to TB treatment (Munro et al., 2007; Salifu, Eliason, & Mensah, 2016).

Moreover, service delivery or customer care at the various health institutions where patients receive their anti-TB medications could serve as barriers to the treatment regime. However, there seem to be inadequate understanding of the factors that influence TB treatment adherence in the Ghanaian context. Therefore, this study explored service-related factors (from TB patients' perspective) that influence TB treatment adherence among TB patients at Sekyere South District, in order to inform and improve TB treatment.

## DESIGN AND METHODS

With regards to the topic of the research and its focus on health care, relevant databases such as CIHNAL, Pub Med, MEDLINE, EMBASE, and WEB of SCIENCE as well as grey literature on TB in Ghana, was used to provide an evidence base for the research. The databases used the combination of terms such as 'barriers to TB care', non-adherence', 'and noncompliance', 'default', etc. Additionally, Munro's model (2007) was used to direct the study.

This model is an outcome of a systematic review conducted that included 14 studies from Africa, nine studies from North America, eight studies each from South Asia and East Asia and another two studies each from Latin America and Europe. The model shows relationships that exist between three factors: structural factors, personal factors and the community factors in TB treatment adherence. The model was, however, used in organising the literature review and the analysis process but was not used prescriptively since that would have truncated new ideas from emerging.

### **Study Setting**

Sekyere South District in the Ashanti Region of Ghana was the study site and participants were selected from the main TB treatment centres through the TB coordinators.

### **Sampling**

Using the Institutional TB Coordinators as gatekeepers, a total of 10 TB patients aged 18 years and above were recruited purposively. All these patients consented to participate in the study and had had 2 or 3 months' experience of taking the anti-TB drugs. The choice for the TB patients as participants instead of staff members was apt since it was likely for the latter to be reticent because the lead researcher (YS) is a known health staff at the study setting.

### **Ethical considerations**

This study was approved by the Institutional Review Board (IRB) of Noguchi Memorial Institute for Medical Research (NMIMR), University of Ghana and Ethics Review Committee (ERC) of GHS. All physical data about participants were anonymised and stored in a password-protected folder on a computer. Pseudonyms were used in place of participants' real names to ensure confidentiality and anonymity of all participants.

## **Study Design: Qualitative interpretive descriptive design**

This study used a qualitative approach using in-depth individual interviews to explore experiences information that would otherwise be withheld in a group interview (Morgan, Ataie, Carder, & Hoffman, 2013).

A semi-structured interview tool generated based on the research aim was used to elicit responses from participants and this allowed them some level of control about what their experiences were and at the same time keeping the discussion focused (Kvale, 1996). Additionally, it encouraged diverse perspectives of patients living with TB that could otherwise be difficult to achieve using quantitative methods (Creswell, 2013; Thorne, 2008). The in-depth interviews were used for data generation due to the sensitive nature of the topic and for participants to feel free to talk about their unique experiences.

## **Data collection and Analysis**

All participants were approached through the institutional TB Coordinators (TB focal persons) who are responsible for supervising and coordinating the care. Each participant was asked to sign a consent form and participants were under no obligation to participate if they didn't want to. Participants took part in a one-on-one in-depth interview and data collection continued until when the data was rich both in-depth and breadth to understand the factors affecting adherence (n=10). All the interviews were audio-recorded and lasted between 45 minutes and 80 minutes. The researcher kept a field diary to enrich the data during the analysis. Concurrent analysis with data collection allowed developing themes to guide the recruitment of subsequent interviewees while Munro et al (2007) model guided but was not used prescriptively in the analysis. This is because that could have truncated any opportunity for new ideas from the study (Mayan, 2009). According to Munro et al. (2007), there exists a bi-directional relationship between service-related factors and patient factors that influence treatment adherence. The model further indicates that service intervention is likely to influence patient adherent behaviour. Likewise, interaction with health service is likely to be

influenced by their knowledge, attitude, and beliefs, as well as the patients' interpretation of wellness and illness (Munro et al., 2007).

After reading through the transcripts, Miles and Huberman's content analysis procedure was used for data analysis (Miles & Huberman, 1994; Miles, Huberman, & Saldana, 2013) by the first and second researchers that produced three main themes with sub-themes discussed later on in this work.

### **Rigour**

According to (Lincoln & Guba, 1985), a qualitative study needs to be credible, dependable, confirmable and transferable. Trustworthiness of findings was guaranteed by first following the laid down principles of conducting qualitative research to ensure congruence of the emerging ideas with the research aim. Areas of discrepancies between the coding were resolved in a discussion by first and second authors. Finally, the themes and sub-themes were reviewed by the third author to establish the basis of evidence (Thorne, 2008). All decisions were made within the agreed parameters ethical approvals from University of Ghana and the Ghana Health Service Institutional Review Boards in order to safeguard the participants. Since each research aims at bringing out finding(s) that contributes to problem-solving, this research provides sufficient account of participants and their unique circumstances to assist readers to determine the extent the findings are applicable in their own contexts.

## **FINDINGS**

### **Description of the sample**

Ten (10) participants (5 men; 5 women; median age 36) took part in the study. A total of three central themes emerged from the data: Institutional support, poor staff attitude/ good customer care and patients' unmet needs. A very important factor why participants were encouraged to adhere to their anti-TB drugs was the support received from the Health Care



Workers (HCW). These HCWs were the nurses and Laboratory personnel who usually serve as the TB focal persons. Participants identified other supportive care such as the giving of specific instruction and monitoring patients to take their drugs.

### **Theme 1: Staff attitude**

The interpersonal relations that exist between health providers and the participants, as well as the degree of communication that existed, had a significant influence on treatment adherence. Where there was the lack of communication or poor relationship between patient and the health providers, patients had problems with adherence.

#### *Having time for the patient*

Participants who had a warm and friendly relationship with the health personnel were confident and had the zeal to continue with the treatment because of the confidence they had. Almost all participants expressed their adherent behaviour to the warm, friendly relationship they enjoyed with the HCW. That is, the warm reception and the concern shown to participants attracted them to the facility. Most participants (7) alluded to the fact that the relationship they had with the HCWs was cordial, friendly, exceptional and therapeutic. Anna, a 42-year-old widower with joy had this to say:

*The way and manner the nurse encourages me anytime I go to the hospital for my drugs motivated me to always take the drugs. Sincerely I did not find any problem with the nurses there and I even told my daughter about the warm reception I get from one particular nurse anytime I go for my drugs. In fact, the nurse treated me as if I were his mother. (Anna)*

Suku narrated his experience as follows:

*I have a very good interpersonal relationship with the staff caring for me so I don't hide any information from them. I do not have any problem when I come to the Hospital for my drugs; immediately I get there they retrieve my folder and give me the drug.*

*This is actually helping me.*

### ***Stigmatising attitude***

Contrary to the expression of the affable relationship that was demonstrated by some staff, some staff rather showed some attitude that was not appreciated by some participants. This according to participants, explained was stigmatizing and decreased their motivation to attend to the facilities. This was what Yawa had to say:

*One day I went to the Hospital for my drugs and I met one of the staff standing on the walkway with two others. When I got closer to them, I greeted them and all of a sudden all of them burst into uncontrollable laughter. I was really hurt and disturbed by it, and I know it is because I have TB. ....that is what he does when he sees me.*

*His behaviour tells it all. Even up to date I think about it a lot and I feel shy anytime I see him at the hospital and his presence makes me uncomfortable going for my drugs.*

### **Theme 2: Patients' unmet needs**

Generally, participants expressed the necessity to address some pressing problems that may not be directly related to the TB but are of concern to them. Some participants indicated that they had other needs that require some intervention. Among those needs are participants need for holistic care including spiritual care, need for further information, and the need for support groups to assist them with their treatment regime.

#### ***Need for more information***

Despite the fact that adherence counselling is offered to some participants at some facilities, participants still demonstrated the need for further information about care. In addition, other

participants did not receive adherence counselling and they still have deep-seated beliefs about the cause and certainly the treatment of TB. Participants expressed the need for more detailed information on TB. Ewura, a teacher, who had good knowledge about TB and its treatment, indicated the need for continuous information on TB. She reported:

*Though I was informed of the cause of TB and how long the drugs are to be taken, I think more information about TB will not be a bad idea. I have read about TB but certainly, it is not all the technical terms that I will understand. This will allow us (TB patients) to fully understand all information on TB. It will also afford us the opportunity to have our misconceptions addressed.*

### ***Need for TB support group***

A majority of participants found the establishment of TB support group very useful as nine out of the ten participants were in support of that. The other patient declined for fear of stigma.

A 73-year-old farmer, Agya, could not hide his wish for the formation of a TB patient support group. He narrated:

*I think if there is any such group it will be beneficial in terms of providing a targeted educational programme to all those taking TB drugs. Even those patients who may not be able to go for such programmes will get feedback from colleagues who will be able to attend such a programme just like the cocoa farmers Association I belong to. Anytime there is a meeting and a member was unable to attend, those members that were able to attend will relay the information to them.*

### ***Need for holistic care***

Most participants with TB have various problems. These include physical, emotional, psychological, and spiritual care. Thus, holistic care was not met and patients still have unmet emotional, spiritual, and physical needs. For example, TB patient who has arthritis (joint

pains) expects that the staff also demonstrated enough commitment towards the care of arthritis. Even more, some of these participants have other co- morbid conditions such as HIV/AIDs, diabetes etc.

Kofo, a previously defaulted patient, described what worries him that has been overlooked by the health workers. He lamented:

*.....my feet became swollen while on the anti-TB drugs but when I reported to the facility during review they did not give me drugs to solve that problem. I have reported that problem more than three times to them but nothing was done about it.*

*Subsequently, I decided to buy some drugs from the pharmacy shop and that drug really helped me. As a result, I stopped collecting the anti-TB drug.*

Another participant, Maame indicated the need for a more ‘holistic’ approach to care that will encompass not only the physical but the spiritual health. She recounted:

*There (at the hospital), the staff do not talk about our other needs such as prayers.*

*You know, some of us have other problems that are not only physical but spiritual as well.*

*Because of the TB, we may have other social issues which may even be bordering us more than the TB. I think the care should not only be centred on the TB drugs alone but any other thing we think is of great concern.*

### **Theme 3: Institutional Support**

Despite the challenges, patients pointed out some things that were helpful for adherence. A very important factor why participants were encouraged to adhere to their anti-TB drugs was the support received from the HCW. Participants identified other supportive care such as the giving of specific instruction and monitoring patients to take their drugs.

### ***Adherence counselling***

Participants described the counselling that they received from the facilities to be one of the factors that encouraged them to adhere to treatment. Through the counselling, participants were encouraged to take their drugs, and they were reassured of cure.

Anna, a widow and unemployed, narrated the help she received from the Institutional TB coordinator that encouraged her not only to go to the facility for her drugs but to take her drugs at home as well:

*The help I had from the hospital, especially the TB nurse I was assigned to, was great. His words of encouragement and motivation urge me on to take my drugs. Anytime I am scheduled to for appointment at the hospital, he is always there and he never fails me. He keeps on checking on me if I am taking my drugs.*

The case was different for Kofo who defaulted because the staff did not give him enough counselling and the necessary follow-up:

*My streptomycin injection got finished so I stop taking the oral anti-TB drugs. No staff contacted me when I stop the drugs. It was not my fault that I did not get some of the streptomycin drugs.*

### ***Provision of Enablers package***

Food supplements provided for participants encouraged them to take their drugs. The food supplement given to patients such as toasted cornmeal used for porridge (known as *Tom Brown*) or chocolate drink (*Milo*) helped them to take the drugs. The provision of food supplement and at times some money for transportation to the hospital which is collectively called enablers package was highly beneficial to the participants especially those who did not have enough money. Out of the ten participants, seven indicated how they benefited from provision of the enablers package.

Suku, a widower, and a two-time defaulter recounted his experience as:

*Providing us with food has helped me to take the drugs because at times I do not have food to eat. I have received cereal from the District Office. The Tom Brown is very good because when I use it to prepare porridge it gives me strength. I had it only once; nevertheless, the tom brown was really helpful to me.*

### ***Supervising the patient***

The supervision that the health staff provided for the participants was very beneficial. Participants recounted the role of supervision played in their treatment. Participants were reminded and coached to take their drugs through treatment supporters. The treatment supporters are people, usually family members, who oversee the patients to take their anti-TB drugs at home.

Narrating the special supervision, he received from the facility, Kiki had this to say:

*The nurses supervise me, reminds me of the next date to come for the next batch of drugs. Whenever I go for my drugs, the nurses check the drugs and verify with the TB treatment card.*

## **DISCUSSION**

Three main themes were identified: Institutional support, staff-patients relationship (customer care), and unmet care needs. Other studies have also examined the experience in the healthcare system as patients seek treatment (Ayisi et al., 2011). These factors either serve as barriers or facilitators to adherence to drugs.

Healthcare workers play important role necessary in order for patients to comply with treatment (Chalco et al., 2006). The support participants received from the staff encouraged them to adhere to their treatment. These supports, according to participants, included counselling; provision of food incentives; and supervision or monitoring. Several studies have indicated the role motivation, in the form of incentives and benefits, played on the adherence to anti-TB drugs especially among the socially marginalized (Arcêncio et al.,

2008; Gärden et al., 2013). It equally supports the work of Jakuboviak et al (2009) who used adherents and non-adherents to find out the sort of social backing to motivate TB patients to complete treatment. Their study found that most patients (67%) preferred rewards and others such as food (41%) and fare for transportation (32%). This might be because some TB patients are usually weak and may not be able to work. The support from the health facility in supporting TB patient is crucial in treatment adherence. A study conducted in South Africa concluded that mobile phone text message interventions have a potential to improve patients' adherence to TB treatment, though the evidence is uncertain (Nglazi et al., 2013).

A good staff-patient relationship was identified as a motivating factor that helped patients to adhere to their treatment. Participants who had a bad encounter with the staff at the health facilities decided not to go for their drugs. Consistent with the findings of this study, (Kannan & Veazie, 2014), Gebremariam, et al. (2010) and Munro et al., (2007) all indicated in their studies that poor staff relationship with TB patients led to TB treatment non-adherence. With the exception of the study of Munro et al. (2007) that did a systematic review, the two remaining qualitative used TB patients as participants. However, the findings in this current study were varied so far as the staff-patient relationship is a concern. While some participants described their relationship with the staff as exceptional and that the staff had time for them, few described the relationship as bad and therefore, participants did not have trust in the staff. Participants who did not have trust in the health staff coupled with inadequate communication and unsatisfactory provider-patient relationship affected participants 'decision' to continue taking the treatment until the end. This echoes the works of others that indicated that patients having a bad perception about healthcare staff, and poor staff-patient relationship serve as barriers to TB treatment adherence (Arcêncio et al., 2008; Dodor & Kelly, 2010; Gebremariam et al., 2010; Widjanarko, Gompelman, Dijkers, & van der Werf, 2009).

Additionally, (Escott & Walley, 2005) in their qualitative study identified that unaccepted attitudes of some health workers made it difficult for patients to continue with treatment.

However, unlike this current study, their study included patients, family treatment supporters and health workers as the participants. Lewis and Newell (2009) in a study to explore patients' support needs while on treatment with the use of individual interviews and focus group discussions, concluded that improved communication between service providers and patients led to increased patients' confidence in treatment.

Each patient has his/her main reason for seeking care. Once that reason is fulfilled, the individual becomes satisfied and happy. Conversely, if the reason for seeking care remains unattended then the patient loses hope and gives up treatment. The study found that patients had unmet needs that interrupt their adherence. They expressed the need for more information on TB and its treatment, the need for support groups, and the need for holistic care. The informational needs of the participants may suggest that some TB patients do not have adequate information about TB and its treatment. This may lead to a situation where participants who are put on anti-TB drugs still have their conceptions about TB and the anti-TB drugs shaped by the socio-cultural beliefs. This also presupposes that patients who do not feel that they have some control over their treatment are more likely to be non-adherent and a patient with a high sense of efficacy is associated with adherence (Nabi et al., 2008; Orr, 2011). Lewis and Newell (2009) also indicate in their work that important information that was given to patients and their families lead to treatment adherence. That information included education on the treatment regimen, duration, and side effects; and how to manage the side effects as well as the need to comply with treatment. It has been documented that delay in seeking health and adherence to TB medications requires culturally specific patient, family and community education programmes that meet their needs and aspirations (Woith & Larson, 2008). Participants' encounters were consistent with the study by (Abebe et al., 2010) which revealed that patients' inadequate knowledge on TB and its treatment affects their health-seeking behaviour and treatment adherence. However, unlike the current research, the study was a quantitative study. In a study related to this study, (Zhou et al., 2012) identified that patients who had no prior knowledge about TB diagnosis, who had not received



counselling before treatment, and those who were not supervised stood high chance of not adhering to TB treatment: a view supported by others (Gebremariam et al., 2010; Gerrish, Naisby, & Ismail, 2013; Munro et al., 2007).

It is worthy of mentioning that TB affects all aspects of lives of patients (Lewis & Newell, 2009) and therefore, health care providers should be interested in exploring an attending to these needs of patients which may include physical, psychological, emotional, social needs etc. This will probably provide the ‘holistic’ care that the TB patients’ needs. The need for support group confirms previous studies such as one done by Escott and Walley (2005) that saw the need for establishing self-help groups. The call by TB patients in this current study for support groups possibly re-echoes the findings that some participants had inadequate family support. However, because of the issue of the stigma, the formation of support groups may not be patronized by some TB patients for fear of being tagged (Salifu et al., 2016).

## LIMITATION

The views of family caregivers or healthcare providers were not considered. That information could have helped to triangulate the findings from the TB patients. However, the involvement of staff as participants could have been interpreted by them as a way of monitoring their personal activities.

Though, the practical relevance of qualitative research has been contested by others in terms of applicability of a study with small sample size (in this study 10 participants were used). However, the applicability of this study appears useful since the study sought to mainly explore “how” and “why” the social and cultural factors affect TB treatment adherence. And this is absolutely in line with the epistemological stance that warranted the qualitative study. Therefore, it is the meaning and the understanding from this study that apply to another context with similar characteristics, hence the provision of sufficient contextual information.

Consequently, the responsibility lies with the reader to judge if the findings are applicable to their circumstance.

No attempt is made to make generalisation due to the philosophical stance but the findings might significantly lead to improvement in TB treatment adherence and improvement in the quality of life of patients living with TB. It may also be useful in other patients taking treatment for other chronic conditions such as AIDs, hypertension, Diabetes, just to mention a few.

The use of dyadic interviews consisting of the patients and their caregiver or treatment supporters could have provided an opportunity to have an interactive and much broader scope on the issues.

## IMPLICATIONS FOR CLINICAL HEALTHCARE, MANAGEMENT, AND POLICY

It is imperative that all stakeholders such as staff, patients, family caregivers and support groups acknowledge: patient unique role in treatment, the importance of recognizing and dealing with challenges associated with treatment and the role of family and health staff support in treatment adherence. Even more, it is important for practitioners to acknowledge the role of cultural and social context in influencing treatment and the influence of unmet needs of patients in their treatment adherence.

As part of the measures to improve adherence, checklist on the various themes identified should be prepared to guide patients while paying attention to support systems available for the patient. Again, all newly diagnosed TB patients who might be classified as high risk for non-adherence should be monitored strictly. All TB patients should be provided with the needed information and any practical assistance that can help improve adherence.

Again, there appears the need for collaboration between the clinical health staff and the community health workers such as community health nurses for the monitoring of patients at home to ensure treatment adherence.

## CONCLUSION

Service-related barriers to treatment included poor interpersonal relationship and communication that affect the expectations of most patients. Again, some unmet needs of patients were a common subject matter that participants narrated as reasons for not adhering to treatment.

However, adherence-counselling, supervision, and provision of practical support such as enablers' package for patients were the factors which facilitated treatment adherence.

Strong adherence counselling for TB patients and thorough pre-treatment assessment that identifies any potential barrier to treatment is recommended. Future research on home-based care for chronic patients such as TB patients receiving care at home might be useful and the design should include the caregivers and healthcare workers for broader perspectives.

Conflict of interest: None declared

## **Acknowledgement**

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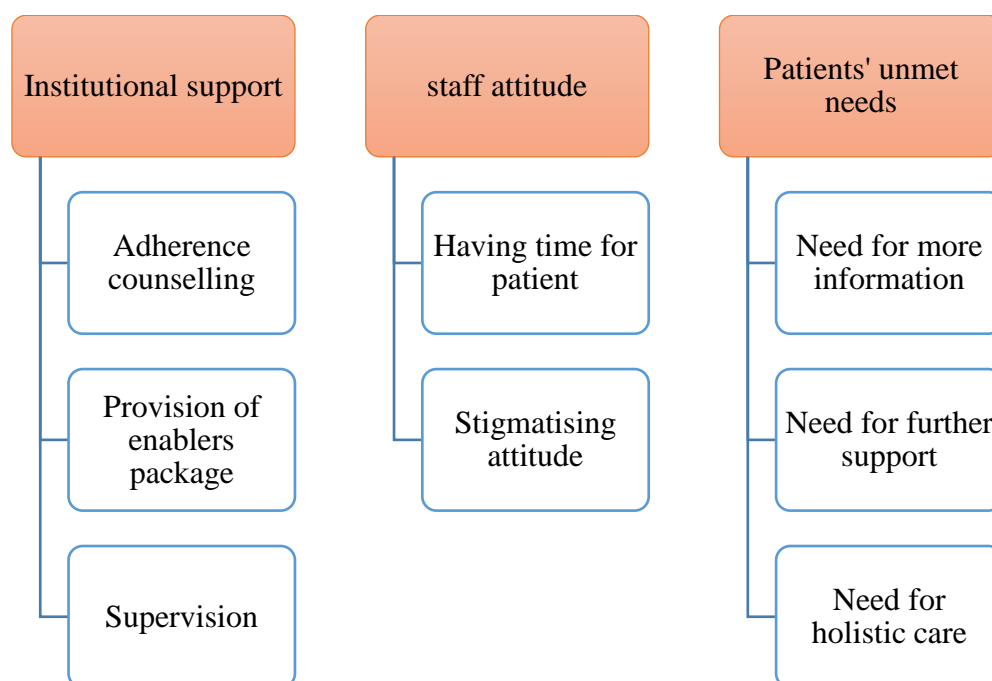
I want to thank the staff of Sekyere South District and the enthusiastic participants who willingly opted to be part of this study.

## APPENDICES

**Table 1: Socio-demographic information about participants**

Fictitious name	Age	Sex	Duration of taking anti-TB drugs	Level of Education	Distance to Health facility	Occupation	Marital status	No. of children
Ewura	32	F	4 months	Tertiary	5km	Tutor	Single	Nil
Kiki	22	M	5 months	Secondary	7km	Student	Single	Nil
Anna	41	F	5 months	Basic	5km	Trader	Widow	3
Suku	35	M	4 months (Re-treatment)	Nil	2km	Labourer	Widower	1
Maame	20	F	3 months	Secondary	5km	Unemployed	Single	1
Panin	22	M	3 months	Secondary	1km	Student	Single	Nil
Obaa	26	F	4 months	Secondary	1km	Pupil teacher	Married	1
Agya	73	M	5 months	Middle school	12km	Farmer	Married	6
Yawa	27	F	3 months (Re-treatment)	Primary	5km	Seamstress	Divorced	1
Kofo	63	M	2 months (Re-treatment)	Middle School	2 km	Nil	Married	3

**Table 2: Themes of services-related barriers and facilitators to Tuberculosis treatment adherence**



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