

Research

Health service providers' perspective on barriers and strategies to tuberculosis treatment adherence in Obuasi Municipal and Obuasi East District in the Ashanti region, Ghana: a qualitative study

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Abstract

Background Despite the substantial improvement in treatment success rate over the past two decades in Ghana, some districts in the country still record high rates of tuberculosis (TB) deaths and lost-to-follow-up. The high incidence of these adverse outcomes suggests that the TB programme is not performing well in these districts which could be due to some barriers in the programme implementation. This paper explored the perspectives of healthcare providers on the barriers to TB treatment adherence and the potential strategies to address them in two high-burden districts in the Ashanti Region of Ghana.

Methods This study utilised an explorative qualitative study design among 16 purposively selected healthcare providers directly involved in TB care in the Obuasi Municipal and Obuasi East District. Key informant interviews were used to collect data, which were audio-recorded and transcribed word-for-word. The transcriptions were then imported into Atlas.ti version 8.4 software for thematic content analysis.

Results Findings from this study revealed significant socioeconomic and individual barriers to TB treatment adherence. Key socioeconomic barriers included income insecurity, transportation cost, food insecurity, lack of public education on TB and frequent shortage of TB diagnostic tools. The individual barriers identified were misconception of TB causation, perceived full recovery after intensive phase treatment, inadequate patient privacy and noncompliance to treatment transfer protocol. The strategies recommended by healthcare providers to address these barriers were home-based treatment, provision of food incentives, frequent education on TB, and usage of reminder systems for follow-ups.

Conclusion The barriers to TB treatment adherence from the healthcare providers' perspective were mainly socioeconomic and individual. The suggested strategies offer actionable steps towards addressing these barriers. Thus, it is recommended that the TB programme and other supporting stakeholders take into account these barriers and adopt these strategies when planning for TB control to enhance treatment adherence and improve patient health outcomes.

Keywords Tuberculosis · Barriers · Strategies · Healthcare provider · Treatment adherence · Ghana

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Abbreviations

CHAG	Christian Health Association of Ghana
CHPS	Community-based Health Planning and Services
DOTS	Direct observed treatment short course
GHS-ERC	Ghana Health Service Ethical Review Committee
HIV	Human immune virus
KII	Key informant interview
NTP	National tuberculosis control programme
TB	Tuberculosis
WHO	World Health Organization

1 Introduction

Tuberculosis continues to pose a significant health threat, affecting millions of individuals each year [1]. In 2020, it was reported that TB affected 9.9 million people worldwide, and it resulted in the death of 1.5 million people, including 214,000 people living with HIV [2]. The World Health Organization (WHO) African region contributed to 25% of the global TB incidence cases, positioning the continent as the second-highest TB endemic region. Additionally, the highest TB deaths occurred in the WHO African region, with a rate of 85% [2]. In Ghana, 45,000 new tuberculosis cases are estimated by the WHO annually [2]. Tuberculosis kills more adults each year than HIV in the country [3]. In 2020 for instance, the TB mortality rate in Ghana was 36 per 100,000 among HIV-negative patients which is about three times higher than the mortality rate among HIV-positive patients (15 per 100,000 population) [2].

TB can be treated, and its spread can be stopped by promptly identifying and treating those infected [4]. However, any delay in treatment initiation can worsen the patient's condition and potentially affect the effectiveness of the treatment [5]. Once treatment starts, adhering to the medication schedule is crucial for positive patient outcomes, reducing the risk of drug resistance, and ultimately eradicating the global TB epidemic [6]. Nevertheless, in many countries, patients often struggle to adhere to treatment due to various reasons which could be either clinical, social, economic, cultural, or institutional [5, 7–18].

In Ghana, there has been a significant improvement in the treatment success rate over the past two decades, that is, from 50% in 2000 to 86% in 2020 [2]. Despite this progress, the success rate still falls short of the 90% target set in the country's strategic plan for 2015–2020 [19]. Districts with a high incidence of TB often report alarmingly high rates of adverse treatment outcomes, particularly cases of patients lost to follow-up and deaths [19]. For example, in the Ashanti region, Obuasi East District and Obuasi Municipal are among the top five districts with the highest TB cases. These districts have consistently reported high rates of patients lost to follow-up and TB-related deaths over the years. Recent data from both districts show that out of 237 patients who started TB treatment in 2020, 72 (30.4%) experienced adverse outcomes. This includes 55 patients (23.2%) who were lost to follow-up and 17 (7.2%) who died due to TB [20]. The high adverse TB treatment outcomes suggest that the programme is not performing well in these districts which could be due to potential barriers or gaps between the programme policies and practices in the districts. Exploring these potential barriers is crucial to addressing the challenges faced in TB treatment. Even though some studies have investigated some barriers to TB treatment adherence [21–24], context holds significance for studies of this kind. The barriers can differ depending on the context; hence it is important to understand and promote context-specific studies to assist in identifying potential distinctions in the barriers to TB treatment [24].

Furthermore, studies suggest that the success of a health programme implementation is dependent on how well healthcare providers apply these policies at each level of care [23]. Frontline healthcare providers have direct interactions with patients regularly as part of their service delivery, as a result, they can critically assess patients' situations and provide better perspectives on healthcare delivery [7, 23]. This qualitative study was part of a larger project which investigated the barriers and strategies to TB treatment adherence in Obuasi Municipal and Obuasi East District in Ghana [25]. The present study aimed to explore the perspectives of healthcare providers on the barriers to TB treatment adherence in the two districts and the potential mitigating strategies to address these barriers.

2 Methods

2.1 Study setting

The study was carried out in the Obuasi Municipal and Obuasi East district located in the southern part of the Ashanti Region in Ghana. The two districts cover a land size of 1624 km² with a total population of 196,698 [26]. TB case management is provided exclusively at three healthcare facilities across both districts; a government hospital, a hospital owned by the Christian Health Association of Ghana (CHAG), and a private hospital.

2.2 Study population

The study population was healthcare providers directly involved in TB care in the study setting. However, only those with at least one year of working experience in TB care were selected to participate in the study. A year's experience in TB care was deemed relevant because it ensures the participants have enough exposure to the realities of TB care and can provide an adequate understanding of TB complexities, thereby enhancing the validity of the study findings.

2.3 Study design and sampling

This study utilised an explorative qualitative study design aimed at understanding the perspectives of healthcare providers on barriers to TB treatment adherence in the study setting and the potential mitigating strategies to address these barriers. Using maximum variation purposive sampling, the sample was drawn across the three health facilities that manage TB within the study setting. Participants were selected based on key characteristics such as role and years of experience in TB management to obtain varied perspectives on the phenomenon. In all, 16 healthcare providers met the inclusion criteria in both districts and were selected for the study. The participants included two pharmacists, two institutional TB coordinators, six DOTS nurses, and six community health volunteers.

2.4 Data collection procedure

Data were gathered using key informant interviews (KIIs) (Supplementary file 1). This was done with the aid of an interview guide adapted from existing literature [8], which was then modified by two qualitative research experts to meet the study's objectives. A pretest was conducted to ascertain whether the questions were in the guide easily understood and to identify possible flaws of the interviewers such as probing skills. Any identified issues were rectified after the pretest to ensure the tool's validity and reliability. The interviews were conducted in English, with assistance from two trained public health officers, for a duration of 30 min and were completed within a period of one month (July 2022–August 2022). With the participants' permission, audio recordings of their responses were made.

2.5 Data analysis

An intelligent verbal transcription was conducted on all audio-recorded interviews. The transcripts were carefully reviewed to remove any identifiable information about participants before analysis. Cross-validation of transcripts was done to ensure the reliability of the information. Specifically, participants were allowed to review, provide feedback on, and approve their interview transcripts. Data analysis was carried out using Atlas.ti version 8.4 software, with similar responses grouped into main and sub-themes. The analysis process involved examining patterns and relationships among the codes. The resulting themes were exported to Microsoft Word for further interpretation.

3 Results

3.1 Participant characteristics

The respondents' ages range from 25 to 51 years. Most of them had completed tertiary education with diploma certificates. Additionally, the respondents' years of working experience in TB care ranged from 2 to 12 years (see additional details of participants' characteristics in supplementary file 2).

3.2 Participants' perspectives on barriers to TB treatment adherence

The emerging contextual barriers to TB treatment adherence from the healthcare providers' perspective were categorised into socioeconomic barriers and individual barriers. The socioeconomic barriers included income insecurity, transportation cost, food insecurity, lack of public education on TB and frequent shortage of TB diagnostic tools. On the other hand, the individual barriers included misconceptions of TB causation, perceived full recovery after intensive phase treatment, inadequate patient privacy, and noncompliance with the treatment transfer protocol (Table 1).

3.3 Socioeconomic barriers

3.3.1 Economic burden—income insecurity, transportation cost and food insecurity

Income insecurity, leading to financial strain, was reported as a major socioeconomic barrier to TB treatment. To reduce the transmission of the disease and improve patient recovery, the protocol for TB treatment necessitates that a patient refrain from working until considered medically fit [27]. This requirement, however, is a challenge for some patients, especially those with unstable jobs, as their livelihood solely depends on their labour. Consequently, these individuals often prioritise their work over their health, defaulting on their treatment particularly when their symptoms subside. Some respondent shared their observation as follows:

“Some patients have financial problems because some say for them to stop their jobs to take the medication fully for 6 months is difficult. Some of them will tell you they feed themselves and their family with the income from their job. These complaints normally come from those with unstable jobs. Since they get some income from it, if you tell them to put a hold on that job for some months or at least finish their medication, they agree but with time they go back to it when the symptoms subside and when they start having the symptoms again then they return to the facility for care.”—Female TB DOTS Nurse, Public Facility.

The respondents added that some patients who defaulted treatment cited transportation issues as a primary reason. In the context of TB care in Ghana, the treatment protocol necessitates that either the patient or a designated treatment supporter retrieves the medication from the healthcare facility every month for 6 months. This becomes particularly challenging when the patient lacks familial support and is financially handicapped. The inability to afford transportation costs

Table 1 Contextual barriers to tuberculosis treatment adherence

Category	Theme	Sub-themes
Socioeconomic barriers	Economic burden	Income insecurity
		Transportation cost
		Food insecurity
Individual barriers	Education on TB	Lack of public education on TB
	Resources	Frequent shortage of TB diagnostic tools
	Perception about TB disease and treatment	Misconception of TB causation
		Perceived full recovery after intensive phase treatment
	Care environment	Inadequate patient privacy
Treatment transfer	Noncompliance with the treatment transfer protocol	

often leads these patients to default on their treatment, despite receiving appropriate counseling. Some respondents shared their observations as follows:

“You counsel the person so that the person will be motivated to take his or her drugs. But at the end of the day, the problem that some of them face exists. Some have problems with finances as a result they are unable to afford transportation fares because they go and they come.”—Female DOTS Pharmacist, Private Facility.

“There are some patients who are not able to visit the hospital because of transportation costs. When some are due to revisit, they could call me and complain that their schedules for revisit are up but then they don’t have money. So sometimes I sacrifice and send them the drug with my money. But I surely would not be able to make such sacrifices often so some turn out defaulting on treatment”—Female Community Health Volunteer, Non-governmental Organization.

The respondents also identified food insecurity as a barrier to TB treatment adherence. TB patients must maintain a nutritious diet, which aids in strengthening their bodies, promoting weight gain, and enhancing their immune system to combat the disease alongside the prescribed TB medication. The respondents in this study accentuated that TB medications tend to induce a strong sense of hunger. Therefore, patients must have immediate access to nutritious food following their medication intake. However, when food is not readily accessible, some patients decide to forego their medication due to the intense hunger it triggers.

“Some patients also have serious problems with feeding. The more they take the drug the more they eat, and they have to eat very well. The type of diet eaten also helps the client. Sometimes some of us have to help. I had an experience with a female TB patient who had a co-morbidity with HIV. If I had not helped her with my money for food, I would have lost the client because at that time they need a high nutritional value diet.”—Female DOTS Pharmacist, Private Facility.

“There are some of them who say when they take the drugs, they become hungry and so, the days they do not have any food, they don’t take the drugs. When we go to the field some people could ask that in some time past when they took drugs, they were being given foods like rice, tomb brown, and money. This is something that usually happens, most people request for them but we tell them we have not received some food yet if some come, we will let them know.”—Female Community Health Volunteer, Non-governmental Organization.

3.3.2 Education—Lack of public education on TB

A respondent expressed that despite having various communication platforms, education about TB to the general public is lacking. Instead, traditional healers have taken advantage of these platforms to advertise their products frequently, overshadowing information about TB. The disease only gains public attention during TB celebration week. This lack of continuous public education on TB was identified as a barrier to TB treatment adherence. It is worth noting that public education is a key foundation for successful TB treatment as it raises awareness about the disease, its preventive measures and control mechanisms. It can reduce the myths related to the disease and increase the acceptance rate of the treatment. However, the absence of such education could potentially affect the quality of services rendered in TB treatment.

“There is not enough education on TB. You know there are so many ways or means by which information gets to people; through social media, radio stations, television, and others. Traditional healers are always either on radio or television, social media, and others advertising their products. You only hear about the disease in the public domain during TB celebration week or an event assigned for TB. The traditional healers are always there, and they are taking control.”—Male Institutional TB coordinator, CHAG Facility.

3.3.3 Resources—frequent shortage of TB diagnostic tools

Frequent shortage of TB diagnostic tools was expressed as a barrier to TB treatment. Patients must be aware of their health status at every stage of the treatment process. This necessitates an initial diagnosis to confirm TB, followed by subsequent tests after 2 months, 5 months, and 6 months of medication to determine their progress. The results obtained at these specific intervals guide the DOTS nurse in deciding the next course of action for the patient. However, respondents in this study indicated that the scarcity of TB diagnostic tools often leads to delays in obtaining test results. Consequently,

patients are sent home without a clear plan, as decisions regarding their treatment cannot be made without these results. Some respondents shared their observations as follows:

“The lab sometimes tells us that there are no cartridges for TB tests, and this happens often. I understand that the samples we send are sometimes many but it is not our fault because we just follow the doctor’s instructions. I can send samples to the testing site and the results will take a long time to come. When it happens like that the patients keep coming to the hospital and we have to send them back because we have not yet received their results. We cannot blindly start treatment because it is from the results we can tell if the patient is Rifampicin resistant or not”—Male Institutional TB coordinator, CHAG Facility.

“Sometimes when TB patients visit the hospital and there is a shortage of laboratory tools for follow-up tests, they will need to go back and come another day. Due to this situation, the patients started to complain. They want that anytime the lab should be able to do follow-up tests for them.”—Male DOTS Nurse, Public Facility.

3.4 Individual barriers

3.4.1 Perception about TB disease and treatment—misconception of TB causation and perceived full recovery after intensive phase treatment

Some respondents indicated the presence of misconceptions among some patients about the nature and origins of TB disease. They expressed that some perceive TB as HIV and this makes them reluctant to seek treatment for fear of being labelled or discriminated against. Other patients also attribute the disease to spiritual causes, leading them to seek remedies from traditional healers instead of medical professionals. This belief often results in these patients discontinuing their prescribed TB treatment in favour of herbal solutions.

“Some patients think TB is some kind of different disease and some people also see it to be HIV”—Male DOTS Nurse, CHAG Facility.

“Some prefer to go to the traditional healers for healing because they perceive the TB disease as something related to spirit. So, they go in for traditional medicine rather than coming to the hospital. Some of them could be on the TB drug and at the same time go for an herbal treatment. Sometimes they even stop the orthodox treatment and go for the herbal one.”—Male Institutional TB coordinator, CHAG Facility.

Perceived full recovery after intensive phase treatment was another major barrier to TB treatment adherence expressed by the respondents. According to them, some patients feel that once their symptoms have subsided in two or three months of treatment, they are cured of the disease. Thus, TB patients willingly discontinue taking their medication because of this misleading recovery perception, and later return to the hospital with worse complications.

“The TB treatment is for 6 months, and the first two months of treatment is an intensive phase treatment which is very effective such that there is a higher likelihood for the patients to test negative after completing that phase. In this case, they don’t cough anymore so they feel they have recovered from the disease.”—Male Institutional TB coordinator, CHAG Facility.

“There are some patients when they are given the drugs, they take the drugs for two or three months and willingly stop taking it and stay home because they feel they have now gained strength. They will stay with the disease at home for long until it becomes severe.”—Female Community Health Volunteer, Non-governmental Organization.

Additionally, the complaints patients give about discontinuing treatment after their symptoms subside were mainly because of the size of the TB drugs and the long distance to the health facility.

“When they start feeling fine, they stop taking the drugs and later return to the facility with a cough again. I asked some of them why they decided to stop taking the drugs and they said the drugs are big for swallowing and where they stay is far, so once they feel fine, they don’t see any need to continue up to the sixth month of treatment.”—Female DOTS Nurse, Public Facility.

3.4.2 Care environment—inadequate patient privacy

Inadequate patient privacy was expressed by some respondents as a barrier to patient adherence to TB treatment. They indicated that the location of the TB DOTS unit does not promote privacy. According to a respondent, the presence of other individuals around the DOTS vicinity deters some patients from openly discussing their concerns, which might necessitate counselling to encourage adherence. This situation goes to the extent of affecting their subsequent visit for TB drugs.

“From my discussions with some patients, sometimes when they come to the hospital, they always want to get an environment that offers privacy so that they can tell their problems. When they come and realise that the environment is full of people either colleague staff or people they knew, they refuse to come for their subsequent drugs.”—Male DOTS Nurse, CHAG Facility.

Another issue related to patient privacy is the rendering of other services at and around the TB DOTS unit, and the use of patient waiting seats by other healthcare workers. A respondent perceived that such practices could deter patients from visiting the DOTS unit for subsequent drugs since they may feel stigmatised.

“The room we use for TB management and the same room for HIV services. Ideally, it is not the best practice. Again, the same environment is where the nutrition and reproductive and child health (RCH) unit is based. Since the healthcare workers at the RCH are many, sometimes some of them use our waiting seats allocated for TB patients. This does not only breach privacy but cause other health service providers to contract the disease.”—Male Institutional TB coordinator, CHAG Facility.

3.4.3 Treatment transfer—noncompliance with the treatment transfer protocol

The TB treatment protocol requires that a patient’s relocation to a different district or region be followed by prior notification of the DOTS clinic so that arrangements can be made for the patient to be received by the nearest DOTS clinic at his or her new location [27]. However, some patients travel without prior notification which subsequently interrupts their treatment. A respondent shared her observations as follows:

“There are some patients who when they want to travel, just leave town without notifying the DOTS clinic for a transfer letter to the nearest hospital at their new location. And if they leave instead of reporting to another hospital, they harbour the condition and stay at home.”—Female Community Health Volunteer, Non-governmental Organization.

Another respondent expressed that despite being notified by some patients about short-term travel, they refuse to return. This makes treatment adherence difficult since such patients are given additional drugs according to the duration of stay, they indicate.

“And sometimes when they tell us they want to travel, we ask them when they are coming back. Some tell us they will spend about two weeks, so mostly we give them drugs in advance but later when they go, they don’t want to return, and when you call them to ask why they don’t have any reason for not coming back.”—Female DOTS Nurse, Public Facility.

3.5 Participants’ perspectives on strategies to mitigate the barriers to TB treatment

The emerging strategies from the respondents’ viewpoint included home-based treatment, provision of food incentives, usage of reminder systems for patient follow-up, and frequent education on TB.

3.5.1 Home-based treatment

Home-based treatment was expressed by some of the respondents as a strategy for improving TB management. They expressed that, TB drugs could be sent to the patient at home rather than the patient or treatment supporter visiting

the DOTS clinic every month. This strategy would be able to reduce the financial burden associated with the disease treatment including costs of transportation, as well as enhance monitoring of patient adherence to treatment and health outcomes. Despite expressing home-based treatment as an effective strategy, the respondents indicated that its effectiveness would require a mode of transport like motorbikes to the patient's homes.

"The TB treatment can also go to the doorstep of the client. If this could be possible it will help solve the problem of financial constraints."—Female DOTS Nurse, CHAG Facility.

"If we can get means like a car or motorbike, then within a week we can visit one or two of the patients, like a home visit sort of, to check whether they are taking the drugs or not and as to whether they are improving or not. If we get this kind of resource, I believe it will help."—Male DOTS Nurse, CHAG Facility.

Another respondent indicated that patient privacy can be assured when drugs are sent to them at home. The respondent said;

"If the drug is to be sent, it is not expected that it will be announced to the community or to someone that a drug is going to be sent to this patient. This is not the only sickness that can be dealt with in such a manner. There are HIV patients whose drugs are being sent to their homes by some people. Even if the person is staying with so many people in a house, there is a manner in which communication can be done so that nobody will know what is happening."—Female Community Health Volunteer, Non-governmental Organization.

3.5.2 Provision of food incentives

In past years, food and nutritional support were provided by the National TB Control Programme (NTP) as an enabler and incentive to TB patients to improve their nutritional status as well as encourage treatment initiation and adherence. Patients were given monthly take-home food rations [24]. According to a respondent in this study, the food support by the NTP served as a motivation for patients to adhere to treatment, especially those from food-insecure households, as well as ease the financial burden associated with the disease. Thus, should this support be implemented again, it will enhance adherence to TB treatment.

"Also, there used to be packages to support TB clients. Some complained they eat a lot when they are on treatment. The packages do not come anymore, so if it can be possible those in charge should try and support the client with that package. The clients were not taking money, it was only food. I used to share "Tom Brown" to the clients. If this take-home food can come back, it will motivate the client to come for the drugs and also minimise financial constraints since they wouldn't have to think of what to eat before taking their drugs."—Female DOTS Pharmacist, Private Hospital.

3.5.3 Frequent education on TB

Frequent education on TB was indicated by a respondent as a strategy for improving TB management in the district. The respondent indicated that education on TB should not be offered to patients only when they are diagnosed. However, it should be intensified publicly to enhance the understanding of the general public on the disease and its curative and preventive measures.

"It should not be that we offer education only when we come into contact with a client. We have to send information out to educate everyone because we are all susceptible to TB. Education should be intensified."—Male Institutional TB coordinator, CHAG Facility.

3.5.4 Usage of reminder systems for follow-up

Some respondents indicated the use of reminder systems as a strategy for improving TB treatment in the districts. They expressed that instituting reminder systems like Short Message Service (SMS) or phone calls could help prompt patients to attend the DOT centre for appointments on time or follow up on patients who have missed or defaulted on the scheduled appointment. Additionally, they indicated that patients could be visited days before their appointment date to remind them of their visit to the hospital.

“When it is getting to three days or four days for a patient’s monthly revisit schedule to be up, we can visit the person or send an SMS so that the patient can be aware that he or she is left with three days to come for his or her drugs. If you visit or follow up on the person through the SMS system, that fellow can come to the hospital.”—Female DOTS Nurse, Public Facility.

“There are those whom we have their telephone numbers, so we can call them to remind them. There are some when you remind them, they will come unless they do not have money. So, with those who complain of not having money, we can support them by sending the drugs to them ourselves.”—Male DOTS Nurse, CHAG Facility.

4 Discussion

This study explored healthcare service providers’ perspectives on the barriers and strategies to TB treatment adherence in two districts in the Ashanti region of Ghana. The views expressed by the respondents on the barriers to TB treatment were mainly individual and socioeconomic. The socioeconomic barriers included income insecurity, transportation cost, food insecurity, lack of public education on TB and frequent shortage of TB diagnostic tools whilst individual barriers included misconception of TB causation, perceived full recovery after intensive phase treatment, inadequate patient privacy and noncompliance to treatment transfer protocol.

Income insecurity, leading to financial strain, was reported by most healthcare providers as a major barrier to TB treatment. A similar finding was reported in a study in Uganda [7]. The respondents in this study expressed that because the nature of the disease disallows patients to attend their jobs unless deemed medically fit, most of them find it difficult to complete the full course of treatment since they depend solely on the income from their jobs to cater for their needs and that of their families. This situation is coupled with attendant financial costs such as the cost of transport and food even though TB drugs are free [9]. According to the healthcare providers in this study, patients who do not adhere to treatment are those financially handicapped and/or have no family support. These patients are unable to afford transportation costs to the health facility. Additionally, TB drugs stimulate hunger and hence in the absence of food, patients refuse to take the drugs. This is in congruence with “Maslow’s Hierarchy of Needs” which posits that individuals are motivated to fulfil basic needs before moving on to other needs [28]. Thus, when patients are faced with challenges of fulfilling their basic needs of physiological well-being and safety, such as food and travel, they are unlikely to pursue higher-level needs (such as adhering to a long-term treatment regimen) if their basic needs are not met. Similar findings are reported in studies in South Africa [11], and Eritrea [10].

Misconception of TB causation was another barrier to TB treatment. The healthcare providers expressed the notion that some patients perceive TB as HIV. This perception may arise from the fact that both diseases can coexist in patients and share similar immune-weakening effects [2]. In addition, some patients attribute the disease to spiritual causes, leading them to seek remedies from traditional healers instead of medical professionals. These misconceptions about TB disease influence the patients’ attitudes toward adherence to the prescribed treatment regimen, consequently affecting their health outcomes. Similar findings were reported in studies in other parts of Ghana [21] and the Pacific Island nation of Vanuatu [29]. Another major barrier in this study was perceived full recovery after intensive phase treatment. This study found that once symptoms are subsided, TB patients willingly stop treatment because they feel better and think they have recovered. A similar finding is reported in studies in Pakistan [12], India [30], Swaziland [31], and Russia [17]. Additionally, this study revealed that the size of the TB drugs and the long distance from the patient’s residence to the health facility influence their decision to stop taking the drugs when their symptoms subside after two to three months of treatment. Similar findings are reported in studies in another part of Ghana [24], Ethiopia [13], and Indonesia [8]. Other studies have established a direct link between patient’s perceived full recovery after intensive phase treatment and their perception of TB disease in that patients who did not believe that they had TB, only wanted a cure for their symptoms and ceased treatment once these were reduced [15]. The misconception of TB causation and perceived full recovery after intensive phase treatment can also be because of inadequate public education about the disease as indicated in this study. Furthermore, this study revealed that traditional healers in the districts more often advertise their products, which they claim cure TB, through several communication media including the radio, television, and social media, however, awareness creation of the disease in the public domain by a healthcare provider is done only during a world TB celebration week. This communication deficiency gives traditional healers a competitive advantage to have increased acceptance of their product over orthodox medicine. These misperception challenges can be seen through the lens of the Health Belief Model, which suggests that individual perceptions of a disease can significantly influence health behaviours. Thus, to address these

challenges, interventions must be designed to alter these perceptions and promote a more accurate understanding of TB. This could involve educational campaigns to dispel myths and provide factual information about TB, its causes, and its treatment. Furthermore, healthcare providers could also be trained to communicate more effectively about TB, ensuring that patients understand that it is a medical condition unrelated to HIV or spiritual causes. In addition, collaboration with traditional healers could be explored. Given their influence in certain communities, they could play a crucial role in disseminating accurate information about TB and encouraging patients to seek medical treatment.

This study also found inadequate patient privacy as a barrier to TB treatment adherence. In the study setting, TB DOT units are situated close to other units like the health facilities' RCH, nutrition, and pharmacy units. Some healthcare providers in this study revealed that the location of the TB DOT unit affects patient privacy and encourages stigma since the patients interact with other healthcare users and service providers who are not involved in TB care. This situation influences patients' refusal to express their issues as well as revisit the same DOTS clinic for subsequent drugs since they may feel stigmatised. Similar findings were reported in studies in Russia [17], Uganda [14], and Ghana [24]. The stigma associated with TB makes it essential for a fair balance in properly positioning TB DOT units. Meanwhile, some studies have discouraged the isolation of TB DOT centres from the main health facility premises because of stigma [24], even though this practice could enhance patient privacy. This shows how complex the nature of this barrier is to TB treatment. Additionally, the healthcare providers expressed that rendering essential services at and around the TB DOT unit may increase the risk of infection among vulnerable healthcare users like pregnant women, children, and people living with HIV [22, 24].

This study found noncompliance to treatment transfer protocol as another barrier the healthcare system faces regarding TB treatment. The treatment protocol requires healthcare providers to use TB treatment referral/transfer forms to coordinate referrals and transfers. Patients are also required to notify the TB DOT nurse of any travel so that an arrangement can be made for them to be received by another DOT centre in the district where they will be staying to continue treatment patients [27]. However, the healthcare providers in this study expressed that some patients travel without their notice, hence they are unable to provide them with transfer forms. This could be because the patients were either not aware of this protocol and its importance, or they were forgetful or completely ignored the advice given to them [32]. Thus, patients' noncompliance to the treatment transfer protocol interrupts treatment and makes it difficult for the healthcare provider to monitor the patient's treatment.

Frequent shortage of TB diagnostic tools was identified as a barrier to TB treatment. In Ghana, the Gene Xpert MTB/RIF assay is used as a first-line test for pulmonary TB diagnosis because of its high sensitivity and specificity rate, and ability to detect rifampicin-resistant TB [33, 34]. Additionally, sputum smear microscopy is used for follow-up tests after treatment has been initiated. The healthcare providers expressed that the shortages in cartridges and/or sample reagents for TB tests delay patient test results and their decision to initiate treatment. Similar studies have been reported in Ethiopia [35, 36]. This challenge could result in a significant reduction in the TB case notification rate in the study setting, and negatively affect the performance and quality of the TB control programme [35]. Furthermore, long delays in TB diagnosis and treatment initiation could increase clinical complications and transmission of the disease as well as cause poor treatment outcomes [5, 16].

4.1 Recommended strategies for addressing barriers to TB treatment adherence

In this study, the healthcare providers proposed several strategies that could be employed to address the barriers to TB treatment adherence which included home-based treatment, provision of food incentives, usage of reminder systems for follow-up, and frequent education on TB.

Home-based treatment was proposed by healthcare providers as an effective strategy to address the challenge of the financial burden associated with TB treatment. Specifically, rather than the patients or treatment supporters visiting the TB clinic for drugs every month, healthcare providers could assume the responsibility of sending the drugs to the patient at home. This strategy would not only address the challenge of transportation costs, it will in the long term enhance monitoring of patient adherence to treatment and early identify any adverse event following the TB drugs. However, to effectively implement this strategy, the NTP would be required to support the healthcare providers with resources like motorbikes to reach patients with difficulty accessing the health facility due to geographical limitations. It is worth noting that a similar strategy proved effective in Iraq [37] and in Xigaze in China where village doctors visited patients' homes once per month to remind and encourage them to comply with their treatment [18].

Another strategy proposed by a healthcare provider in this study to address the challenge of the financial burden associated with TB treatment was the provision of food incentives for patients. The earlier implementation of TB Enablers Packages, which included benefits such as transportation allowances, mobile phone credits, and exceptional food provisions, played a pivotal role in promoting the completion of treatment. These incentives were particularly beneficial for patients from food-insecure households. Furthermore, these packages enhanced the effectiveness of supervised treatments administered in both community settings and healthcare facilities. This comprehensive approach not only facilitated adherence to the treatment regimen but also contributed to improved patient outcomes [24]. Thus, the challenge of income insecurity, transportation, and feeding could be resolved if these Enablers Packages provided by the TB programme to support TB patients are reintroduced in the country.

Frequent education on TB was proposed as a strategy to address the challenge of the misconception of TB causation and the perceived full recovery after intensive phase treatment among patients in the districts. This strategy aligns with Paulo Freire's Theory of Critical Consciousness, which highlights the empowering role of education in enabling individuals to critically assess their circumstances and initiate change [38]. Thus, frequent education on TB can help to raise an individual's critical consciousness about the disease and promote adherence to the treatment regimen. Supporting this, other studies have identified education as an effective strategy in mitigating the risk of treatment non-adherence [4, 39]. Thus, it is imperative to intensify TB education at the community level by utilising community radios and other communication media to raise awareness and improve compliance with TB treatment. By so doing, healthcare providers could collaborate with community radio broadcasters to provide frequent health education on TB at the community level, especially in hotspot areas within the study setting.

Usage of reminder systems for follow-up was another strategy proposed by some healthcare providers in this study to address the barriers to TB treatment. This study found that instituting SMS reminders and/or phone calls could help improve TB treatment adherence in the study setting by prompting patients to attend the DOTS centre on time or follow up on patients who miss their scheduled appointments. A similar strategy proved effective in improving treatment adherence in studies in Pakistan [40], China [41], and Cameroon [42, 43]. The SMS functions on every mobile phone and it provides the farthest reach and penetration globally. Thus, its usage serves as an opportunity to reach patients between clinical visits [44].

This study contributes significantly to the TB programme by providing an understanding of the barriers to TB treatment adherence and completion from the perspectives of healthcare service providers. Additionally, it proposes strategies that can be incorporated into the TB programmes to address the identified barriers and improve treatment outcomes.

4.2 Limitations of the study

This study had some limitations. This study only focused on the experiences of respondents within a specific study setting, hence the findings may not be representative of the views and experiences in other settings of the country due to geographical differences. Additionally, although the findings are instructive, the study design used, qualitative, limits its generalisation to the larger population. This study did not collect qualitative data using Focus Group Discussions (FGDs), this would have shed more light on the health system factors affecting the uptake of TB treatment including more understanding of perceptions, experiences and challenges faced by health service providers. Thus, further quantitative study is required to obtain a more comprehensive understanding of the situation and establish how these findings can be applied to the larger population.

4.3 Implication of findings

The implications of these findings are significant to TB programme policy and practice. The findings imply that addressing the barriers to TB treatment adherence requires a comprehensive approach that considers the various contextual socioeconomic and individual challenges faced by patients. This involves implementing supportive policies to address income insecurity, improve access to transportation, ensure food security, enhance public education about TB, ensure the availability of TB diagnostic tools, address misconceptions about TB and improve patient privacy.

5 Conclusion

This study found major socioeconomic and individual barriers to TB treatment. Key socioeconomic barriers identified by the healthcare providers were income insecurity, transportation cost, food insecurity, lack of public education on TB and frequent shortage of TB diagnostic tools. The individual barriers identified were misconception of TB causation, perceived full recovery after intensive phase treatment, inadequate patient privacy and noncompliance to treatment transfer protocol. Several strategies were recommended by healthcare providers to address these problems. Home-based treatment was proposed as a measure to address the challenge of transportation costs and ensure patients receive the treatment they require. This can also improve accessibility and strengthen monitoring and supervision of patients' treatment compliance. Providing food incentives can assist in decreasing food insecurity, which is frequently a substantial barrier for patients. Frequent health education campaigns can help address misconceptions regarding tuberculosis causes and emphasise the significance of following treatment procedures. Finally, the adoption of reminder systems can improve treatment adherence and allow for timely transfers. The government, NTP, healthcare providers, and other supporting stakeholders must work collaboratively to implement these recommendations to enhance treatment adherence, improve patient health outcomes, and ultimately contribute to the global goal of TB eradication.

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Author contributions M.A.A. contributed to the study design, interview guide development, data collection, data analysis, data interpretation, and article preparation. J.A.A., P.D.G., and E.A. contributed to the study design, interview guide development, data interpretation, and article preparation. D.G. and P.S. contributed to the study design and data collection. E.M.K. contributed to the data analysis, data interpretation, and article preparation. All authors read and approved the final manuscript.

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Data availability The datasets used and/or analysed during the current study are available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate The study was approved by Ghana Health Service Ethical Review Committee (GHS-ERC: 014/06/22), and conducted in accordance with the Helsinki Declaration. In compliance with the Ghana Data Protection Act, 2012 (Acts 843), all the participants were made aware of the purpose for which the data was collected, the recipient of the data, and their right to withhold information as they saw fit [45]. Written informed consent was obtained from all participants before data collection. All recorded information was treated confidential and no personally identifiable information about the participants was presented in the analysis. Participants were assured that none of the information gathered would be shared with anyone and would be used only for this study. All methods were carried out in accordance with relevant guidelines and regulations.

Consent for publication Not applicable.

Competing interests The authors declare that they have no competing interests.

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