Influential Factors in the Treatment Outcomes of Tuberculosis in Directly Observed Therapy at the La General Hospital in the Greater Accra Region, Ghana

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A R T I C L E   I N F O

A B S T R A C T

Background: Tuberculosis is a major cause of morbidity and mortality in Africa, especially Ghana. Despite the current treatments for tuberculosis, positive treatment outcomes are not attainable due to the differences in the socio-economic and bio-psychological status of the patients. The present study aimed to assess the influential factors in the treatment outcomes of tuberculosis.

Methods: This qualitative study was conducted to determine the influential factors in the treatment outcomes of tuberculosis in terms of the patients, community, and healthcare providers. Data collection and management were performed using version 11 of the NVivo software. Sample population included 10 patients, five healthcare providers, and five community members (treatment supporters). Data analysis was carried out using framework analysis, where the emerging themes were identified and discussed in relation with literature.

Results: The results revealed that wrong/negative perceptions about TB, social stigma, and the use of alternative treatment methods could result in unsuccessful treatment outcomes.

Conclusion: The study recommends that community awareness of TB and the search and implementation of policies toward improving TB treatment outcome should be pursued.

1. Introduction

The global community has made efforts to control tuberculosis (TB) and promote health. Such efforts include bacille Calmette-Guerin (BCG) vaccination, anti-TB medications, directly observed therapy strategy (DOTS), and the End TB strategy by the World Health Organization (WHO) [1]. BCG was widely used after World War I in Europe and Ecuador [2]. The protective efficacy of BCG against TB has been estimated at 60-80% in the children who have not been exposed to TB infection [3]. Some of the introduced medications for the treatment of TB include isoniazid, rifampin, ethambutol, and pyrazinamide [4].

According to statistics, the mortality and incidence rates of TB have reduced since 2004 [1].

However, the epidemic remains a global health threat considering the increasing comorbidity and multidrug resistance of TB . The WHO has reported that approximately 1.8 million deaths result from TB, while about 10.4 million new cases of the disease occurred worldwide in 2015, affecting 56% of men and 10% of children . China, Indonesia, Nigeria, India, Pakistan, and South Africa constitute 60% of 10.4 million new cases of TB [1]. Globally, the disease incidence was reported to decline by 1.5% from 2014 to 2015 [4].

According to Zumla et al. (2015), despite this reduction, TB remains among the ten leading causes of mortality across the world. India alone accounts for more than one third of the TB cases and deaths in the world, while Africa is severely burdened with TB/HIV co-infection [4].

"TB is a communicable disease caused by Bacillus Mycobacterium Tuberculosis [5].

Usually, TB affects the lungs - Pulmonary TB, with a few instances of TB affecting other parts of the human body - extra pulmonary TB [6]. The disease is transmitted through airborne particles called droplet nuclei. Infected people release droplet nuclei into the atmosphere through coughing, sneezing and laughing [7]. However, not everyone who breathes in droplet nuclei contracts the disease. The bacilli are able to live dormant in the human body for many years and only resurface when the immune system is compromised [8].

A TB patient may infect others if untreated [8]. It is notable that exposure to TB infection does not imply that an individual will develop the disease. However, it is estimated that out of 2-3 billion infected individuals, 5-15% develop the disease at some point in their life [1]. The main symptoms of TB include excessive weight loss, severe headaches, chest pain, dyspnoea, night sweats, and death [9]. Furthermore, the disease imposes an economic burden on the families of the patients, as well as the national resources of health care [10].

In Ghana, the burden of TB has been flagged as a major public health issue [11]. As such, this country has adopted the DOTS by the WHO in 1994 and achieved nationwide coverage in 2000 [12]. Nevertheless, Ghana was ranked the 13th country in terms of the new cases of TB in Africa in 2006, with the rise of the new TB cases during 2011-2013. According to statistics, the Ashanti region in Ghana represented the highest number of the newly reported TB cases (n = 3,041), followed by Greater Accra region (n = 2,901). Furthermore, up to 2,400 cases were lost to the follow-up or defaulted in the treatment follow-up based on the DOTS in Greater Accra. The Greater Accra region recorded 48% of its target population in 2013 [7].

In a study regarding the definition of TB treatment outcome, Sengul et al. (2015) categorized TB patients based on the treatment outcomes. Accordingly, the patients would have successful outcomes if they completed the treatment or were effectively cured. On the other hand, those with poor outcomes defaulted, died or failed in the treatment. Complete eradication of TB requires policymakers to recognize the risk factors for unsuccessful treatment outcomes. According to the literature, some bio-psychosocial and economic factors could predict the unsuccessful outcomes of TB treatment. Such examples are patients, healthcare facilities and providers, and community-related factors [13].

Some of the patient-related factors that may predict the unsuccessful treatment outcomes of TB are age, gender, education level, economic status, occupation status, place of residence, access to health insurance, knowledge of TB, comorbidity status, alternative medication, and migration [12, 13-15]. Additionally, a plethora of evidence suggests that healthcare providers and facilities may variably affect the outcomes of TB treatment [12, 16-18]. Studies done on TB treatment outcomes in Ghana were mostly quantitative. Thus, the present study seek to explore the possible factors associated with tuberculosis treatment outcomes at the La General Hospital through a qualitative approach.

2. Materials and Methods

2.1. Study Design

This study was conducted using a qualitative research design in order to provide an in-depth understanding of the phenomenon under investigation [19].

2.2. Sampling Strategy

For qualitative data, purposive sampling was used to carefully select the TB patients and key informants. Purposive sampling was considered a proper technique to select the participants due to their characteristics [20]. Etikan et al. (2016) have denoted that purposive sampling is used to identify and select the cases that provide adequate information for the most proper use of the available resources. In total, 20 participants were enrolled in the present study, including five community members (5), five healthcare providers (5), and 10 TB patients (10) [20].

2.3. Data Analysis

The qualitative interview data were assessed using framework analysis, which is specifically used in policy-implied research [21]. According to the author [21], framework analysis is a flexible technique that allows for data analysis during the data collection process, which saves the time of the researcher not to wait for all responses before analysis. Familiarization with the transcribed data was carried out while recognizing the diversity of the demographic characteristics of the subjects. Emerging themes were identified, and data were interpreted using version 11 of the NVivo software.

2.4. Ethical Considerations

Ethical clearance was granted by the Ethics Review Committee of the Ministry of Health/Ghana Health Service (MOH/GHS) as a requirement to conduct the current research a healthcare facility, and the reference number was obtained from the committee as well [Protocol ID NO.: GHS-ERC 16/12/16]. Additionally, a letter of introduction was sent to the regional director of health services in the Greater Accra region from the School of Public Health (SPH), College of Health Sciences, and University of Ghana to obtain the required permit for data collection in the selected healthcare center. In addition, a letter was sent to the medical director of the La General Hospital in order to clarify the objectives of the research, intention of the author to use the hospital, and enroll the healthcare providers in the study. The objectives of the research were explained to the participants as well, and written informed consent was obtained. Moreover, the

participants were assured of confidentiality terms and anonymity, and participation in the research was voluntary; as such, they could withdraw from the study at any given time.

3. Results and Discussion

3.1. Sociodemographic Findings

Among 10 interviewed TB patients (TBPs), six cases were female, seven cases were informal workers (e.g., hairdresser, taxi driver, tailor, and petty traders), and two cases were employed as cleaners and security personnel in the formal sector. One of the patients was a recent graduate from a tertiary institution and unemployed.

Five healthcare providers (HCPs) were interviewed at the clinic regarding their patients, health system, and the community-related factors associated with the treatment outcomes of TB. Among the HCPs, four cases were female. The interviewed HCPs had a minimum of one year of work experience with patients, which may imply that they had adequate information and experience regarding TB patients at the clinic and had possibly been engaged in community health education programs.

Three out of five treatment supporters (TSs) were the relatives of the TB patients, who lived with the patients during the treatment and had indirect experiences and perceptions regarding TB. In addition, one of the TSs was a healthcare provider who vouched to support a patient who was rejected by his family. Three of the TSs were male.

3.2. Patient-related Factors

3.2.1. Beliefs of Patients Regarding the Causes of TB

The TB patients expressed their opinions regarding their belief systems. Accordingly, they believed that weather and spiritual factors were the main causes of their disease. The patients who resided in fishing communities noted that fishing activities at night and in unfavorable weather conditions were the causes of TB. On the other hand, the patients who believed that TB was a spiritual disease most often discontinued their treatment in order to stay in prayer camps and churches, expecting their deliverance by God. Some of the responses of the patients in this regard are as follows:

"When I started coughing, I did not take it seriously because I believed the cold weather at the sea caused people to cough." (TBP 7).

"I dreamt that someone breathed on me only to wake up the next morning coughing profusely, so I came to the prayer camp for spiritual healing." (TBP 10).

3.2.2. Knowledge of Patients Regarding TB

Knowledge of the TB patients regarding their disease was observed to be limited, which in turn influenced their treatment outcomes. The patients accommodated the knowledge that coughing was a condition that occurs during rainy, cold, and wet seasons. All the interviewed participants

reported to have had no knowledge of TB prior to their diagnosis. In addition, relapse and recurrent TB infection in the patients were among the consequence of the limited knowledge of the patients regarding TB infection .

"I did not know of TB until I was diagnosed. I think the people in my area also have insufficient information about this disease." (TBP 2).

According to the findings, the patients who had inadequate knowledge of TB, as well as its causes and treatment, were likely not to adhere to the treatment [13, 16].

3.2.3. Smoking Habits and Alcohol Consumption

Excessive alcohol consumption causes damage to the human lungs, while smoking affects the respiratory tracts, rendering the immune system weak and vulnerable to TB infection. The TB patients with alcohol consumption and smoking habits experienced relapse, while they stated that their familial history of alcohol consumption and smoking habits had no effects on their current condition. For instance, they believed that these factors are not associated with TB infection as their father and other relatives were disease-free despite drinking and smoking.

"I do not believe that drinking alcohol and smoking could cause TB. My grandfather used to smoke and drink alcohol a lot, and yet, he never had TB. I think there is no association between alcohol consumption, smoking habits, and TB." (TBP 6).

"I think that drinking alcohol has nothing to do with developing TB. Honestly, I did not drink alcohol while taking the medicines, but now that I am cured, I take very small portions of alcohol." (TBP 5).

In the present study, only a few patients acknowledged the correlation between TB, smoking habits, and alcohol consumption. After counseling with healthcare providers, these patients stopped these activities, which contributed to their successful treatment outcomes. This is consistent with the findings of Naidoo et al. (2013), who claimed that alcohol and tobacco use were among the key predictors of non-adherence to treatment in TB patients [22].

3.2.4. TB/HIV Comorbidity Status

Patients with HIV/TB comorbidity often die during treatment. According to healthcare providers interviewed, they could not explain if it was the HIV that caused patients death since patients' respond positively to the TB treatment.

"HIV patients already have weak immune systems. As a result, when they are infected with TB, their condition is deteriorated and they often die before the completion of the treatment. However, we are unable to determine whether they have died of TB/HIV or the depression and stigma imposed by the community." (HCP 4).

"The patient was fine; she was taking all her medicines for HIV and TB. She had begun to put on weight, and the

coughing had stopped, but one morning, she suddenly passed away." (TS 3).

3.2.5. Treatment Costs

In Ghana, the treatment of TB is sponsored by the National Tuberculosis Program, and no medication costs are imposed on the patients [23]. This implies that the TB patients in this country have access to TB treatment regardless of their income status. Moreover, the mentioned protocol demands that patients are referred to the nearest healthcare facility for medication, which in turn reduces transportation costs and commuting time [24]. In this program, patients have reported to have spent less money on transportation, which indicates that the treatment costs of TB influence the successful treatment outcome rather than the income status of the patients.

In contrast, some studies have demonstrated that patients with low income levels may not be able to afford the costs of feeding and transportation during the treatment of TB, which could lead to the discontinuation of the treatment [16, 25].

3.2.6. Negative Reactions to Medications

In the present study, the TB patients mentioned experiencing skin rashes on their stomach and back. According to Yee et al. (2013), negative reactions to medications are barriers to the completion of treatment and could lead to hospitalization, default, death, and prolonged treatment. Contrary to the findings of Yee et al. (2013), the knowledge and remedies obtained from healthcare providers caused the patients to decide to continue the treatment in the current research [26]. It is only in severe conditions that patients are asked to stop the medications due to drug sensitivity tests and further medical examinations.

"A patient had the Stevens-Johnson syndrome, and we had to discontinue treatment. She was transferred to Korle Bu teaching hospital for further treatment and returned to continue the medication afterwards." (HCP 1).

3.3. Factors Related to Healthcare Facilities Providers

3.3.1. Attitudes of Healthcare Providers

According to the results of the present study, the attitudes of healthcare providers played a key role in obtaining successful TB treatment outcome. Some healthcare providers, who work outside the DOT centre, often avoid physical contact with TB patients at the hospital. The healthcare providers in TB clinics also stated that the physicians and nurses in other departments refer the patients with reports of consistent coughing to the clinic without proper diagnosis since they are afraid of contracting the infection if they interact with these patients. Despite the training provided to these professionals on TB, their fear and the stigma attached to TB largely influence their attitudes toward the disease.

"Some nurses at the ward put on gloves and nose masks when touching [suspecting] the TB patients who are not infectious. It really annoys me when a patient's relative is given gloves to wear while washing the patients' clothes. Even a physician would not allow the patient to sit in his consulting room, and the patients should stand outside while the physician sits in his office and talks with the patient through the open door of his office." (HCP1).

This finding is consistent with the previous studies in this regard. Accordingly, the attitudes of healthcare providers could encourage or discourage TB patients to attend healthcare facilities [14, 27].

3.3.2. Counseling by Healthcare Providers

According to the findings of the current research, the counseling provided by healthcare professionals could help TB patients overcome some challenges regarding compliance with the treatment regimen. Furthermore, patients could enhance their knowledge of the disease and learn how to live with their family, so that they could avoid the spread of the disease. Patients who comply with the counseling instructions of healthcare providers tend to adopt new behaviors (e.g., healthy dietary habits and avoiding alcohol consumption), which in turn facilitate treatment success. In the present study, the patients admitted that they would have stopped taking the medicines if it was not for the counseling they had received by the healthcare providers.

"I was told that if I continually miss my medication, the capsules will not be able to cure me, and I will have no other option than injections. Therefore, I was motivated to take the capsules so as to avoid the deterioration of TB." (TBP 7).

This finding supports the assertion that when healthcare providers offer counselling, patients are more likely to complete the treatment successfully [16].

3.3.3. Waiting Time

In the current research, the TB patients reported to have spent less time at the DOT centre when they were referred for medication administration. As a result, they were not preoccupied with defaulting treatment since the healthcare providers spend adequate time with the patients. Moreover, the patients claimed that being granted the opportunity to schedule the times for their physician visits motivated them to remain committed to their treatment. Some of their comments described how healthcare providers were ready to serve them as early as 5:00 in the morning before they went to work. When asked about their opinions on the waiting time at the healthcare facility, the following notions were highlighted in their comments:
"I did not spend much time at the hospital when I came to receive my medication. Immediately after I arrived, the healthcare providers handed me water and my medicine, and I was able to get to work early." (TBP 4).

"I felt my time was respected when the nurse asked me to decide what time during the week I was able to refer for my physician visit. I also listen and follow the instructions they give me concerning my health." (TBP 2).

However, some patients mentioned waiting for a long time before visiting the physician due to the high number of patients with various medical conditions waiting for their appointment. Nevertheless, the prolonged waiting time at the hospital did not discourage the patients from treatment adherence. In addition, they were allowed to select their preferred time during the week to visit their physician for a check-up.

"When I have to meet the doctor for a routine check-up, I have to wait for a long time in a queue because there are not enough doctors in proportion to the number of the patients. There are always many patients waiting to be visited, and at the moment, there are no specialists for TB patients only." (TPB 9).

When patients wait for several hours at the hospital, they become frustrated with losing their productive time in queues. Some researchers have conclude that prolonged waiting time at healthcare facilities is a barrier to treatment compliance [28]. However, our findings indicated that the TB patients did not wait for long at the healthcare facility.

3.3.4. Insufficient Finances and Logistics

In the present study, the healthcare providers expressed their opinions regarding the lack of financial support from the Regional Health Directorate to support activities such as home visits, community outreach programs, and tracking of default cases. As such, the healthcare providers had to pay for the transportation of the patients to their homes. In addition, these professionals complained of having to roam in slums to track the lost cases for their follow-up.

The analysis of the results in the current research demonstrated that to cope with such situations, the healthcare providers at the DOT centers must limit the frequency of home visits although it implies that they may miss some patients who might have migrated from their known places of residence. This factor discourages healthcare providers from the tracking of the patients who default. The healthcare providers also believed that this factor contributes to unsuccessful treatment outcomes in some patients.

"We used to have a car for home visits, but now, we are either told that there is not enough money for a care or that the car has broken down. We cannot afford to spend our money on home visit. We are also tired of walking long distances to the slums only to visit patients." (HCP 2).

In Ghana, TB treatment is sponsored by the Global Fund to Fight AIDS, TB, and Malaria. However, there is inadequate political will to battle these diseases [24]. This is evident in the implementation of operational policies and resource allocations.

3.4. Community-related Factors

3.4.1. Social Stigma

TB is highly stigmatized and surrounded by misconceptions in the Ghanaian community. The analysis in this regard revealed that TB patients would do anything possible to avoid the stigma attached to their disease, including the disconsolation of their medications to avoid being recognized in their community.

In general, TB patients and their families avoid disclosing the status of the TB patients in their families to the community members. According to the treatment supporters, they aim to protect the dignity of their families.

"No one in this compound knew what was wrong with my daughter, except her husband and son. I only told those who asked that she had typhoid. If I told them the truth, they would regard our family as unclean and would look down on us." (TS 1).

As such, the patients who disclosed their TB status to close friends and neighbors were stigmatized, isolated, and insulted in their community. In addition, they were occasionally denied access to the shared washrooms and toilets provided for the residents of compound homes. Although treatment supporters were faced with a monumental challenge in this regard, they remained hopeful for successful treatment outcomes.

"Yes, I told the neighbors about my son's condition, thinking that they would sympathize with me. I was surprised at their attitude toward me and my family. They insult me with my son's condition and changed the padlock to the household bathroom, so that we could not bath there and contaminate the place." (TBP 5).

This is in line with the findings of Soomro et al. (2013), which indicated that social stigma was a major barrier to treatment adherence in the TB patients in Rawalpindi (Pakistan) [18]. According to the mentioned study, the social stigma propagated from the community influences the patients, leading to default treatment [18].

3.4.2. Family Support

According to the results of the present study, the majority of the TB patients received social support in the form of money, services, and encouragement by their family members. In the community of Ghana, individuals are organized around the extended family system. In such families, the members have a pool of relatives to nurture and support in times of need. Therefore, it was not surprising when the patients reported to have received support from their family during their treatment.

"It was my aunty and mother who went to the hospital with me when I was weak. They had to stop working to take care of me." (TBP 5).

"My brother and his wife were really helpful to me. They provided me with food and sometimes money when I needed them." (TBP 9).

This finding could justify the hypothesis proposed by Marfo, denoting that poor family support is a major contributing factor to high default rate. In addition, Marfo explained that patients discontinue treatment since their families are not financially and socially supportive [12]. This finding corresponds with a study in peri-urban Lima (Peru), which revealed that family members contributed to meeting the psychosocial and economic needs of the TB patients who were faced with burdensome medical expenses [29].

3.4.3. Alternative Treatment

In the current research, the TB patients recognized and might have used alternative treatments. However, they abandoned the alternatives treatments to receive conventional treatments.

"I had heard of a prayer camp that cures such diseases, but I had not tried anything beside what I was provided with at the hospital. After taking the medicines for a few months, I saw how they helped me. So, I did not think of going to the prayer camp." (TBP 3).

"I tried an herbal mixture recommended by a friend along with the hospital medicines. For about two weeks, my condition did not improve until I stopped taking the herbal mixture." (TBP 10).

The perceived benefits of conventional treatments motivated the patients to continue their treatment. Some of these benefits include free treatment, nearness to the residence of the patient, and opportunity to schedule checkup dates. It is notable that the healthcare providers advised the patients against alternative treatments since they could deteriorate their medical condition and increase the risk of defaulting and treatment failure. This is in line with the findings of Muture et al. (2011), who conducted a case-control study in Nairobi (Kenya) and observed that using herbal medicines was a predictor for defaulting treatment [16].

3.4.4. Distance

In Ghana, transportation costs are a major expenditure, which constituted a major portion of the income of the community members. The poor conditions of the roads and traffic in urban Ghana causes stress in the commuting of the members. With regard to the effects distance of healthcare facilities on the treatment outcomes of TB, the patients in the present study stated to have no challenges with the distance of healthcare facilities and referral for medication as they lived in the suburbs of the healthcare facility. Based on the protocol of the National Tuberculosis Control Program in Ghana, TB patients must refer to the facilities in the vicinity of their place

of residence in order to enable them to cope with their frequent visits to the hospital for medication.

"Most of the times, I walk to the hospital with my husband. It is not far from my house, so I use walking as an exercise." (TBP 8).

All the interviewed TB patients in the current research admitted that transportation costs and the distance from their place of residence to healthcare facilities were not problematic. In addition, they reported to have paid nothing for the TB medicines they received at the hospital.

"I really did not pay for the medicines and laboratory tests. Even the X-ray was covered by the National Insurance." (TBP 3).

Even the patients who lived far from healthcare facilities did not consider the distance as a reason to discontinue their medication since the healthcare facility was close to their workplace.

4. Conclusion

According to the results, patient-related factors (e.g., age and gender) were not associated with TB treatment outcomes. However, factors such as smoking habits, limited knowledge of TB, alcohol consumption, and HIV-positive status could contribute to unsuccessful treatment outcomes. Furthermore, our findings indicated that the factors related to healthcare provider (e.g., attitudes of healthcare providers and insufficient funds and logistics) may lead to unsuccessful TB treatment outcomes. On the other hand, counseling could influence successful TB treatment outcomes. Additionally, it was concluded that nearness to healthcare facilities and availability of conventional TB treatments in the community could result in positive treatment outcomes, while the social stigma attached to the disease may lead to unsuccessful treatment outcomes.

Limitations of the Study

One of the limitations of the present study was the sample size, which was mainly focused on the TB patients, as well as their treatment supporters and health providers at La General Hospital in the Greater Accra region in Ghana. Therefore, the results may not be generalized to other patient population within this country.

Authors' Contributions

E.T.T. and P.A. and A.A.A., conceptualized the study. E.T.T., collected the data. E.T.T. and P.A., worked on the methods and data analysis. E.T.T. and P.A., wrote the first draft. A.A.A., reviewed and edited the drafted manuscript. A.A.A., supervised the study. All authors revised, read, and approved the final manuscript.

Conflict of Interest

The authors declare no conflict of interest.

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