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RESEARCH ARTICLE

Patients' Perceptions on the Factors Contributing to Non-conversion after Two Months of Tuberculosis Treatment at Selected Primary Healthcare Facilities in the Ekurhuleni Health District, South Africa

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Abstract:

Background:

Tuberculosis patients' non-conversion is one of the factors impeding the 'End TB' strategies in South Africa. Several reasons have been recognised as contributing to patients with TB non-conversion, including TB illiteracy, denial of TB infection, reluctance to honour follow-up visits, and an unwillingness to take prescribed treatment for six months.

Objective:

In light of this, this study aimed at exploring and describing factors contributing to patients with pulmonary TB non-conversion at two and three months of treatment at selected primary healthcare facilities in the Ekurhuleni Health District, Gauteng province.

Methods:

A qualitative, explorative and descriptive research design was adopted with eight purposively sampled patients receiving TB care from five selected primary healthcare facilities. Semi-structured interviews were utilised to collect data from eight purposively sampled participants, who were interviewed on what they perceived to be factors contributing to patients with TB non-conversion at two and three months of treatment.

Results:

The study found that patients with TB attending the selected primary healthcare facilities experience psychosocial problems, such as shortage of food and lack of family support, as well as insufficient patient healthcare literacy.

Conclusion:

The study recommends that enhanced patient education be given from the time a patient starts TB treatment. The involvement of multi-disciplinary teams and other stakeholders is important in the management of patients with TB. Furthermore, the outreach team must provide health education to patients with TB family members, so that they can support the patients with TB to comply with treatment. Family support must be emphasised because it encourages patients with TB to comply with the course of treatment.

Keywords: Perceptions, Contributory factors, Non-conversion, Tuberculosis treatment, Healthcare facilities, Patient.

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1. INTRODUCTION

Tuberculosis (TB) is a contagious bacterial infection that attacks the lungs and may consequently spread to other organs [1]. In this paper, TB refers to a condition diagnosed by GeneXpert sputum, with results revealing the detection of Mycobacterium TB and Rifampicin sensitivity. Tuberculosis is

listed among the highest prevalent epidemics in South Africa [2]. Numerous academic's [3] proffer that TB incidence has been on the decline in South Africa since 2009, and that deaths attributed to TB have lessened significantly in recent years. The decrease in TB mortality is due to effective diagnosis and treatment, during which sputum smear conversion has a vital role to play. Sputum smear conversion during PTB treatment reveals a patient's response to therapy and determines the direction of TB patient care [4].

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Furthermore, sputum smear conversion, as part of observing the efficacy of TB treatment and reduction of infectiousness, essentially decreases the burden of disease [5]. The management of patients with TB relies largely on the smear microscopy results [6]. Sputum smear conversion after two months is thus an important indicator of the progress in TB treatment.

The results of the sputum smear at the end of the intensive phase give guidance to clinicians on whether the patient should be switched to the continuation phase or whether the intensive phase should be extended for another month [7 - 9]. This suggests that a delay in sputum conversion to negative increases the rate of relapse and can lead to the occurrence of drug-resistant TB (DR-TB) [10]. To combat occurrences of relapse, various measures have been put in place by the National Department of Health (NDoH) to manage TB and to reach its targets at the same time. The measures include assigning patients to a treatment supporter, who might be a community health care worker or a family member. The treatment supporter is given health education about the TB disease, the treatment that the patient is taking and the duration thereof, the patient's follow-up dates, and is advised to report the challenges the patient might be facing. Furthermore, the patients' psychosocial, economic and health challenges that might hinder the patient's progress to treatment must be discussed as the patients come to the health care facility. Hence, a multidisciplinary team meeting is encouraged to develop problem-solving strategies.

However, the researchers have observed that the Ekurhuleni Health District, in particular, does not meet the NDoH's set targets, particularly because non-conversion at 2 and 3 months of TB treatment is still high among some patients attending primary healthcare facilities in the Ekurhuleni Health district.

The National Tuberculosis Management Guideline (NTMG) 2014 in South Africa states that in patients with TB, sputum smear must be collected for conversion at two months of treatment. Patients with TB are expected to have conversion at two months of treatment to show effectiveness of the TB treatment. Patients' results identified as non-conversion at two months or three months of treatment is a challenge in TB management control. As for the above statements, at Ekurhuleni Health district, the District Health Information System (DHIS) statistics from 1st April 2017 to 31st March 2019 showed most patients as having non-conversion at two and three months of TB treatment.

During the period noted above, 5791 patients were diagnosed with TB as new or re-treatment; the patients' sputum smear was positive. The District TB conversion report showed that out of 5791 diagnosed with TB, 3216 patients had conversion at 7 weeks of treatment. Also, among them, 1508 patients had non-conversion by the 7th week of the treatment, and 792 patients were not evaluated (meaning that the sputum was either not collected or results were not captured in the TB system). About 116 patients died before conversion date, while 74 patients were transferred to other provinces or other districts' health care facilities before the conversion period. In addition, a total number of 82 patients were Lost to Follow

(LTF) or treatment interrupters, meaning that the patients were no longer able to access their patients with TB in the health care facilities. Furthermore, it was indicated that there was no patient who progressed to multi-drug resistance TB (MDR-TB).

As per the NTMG, patients must be given an extra month in the intensive phase of TB treatment if they had non-conversion at two months. Patients' reasons for non-conversion must be identified and addressed, and then another sputum by week 11 must be collected from the patients. A challenge identified in the report was that there were 1508 patients during the first 11 weeks of patient TB treatment. Of the 1508 patients, only 638 patients' sputa conversion was negative, 291 remained positive, 550 patients' sputa were not evaluated, and seven patients died before their sputa were collected. Moreover, four patients were moved to other facilities in the district, while 15 patients were LTF, and three were diagnosed with MDR TB. From the above, there is a need for further exploration of the factors contributing to the non-conversion of patients on PTB treatment at Ekurhuleni district clinics.

Non-conversion is defined as a process whereby the sputum smear remains positive at the end of an intensive phase of treatment (2 months for new cases and 3 months for re-treatment cases) [11]. In this paper, the term 'non-conversion' refers to patients who started TB treatment at 2 or 3 months and did not experience conversion to the continuation phase. Against this background, this research article aims at exploring and describing the patients' perceptions of the factors contributing to patients with TB non-conversion at selected healthcare facilities in the Ekurhuleni Health District, Gauteng, South Africa. It is envisaged that the results and recommendations of this study will benefit both the professional nurses during nursing practice and patients by assisting in facilitating the understanding of the factors that contribute to TB non-conversion at 2 or 3 months of treatment. The patients are the people who are either receiving or are registered to receive TB treatment [12]. In this article, patients refer to the clients visiting the selected Ekurhuleni healthcare clinics for TB management and collection of medication.

2. LITERATURE REVIEW

Factors that contribute to patients with TB non-conversion during treatment are partly responsible for the continued prevalence of the TB disease [13]. Factors contributing to non-conversion of patients with TB have been highlighted in a number of research-based articles. For instance, a study conducted in China [14] reported an association between smoking history and sputum smear non-conversion. In the same vein, Siddiqui *et al.* [15] found that smokers on TB treatment were associated with delayed sputum smear conversion at 8 weeks. Visser *et al.* [16] also found that a positive smoking history was associated with delayed sputum smear conversion in South Africa.

Individuals with positive smoking history are likely to have a radiologically extensive disease, which some studies have associated with sputum smear non-conversion [14, 15]. A study conducted in China [17] indicated a connection between TB prevalence, poor working conditions and relocation to access

job-related opportunities. In that study, the participants reported that they were non-adherent to TB treatment due to their movement from one place to another. Poor working conditions were mentioned as the main reason that compelled them to relocate to other countries. As such, the participants either forgot or stopped taking treatment because they did not have referral letters or other documentation required for their treatment.

Language barriers between patients and healthcare workers also contribute significantly to patients with TB non-adherence to treatment and non-conversion at 2 or 3 months of treatment. Proper and clear communication between the health worker and patient is vital, as it enables the patient to understand his or her condition and the required treatment. Hane *et al.* [18] conducted a study in Senegal and found that there was no proper communication between patients and healthcare providers regarding diagnosis, registration and continuity of treatment. The study also found that patients believed that after two months of treatment, they were cured since they felt better. In other words, patients did not have sufficient knowledge to discern the importance of completing treatment and that this would entail that they should complete the full course of the treatment regime. Findings from the same study also revealed that short messages given to patients with TB by healthcare workers helped to address the issues associated with TB. Thus, poor communication between patients and healthcare workers is also the cause of low health literacy among the patients.

In South Africa, low health literacy is still a major problem, and this could also be ascribed to language barriers, although health literacy is not necessarily limited to language competence. Not all patients with TB are English speakers or highly illiterate, for that matter [19]. Linguistic competence and levels of literacy are important to consider here because there is a strong relationship between low literacy and health status [20, 21].

Patients, who generally have many health problems, are less aware of preventive and curative health measures and services, which contribute to their poor health status and the adoption of unhealthy lifestyles [22]. Accordingly, because of the challenges related to health literacy, patients often have a poor understanding of the medication they are using [22]. This is one of the many challenges encountered in the South African healthcare sector. Knowledge of disease symptoms is the prerequisite for self-referral. Ignorance of the necessity for treatment compliance, coupled with inadequate knowledge about TB, was cited by 20 out of 120 TB cases, and was the most important reason for treatment default [23].

In a study conducted in the Eastern Cape, a correlation was found to exist between stigma and causes of patients with TB non-adherence to treatment/non-conversion [24]. The same study found that stigma influences PTB adherence in most patients. The patients in the same study reported that they did not feel comfortable with the way their neighbours looked at them when they went out to catch the transport service to the clinic. They also did not feel comfortable with the fact that patients with PTB were using specified rooms and assisted by nurses known to be treating patients with TB [24]. The possible influence of social stigma with regard to smear conversion can

be explained by patients' fear of the loss of support, both economical as well as emotional, coupled with neglect by family and community. The interplay of these multiple social factors may lead to lower adherence to anti-TB therapy (ATT) and also nutrition deprivation due to neglect, which, in turn, may result in a delay in smear conversion, as evident in their results.

3. MATERIALS AND METHODS

This study was conducted at selected primary healthcare facilities in the Eastern Sub-District Region of the Ekurhuleni District Municipality in the Gauteng province. The population for this research comprised patients with TB who had sputum non-conversion at 2 or 3 months of their TB treatment at the selected primary healthcare facilities in the Ekurhuleni Health District.

An explorative, descriptive and qualitative research design was adopted for this research. This design was suitable for this study, as it assisted the researchers in having a better understanding of patients' perceptions of the factors contributing to non-conversion at 2 or 3 months of TB treatment. Non-probability purposive sampling was utilised to obtain male and female patients with TB between the ages of 18 years and 60 years.

4. DATA COLLECTION AND ANALYSIS

In-depth semi-structured interviews were used to collect data from eight patients with TB at selected primary healthcare facilities in the Ekurhuleni Health District. The interviews were conducted in consultation rooms with minimal distraction. The in-depth individual semi-structured interviews provided the researcher with an opportunity to probe and investigate hidden and suppressed perceptions of the participants. The researcher recorded the interview with the consent of the participants. In-depth semi-structured interviews were conducted with guidance from the interview guide, a 'grand tour' question was asked, followed by probing questions following the participants' response. The question was: *Could you please share your experiences regarding the factors contributing to non-conversion during TB treatment?*

The participants were encouraged to share their experiences without being intimidated by the recording and the researcher, who would be asking clarity-seeking questions and writing field notes. During the interviews, the researcher wrote field notes with the participants' permission. In addition, an audio recorder was used to capture the participants' oral statements during the interviews, after which they were digitally stored in a personal computer and external hard drive. The files folder was protected by a password. Verbatim transcripts, field notes and audio records were stored in the researcher's safe to prevent access by any unauthorised persons.

Data were uploaded into a computer and then analysed using an Atlas TI data analysis computer tool Version 9 for the storage of textual data, after which Tesch's thematic coding steps were followed. Audio-recorded interviews were transcribed verbatim, and the transcripts were stored in one folder through the Atlas TI application. The researcher read the

transcriptions several times, and themes reflecting similar ideas were highlighted and grouped together in different codes. The grouping of codes was conducted electronically using Atlas TI coder. 3 themes, 6 sub-themes and 11 categories were identified in the findings.

4.1. Trustworthiness

In this paper, trustworthiness was ensured by means of the credibility, transferability, dependability and confirmability criteria [25]. Credibility was achieved through prolonged engagement and persistent observation of the participants during the interviews. The researcher spent time with the participants during interviews to build rapport with them. In addition, probing, clarity-seeking and follow-up questions were asked, which helped the researcher to gather more information on the contributing factors of patients with TB non-conversion at two months of treatment.

Prolonged engagement was undertaken with the participants during and after data collection to allow the researcher's better understanding of the environment of the participants as a contributory factor to the framing of their experiences and perceptions. Dependability was ensured through the researcher's provision of detailed information on the setting, research paradigm, data collection and analytical methods utilised in this study. Although transferability is not always possible in qualitative studies, the researcher provided thick descriptions of the entire research process to enable interested researchers to replicate the findings of this study in their own environments with different participants. Confirmability was ensured by providing the research supervisor with interview recordings and transcribed data for the audit trail.

4.2. Ethical Considerations

Ethical clearance was obtained from the University of South Africa (UNISA) Department of Health Studies Scientific Review and Research Ethics Committee (REC-012714-039; EHC ref: HSHDC/106/2020). Permission to conduct this study was also obtained from the Ekurhuleni Health District Ethics Committee (NHRD No: GP_202008_157; Research Project No: 31/08/2020-04). The researcher observed and applied the ethical principles of informed consent, beneficence, justice and respect of persons' dignity throughout the study.

Accordingly, the participants were informed about the details of the study, including a participants' leaflet, and a signed consent form was obtained following a detailed explanation of the purposes, benefits and requirements for participating in the study. The participants were encouraged to be in a room that had minimal distractions to ensure their privacy, confidentiality and anonymity and avoidance of disturbance during the interviews.

5. RESULTS

During data analysis, the following three themes emerged in relation to factors contributing to patients' non-conversion during TB treatment:

- Patients' healthcare literacy
- Psychosocial support issues
- Challenges experienced by the patients

5.1. Patients' Healthcare Literacy

The patients who participated in this study affirmed that they did not understand the health education that was being offered at the healthcare facilities. Some patients did not know what TB is, while three patient participants stated that they do not remember the health education that was given at the clinic. Osborne [19] revealed that in South Africa, low health literacy is a serious problem, which is caused by language barriers. Most patients with TB have been found to be unable to speak English due to high levels of illiteracy in the country. Therefore, a strong relationship exists between low literacy and health status. Furthermore, nurses' attitudes towards patients with TB, facility support and treatment timing were mentioned and identified as sub-themes, which will be discussed in detail in this article.

Three patient participants stated that they had not received TB health education, thus:

"According to me, I do not want to lie, I do not know what TB is, but the symptoms I have experienced, such as cough, made me visit the clinic."

"I do not know how I can define TB because they just took my sputum and then informed me that I have TB."

"Aah... they did not explain to me, not knowing maybe the other patients have been informed. Myself ... No, I have never been told any information about TB."

Patients, who have low knowledge about tuberculosis, and the treatment thereof, are usually non-adherent [26]. However, if there is adequate knowledge about the disease condition, it tends to have a relevant impact on the health behaviour and adherence of the patients. Therefore, there is a need to improve communication and health education at health facilities, clinics and in communities, and it is important to identify their needs. Tuberculosis treatment, its side effects and duration should be discussed before the commencement of treatment. In addition, patients should always be encouraged to inform and include family members, friends and, where appropriate, their significant others in the treatment journey [26].

Patient education regarding the importance of treatment adherence, sputum collection and the role of the sputum in TB control is essential in TB management. The knowledge related to tuberculosis and the treatment thereof had a significant impact on the adherence of the participants in this study. Participants, who had adequate health literacy levels, indicated that they acquired their knowledge from health education provided by health professionals in the clinic. The study by Molapo [27] found evidence that health education related to a specific condition, such as tuberculosis, improves a patient's knowledge regarding that condition.

This study has similar findings to the study done in Sudan, which showed that lower educational levels could be associated with treatment default. A lack of knowledge and awareness about TB and TB treatment was found to be associated with

non-compliance. Patients, who earn a meagre income, were associated with non-compliance. Tuberculosis patients' education at the start of TB treatment is a crucial management step, and will enhance patients' knowledge and awareness about TB and its treatment, while also mitigating drug side effects and minimising early default. Tuberculosis patients of low socio-economic status should be provided with more focused supervision, health education and support to enhance their compliance [28].

5.2. Psychosocial Issues

Some patients reported that they take TB treatment on an empty stomach because of a shortage of food in their homes. Furthermore, some mentioned they only eat when neighbours and friends provide them with food. The following participant statements attest to these views:

"Sometimes, I would sleep having not eaten. Sometimes, I would tell the people am used to them ... they will give me food to be able to cook, if they do not give me, I would sleep without eating."

"No, there is nothing ... the only problem I am experiencing is shortage of food at home ... I heard I can get soft porridge [at the clinic], so I also came to ask for assistance with soft porridge, because I am having a problem at home. Even today, I took my pills with empty stomach. I think if I can get food, I will be fine."

The findings presented in this present paper are in line with the study conducted in KwaZulu-Natal, which found that unemployment, poverty and lack of food were some of the contributory factors to non-compliance with treatment, as the majority of participants stated that they were unemployed, and as a result, solely depended on the disability grants [29].

5.2.1. Low Education Level and Health Literacy

Low educational level was also cited as the leading cause of non-adherence to TB treatment; the patient has a major role to play in the treatment process. The health literacy is said to affect the patient's capacity to obtain, process and understand basic health information and services, which they need to make appropriate health decisions [30]. The findings presented in this paper are similar to those of a study done in Sudan, which revealed that a lower educational level is associated with treatment default. Lack of knowledge and awareness about TB and the treatment thereof was found to be associated with non-compliance to TB treatment.

Patient education at the start of the treatment is a crucial step in the management of TB and will enhance patients' knowledge, awareness, treatment, and mitigate drug side effects, and therefore minimise early default. In addition to that, literature suggests that providing health education, focused supervision and support to those patients with low socio-economic status enhances compliance to TB treatment. It is therefore important to provide more focused supervision to patients who are taking TB treatment [28], as it will prevent non-compliance and treatment interruptions that are prone to non-adherence to treatment and non-conversion at 2 months of TB treatment.

Patients with TB and their families were relatively knowledgeable about TB compared to the general population. This could be related to the health talk that the patients and family received when visiting the clinics [31]. In this study, all participants provided different ideas regarding the support they needed from the healthcare facilities, family, and friends. A support system is regarded as an important factor that can influence the patients' perspective on conversion, as indicated below:

"Okay ... (crying) I have a daughter. She is 11 years old. She is my everything, she motivated me in such a way that every time I look at her...she was my motivation when I was very sick. I was very sick. She had to look after me as her mother. She would bath me. She had to cook for me, because I could not even walk."

"Mmmm ... there is a certain woman, that woman the month has elapsed she would buy me food and bring (it) here. So, (the) food that the person brings, if it's finished, it's finished. I have even said that at clinic they do not have soft porridge and you can see me today I have not found anything, but I woke up in the morning and took my tablets, so there is no food."

Lack of support from the nursing staff and family was one of the factors contributing to non-compliance with treatment identified by the participants in this study. Aiyegoro [32] indicates that, in Gauteng, patients who have a poor support system have poor adherence profiles. Meanwhile, patients who are not provided with counselling throughout the treatment course are likely to be non-adherent to treatment. Lack of support from family members as well as family beliefs about PTB result in non-adherence to PTB treatment among patients. Patients, who do not receive messages as reminders of follow-up visits in the clinics, are susceptible to non-adherence because they would forget to attend the follow-up sessions, as indicated below:

"Yes, they used to console me that I will convert and then they also advised me to stop drinking alcohol and smoking. Maybe smoking and drinking contributed to me having TB - so I should stop, so that I will convert. They supported me and told me that I will be fine only if I take my treatment as directed and stop drinking and smoking."

Lack of family support plays a role in patients being non-adherent to their TB treatment. During the intensive phase of TB treatment, family support is crucial in patients complying with their TB treatment. In the study conducted by Gugssa Boru *et al.* [33], one patient stated that she stopped taking treatment due to a lack of family support. The patient-nurse relationship was also found to be of utmost importance. Consequently, patients who had negative interactions with the nursing staff were likely to be non-compliant, compared to those who had a good relationship with the nursing staff. The health facility's operating hours were also identified as a hindering factor to TB treatment compliance, as some patients could not manage to visit the facility during operating hours due to other commitments [32].

5.3. Co-infection with HIV

Some patients stated that they were co-infected with HIV and TB, and were receiving treatment for both. One patient stated that she was doing well, as she would take the treatment at different times:

“Yes, I have HIV.”

“It is HIV.”

“I have felt better because I was getting better. I did not have a problem, because I was taking TB pills in the morning and taking ARVs in the evening.”

The findings in this study are contrary to other similar studies [9], [34], which stipulated that HIV-positive patients had early TB sputum conversion. Another study also stated that literature showed that sputum smear is not affected and conversion is shorter in HIV/TB co-infected patients [9], [34]. However, the study conducted in Rwanda [35] found that HIV-positive patients were associated with TB non-conversion as an important independent predictor of treatment failure and sputum smear non-conversion.

5.4. Smoking and Use of Alcohol While on TB Treatment

Smoking while on TB treatment emerged as another theme from patients; three patients interviewed in this study stated that they were using substances, such as alcohol and cigarettes, which might have contributed to non-conversion. Literature suggests that smoking patients, who fail to have conversion at 2 months of TB treatment, are likely to be males with or without primary school education. The same study also revealed that patients who excessively consume alcohol are found to be at higher risk of non-conversion [36]. One of the three patients also stated that it was difficult for him to stop smoking, as he experiences nose bleeding when he does not smoke. They report on their experiences as follows:

“I might have smoked for 1-2 months. Yes, but since starting to get sick, I have not taken any. What they have told me about smoking, I must stop smoking and I must be able to stop drinking alcohol that is what they have told me and that, when taking pills, I must not change the time of taking treatment; I must take treatment (at the) same time, every day.”

“Yes. I smoke, but now I was told to stop smoking, but it is difficult, and I experience blood coming out of the nose. I now smoke one in the morning and one in the evening to prevent blood that comes out of the nose. I ... used to smoke around 20 cigarettes per day.”

The study conducted by Salam *et al.* [6] highlighted that addiction to tobacco or other drugs does not have an influence on sputum smear conversion. Another study argued the contrary, stating that heavy smoking significantly delays sputum smear conversion [37].

A study conducted at Western Reserve University, Makerere, showed that patients with a positive smoking history were about two times more likely to have sputum smear positive results at the end of two months of tuberculosis treatment [38]. Individuals with a positive smoking history are likely to have a radiologically extensive disease, which some studies have associated with sputum smear non-conversion

[39].

The findings of the present research are consistent with a study, which found similar results, where smokers on TB treatment were associated with delayed sputum smear conversion at seven weeks [15]. In the same vein, another study [16] also found a positive smoking history to be associated with a delay in sputum smear conversion in South Africa [16].

5.5. Side Effects

TB treatment-related side effects have emerged as a challenge amongst patient participants. However, although some of the patients interviewed in this study stated that they experienced different side effects while undergoing TB, most of the patient participants mentioned experiencing side effects, such as sore or swollen legs, an itchy back and vomiting. However, they did not stop taking treatment; instead, they returned to the clinic and sought medical advice from the nurses, as reported below:

“In the beginning, I had itchy back. The first tablet gave me itchy back and sore feet. It was very sore feet. My feet were sore ... sometimes, I could not stand. I could not walk; it was so painful. When I sleep, I would find it difficult to stand on my feet and with this one, not really. It is only the puffy eyes in the morning.”

“Okay, my legs became problematic. I would have swollen legs after walking long distances and they would be very painful. If I ... do house chores for 2 hours, I will become very tired and weak. This caused me to do our laundry at home sitting down.”

“The first tablet made my legs to feel hot and numb. I could not walk; it was so painful. Then, after 7 days I went to the clinic ... then (the)sister told me it is like that, I must continue taking my medication I will be fine. Then I continued and I started to feel better.”

“It was the first 3 days of starting treatment, as I took my tablets at 06h00 in the morning and then ate my breakfast around 06h30 or 07h00. Then I will vomit, since I was not used to the treatment, and it smelled funny. I also had pins and needles on my legs, which the sister (Nurse) explained as (the)side effects of the treatment and (they) gave (me) treatment for legs”

The study conducted on the determinants of adherence to tuberculosis therapy among patients receiving directly observed treatment at a hospital in Pretoria [31] concurred with what the nurse participants stated in this study regarding side effects. However, the findings were contrary to the patients' perceptions regarding side effects in the present study. Adverse reactions to the TB drugs, such as the side effects that patients with TB experienced in this study, were identified to be the factors that would contribute to non-adherence among patients with PTB in Gauteng province [31].

One participant reflected that he was using traditional medicine. To that effect, a patient averred:

“When I started coughing, I was drinking traditional medicine and hot tea before I came to the clinic to start

treatment.”

There are misconceptions about the causes of TB, which is sometimes attributed to witchcraft [40]. The findings of this research concur with the findings of a study, which reported that traditional medicine is widely used as an alternative to Western medicine, even though it does not help the patients and that the patients would divert back to Western medicine [32].

6. DISCUSSION

The findings of this study reveal co-morbidities and substance use as some of the contributing factors to TB non-conversion. Some participants stated that they had other conditions other than TB. A few participants stated that they were smoking while on treatment, and only one continued to smoke after receiving health education. Nurse participants pointed out that some patients were in denial, making it difficult for them to get to conversion, which has also been confirmed in the literature [41].

In this study, participants did not indicate pill burden as a factor that contributed to non-conversion to TB treatment. However, another study reported that pill burden, as well as treatment-related side effects, contributed to patients' non-compliance [32].

Treatment compliance was stipulated by the interviewed nurses to be another important factor contributing to patients' non-conversion, though the patients in this study stated that they were taking treatment as prescribed. The use of traditional medicine by the patients was noted by the nurse participants and confirmed by only one participant, who had used traditional medicine before accessing TB treatment. A similar study corroborated the prevalence of dual practices among patients [10].

The findings of this research suggest that health literacy is a contributory factor to patients' non-adherence to TB treatment as it has been linked to poor understanding of the medication they are using. The lack of health literacy is one of the many challenges faced by the South African health care system today as most patients cannot read or write, which impacts their understanding of the importance of the need to complete their treatment phase. Knowledge of disease symptoms is the prerequisite for self-referral in good time. In the same vein, in another study on non-adherence to TB treatment, ignorance of the necessity for treatment compliance coupled with inadequate knowledge about TB was attributed to treatment default in 20 out of 120 TB cases and was reported as a major contributory factor to sputum non-conversion [23]. A study conducted on patients' perspective about factors associated with loss to follow-up, relapse and treatment failure in tuberculosis patients revealed that poor adherence by patients to anti-tuberculosis drugs contributes to the worsening of their TB problem and relapse and that treatment failure can harbour drug-resistant mycobacterium [42, 43].

The findings of this research indicate that social issues, such as a lack of support from the patients' families, including nutrition-related factors, such as shortage of food and social support, are some of the challenges that cause some patients to

take treatment on empty stomach, and which have proved to be detrimental to their progress as these TB drugs are supposed to be taken with food [7, 41]. Taking TB drugs on an empty stomach may cause more side effects, such as nausea and vomiting, and subsequently lead to non-adherence. Such situation was aggravated by the fact that a majority of the patients were unemployed and not receiving social grants. This was outlined by both the patients and the nurses. The WHO emphasizes the importance of ongoing nutritional assessment, counselling and addressing nutritional deficits for patients with TB. A study done on nutritional intake among patients undergoing tuberculosis treatment in Asia recommends that increasing nutritional intake, i.e., small yet regular meals which are high in protein and fresh fruits and vegetables or other snacks low in sodium and saturated fats, is important to supply additional micronutrients to patients who are on TB treatment [44]

According to the nutritional component of the TB management program in South Africa, patients must be encouraged to eat a balanced diet using readily available food, stop smoking and reduce alcohol intake. Dieticians are expected to visit the facilities for patients' nutritional support. The food parcels that are provided by the facilities include instant porridge and juice. In addition to that, the NGOs provide food packages, such as the following:

- Maize meal, instant porridge, samp, rice, bread flour, powder milk,
- Pilchard, cooking oil, soya mince and soup powder,
- Tea bags, sugar, peanut butter, salt,
- Vegetables, such as carrots, cabbage or spinach and sugar beans.

The findings presented in this study are in line with other studies, which reveal that economic challenges, job-related challenges and family support are some of the factors that affect treatment outcomes and, subsequently, sputum conversion. In a recent qualitative review, economic constraints due to absence from work to attend appointments, or the direct and indirect costs of accessing treatment, were commonly cited by patients as important barriers to completing TB treatment [45].

Stigmatisation of the patients was also mentioned by the patients and was cited as a reason why some patients were not receiving support from their family members. Health-related stigma has been defined as “a social process characterized by exclusion, rejection, blame, or devaluation that results from experience or reasonable anticipation of an adverse social judgment about a person or group identified with a particular health problem, such as AIDS and TB. A study on stigma among patients with TB and healthy community members in Thailand has revealed that individuals diagnosed with TB report fear of isolation and rejection, including, being divorced or having marriage problems, being denied to share meals, utensils or sleeping rooms with family members, and have endured general avoidance or gossips among community members [46]. According to research, stigmatisation of patients with TB is exacerbated by the language used to label patients, such as TB patients, defaulters, as well as the obligatory

screening, testing and disease notification systems that lack privacy [47].

This is a cause for concern as a study on fighting TB stigma asserts that although people with TB and policy makers have always recognised the stigma that surrounds the disease, not much has been done to confront it; instead, more emphasis has been put on the risk and fear of transmission of the airborne infection and the well-being of the public over that of individual patients [47 - 49].

It was also noted that, in general, the nurses did not include family members in the TB treatment process. Such exclusion poses a significant gap in the treatment process [43].

6.1. Limitations of the Study

This study was conducted at only five clinics in the Ekurhuleni Eastern Health Region. These clinics were purposefully sampled. As such, the findings of the study cannot be generalised to all clinics and other sub-districts. The patients who participated in this study might have not shared all the information that contributed to non-conversion as data were collected at each clinic's consulting room. The study also focused on patients' with TB non-conversion at 2 and 3 months only, and did not include 23 weeks' sputum non-conversion.

6.2. Recommendations

- A proper, full history must be collected from all the patients, because this will give the nurses a clear picture of how they are supposed to manage the patients. The nurses must explain to the patients the importance of providing correct information, as some patients end up providing incorrect information because they do not understand the impact this can have on their treatment.
- It is crucial for the nurses to explain to patients about the importance of adhering to treatment, so that the patients can have an understanding of why they should diligently follow the treatment regimen and what is expected of them during the course of the treatment.
- Strengthening the use of the National adherence strategy (NAS) guideline by the nurses and health promoters is important to ensure that no critical information is missed during patient education and adherence to treatment.
- It is important to involve the patient's family, especially during the screening of the family for TB signs and symptoms, because excluding the family may contribute to discrimination and isolation, as they are not involved in the patient management process.
- Greater involvement by other stakeholders is required, especially in cases where the patient does not have food. Social workers, dieticians and doctors must be included, particularly where malnourishment is identified.
- Reports or challenges from the WBPHCOT must be addressed in weekly meetings, and there must be a quality improvement plan of action.
- The WBPHCOT must assist by educating the

community about TB through 'Imbizos' (Community health awareness campaigns), door-to-door campaigns and community meetings to educate them about how to take care of the family members diagnosed with TB. This will also help to reduce the stigma attached to a TB diagnosis.

- The WBPHCOT must also involve NGOs, NPOs and all the stakeholders, who have the capacity to assist patients according to the patients' needs.

CONCLUSION

Psychosocial challenges affect patients with TB. Enhanced patient education must be offered when patients start their TB treatment. The findings of this study reveal that co-morbidities and substance use are some of the factors contributing to TB non-conversion. Some participants stated that they had conditions other than TB. A few participants stated that they were smoking while on treatment, despite them having received health education. Only one participant continued to smoke even after the second result of non-conversion. Patients were encountering social challenges, such as lack of a family support system, being stigmatised, shortage of food and insufficient social support. The findings in this study have shown that patients experienced a shortage of food, with some taking treatment on empty stomach. Most of the patient participants were unemployed and not receiving social grants, which was highlighted by both the patients and the nurses.

LIST OF ABBREVIATIONS

| | |
|----------------|--|
| TB | = Tuberculosis |
| DR-TB | = Drug-resistant TB |
| LTF | = Lost to Follow |
| NAS | = National Adherence Strategy |
| NDoH | = National Department of Health |
| NTMG | = National Tuberculosis Management Guideline |
| WBPHCOT | = Ward based Primary Health Care Outreach Team |

AUTHORS' CONTRIBUTIONS

N.F. was responsible for data collection and drafting of the manuscript. Z.M. assisted with finalising of the manuscript.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Ethical clearance was obtained from the University of South Africa (UNISA) Department of Health Studies Scientific Review and Research Ethics Committee (REC-012714-039; EHC ref: HSHDC/106/2020). Permission to conduct this study was also obtained from the Ekurhuleni Health District Ethics Committee (NHRD No: GP_202008_157; Research Project No: 31/08/2020-04).

HUMAN AND ANIMAL RIGHTS

No animals were used for studies that are the basis of this research. All human procedures followed were in accordance with the guidelines of the Helsinki Declaration of 1975.

CONSENT FOR PUBLICATION

Informed consent was obtained from all participants of this study.

STANDARDS OF REPORTING

COREQ guidelines were followed.

AVAILABILITY OF DATA AND MATERIALS

The data supporting the finding of this study are available within the article.

CONFLICT OF INTEREST

The authors declare that they do not have personal or financial interests.

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