Chapter 9

Patients and Health System-Related Factors Impacting on Tuberculosis Program Implementation in Resource-Constrained Settings: Experience from Multi-TB Facilities in Oyo State, South-West of Nigeria

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Additional information is available at the end of the chapter

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Abstract

Background: Tuberculosis (TB) is one of the most prevalent human infections and is the second leading cause of deaths from infectious diseases worldwide, and Nigeria is the fourth among the 22 high-burden countries in the world for tuberculosis even though the exact burden of TB in Nigeria is not known.

Methods: The study used exploratory cross-sectional design. A multistage stratified random sampling technique was used to select 680 participants from 16 DOTS facilities in one state in Nigeria.

Results: The results show that 59.25% (410) of individuals believed that the quality of access to care was excellent, 78.44% (542) of individuals believed that the appearance of the healthcare facility they attended was excellent, 75.40% (518) of individuals believed that there were many people accessing healthcare facilities and 82.33% (559) reported that they waited less than 30 minutes at a healthcare facility.

Conclusions: Providing good quality care to patients is an ongoing practice that requires continued consultation with everybody involved including patients who are at the receiving end of the service in order to evaluate and improve on the services rendered. Such practices will motivate compliance to treatment and a collaborative relationship between patients and healthcare providers in TB management. Despite several challenges affecting treatment and patient care, this study reports that healthcare provision

was generally satisfactory. Findings from this study are relevant for policy formation and strategic implementation for TB control program in resource-limited settings.

Keywords: tuberculosis, barriers, Nigeria, individual, provider

1. Introduction

Tuberculosis (TB) is a chronic infectious disease affecting any part of the body but more commonly the lungs [1]. It is one of the most prevalent human infections and is the second leading cause of deaths from infectious diseases worldwide [2]. In 2013, 80% of TB cases occurred in 22 high-burden countries leading to 1.5 million deaths. Nigeria is the fourth among these 22 countries, wherein the World Health Organization (WHO) estimates an incidence rate for all forms of tuberculosis to be '311 per 100,000 populations, incidence of smear positive annually 131 per 100,000 population and prevalence of 546 per 100,000 populations [3, 4]'. Also, TB services are provided mostly as part of the primary health services followed by secondary and tertiary healthcare provided by public and private institutions. Within the public sector, TB consultations, diagnostic, drugs and hospitalization services are provided free of charge [4]. At the private facilities, TB diagnostic and treatment services are provided free of charge; however, all patients irrespective of their health problem visiting the facility pay administrative fees. Following diagnosis, TB patients admitted at the private hospitals are required to pay additional fees for accommodation and feeding. If in any way the care provided in these facilities is found to be substandard, then this will result in poor treatment outcomes, persistent infectiousness as well as possible emergence and spread of drug-resistant strains [2].

The facilities at which TB care is provided are called directly observed therapy (DOTS); their scope of service includes diagnosis of TB (where microscopy services are available), supervised TB treatment, health education and adherence counseling, as well as HIV counseling and testing [4]. While the DOTS approach has been in place and seems to have lessened the burden of care on patients, access and adherence to TB treatment still face multiple challenges at different levels including individual and those that are a result of the system [5–7].

Individual-level barriers involve physical (distance to TB services and access to transport), financial (the direct and indirect costs of seeking TB services), stigma (stigma surrounding TB and its association with HIV), health literacy (TB-related knowledge and education) and sociocultural (gender roles and status in the family) factors, whereas provider-/system-level barriers include provider's degree of suspicion for TB, the number and types of providers seen before TB diagnosis, provider adherence to national TB program guidelines and patient satisfaction with TB services [2, 6, 7]. Due to these challenges, a comprehensive understanding of barriers is needed in order to provide insight into TB service programs, research and policy. It is against this background that this study was designed to determine individual and provider's barriers and delays that limit access and adherence to TB services.

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2. Methods

2.1. Study design

This study was an exploratory cross-sectional design. The study was conducted from June 2016 until November 2016 in 16 randomly selected DOTS facilities in Ibadan, Oyo State, Nigeria.

2.2. Study location

Nigeria lies on the west coast of Africa between latitudes 4°16′ and 13°53′ north and longitudes 2°40′ and 14°41′ east. It occupies approximately 923,768 square kilometers of land stretching from the Gulf of Guinea on the Atlantic coast in the south to the fringes of the Sahara Desert in the north. The territorial boundaries are defined by the Republics of Niger and Chad in the north, the Republic of Cameroon on the east and the Republic of Benin on the west. Nigeria is the most populous country in Africa and the 14th largest in land mass. The country's last census conducted in 2006 placed the country's population at 140,431,790 with a national growth rate estimated at 3.2% per annum [8].

Ibadan is the largest indigenous city south of the Sahara and is located at an altitude generally ranging from 152 m to 213 m with isolated ridges and peaks rising to 274 m. It is the state capital of Oyo State (see **Figure 1** above) which is near the forest grassland boundary of south-west of Nigeria on longitude 3° east of the Greenwich meridian and latitude 7° north of the equator. It

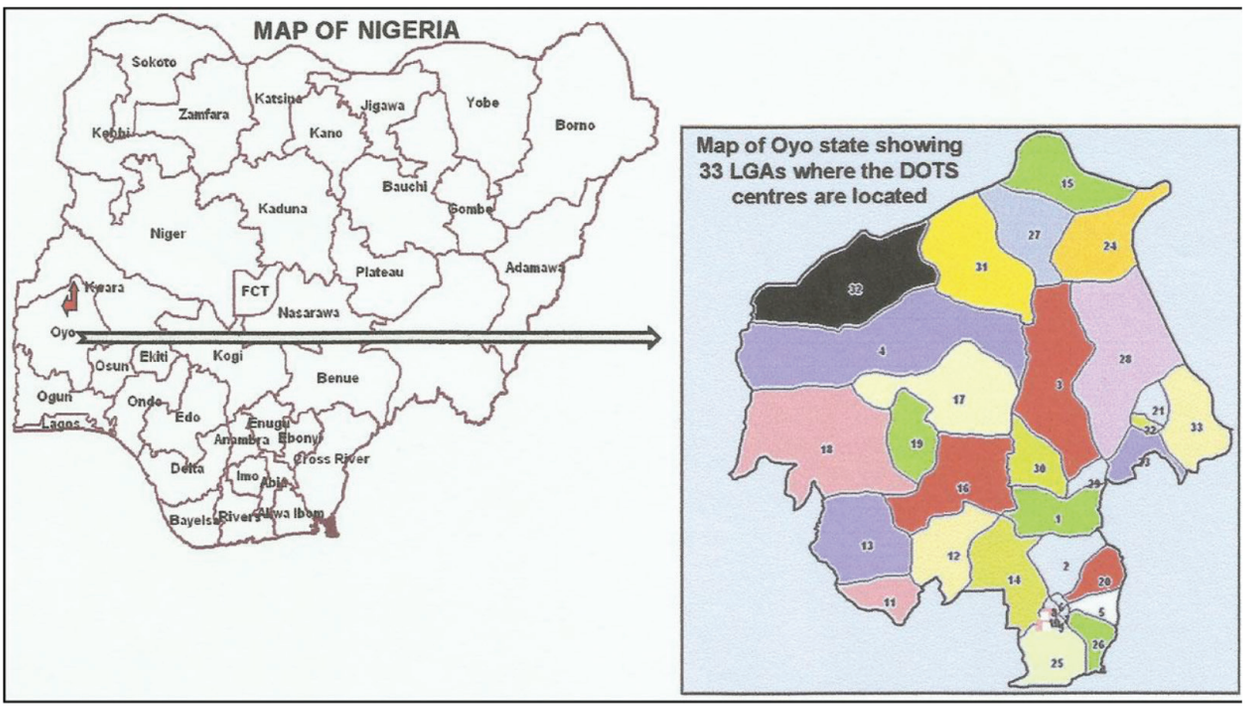

Figure 1. Nigeria (Ibadan, south-west of Nigeria). (Source: Nigeria Demographic and Health Survey, 2013).

is at a distance of about 145 km north-east of Lagos. Oyo State is divided into 33 local government area. It comprises largely the Yoruba-speaking tribe and other ethnic groups. Ibadan is dominantly a civil service city with some level of industrial activity, private businesses and other forms of trade and peasant jobs. The estimated population is 2.6 million people. Religious groups in the city are the Christians, Muslims and traditionalists. The study sites include those that are randomly selected from the under listed DOTS centers in Ibadan within the LGAs (strata): (i) Moniya Primary Health Care, (ii) Ojoo Primary Health Care, (iii) Odogbo Military Hospital, (iv) SDP Primary Health Care, (v) Iwo Road Primary Health Care, (vi) Alafia Hospital, (vii) Medical Outpatients-University College Hospital, (viii) Adeoyo Maternity Hospital, (ix) Jaja Health Services-University of Ibadan, (x) Alafara Primary Health Care, (xi) Agodi Prisons, (xii) OLA Catholic Hospital, (xiii) Sabo Primary Health Care, (xiv) Oniyanrin Primary Health Care, (xv) Atolu Primary Health Care, (xvi) Iyana Church, (xvii) Ejiku Primary Health Care, (xviii) Agbongbon Primary Health Care, (xix) SMG Catholic Hospital, (xx) Molete Primary Health Care, (xxi) Adifase Primary Health Care, (xxii) Chest Hospital Jericho, (xxiii) Olomi Primary Health Care, (xxiv) Ring Road State Hospital and (xxv) Apete Primary Health Care.

2.3. Sampling

The sampling technique was a multistage stratified random sampling technique. The first stage was to identify all the LGAs in Ibadan, classify the LGAs into strata and make a random selection of LGAs. The second stage was a random selection of the DOTS facility within the selected LGAs from which simple random selection of consenting TB patients attending DOTS facility at the hospitals/health facilities will be was attained. This multistage stratified random sampling technique was employed with the aim of precluding investigator bias and ensuring that the study population selected for the study is representative of TB patients in the study location.

2.3.1. Sample size estimation

Using the logic for calculating the analysis of variance (ANOVA) that is a collection of statistical models for the analysis of differences among group (DOTS centers) means (includes variations within and without/between groups). The assumption is that the groups are independent (unrelated). ANOVA has the advantage of assessing the importance of one or more factors by comparing the response variable means at the different factor levels:

- Effect size: 0.5
- Type 1 error: 0.05
- Type 2 error: 0.2
- Power: 0.80
- Number of groups: 2 (representing DOTS centers within each LGA)
- Critical F value: 4.15 (value which F should be over to get a significant result)

Therefore, the total sample size (participant per DOTS center) is 34, given that the study was conducted in 16 randomly selected DOTS facilities within the selected LGAs.

34 Participants × 16 DOTS facilities = 544 participants.

Assuming nonresponding rate of 20%.

Adjusted sample size (N^1) = N/1 − q.

where q = 0.2; N^1 = 544/1–0.2 = 680 participants (a *minimum of 680 TB patients were recruited into the study).*

2.4. Ethics

Ethical approval for the study was obtained from the University of KwaZulu-Natal (South Africa), Biomedical Research Ethics Committee's approval number (BE233/16). Additional approval was given by the Oyo State's Ministry of Health Ethics Committee (AD 13/479/1045). A full consenting process was applied in respect of all participants.

3. Results

A descriptive analysis assessing the association between individuals' sociodemographic and clinical characteristics (independent variable) and system-related barriers (dependent variables) was conducted. The individuals' sociodemographic characteristics were age, distance from facility, marital status, family type, education, religion, ethnic group and wealth index. The individuals' clinical characteristics were treatment status, where individuals access healthcare, how often individual access healthcare and HIV status. The system-related barriers were the quality of access to care, the healthcare worker attitude, the healthcare center's appearance, the number of people seeking treatment and the waiting time at the healthcare center. Chi-square tests were used to determine the associations between sociodemographic and clinical characteristic associations with the individual and system-related barriers. Logistic regression models reporting odds ratios (OR) and 95% confidence intervals were used to determine the relationship between sociodemographic and clinical characteristics with the individual and system-related barriers.

The results show that 59.25% (410) of individuals believed that the quality of access to care was excellent, 89.33% (611) of individuals believed that the attitude of healthcare workers was positive, 78.44% (542) of individuals believed that the appearance of the healthcare facility they attended was excellent, 75.40% (518) of individuals believed that there were many people accessing healthcare facilities and 82.33% (559) reported that they waited less than 30 minutes at a healthcare facility (see **Table 1**).

The sociodemographic descriptive statistics show that the distance from facility, family type and wealth index were significantly associated with the quality of access to care. Education was partially associated. Education was significantly associated with healthcare worker attitude. Family type was partially significant. The distance from the healthcare facility was associated with the appearance of the facility. Education, religion, ethnic group and wealth index were significantly associated with education which was significantly associated with the waiting time at the healthcare center. Family type was partially associated (see **Table 2**).

Access to care	Frequency (%)
Excellent	410 (59.25)
Not excellent	282 (40.75)
Healthcare worker attitude	
Positive	611 (89.33)
Not positive	73 (10.67)
Healthcare center's appearance	
Excellent	542 (78.44)
Not excellent	149 (21.56)
Number of people seeking treatment	
Many	518 (75.40)
Few	169 (24.60)
Waiting time	
0–30 minutes	559 (82.33)
More than 30 minutes	120 (17.67)

Table 1. Proportion of health system-related factors.

The clinical descriptive statistics show that where individuals access healthcare and how often individual access healthcare and HIV status were significantly associated with access to care. HIV status was significantly associated with healthcare worker attitude. Where individuals access healthcare and how often individuals access healthcare were significantly associated with perceptions about healthcare center's appearance. Where individuals access healthcare was significantly associated with the number of people seeking care. HIV status was partially associated. Where individuals access healthcare and HIV status was significantly associated with waiting time at the healthcare center (see **Table 3**).

3.1. Quality of access to care

The regression models show that those who lived 5 km–10 km from the healthcare facility were significantly more likely to believe that the quality of access to care was not excellent compared to those who lived within 5 km (OR, 2.48; CI, 1.72–3.56; $p < 0.001$). Those from polygamous families were more likely to believe that the quality of access to care was not excellent compared to those from monogamous families (OR, 1.38; CI, 1.00–1.90; $p = 0.049$) (see **Table 4**). Those individuals who did not usually get care at private clinics were significantly less likely to believe that the quality of access to care was not excellent (OR, 0.43; CI, 0.31–0.61; $p < 0.001$). Those individuals who accessed care not more than once a year were significantly less likely to believe that the quality of access to care was not excellent compared to those who accessed care more than once a year (OR, 0.54; CI, 0.37–0.78; $p = 0.001$). Those who did not know their HIV status were significantly more likely to believe that the quality of access to care was not excellent compared to those who were reactive (OR, 2.69; CI, 1.14–6.33; $p = 0.023$) (see **Table 5**).

Access to care	Total	Excellent	Not excellent	p-Value
Age				0.847
Less than 20	55	56.3631	43.64 (24)	
21–30	183	56.28 (103)	43.72 (80)	
31–40	200	59.00 (118)	41.00 (82)	
41–50	112	62.50 (70)	37.50 (42)	
51–60	66	59.09 (39)	40.91 (27)	
60+	46	65.22 (30)	34.78 (16)	
Distance from facility				<0.001
< 5 km	252	69.44 (175)	30.56 (77)	
5–10 km	255	47.84 (122)	52.16 (133)	
> 10	185	61.08 (113)	38.92 (72)	
Marital status				0.972
Never married	212	59.43 (126)	40.57 (86)	
Married	479	59.29 (284)	40.71 (195)	
Family type				0.049
Monogamous	440	61.82 (272)	38.18 (168)	
Polygamous	237	54.01 (128)	45.99 (109)	
Education				0.088
Pre-high school	233	54.08 (126)	45.92 (107)	
High school	282	60.64 (171)	39.36 (111)	
College/higher education	175	64.57 (113)	35.43 (62)	
Religion				0.337
Christian	330	59.70 (197)	40.30 (133)	
Islam	359	58.50 (210)	41.50 (149)	
Traditional	3	100.00 (3)	0.00 (0)	
Ethnic group				0.622
Yoruba	652	58.90 (384)	41.10 (268)	
Igbo	26	61.54 (16)	38.46 (10)	
Hausa	14	71.43 (10)	28.57 (4)	
Wealth index				0.003
Lower class	226	65.04 (147)	34.96 (79)	
Lower middle class	146	65.07 (95)	34.93 (51)	
Upper middle class	262	50.38 (132)	49.62 (130)	
Upper class	58	62.07 (36)	37.93 (22)	

Table 2. Sociodemographic characteristics stratified by access to care.

Access to care	Total	Excellent	Not excellent	p-Value
Treatment status				0.781
Retreatment	47	61.70 (29)	38.30 (18)	
Relapse	44	54.55 (24)	45.45 (20)	
New treatment	552	58.88 (325)	41.12 (227)	
Places where individuals access to healthcare				<0.001
Private clinic	179	44.13 (79)	55.87 (100)	
Non-private clinic	508	64.57 (328)	35.43 (180)	
How often do individuals access healthcare				0.001
More than once a year	443	52.60 (233)	47.40 (210)	
Not more than once a year	169	67.46 (114)	32.54 (55)	
HIV status				0.029
Reactive	49	63.27 (31)	36.73 (18)	
Non-reactive	567	59.44 (337)	40.56 (230)	
Do not know	41	39.02 (16)	60.98 (25)	
Healthcare worker attitude				<0.001
Positive	611	62 (279)	38 (232)	
Not positive	73	34.2 (25)	65.8 (48)	
Appearance of healthcare facility				<0.001
Excellent	611	62 (279)	38 (232)	
Not excellent	73	34.2 (25)	65.8 (48)	
Number of people seeking treatment				0.270
Many	518	60.4 (313)	39.6 (205)	
Few	169	55.6 (94)	45.4 (75)	
Waiting time				0.003
0–30 minutes	558	60.4 (342)	39.6 (216)	
More than 30 minutes	120	55.6 (56)	44.4 (64)	

Table 3. Participants' clinical and care-related characteristics.

3.2. Healthcare worker attitude

Those individuals who had a high school education were significantly less likely to believe that the attitude of the healthcare workers was not positive compared to those who only had a pre-high school education (OR, 0.44; CI, 0.24–0.81; p = 0.009) (see **Table 4**). Those individuals who did not know their HIV status were significantly more likely to believe that the attitude of the healthcare workers was not positive compared to those who were reactive (OR, 6.61; 1.34–32.63; p = 0.020) (see **Table 5**).

Access to care	**OR**	**95% Conf. interval**	**p-Value**
Excellent			
Not excellent (distance from healthcare center)			
<5 km (ref)			
5–10 km	2.48	1.72–3.56	<0.001
>10 km	1.45	0.97–2.16	0.069
Not excellent (family type)			
Monogamous (ref)			
Polygamous	1.38	1.00–1.90	0.049
Attitude of healthcare workers	OR	95% Conf. interval	p-Value
Positive			
Not positive (family type)			
Monogamous (ref)			
Polygamous	1.58	0.96–2.61	0.069
Not positive (education)			
Pre-high school (ref)			
High school	0.44	0.24–0.81	0.009
College/higher education	1.02	0.57–1.80	0.959
Appearance of healthcare facility	OR	95% Conf. interval	p-Value
Excellent (ref)			
Not excellent (distance from healthcare center)			
<5 km (ref)			
5–10 km	0.41	1.25–2.91	0.003
>10 km	0.99	0.60–1.63	0.965
Number of people at healthcare facility	OR	95% Conf. interval	p-Value
Many			
Few (education)			
Pre-high school (ref)			
High school	2.54	1.66–3.88	<0.001
College/higher education	1.26	0.76–2.08	0.379
Few (religion)			
Christian (ref)			
Islam	1.18	0.83–1.67	0.361
Traditional	Null (too few observations in sample)		

Access to care	OR	95% Conf. interval	p-Value
Few (ethnic group)			
Yoruba (ref)			
Igbo	1.74	0.76–3.98	0.190
Hausa	5.91	1.95–17.91	0.002
Few (wealth index)			
Lower class (ref)			
Lower middle class	0.91	0.55–1.50	0.720
Upper middle class	1.30	0.87–1.95	0.204
Upper class	0.43	0.19–1.01	0.054
Waiting time at healthcare facility	OR	95% Conf. interval	p-Value
0–30 minutes			
More than 30 minutes (education)			
Pre-high school (ref)			
High school	0.48	0.30–0.78	0.003
College/higher education	0.98	0.6–1.59	0.944

Table 4. Sociodemographic characteristic regression models.

Access to care	OR	95% Conf. interval	p-Value
Excellent			
Not excellent (places where individuals access care)			
Private clinic (ref)			
Non-private clinic	0.43	0.31–0.61	< 0.001
Not excellent (number of times accessed care)			
More than once a year (ref)			
Not more than once a year	0.54	0.37–0.78	0.001
Not excellent (HIV status)			
Reactive (ref)			
Non-reactive	1.18	0.64–2.15	0.600
Do not know	2.69	1.14–6.33	0.023
Attitude of healthcare workers	OR	95% Conf. interval	p-Value
Positive			
Not positive (HIV status)			
Reactive (ref)			

Access to care	OR	95% Conf. interval	p-Value
Non-reactive	2.81	0.6–11.86	0.160
Do not know	6.61	1.34–32.63	0.020
Appearance of healthcare center	OR	95% Conf. interval	p-Value
Excellent			
Not excellent (places where individuals access care)			
Private clinic (ref)			
Non-private clinic	0.45	0.31–0.65	< 0.001
Not excellent (number of times accessed care)			
More than once a year (ref)			
Not more than once a year	0.57	0.40–0.81	0.002
Number of people seeking care	OR	95% Conf. interval	p-Value
Many			
Few (places where individuals access care)			
Private clinic (ref)			
Non-private clinic	0.48	0.33–0.70	< 0.001
Few (HIV status)			
Reactive (ref)			
Non-reactive	0.57	0.31–1.04	0.068
Do not know	0.35	0.13–0.96	0.042
Waiting time at healthcare center	OR	95% Conf. interval	p-Value
0 to 30 minutes			
More than 30 minutes (places where individuals access care)			
Private clinic (ref)			
Non-private clinic	1.98	1.19–3.32	0.009

Table 5. Clinical characteristic regression models.

3.3. Healthcare facility appearance

Those individuals who lived 5 km to 10 km were significantly less likely to believe that the appearance of the healthcare facility was not excellent compared to those who lived within 5 km of the healthcare facility (OR, 0.41; CI, 1.25–2.91; p = 0.003) (see **Table 4**). Those individuals who did not access care at private clinics were significantly less likely to believe that the appearance of the healthcare facility was not excellent (OR, 0.45; CI, 0.31–0.65; p < 0.001). Those individuals who did not access healthcare more than once a year were significantly less likely to believe that the appearance of the healthcare facility was not excellent compared to those who accessed healthcare more than once a year (OR, 0.57; CI, 0.40–0.81; p = 0.002) (see **Table 5**).

3.4. Number of people accessing healthcare

Those with a high school education were significantly more likely to believe that there were few people accessing healthcare facilities compared to those with pre-high school education (OR, 2.54; CI, 1.66–3.88; $p < 0.001$). Those of the Hausa ethnic group were significantly more likely to believe that there were few people accessing healthcare facilities (OR, 5.91; CI, 1.95–17.91; $p = 0.002$). Those who did not access care at private clinics were significantly less likely to believe that there were few people accessing healthcare (OR, 0.48; CI, 0.33–0.70; $p < 0.001$). Those individuals who did not know their HIV status were significantly less likely to believe that there were few people accessing care compared to those who were reactive (OR, 0.35; CI, 0.13–0.96; $p = 0.042$) (**Table 5**).

3.5. Waiting time at healthcare facility

Those individuals who had a high school education were significantly less likely to report waiting more than 30 minutes at the healthcare facility compared to those who had a pre-high school education (OR, 0.48; CI, 0.30–0.78; $p = 0.003$) (see **Table 4**). Those individuals who did not access healthcare at private hospital were significantly more likely to report waiting more than 30 minutes at a healthcare facility compared to those who accessed healthcare at private clinics (OR, 1.98; CI, 1.19–3.32; $p = 0.009$) (see **Table 5**).

4. Discussion

In this study, we determined individual and provider's barriers and delays that limited access and adherence to TB services in 16 hospitals based in one state of Nigeria. We determined this through assessing the association between sociodemographic and quality of access to care, healthcare worker attitude, healthcare facility appearance, number of people accessing healthcare, as well as waiting time at healthcare facility. Our findings supported those reported in previous studies; for example, we report that living outside 5 km from the health facility was associated with poor perception of access to quality care [9–11]. This finding could be linked to the cost of time and transport incurred in traveling to the healthcare facility and the time taken to receive service upon arrival to the facility especially with treatment such as TB which requires continued contact with healthcare providers [12, 13]. We found that coming from a polygamous marriage or family was linked to significantly associating with not linking healthcare with good quality.

Also, individuals who were never exposed to private healthcare were likely to view public healthcare as providing excellent service. This finding might be due to their inability to compare the services they receive with those provided in private healthcare services. Private healthcare systems are associated with advanced resources, less waiting time and better treatment outcomes; it is therefore not surprising that in our study those who had a pre-exposure to private healthcare were likely to view the current healthcare service as not excellent [13, 14].

Those who knew their HIV status were likely to believe that the quality of care was excellent. This finding is significant because previous findings have shown that co-infection of HIV/TB

can lead to negative side effects, high drug burden and poor treatment outcome [14–16]. The perception by TB-/HIV-co-infected patients that healthcare service was excellent might mean that despite experiencing a double burden of the diseases, access to treatment may be less strenuous as they access treatment at the same facility and are more familiar with the operation of the facility as well as healthcare providers.

Our second aim was to understand the attitudes of participants toward healthcare workers; we found that those who were HIV positive and with high school education, respectively, were likely to perceive healthcare worker's attitude positively. The finding that having high school education was associated with positive attitude toward healthcare providers could be linked with patient's ability to understand the instructions with minimal dependence or assistance from healthcare workers. Also, the difference in satisfaction and sociodemographic factor such as education can be explained through the different expectations which patients may have toward how health providers should care for them. Although this may be the case, it is important that patients have a positive perception of healthcare workers in order to comply to treatment and hospital visits [6, 17]. A positive relationship between healthcare providers and patient was found to be linked to patients playing an active role in the management of their disease and adherence until the end of the treatment [18, 19].

5. Limitations

The following limitations in this study are acknowledged: the study was cross-sectional, collecting data at one point. The views of the participants may have changed after our first contact with them. Although our findings cannot be generalized because they were conducted in 16 health facilities in one country, the self-reported perception of participants was similar across the different facilities.

6. Conclusions

Providing good quality care to patients is an ongoing practice, which requires continued consultation with everybody involved including patients who are at the receiving end of the service in order to evaluate and improve on the services rendered. Such practices will motivate compliance to treatment and a collaborative relationship between patients and healthcare providers in TB management. Despite several challenges affecting treatment and patient care, this study reports that healthcare provision was generally satisfactory. Findings from this study are significant in guiding policy and interventions for resource-limited settings.

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Authors' contributions

OO and JMT conceptualized the idea and designed the study. Data collection, cleaning and processing were conducted by OO. Data analysis and interpretation were conducted by OO, LM and LM OA and supervised by JMT. All authors wrote the initial manuscript and read and approved the final manuscript.

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Competing interests

The authors declared no competing interests.

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