Chapter 10

Clients' Perception of Quality of Multidrug-Resistant Tuberculosis Treatment and Care in Resource-Limited Setting: Experience from Nigeria

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Abstract

Background: Quality care is essential to the well-being and survival of people with multidrug-resistant tuberculosis (MDR-TB). The aim of this study is to explore how MDR- TB patients, who were voluntarily hospitalized, perceived care and treatment strategy and to assess the influence of psychosocial factors on their perception of care and treatment strategy in Nigeria. Methods: The study enrolled 98 MDR-TB patients on voluntary confinement in four MDR-TB hospitals in Nigeria. Patients' perceptions of quality of care and treatment strategy were evaluated with 28-item and 6-item instruments, respectively. Bivariate analysis was used to test for an association and multivariate analysis for factors that might contribute to the perceived quality of care. Results: Seventy-eight per cent (78%) of the participating patients perceived the quality of care to be good. Patients with better psychosocial well-being had five times higher odds to report good quality of care. Conclusion: The majority of MDR-TB patients perceived the quality of inpatient care to be good in Nigerian hospitals; however, their psychological

health influenced their perception significantly. Health care providers need to improve treatment strategies to encourage acceptance of care as poor perception to health care service delivery may deter treatment completion and also cause relapse among clients on treatment.

Keywords: satisfaction, quality of care, multidrug-resistant tuberculosis patients, Nigeria

1. Introduction

Tuberculosis (TB) is a major global public health crisis which was estimated to have led to 1.4 million deaths in 2015 [1]. Despite the availability of effective treatment for the disease, HIV co-infection has contributed to its re-emergence in more severe form with 5% of TB-infected patients reportedly experiencing multidrug resistant TB (MDR-TB) in 2013 [2, 3]. These incidents are growing particularly in developing countries such as Nigeria [4]. Nigeria is reported to have more than usual numbers of MDR-TB cases, which further poses threat to the control and eventual elimination of TB in the country [5, 6].

The acquisition of MDR-TB is a consequence of two main factors such as health service and patient-related. On the part of the health services, it is primarily a result of the compromised quality of care provided to TB patients. These include, inter alia, long waiting time to see the health workers, delayed retrieval of laboratory results, non-availability of anti-TB drugs and sub-optimal dosing of rifampicin and isoniazid among patients with TB/HIV co-infection [7]. While these established health service challenges impact acquisition of MDR-TB, there is the interplay of factors framed by patients' characteristics, disposition and behaviours to their TB treatment and care. Patients diagnosed with MDR-TB are also reported to experience psychosocial and economic challenges such as stigma, fear of being discriminated, lack of adequate funds, depression and psychological distress as a result of side effects from the treatment [8]. All these factors need to be addressed comprehensively particularly because of the significant role they play in determining treatment completion or adherence.

To cultivate consistent adherence, retention of patients and reduction of the prevalence of MDR-TB cases, a new treatment approach which is considerate of patients' needs should be adopted. This can be achieved through prioritizing patients as essential collaborating partners to the treatment team. It is important to listen to patients' voice because they have a potential to contribute to treatment innovations. They are also recognized as crucial in the caring process of culminating the widely encouraged patient-centred approach to care [9, 10].

In both policy and practice, it is becoming a standard requirement in the field of healthcare to give serious importance to patients' views [11]. Understanding the attitudes and perceptions of patients towards the care they receive is crucial in tailoring services which meet their needs. Such efforts will improve treatment success. For instance, in Nigeria, the treatment success rate for drug-resistant TB is 60% compared to 85.5% for the drug susceptible TB [12]. Among many factors contributing to, this is the possibility that the patients are not fully involved in their care and convinced or satisfied of the quality of services they receive.

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Often, patients have a lot of expectations from healthcare providers and the care they provide [13]. Without a concomitant quality service delivery, patients may become cynical and lower their own desire to participate actively in their care. With an increasing number of MDR-TB patients in need of treatment, research on the patients' perception of the quality of health care services they receive remains crucial. Understanding the perceptions will strengthen the primary care practices and provide insight on how patient centred care can be improved. Such information generated from research findings will be helpful to improve the quality of care and health service delivery to the patients [13, 14]. With this in mind, this study explored how MDR-TB patients on confined hospitalization perceived the treatment strategies and quality of care of the DOT programme, and assessed the influence of psychosocial factors (namely psychosocial and mental well-being) on their perception of quality of care.

2. Methods

2.1. Study settings and target population

This was a facility-based, cross-sectional study of all the patients who were managed for MDR-TB between January 2012 and October 2012 in four out of the five centres for the treatment of MDR-TB in Nigeria. The centres and the corresponding number of patients enrolled in the study were University College Hospital Ibadan (24 patients), Government Chest Hospital (GCH) Jericho, Ibadan (22 patients), Dr. Lawrence Henshaw Memorial Hospital (DLHMH), Calabar (12 patients) and Mainland, Lagos (40 patients). Admission of MDR-TB patients into the treatment programme started in January 2012 while recruitment for the study was in October of the same year. These patients were admitted in the hospital on the basis of having developed resistance to TB, and being willing to remain in isolation for the duration of 8 months for intensive treatment, with visitations limited to once a week from family members.

2.2. Measures

We used two questionnaires to measure different aspects of the patients' perceptions of care and treatment. The psychosocial well-being and mental well-being of patients were evaluated to assess their influence on perception prese nted in **Table 1** below. Psychosocial well-being as the independent variable was characterized as poor and good if respondents had an aggregated score of ≤9 and ≥ 10 points, respectively. Mental health was characterized as poor and good if the patient had an aggregated score of ≤5 and ≥ 6, respectively.

The patients' perception of treatment strategy was evaluated with a six-item instrument that asked whether they preferred the current method of treatment that is applied for their treatment during hospitalization. The responses were either 'Yes' or 'No' and coded 1 and 0, respectively. Respondents who selected 'Yes' supported the current treatment recommendations.

Variables	Items	Measure
Psychosocial well-being		Dichotomous
	Concerned that people will say bad things of me	
	Fear of Social rejection/isolation due to stigma	
	Worried that people will know I am treating TB in the hospital	
	Loneliness	
	Worried about my family	
	Miss being with my partner	
	Long hospital stay denies me the support from my family	
	Being separated from my family	
	Worried about disengagement from community	
	Hospital feels like a prison	
	Concerns about side-effects of medicines	
	Concerned that I have taken too many drugs	
	Have ability to tolerate side-effects	
	Low expectations of cure	
	Miss doing all the usual things I use to do	
	Worried that I will lose my job	
	Frustrations about the temporary inability to work/study/perform social responsibilities	
	Worried about income	
Mental health		Dichotomous
	Feel that I let myself and my family down	
	Has no pleasure in doing things	
	Feeling down, depressed or hopeless	
	Trouble falling or staying asleep or sleeping too much	
	Trouble concentrating on things	
	Being restless because I have been idle	
	Feels that it is better to be dead	
	Has poor appetite	
	Have little energy	
	Feeling bad about disengagement from my partner(s)	
Perception of quality of care	**Cronbach alpha = 0.949**	
Interpersonal relations	**Cronbach alpha = 0.904**	Scales
	Manner in which health workers receive	
	Respect shown by the doctors	
	Respect shown by the nurses	
	Respect shown by the hospital/ward maids	
	Respect shown by the cleaners	

Variables	Items	Measure
	Reassuring attitude of the health workers	
	Respect for privacy during the physical examination.	
	Doctors showed me interest	
	Have special knowledge of TB	
	Maintain confidentiality about my TB status	
	Give information about possible side effects of drugs	
	Give information about the use of my TB medication	
Health workers' competencies	**Cronbach alpha = 0.908**	Scales
	The explanations about my health problem were clear and complete	
	The explanations about the tests to be taken were clear and complete	
	The explanations about the treatment chosen were clear and complete	
	My involvement in the decisions concerning the treatment	
	Time spent in consultation with my doctor.	
	History of my problem taken by the doctor	
	Doctor's skill in making the physical examination more comfortable.	
	Appropriateness of the tests and physical examination	
	Correct diagnosis made by the doctor.	
	Execution of the care and treatments	
	Possibility of seeing the same doctor every time.	
	Time spent waiting to obtain test results.	
Social visits	**Cronbach alpha = 0.682**	Scales
	Improvement in my state of health	
	Lessening of my fears and anxieties	
	Return to my routine activities	
	Ability to react (what to do, who to contact) if my state of health deteriorates.	

Table 1. Variables and number of items with Cronbach alpha scores.

All the six items on treatment strategy were aggregated such that a higher score represented greater support of treatment strategy.

Patients' perception on the quality of care was evaluated with a 28-item tool (**Table 1**) that measured perception with a 5-point Likert scale, a measurement going from negative to positive indicated better perception of quality of care. For the purpose of further description of data and logistic regression procedure, the perception of treatment strategy score was characterized as 'does not support treatment strategy' and 'supports treatment strategy' if respondents had an aggregated score ≤ 3 and ≥ 4, respectively. For perception of quality of care, respondents were characterized as poor, indifferent and good if respondents had an aggregated score as follows: 28–73, 74–95 and 96–140, respectively.

2.3. Statistical analysis

We used summary statistics to show the distribution of the main variables, and the values were expressed as an absolute number with percentages and mean with standard deviation for categorical and continuous variables, respectively. We performed both bivariate analysis and multivariable logistic regression models to examine the associations between participants' socio-demographic and other characteristics with the perceived treatment strategy and quality of care. Univariate analyses were used to determine the unadjusted (crude) odds ratios, and bivariate analysis of the result for the association between independent variable (IV) and treatment perception was done using Student t-test when IV had two levels and ANOVA when the levels were more than two.

Multivariate logistic regression was performed to determine the factors that predict perceptions of both treatment strategy and quality of care. We considered variables for inclusion in the multivariable model if they reached a moderate level of significance ($p < 0.25$). The model significantly predicted the outcomes better than a model without the predictors. The model chi-square test value provides a measure of improvement due to the introduction of the independent variables. Nagelkerke R^2 provides an overall model fit. The following regression diagnostics were used to assess the goodness-of-fit of the model and to choose the parsimonious model: the Hosmer-Lemeshow goodness-of-fit test, tolerance test for multicollinearity and link test to check for model specification error. Thereafter, we performed receiver operating curves (ROC) (c-statistics) analyses to determine the predictive power of the final multivariable model. The ROC curve plots the sensitivity of the model against 1 minus sensitivity for different cut-off points of the predicted probability of having hypertension. The greater the ROC curve (upper limit =1), the better the model is at discriminating between hypertension cases. Results were presented as odds ratios (ORs) with 95% confidence intervals (CIs). All statistical analyses were performed using IBM SPSS version 20. The significance tests were two-tailed, and statistical significance was defined at the alpha level of 0.05.

3. Results

3.1. Socio-demographic, medical history and well-being of patients

A total of 98 patients were recruited into the study between January 2012 and October 2012 from 4 MDR-TB centres in Nigeria. Most (63.3%) of the participants were males. The mean age of patients was 36.1 years (SD 11.97). More than half (55.1%) of the patients were married. Most (65.3%) patients were Christians, while Muslims made up the remaining 34.7%. Most of the respondents had some form of education, as only 14.5% had no formal education. About three quarters (74.5%) were unemployed (see **Table 2**).

Table 2 indicates that some of the participants (34.6%) in the selected centres have been on TB treatment between 5 and 10 years, without cure resulting in their resistant to treatment. About

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Characteristics	Frequency n	Percentage %
Sex:		
Male	62	63.3
Female	36	36.7
Age (Mean ± SD) 36.1 ± 11.97		
≤30 years	34	39.5
> 30 years	52	60.5
Marital status		
Currently single	44	44.9
Currently married	54	55.1
Religion		
Christianity	64	65.3
Islam	34	34.7
Education		
No formal	13	14.5
Primary	25	27.8
Secondary	39	43.3
Post-secondary	13	14.4
Current employment status		
Unemployed	70	74.5
Employed	24	25.5
Income (Naira)		
≤100,000	28	56.0
10,001–20,000	7	14.0
20,001–50,000	8	16.0
>50,000	7	14.0
Family members visit		
Yes	72	80.0
No	18	20.0
Number of TB treatment(s) in the past		
1	16	16.3
2	29	29.6
3	36	36.7
≥4	17	17.3

Characteristics	Frequency n	Percentage %
Number of years on TB treatment		
1–2	21	21.4
3–4	27	27.6
5–10	34	34.7
>10	16	16.3
Current length of admission (months)		
1	4	4.1
2	16	16.3
3	9	9.2
4	10	10.2
5	35	35.7
6	1	1.0
7	16	16.3
8	7	7.1
Treatment Centre		
UCH, Ibadan	24	22.5
GCH, Ibadan	22	22.4
DLHMH, Calabar	12	12.2
Mainland, Lagos	40	40.8
Psychosocial well-being		
Poor	28	28.6
Good	70	71.4
Mental health		
Poor	39	39.8
Good	59	60.2

Table 2. Description of MDR-TB patients in isolation, Nigeria.

7.1% of patients were almost at the end of the DOT strategy, which lasted for a period of 8 months. Another 16.3% of patients were also near the completion of their treatment course at 7 months, and only 4% of patients were just beginning the treatment at 1 month. Results showed that a higher proportion of the patients had good psychosocial and mental well-being, 71.4 and 60.2%, respectively.

3.2. Perception of treatment and quality of care of patients

Table 3 shows that 63.8% accepted that patients with MDR-TB could be admitted for many months in the hospital for isolation and treatment. However, 43.5% preferred out-patients' treatment option. Similarly, a slight majority of 51.7% indicated a preference for treatment at

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Item	Yes (%)	No (%)
Do you think this type of treatment where patients are kept in hospital for a long time is good?	63.8	36.2
*Would you have preferred to be treated as an outpatient?	43.5	56.5
*Would you have preferred to have a community health staff come to give you your medicine/injection at home?	51.7	48.3
Can you recommend this method of treatment to anybody close to you if they have drug resistant TB?	85.4	14.6
Should the government use this method to treat people with drug resistant TB?	73.6	26.4
Do you know about the progress of your treatment?	67.7	32.3

*Reversely coded for scoring.

Table 3. Perception of treatment strategy.

home through visiting community health workers. A considerable proportion (85.4%) indicated that they would recommend the treatment method to another person close to them if they had MDR-TB. A large number of participants (73.6%) were of the opinion that the government should use the in-care hospitalized intensive phase method to treat people with MDR-TB. The proportion who reported that they were informed about the progress of their treatment was 67.7%. Overall, the treatment strategy during hospitalization was supported by 69.4% of the patients (**Figure 1**). With respect to quality of care, internal consistency was shown to be excellent for overall quality of care, with Cronbach alpha = 0.949, and perception of interpersonal relations, Cronbach alpha = 0.904; perception of health workers' competencies, Cronbach alpha = 0.908, but lower for perception about visits, Cronbach alpha = 0.682. Mean score for overall perception of the quality of care was 109.2 (SD 24.00), out of a maximum score of 140 points with a minimum score of 28 (as shown in **Table 4**). Few patients (7.8%) had a

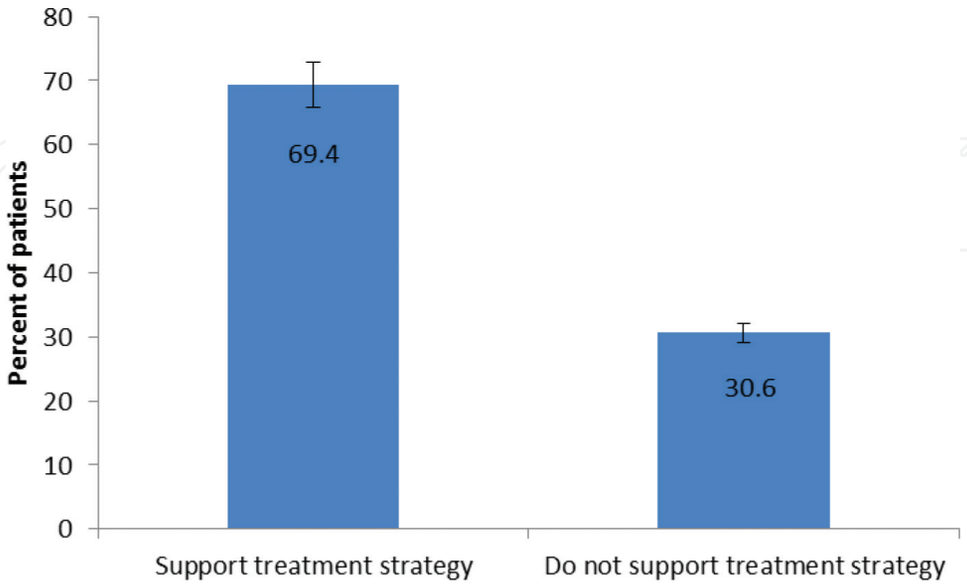

Figure 1. Patients' support for current TB treatment strategy.

	Number of items	N	Minimum	Maximum	Mean (SD)
Perception on treatment strategy	6	98	0	6	3.63 (1.69)
Overall Perception on quality of care	28	90	28	140	109.17 (24.00)
Interpersonal relations	12	91	12	60	46.61 (11.18)
Doctors work	12	93	12	60	46.04 (11.28)
Opinion on what I got from the visit	4	93	4	20	16.12 (3.36)

Table 4. Patients' scores on the perception of treatment strategy and quality of care items.

poor perception of the quality of care they received from the facilities; 78.9% had a good perception about the quality of care they received, while 13.3% were indifferent (**Figure 2**).

Correlation analysis was performed to test how the different domains of perception associated with overall quality of care (**Table 5**). Results showed a positive significant association between all the domains with overall perception. This implies that as interpersonal relations, perception about health workers' competencies, and perception about visit either increased or decreased, there was a corresponding increase or decrease in overall perception of quality of care. This association indicates the importance of the increased interpersonal relationship, professional competencies and social visits on improving the perception of quality of care. Only health workers' competence showed weak positive association with the perception of treatment strategy.

3.3. Perception of treatment and quality of care following socio-demographic, medical history and well-being status of patients

Results as shown in **Table 6** indicated that few variables were associated with the perception of treatment strategy. There was a significant difference in the means of perception to treatment

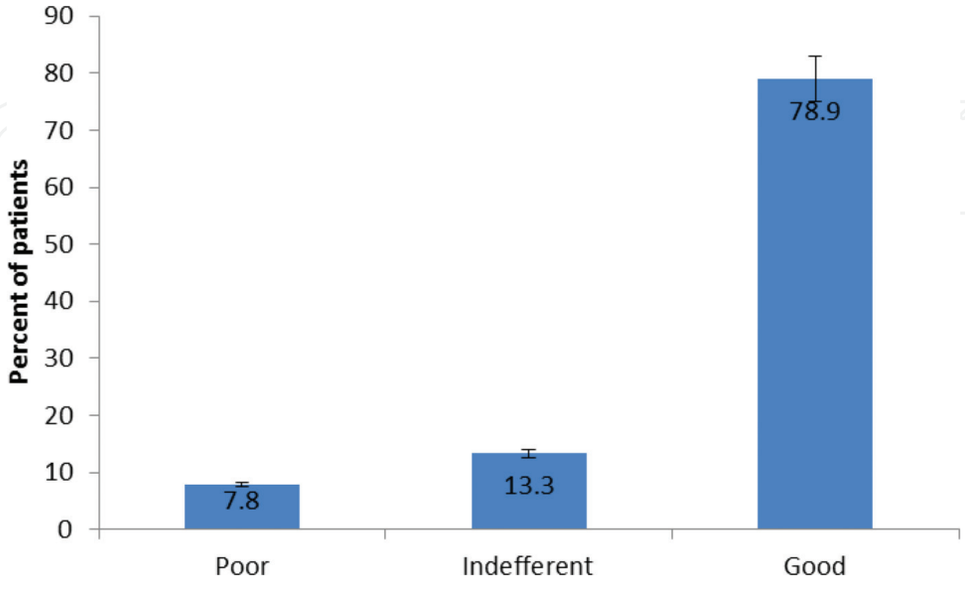

Figure 2. Patients' perception of quality of care.

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Domains	Perception on quality of care		Perception on treatment strategy	
	r	*p*	r	*p*
Interpersonal relations	0.952	<0.001	0.163	0.123
Health workers' competence	0.941	<0.001	0.200	0.054
Social visits	0.746	<0.001	0.045	0.668

Table 5. Association between domains of quality of care and overall quality of care.

	Perception on treatment strategy			Perception on quality of care		
Characteristics	**Mean (SD)**	**F**	***p***	**Mean (SD)**	**F**	***p***
Sex						
Male	3.74 (1.64)	0.699	30.405	108.83 (24.85)	0.037	0.849
Female	3.44 (1.77)			109.86 (22.59)		
Age						
≤30 years	3.67 (1.64)	0.010	0.920	113.00 (26.17)	1.406	0.239
> 30 years	3.71 (1.53)			106.39 (23.16)		
Marital status						
Currently single	3.79 (1.70)	0.734	0.394	114.81 (22.70)	3.740	0.056
Currently married	3.50 (1.69)			105.05 (24.30)		
Religion						
Christianity	3.78 (1.65)	1.423	0.236	109.79 (22.78)	0.106	0.745
Islam	3.35 (1.75)			108.06 (26.41)		
Education						
No formal	4.00 (0.816)	1.062	0.369	104.14 (25.50)	0.893	0.448
Primary	3.32 (1.43)			114.91 (17.518)		
Secondary	3.94 (1.83)			105.22 (28.54)		
Post-secondary	3.37 (1.84)			110.84 (21.77)		
Current employment status						
Unemployed	3.84 (1.72)	3.211	0.076	111.84 (24.78)	3.834	0.053
Employed	3.12 (1.59)			100.56 (20.41)		
Monthly income						
≤100,000	4.21 (2.02)	2.613	0.062	122.48 (15.11)	7.747	<0.001
10,001–20,000	2.71 (1.11)			114.71 (10.54)		
20,001–50,000	4.50 (1.85)			86.50 (31.08)		
>50,000	2.71 (0.95)			97.71 (25.54)		
Family member visits						
Yes	3.69 (1.61)	0.034	0.853	108.87 (22.08)	0.034	0.855
No	3.61 (2.03)			110.05 (30.50)		

	Perception on treatment strategy			Perception on quality of care		
Characteristics	**Mean (SD)**	**F**	***p***	**Mean (SD)**	**F**	***p***
Number of TB treatment in the past						
1	4.50 (1.75)	3.407	0.021	113.40 (16.75)	0.293	0.830
2	3.00 (1.60)			106.33 (27.60)		
3	3.88 (1.63)			108.90 (25.61)		
≥4	3.35 (1.57)			110.56 (21.10)		
Number of years on TB treatment						
1–2	3.80 (1.69)	0.250	0.861	107.10 (32.00)	0.205	0.893
3–4	3.40 (1.82)			107.95 (25.13)		
5–10	3.70 (1.71)			111.84 (18.88)		
>10	3.62 (1.54)			108.06 (22.19)		
Current duration on admission						
1–2	3.65 (1.92)	0.893	0.448	104.95 (26.05)	1.730	0.167
3–4	4.05 (1.80)			118.00 (24.10)		
5–6	3.30 (1.78)			112.20 (17.05)		
7–8	3.78 (1.16)			102.00 (29.77)		
Treatment centre						
UCH, Ibadan	3.12 (1.19)	4.366	0.006	108.16 (22.16)	7.150	<0.001
GCH, Ibadan	3.95 (1.13)			109.88 (28.35)		
DLHMH, Calabar	5.00 (1.59)			134.66 (5.26)		
Mainland, Lagos	3.35 (2.00)			101.00 (21.23)		
Psychosocial well-being						
Poor	3.79 (1.83)	0.591	0.444	107.40 (30.69)	0.188	0.666
Good	3.52 (1.60)			109.86 (21.12)		
Mental health						
Poor	3.85 (1.81)	0.685	0.410	110.48 (30.38)	0.153	0.697
Good	3.54 (1.64)			108.42 (19.66)		

Table 6. Perception of treatment strategy and quality of care distributed by socio-demographic, medical history and well-being of patients (higher mean values are associated with better perception).

strategy with the number of TB treatment in the past, as a higher mean score for the perception of treatment strategy was observed for patients who had only treated TB for the first time. Differences were observed in mean scores for treatment strategy by centre, with the DLHMH-Calabar registering a higher mean compared to the other centres. The bivariate analysis did not yield associations between psychosocial and mental well-being and perception of treatment strategy. Significant associations were, however, seen between income and treatment centre, and perception of quality of care such as patients in the low-income category had a

statistically higher mean for perception of quality of care. Furthermore, patients at the DLHMH-Calabar treatment centres had a significantly higher mean for the quality of care compared to those in other centres.

Independent variables that were significant in bivariate model and the two well-being variables—psychosocial and mental well-being—were added in a multivariate model with the two outcome variables using MANOVA, to examine the association between independent variables and the combined dependent variables. **Table 7** shows that all the variables remained significant in multivariate analysis, except psychosocial and mental well-being, indicating that there were significant differences in the means of the composite outcome variables with respect to the groups of each independent variable in the model. Partial eta-squared (η2) indicated some levels of contribution of some of the variables like employment status, treatment centre to the model, implying that these two variables did not exert a considerable effect on perceived treatment strategy and quality of care.

3.4. Predictors of perceived treatment strategy and quality of care

The variable psychosocial well-being became significant in the logit model predicting high perception of quality of care (**Table 8**). As patients with good psychosocial well-being were more likely to perceive the quality of care as good (OR: 5.1, CI: 1.46–23.94). Patients in the Mainland-Lagos and GCH-Ibadan were less likely to have a good perception with respect to quality of care compared with those in UCH-Ibadan, although the relationship was not significant. Patients who had spent ≥ 3 months in admission were less likely to perceive the quality of care in a positive light than those who had spent 1–2 month in admission. No difference was observed between patients treated for TB ≥ 4 times and those treated once previously (OR: 0.93, CI: 0.14–6.32) (**Table 9**). Employed participants were less likely to support treatment strategy (OR: 0.23, CI: 0.06–0.90) and less likely to perceive the quality of care as good (OR: 0.11, CI: 0.02–0.88), compared with the unemployed. Patients with secondary education and above were less likely to perceive the quality of care as good, while those who had primary education were twice more likely to report the quality of treatment as good than those who had no formal education.

Variables	Pillai's Trace F	*p*	η^2
Current employment status	5.563	0.031	0.582
Monthly Income	2.720	0.046	0.476
Number of TB treatment in the past:	2.755	0.044	0.479
Treatment centre	3.021	0.032	0.502
Psychosocial well-being	2.724	0.125	0.405
Mental health	1.330	0.317	0.250

Table 7. MANOVA for perceived treatment strategy and quality of care by selected variables.

	Perception of quality of care			
	Adjusted OR	**95% CI Lower bound**	**95% CI Upper bound**	***p***
Marital status				
Currently single	1			
Currently married	0.328	0.090	1.195	0.091
Employment status				
Unemployed	1			
Employed	0.272	0.071	1.044	0.058
Psychosocial well-being				
Poor	1			
Good	5.909	1.458	23.938	.013

Model Chi-square = 11.107, p = 0.011, Nagelkerke R^2 = 0.201. Selected variables entered on first step: Gender, age, marital status, religion, level of education, employment status, number of treatments in the past and psychosocial well-being.

Table 8. Adjusted logit model for support for good perception of quality of care.

	Perception of quality of care			
	Adjusted OR	**95% CI Lower bound**	**95% CI Upper bound**	***p***
Marital status				
Currently single	1			
Currently married	0.284	0.091	0.886	0.030
Religion				
Christianity	1			
Islam	0.224	0.065	0.774	0.018
Employment status				
Unemployed	1			
Employed	0.341	0.103	1.131	0.079
Number of treatments in the past				
1	1			
2	0.061	0.010	0.372	0.002
3	0.445	0.084	2.353	0.341
≥4	0.927	0.136	6.316	0.939

Chi-square = 28.891, p<0.001, Nagelkerke R^2 = 0.397. Selected variables entered on first step: Gender, age, marital status, religion, level of education, employment status, number treatment in the past and psychosocial well being.
[a]Model X^2 test = 26.39, p<0.001, R^2 = 0.412.

[b]Model X^2 test = 30.067, p<0.001, R^2 = 0.506.
All independent variables were added in the logistic regression model, but only variables that are significant in stepwise process are presented.

Table 9. Adjusted logit model for support for current treatment strategy.

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4. Discussion

This study sought to describe perceptions of TB infected patients on the method of treatment they were undergoing, the quality of care they were receiving while in hospitals, and the relationship between their perceptions as well as their psychosocial and mental well-being. To address these objectives, the current study used self-developed assessments. Our study found that the sample perceived the treatment strategy and quality of care received during the MDR-TB to be acceptable. For instance, 69.4% of the sample undergoing TB treatment in the four centres included in the study supported the treatment strategy offered, while 78.9% of the sample perceived the quality of the service to be satisfying. Similar findings were also shown in other studies conducted in Nigeria, Ethiopia and South Africa, respectively [15]. The study further suggests that patients' satisfaction was influenced by a positive interpersonal relationship between health workers, health workers' competence and the social visits patients got. These factors were also found to be associated with adherence to the treatment and continued use of the services. Other studies have reported similar findings suggesting that the patient-service provider relationship is an important reason for satisfaction with TB treatment service [15–19].

The study further reveals that treatment perception was influenced by employment status, the number of TB treatment in the past and the treatment centres. On the other hand, satisfaction with the quality of TB care was majorly influenced by marital status, employment status, monthly income and treatment centre at the bivariate level. A higher mean score for the perception of treatment strategy and quality of care is observed for unemployed patients than employed patients, and the result was confirmed by multivariate analysis. Similarly, patients who earn lower monthly income perceived quality of care to be better than patients who earned a higher income as the result showed. Our finding is similar previous findings which reported that TB patients who had no income were more satisfied with the TB care service than those who had savings [20]. Unlike our findings and those from other studies [21, 22], the authors reported a positive relationship between service satisfaction and educational level. This scenario may be due to people from lower social classes having modest expectations, partly due to limited awareness or limited ability to choose and hence vary expectation. They may also be reluctant to voice dissatisfaction for fear of losing the service. It is necessary to use other flexible and anonymised methods, for instance, qualitative research techniques, to determine client satisfaction. It is also asserted that patients from developing societies are often less likely to report dissatisfaction with the quality of care despite inadequate health resources and lack of access to health facilities in these places, compared with patients in developed societies where services are much better [22].

In comparison with patients who had previously received TB treatment, the study highlights that patients who were only treating TB for the first time showed a statistically higher mean for acceptance of treatment strategy, and this better perception dampened as numbers of time on treatment increased, but increased again slightly as patients experienced more TB treatment. The lower acceptance among patients who have treated TB more than once is because these patients have more experience of the treatment programme, and possibly unsuccessful in

repeated treatments; therefore, seeming to resign their trust in the effectiveness of the existing programme. In such circumstance where patients have undergone treatment for a repeated number of times, MDR-TB patients are to be encouraged to adhere, and not reject treatment programmes. The DOT centre where treatment strategy was more acceptable, with an equally better perception of quality of care was the DLHMH centre in Calabar. No notable associations were observed. All the well-being variables were not significantly associated with any perception outcome in bivariate analysis; however, after controlling for other independent factors in logistic regression analysis, the result showed a significant effect, as a higher likelihood of a good perception of quality of care among patients who had good psychosocial well-being was exhibited. Some studies have shown that patient's satisfaction with treatment during illness can be enhanced when the psychosocial needs of the patients are met [23, 24]. Patients who had spent 5–6 months on admission had higher odds of perceiving care positively as compared to those with either less or more time on admission. There was also an association between marital status and perception in logistic regression. Married patients were less likely to report acceptability of treatment method and a good quality of care. This could be explained as an issue of difference in expectations of this group of individuals. It is possible that married people have more expectation from the services than those who are not married because they may feel the weight of family responsibilities more than their unmarried counterparts, as such expect an even greater strategy that would improve their conditions so they can return to cater for those responsibilities.

5. Limitations

One of the major limitations of this study was the low sample size which may affect a more robust description of the perception of treatment strategy, quality of care and other likely associations between independent factors and outcome variables that is not detectable as a result of low sample size. In addition, this study did not measure the characteristics that are related to health service delivery which can be determinants of perception than merely individual's characteristics. Although this is the case, findings from this study provide insight into the perceptions of MDR-TB patients on quality care.

6. Conclusions

This study shows a considerably high acceptability of the DOT strategy for treatment and satisfaction with the quality of care that patients are receiving while hospitalized. Acceptability of the treatment method was influenced by marital status, employment status and the number of TB treatments in the past. The psychosocial well-being influences the patient's perceived quality of care.

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Competing interests

The authors declared no competing interests.

Authors' contributions

OO, BAU and KEO developed the concept of the study. Data collection, cleaning and processing was conducted by OO, EEU and KEO. Data analysis and interpretation was conducted by BAU, OO, EEU, KEO, KHM, DAA and LM. All authors wrote the initial manuscript, read and approved the final manuscript.

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