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Perceived Quality of Life among Persons Living with Tuberculosis in Karu LGA, North-Central Nigeria: A Cross-Sectional Study

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ABSTRACT

Background: Tuberculosis (TB) remains a major public health concern in Nigeria, which ranks among the high TB burden countries globally. While control programs emphasize bacteriological cure and treatment completion, patient-reported outcomes such as quality of life (QOL) are rarely assessed in routine practice. Understanding QOL impairment among persons living with tuberculosis (PLWTB) is essential for patient-centered care.

Objective: To assess perceived quality of life and identify sociodemographic and clinical correlates among persons living with tuberculosis (PLWTB) in Karu Local Government Area, Nasarawa State.

Methods: A cross-sectional study conducted among 205 adult PLWTB receiving treatment at two Directly Observed Treatment Short-course (DOTS) centres. QOL was assessed using the World Health Organization Quality of Life Brief Version (WHOQOL-BREF) instrument. Domain scores were transformed to a 0–100 scale and dichotomized into good (≥ 60) and poor (< 60). Descriptive statistics were computed using SPSS version 25 significance set at $p < 0.005$

Results: The overall mean QOL score was 44.6 ± 21.2 . More than half of respondents were dissatisfied with their health status, and only 24.8% reported good physical health-related QOL. Poor QOL was reported in the physical (75.2%), psychological (59.5%), social (83.4%), and environmental (83.9%) domains. The treatment phase and occupation were associated with better QOL perception.

Conclusion: PLWTB in Karu experience profound multidimensional QOL impairment, particularly in social and environmental domains. Findings highlight the burden of TB beyond clinical treatment and cure and underscore the need for more patient-centered multidisciplinary care strategies, including monitoring QOL.

Keywords: Tuberculosis, Quality of Life, WHOQOL-BREF, domains



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INTRODUCTION

Tuberculosis is one of the infectious causes of significant morbidity and mortality worldwide, with low- and middle-income countries bearing the greatest burden. In the report by the World Health Organization (WHO), 10.6 million new TB cases occurred globally in 2022, with Africa accounting for nearly one-quarter of cases and one-third of deaths.¹

Nigeria is among the countries with the highest TB burden, ranking among the top ten globally, and continues to experience substantial gaps between estimated and notified cases.^{1,2} Despite progress in case detection, the expansion of GeneXpert diagnostics, and the implementation of the Directly Observed Treatment Short-course (DOTS) strategy, which have shown significant treatment success rates, TB continues to exert significant physical, psychological, and socioeconomic impacts on affected individuals.³ Traditionally, TB program evaluation and outcomes have focused primarily on case detection, bacteriological cure, and reductions in mortality as primary indicators of success but substantially ignoring the lived experiences of these patients such as daily functioning, social relationships, economic hardships and environmental well-being. However, chronic infectious diseases such as TB extend beyond these microbiological parameters.

Quality of life (QOL), as defined by WHO, reflects an individual's perception of their position in life within their cultural and value systems, and in relation to their goals and expectations.⁴ This multidimensional construct encompasses physical health, psychological state, social relationships, and environmental context of the individual.

Evidence from various settings has demonstrated that persons living with tuberculosis experience significant impairment in their QOL domains, even during treatment. Studies from South Africa, Ethiopia, and India consistently show reduced QOL among TB patients compared with the general populations.^{5,6,7} In Nigeria, some studies in the south have explored TB-related QOL, and have shown that TB patients experience clinically significant impairment and the degree of impairment could also be used to predict defaulters.^{8,9,10} Physical limitations, stigma, financial hardship, social isolation, and treatment burden are among several things that contribute to their diminished well-being. Despite this, QOL assessment is not routinely incorporated into TB programmatic management, and data from North-Central Nigeria remain limited.

Karu, a local government area in Nasarawa State, significantly bordering the Federal Capital Territory (Abuja), represents a rapidly urbanizing setting with high population mobility, socioeconomic disparities, and documented TB caseload.¹¹ Assessing QOL among TB patients in this setting will provide insight into the broader impact of the disease, inform patient-centered interventions, and guide policy decisions in this region of the country.

METHODOLOGY

Setting: The study took place in Karu local government area of Nasarawa State, one of the north-central states of Nigeria. Karu is located strategically along the Abuja-Keffi corridor, bordering Abuja which is the capital of Nigeria and therefore hosts the majority of the workers from Abuja. It is about 2,640 km² in size with an average temperature of 29°C and average annual rainfall of 1250mm.¹² It was originally housing the civil servants, lower-income families and farmers of the state but the population size has grown tremendously due to its proximity to Abuja.

Design: A cross-sectional study conducted between April and July 2025 at Primary Health Care centers (PHCs) providing DOTS services in Karu.

Population: The patients attending the DOTS units of the selected PHC during the period of the study. Eligibility criteria: The study included adult patients (≥ 18 years) diagnosed with drug-sensitive pulmonary or extrapulmonary TB receiving treatment at the selected centres. Patients with drug-resistant TB, those too ill to participate, those with cognitive impairment and anyone who refused participation were excluded.

Sample Size Determination: A total of 205 participants were recruited using consecutive sampling until the required sample size was achieved.

The sample size determination of this study was based on the Kish's formula¹³ for sample size estimation:

Kish Formula $n = Z^2 pq / d^2$

Where n = minimum sample size

Z = Standard normal deviant at 95% confidence interval = 1.96

p = prevalence from previous study 8% (0.08)

q = $1 - p$ ($1 - 0.08 = 0.92$)

d = level of precision = 0.05

$$n = 1.96^2 \times 0.08 \times 0.92 = 113.1$$

Allowing for 10% non-response, sample size of 125

To increase the power of the study, sample size was increased to 205

Sampling methodology

The sampling was in two stages:

First stage: A simple random sampling was used to select two Primary Health centers among the five in the local government. The number of participants were shared between the two PHCs

Second stage: All consecutive participants accessing treatment at the centers who met the eligibility criteria and gave their consent were recruited till sample size was achieved in each center.

Data Collection: Data were collected using the WHOQOL-BREF instrument including the sociodemographic variables of the participants. It is a validated and reliable tool used globally and had been translated into several languages including Yoruba.¹⁴ The WHOQOL-BREF contains 26 items grouped into four domains: physical health, psychological health, social relationships, and environmental health environmental (having 7, 6, 3 and 8 questions asking questions related to each domain respectively). The remaining two (2) questions assess the patient's overall QOL and health satisfaction. Responses were recorded on a 5-point Likert scale. 1 indicating the lowest score and 5 indicating the highest score of perception. Raw domain scores were transformed to a 0–100 scale according to the developers' instructions and guidelines.¹⁵ Thereafter, scores of below 60% were classified as low QOL in that domain, while scores of 60% and above were classified as good QOL to make it comparable with the scoring pattern in previous studies.^{16,17} The questionnaire was pretested among ten of the patients assessing the TB care in these facilities but they were not included in the participants studied. The questionnaire was administered by the researcher and trained assistants (who helped in interpretation to Hausa language whenever a participant could not understand English).

Data Analysis: Clinico-demographic data were represented with frequencies and percentages in tables and figures. Inferential statistics such as chi-square tests was used to investigate the association between the various domains and demographic data of the participants and significant factors from the test were used to conduct the binary logistic regression model analysis to identify predictors of quality of life across the four WHOQOL-BREF domains (physical, psychological, social, and environmental) among people living with tuberculosis in Karu, Nasarawa State, Nigeria. Data was analysed using the Statistical Package for the Social Sciences (SPSS), version 25. All p-values

were two-tailed, and those less than 0.05 were considered statistically significant.

Ethical Considerations: Ethical approval was obtained from the Bingham University Teaching Hospital ethics committee (NHREC/ 21/05/2005/01454). Written informed consent was obtained from all participants after they had been educated on the purpose of the study and confidentiality of information assured. Only initials were used on the questionnaires, and all data were stored with codes and accessible only to the researcher and those authorized to maintain confidentiality.

RESULTS

A total of 205 patients were interviewed and participated in the study, with a mean age of 40.4 ± 13.6 years. Males constituted 64.9% of participants. Only 19% did not have formal education and 28.3% were unemployed (Table 1). The overall mean QOL score was 44.6 ± 21.2 , indicating generally low perceived quality of life (Table 2). The psychological domain had comparatively higher scores (50.1 ± 22.7) than other domains, while the social and environmental domains were most severely affected. Regarding the overall perception of QOL shown in Table 3, only 24.8% rated their quality of life as good/very good, while 37.6% reported it as neither poor nor good. Nearly half of the respondents (47.8%) expressed dissatisfaction with their health. Table 4, the bivariate analysis showed that the overall QOL perception of the participants was associated with occupation and the phase of treatment, and after subjecting the variables to multivariate analysis, only the phase of treatment was a significant factor.

Table 1: Socio-demographic characteristics of persons living with tuberculosis in Karu (N = 205)

Variable	Frequency (n)	Percentage (%)
Age group (years)		
18–30	58	28.3
31–40	53	25.9
41–50	51	24.8
≥51	43	21.0
Mean age (±SD)	40.4 ± 13.6	
Gender		
Male	133	64.9
Female	72	35.1
Marital Status		
Single	64	31.2
Married	125	61.0
Divorced/Separated/Widowed	16	7.8
Educational status		
No formal education	39	19.0
Primary	24	11.7
Secondary	93	45.4
Tertiary	49	23.9
Occupation		
Unemployed	58	28.3
Self-employed	91	44.9
Civil servant	40	19.5
Student	15	7.3

Table 2: Domain QOL outcomes among persons living with tuberculosis in Karu (N = 205)

Domain	Good QOL n (%)	Poor QOL n (%)	Mean Score (±SD)
Physical	51 (24.8)	154 (75.2)	45.2 ± 21.4
Psychological	83 (40.5)	122 (59.5)	50.1 ± 22.7
Social Relationships	34 (16.6)	171 (83.4)	40.4 ± 22.4
Environmental	33 (16.1)	172 (83.9)	42.8 ± 17.8
Overall QOL	—	—	44.6 ± 21.2

Table 3: Overall perception of Quality of Life and Health satisfaction

Variable	Frequency (n)	Percentage (%)
Overall QOL perception		
Very poor	28	13.7
Poor	49	23.9
Neither poor nor good	77	37.6
Good	46	22.4
Very good	5	2.4
Satisfaction with health		
Very dissatisfied	39	19.0
Dissatisfied	59	28.8
Neutral	68	33.2
Satisfied	37	18.0
Very satisfied	2	1.0

Table 4: Bivariate and multivariable analysis of factors associated with overall Quality of Life among persons living with Tuberculosis in Karu, Nasarawa State (N = 205)

Variable	Good QOL n (%)	Poor QOL n (%)	χ^2	p-value	Adjusted (95% CI)	OR	Adjusted p-value
Age Group (years)							
≤40	29 (56.9)	82 (53.2)	0.202	0.746	0.790 (0.324–1.922)		0.603
>40 (Ref)	22 (43.1)	72 (46.8)			1		
Gender							
Male	36 (70.6)	97 (63.0)	0.971	0.398	1.404 (0.632–3.118)		0.404
Female (Ref)	15 (29.4)	57 (37.0)			1		
Occupation							
Unemployed	16 (31.4)	42 (27.3)	13.691	0.008*	1.100 (0.570–2.121)		0.777
Employed	35 (68.6)	112 (72.7)			1		
Type of TB							
Pulmonary	38 (74.5)	130 (84.4)	2.542	0.111	0.540 (0.251–1.160)		0.114
Extrapulmonary (Ref)	13 (25.5)	24 (15.6)			1		
Phase of Treatment							
Intensive Phase	28 (54.9)	42 (27.3)	13.006	<0.001	3.246 (1.685–6.254)		<0.001*
Continuation Phase (Ref)	23 (45.1)	112 (72.7)			1		

OR = Odds Ratio, CI = Confidence Interval, Ref = Reference category* statistically significant at $p < 0.05$

DISCUSSION

This study demonstrates substantial impairment in quality of life among persons living with tuberculosis in Karu LGA, North-Central Nigeria. The overall mean QOL score was low among the participants, with the least impairment observed in the social and environmental domains. Comparing this finding to that noted among normal individuals in a study in the Southwest where 81.6% of them reported good QOL, this is significantly lower.¹⁸ These findings underscore that TB is not merely a biomedical condition but a multidimensional health challenge with broad personal and societal implications.

The mean overall QOL score (44.6 ± 21.2) is lower than scores reported in studies from China and Brazil, which may be a result of the better socioeconomic status of these countries.^{19,20} Differences may reflect economic constraints, health system differences, and sociocultural stigma patterns.

The poor QOL observed in this study is consistent with findings from Ethiopia and South Africa, where over half of TB patients reported significant QOL limitations.^{5,6} The high proportion (75.2%) of respondents reporting poor physical QOL is consistent with findings from Ethiopia, South Africa, and India, where TB patients reported significant physical limitations during treatment.^{5,7,21} A Nigerian study conducted in Lagos similarly reported reduced physical

domain scores among TB patients compared with healthy controls.²² The characteristic symptoms of TB, including fatigue, weight loss, and general debility, which may persist even after treatment initiation, could account for this. Additionally, adverse drug reactions such as nausea, hepatotoxicity, and neuropathy may further impair physical functioning.

These limitations may reduce the ability to perform daily activities, including work, caregiving, and mobility, which, in a predominantly low-income population, have immediate economic consequences. Loss of income may further compound psychological stress and environmental insecurity. The sustained physical impairment observed in this study suggests the need for enhanced supportive care, including nutritional supplementation and side-effect monitoring.

The social domain was among the most severely affected, with 83.4% reporting poor QOL. The high proportion of poor social QOL may reflect stigma, reduced social interaction, and fear of disease transmission. TB-related stigma remains pervasive in many African settings, including Nigeria. TB remains highly stigmatized in many communities, including Nigeria, potentially leading to isolation and strained interpersonal relationships.^{19,23} Social isolation may reduce emotional support and strain family relationships, thereby worsening overall well-being. Studies in Ethiopia and Ghana have similarly reported

profound social impairment among TB patients, largely attributed to stigma and fear of disclosure.^{24,25} Similar findings were also noted in Lagos, reflecting the debilitating symptom burden of TB.^{26,27} Addressing stigma through community education and patient support groups may improve social reintegration and overall QOL.

Although the psychological domain showed relatively better scores compared to other domains, nearly 60% of respondents still reported poor psychological QOL. It has been reported that TB diagnosis is frequently associated with fear, anxiety, depression and uncertainty about future productivity, signs that have been associated with poor adherence and unfavourable treatment outcomes.^{18, 28} Evidence from sub-Saharan Africa suggests that psychological distress is often driven by stigma, income loss, and social isolation.²⁹ While some adaptation may occur during treatment due to counselling and health education at DOTS clinics, persistent psychological vulnerability underscores the need for routine mental health screening within TB services.

The environmental domain was also markedly impaired (83.9%). Although anti-TB drugs are provided free of charge in Nigeria, patients often incur substantial indirect costs related to transportation, nutritional needs, and income loss.^{30,31} TB disproportionately affects economically productive age groups and illness-related work disruption increases vulnerability to poverty.³² Economic vulnerability may therefore represent a key driver of poor QOL. TB-affected households experience catastrophic costs globally and WHO has emphasized the importance of eliminating catastrophic costs for TB-affected households as part of the End TB Strategy.^{1,33,34} The high environmental impairment observed in this study supports the need for social protection interventions, such as transportation subsidies and conditional cash supports as implemented in the drug-resistant TB program.

The overall QOL perception was associated with the occupation and the phase of treatment but only the phase of treatment was a predictor of this. Longitudinal monitoring of patients during the phases of treatment would clarify trajectories of QOL perceptions across treatment phases. The overall QOL perception was associated with the occupation and the phase of treatment but only the phase of treatment was a predictor of this. Longitudinal monitoring of patients during the phases of treatment would clarify trajectories

of QOL perceptions across treatment phases. The findings of high prevalence of impaired QOL reinforce that TB management and treatment success rates alone may be insufficient indicators of recovery, and should extend to include psychosocial and socioeconomic interventions. Routine QOL assessment may help identify patients requiring additional support and improve adherence and treatment outcomes.

Strengths and limitations of the study

The study has been able to define the QOL of PLWTB in Karu LGA of Nasarawa State, which is one of the states in the Northcentral region of Nigeria, and has added to the limited data in this region and Nigeria. The instrument, though previously validated in several countries including Nigeria, with several translations to other languages like Yoruba, does not have a Hausa translation, which is a major language in North Central Nigeria. The study was cross-sectional and did not evaluate the possible changes in the QOL of the participants with the progress of treatment and post-treatment. The subjective nature of the answer to the QOL domain questions may also affect the overall scores of the individual patients.

Implications of the findings of the study

The findings highlight the poor QOL among those being treated for TB in Karu in all the domains, suggesting the multifaceted effects of TB on an individual. Long-term follow-up of these individuals is therefore important to ensure good outcomes, adequate adherence to treatment, and less morbidity and mortality. The elderly patients should have comprehensive geriatric assessment to screen, identify and manage comorbidities.

Further research including longitudinal studies with qualitative studies included to explore other factors that might be affecting these patients such as cultural and behavioural factors. A large multicentred study needs to be carried out to define any variation across the country and improve the degree of generalization of findings and provide adequate data for improved policy making processes.

CONCLUSION

Quality of life among PLWTB in Karu LGA is markedly impaired, especially in social and environmental domains. These findings reinforce the understanding of TB as a socio-biomedical disease requiring

multidimensional interventions. While bacteriological outcomes remain essential, incorporating standardized QOL assessments could provide a more holistic evaluation of patient recovery. WHO recommends patient-centered approaches that address social determinants and mental health needs. Integrating routine QOL evaluation into TB programmatic care will identify those at risk, enhancing patient-centered management that aligns with the WHO End TB Strategy. The program needs to have a multidisciplinary team, attending to the patients' needs. There should also be financial support from the government to further alleviate their economic status.

Declarations

Authors' contribution: Conceptualized and designed the study (MAO, ODO and TA), collected the data (MAO, BOB, JOO, UAK), performed the statistical analysis (MAO, ODO, JOO), interpreted the data and drafted the manuscript (MAO, JOO and ODO), critically reviewed and revised the manuscript for important intellectual content (BOB, UAK, and TA), All authors read and approved the final manuscript.

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