

Original Article:

Evaluation of the roles of HIV co-infection and socio-demographic factors as determinants of Quality of Life among Nigerians with Tuberculosis

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Abstract

Background: Tuberculosis [TB] remains a major global public health problem, and particularly in resource-restricted settings with disproportionately high burden. This study is aimed at assessing quality of life [QoL] and the roles of HIV co-infection along with socio-demographic factors on QoL among subjects with TB. **Methodology:** This is a multi-center cross-sectional study among 440 participants recruited by multi-stage sampling technique across 40 Directly Observed Treatment Short-course [DOTS] centres. Interviews were done using designed questionnaire to collect information on socio-demographic and clinical details of respondents. Subsequently, the World Health Organization Quality of Life-BREF [WHOQOL-BREF] questionnaire was used to evaluate QoL. **Results:** Most (61.1%) of the participants was aged between 21 and 40 years, 61.6% were married and 74.5% had a paid job. Majority of the subjects reported fair QoL across all domains. Employment status and monthly income were significantly associated with participants overall QoL and their satisfaction with health ($p < 0.05$). Also, age, gender, marital status, ethnicity and educational status were significantly associated with the social domain of QoL. The HIV co-infection was found to be significantly associated with the physical aspect of their QoL ($p < 0.05$). **Conclusion:** Optimal treatment of HIV co-infection and incorporation of psychosocial medicine into TB management are indicated for improved QoL. Similarly, routine assessment of QoL is desirable.

Keywords: Africans; HIV co-infection; Quality of Life; Tuberculosis

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Introduction

Tuberculosis [TB] remains a major global public health problem, although resource-restricted countries like Nigeria are worse affected. ¹ For instance, up to 9.0 million people developed TB in 2013 globally and the Africa region had the second highest incident cases of TB after Asia. Closely linked is that the HIV/AIDS epidemics has compounded the burden of TB; with the African region accounting for about 75% of these cases. Nigeria has the third highest burden of the disease globally as at 2014; having a total of 590,000 incidence rate (range 340-880) with a population of about 173 million people. ²

Tuberculosis accounts for significant number of deaths as well as remains among the top three killers of women worldwide. ² The mortality that is attributable to TB is unacceptably high, given that most deaths are preventable if people can access health care for a diagnosis and the correct treatment is provided. In general, TB is still a major cause of morbidity and mortality in resource-restricted countries like Nigeria. ³ However, with the introduction of anti-tuberculosis medications in the 1940s and 1950s, the incidence of TB cases declined significantly until the emergence of HIV/AIDS which led to its resurgence. More recently, with improved HIV control and the

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development of effective treatment strategies, the focus of TB management has shifted from preventing mortality to avoidance of morbidity as well as prevention of drug resistance. It is therefore not surprising that there is increased research as well as clinical interest in the area of quality of life [QoL] of individuals being treated for TB.^{4,5}

Given that QoL will provide a broad measure of the economic, socio-cultural, philosophical, psychological as well as spiritual dimensions of TB; the relevance of research based evidence on QoL to policy and clinical practice cannot be overemphasized. For example, many areas of TB management like extended duration of treatment, its terrible side effects, social stigmatization associated with the disease and the usual co-infection with HIV have been closely linked to a reduction in the QoL among people with TB.^{4,5} In some settings, people with TB are often seen as potential source of infection, thus are isolated and people seldom want to be associated with them which can lead to a long term impairment of their psychosocial wellbeing.⁴ More so, chronic illnesses like TB have potential debilitating effects on the physical, psychological economic and social well-being aspects of the QoL; especially in sub-Saharan Africa with limited resources which may differ from what is obtainable in other parts of the world with more available resources.

A number of studies have assessed QoL among people with TB; most of which were single facility based studies and were done in other parts of the world outside Africa. However, there is paucity of multi-center based study on QoL and its associated determinants in people with TB with wide geographical region coverage as done in this Nigerian based work. We posited that HIV co-infection and the identified socio-demographic factors would play determinant roles on the QoL among people with TB.

Materials and Methods

Study location

This is a multi-centers study carried out in Lagos State, located on the south-western part of Nigeria. At present in Lagos State, DOTS Centres are spread across all the Local Government Areas and Local Council Development Areas. This includes both government (Primary, Secondary and Tertiary) and private health facilities that are integrated into the STOP TB Programme and offering treatment, referral and microscopic services. Overall, a total of 196 DOTs centres are owned by the government and treatment is free.

Study design and population

A cross sectional descriptive study was carried out to assess QoL among attendees of DOTS clinics in Lagos state. The study population consisted of all individuals with TB attending DOTS Clinics in Lagos State. Inclusion criteria include consenting participants aged ≥ 18 years and definitive diagnosis of TB. While those on in-patients admissions, pregnant women and Children who are less than 18 years were excluded.

A sample size of 440 was used for this study based on estimation using sample size formula.^(6, 7) Recruitment of participants was done using multi-stage sampling method. A list of all DOTS Centres in Lagos State was obtained from the Lagos State Ministry of Health. Following the collation of the 196 DOTS government owned centres; forty DOTS Centres were randomly selected using a table of random numbers. This was followed by the second stage that involved selection based on the sample size (440); thus, 11 participants were interviewed from each of the facilities chosen. The eligible and consenting participants were recruited by systematic random sampling method.

Ethical consideration

Ethical approval for the study was obtained from the Health Research and Ethical Committee of Lagos University Teaching Hospital, Idi Araba. Permission was obtained from the management board of DOTS facilities in Lagos State as well as the contact person/head of each DOTS centre. The confidentiality of the participants was guaranteed and participation was voluntary as they were assured that they can decline to continue participation without any negative consequences. The eligible and consenting respondents gave a written informed consent before enrollment in the study.

Data Collection Tool

Data collection was carried out by using an interviewer administered/interviewer supervised structured questionnaire which comprises the following sections.

Section A: consisted of respondents socio-demographic details like age, education, gender, ethnicity, employment, religion and monthly income among others.

Section B: consisted of the QoL instrument- the World Health Organization Quality of Life-BREF [WHOQOL-BREF] questionnaire⁸ which has been used in several other studies.⁸⁻¹¹ It consists of 26 questions which assessed information on 4 main areas of health which includes physical, psychological, social relationships and environment

domains. The four main domain scores denote an individual perception of quality of life in each particular domain. For instance, the physical health was assessed by the patients rating of the activities of daily living, dependence on medical treatment to function, energy and fatigue, mobility, sleep and rest, pain and discomfort as well as work capacity. The social relationships domain was assessed by personal relationships, sexual activity as well as social support. The environment domain was assessed by asking questions on their financial resources, physical safety and security, freedom, health and social care: accessibility and quality, home environment, opportunities for acquiring new information skills, participation in opportunities for recreation / leisure activities, transport and physical environment (pollution/ noise/ climate/ traffic). Lastly, the Psychological area include bodily image and appearance, positive feelings, negative feelings, self-esteem, thinking, learning, memory, concentration as well as spiritual/ religion/ personal beliefs. Domain scores are scaled in a positive direction (higher scores denote higher quality of life). Five research assistants who all had tertiary (degree) qualification received one-day training moderated by the researchers and thereafter were recruited for the study. They assisted the researchers in data collection.

Data Collection and analyses

At the point of data collection, the participants were all informed of the reasons and nature of the study. The interviewers thereafter administered the questionnaires. All completed questionnaires were collated and appropriately coded immediately after. Administration of the questionnaire per respondent lasted 12 minutes and data were collected over a period of few weeks.

Data were analyzed with the Statistical Package for Social Sciences software version 20.0. [SPSS-20].¹² The analyzed data was presented as frequency tables. Analysis of Variance (F-statistic) and t-test were used to test for associations between categorical and continuous variables. Level of statistical significance was chosen at ≤ 0.05 . For each of the domain of QoL, the total score was computed in line with previous works.^{10, 13-15} The QoL variables were converted into nominal variables by regrouping the scores based on the mean score into: poor – when the observed value was less than mean \pm SD; fair – when the observed value was equal to mean \pm SD and good – when the observed value was greater than mean \pm SD.^{10, 13-15}

Results

Socio-demographic profile of participants

The mean age of the respondents was 36.49 ± 13.77 years. The youngest respondent was 18 years old while the oldest respondent was 82 years. More than half of the respondents 269 (61.1%) were aged between 21 and 40 years. More than half of the respondents were males 243 (55.2%) as against 197 (44.8%). Also, most of the patients were still married which constitutes 271 (61.6%) of the total population while the single and others [widow(er), Separated and Divorced] each constitute 128 (29.1%) and 41 (9.3%) respectively. Also, 260 (59.1%) of the respondents were Christians which constitute the largest group which is then followed by Islam and Others (Traditional, Atheist) which constitutes 152 (34%) and 28 (6.4%) respectively.

The Yoruba tribe was the predominant tribe 238 (54.1%) among the respondents which was distantly followed by Ibo, Hausa and Others (Nupe, Efik etc) which constitute 115 (26.1%), 67 (15%), 20 (4.5%) respectively. Most of the respondents had Post-Secondary education 171 (38.9%). Other respondents had Secondary, Primary certificates in the descending order and constitutes 138 (31.4%), 105 (23.9%) respectively while only 26 (5.9%) had no formal education. Also, 328 (74.5%) of the respondents were employed while 112 (25.5%) were not gainfully employed. The mean income estimate of the respondents was $56,383 \pm 59,753.72$ with a minimum and maximum income being 3000 naira (\$150) and 500,000 naira (\$2500) respectively. Of the 440 total respondents, only 352 patients were willing to tell us their estimated monthly income. Out of the 352 patients, 101 (28.7%) earn 20,000 naira (\$100) or less while 90 (25.6%) earn between 20,001 and 40,000 naira. More so, 68 (19.3%) earn between 40,001 and 60,000 naira and only 35 (9.9%) earn salaries above 100,000 naira (\$500).

Quality of Life of the participants

Table 1 shows the profile of QoL among participants. The mean score of the perceived (overall) quality of life of the respondents was 3.40 ± 0.93 and after categorization, more than two-third of the respondents had a fair overall quality of life, 324 (73.6%) while the mean score of the perceived (overall) satisfaction of the respondents with their health was 2.95 ± 0.93 and after grading, the fair class was the most predominant with 156 (35.5%) which was closely followed by poor and good with values of 150 (34.1%) and 134 (30.5%) respectively.

In terms of specific domains, the participants had mean score of $55.63 (\pm 14.59)$; $53.40 (\pm 13.67)$; $55.87 (\pm 21.10)$ and $56.03 (\pm 13.59)$ on domain

of physical, psychological, social relationship and environmental respectively. On the social relationships domain; 78(17.7%) respondents reported poor levels of QoL, which was the largest

among people with QoL. Environmental domain had 334 (75.9%) respondents while Psychological domain had 92 (20.9%) which constituted the largest in the fair and good group respectively. See table 1

Table 1: Profile of QoL among participants

Parameters	Level of QoL		
	Poor	Fair	Good
	n(%)	n(%)	n(%)
Perceived Overall QoL	86(19.5)	324(73.6)	30(6.8)
Satisfaction with Health	150(34.1)	156(35.5)	134 (30.5)
Specific QoL Domains			
Physical	72(16.4)	308(70.0)	60(13.6)
Psychological	76(17.3)	272(61.8)	92(20.9)
Social Relationship	78(17.7)	316(71.8)	46 (10.5)
Environmental	62(14.1)	334 (75.9)	44 (10.0)

QoL-quality of life; n-frequency; %-percentage

QoL; MI (₦)- monthly income in naira; ₦20,000 –equivalent to \$100; F-sstatistics- Analyses of variance(ANOVA); t-test-student t-test analyses of means; p-significant value <0.05; bold-p<0.05

Relationship between socio-demographic factors and QoL among participants

As shown in table 2, there was a statistically significant association in the mean scores of the various age groups of respondents and their mean overall satisfaction with their health with F-statistic value of 0.503 and a p-value of <0.001 while there was no statistically significant association in the mean score of the various age groups and their mean overall quality of life. However, there was no statistically significant association in the mean scores of various groups of sex (male and female), marital status (married, single and others) and religion (Christian, Islam, Others) of the respondents and their overall quality of life as well as satisfaction with their health. There was a statistically significant association in the mean overall satisfaction with health of the respondents from Yoruba to Ibo to Hausa and other tribes with f statistic value of 2.797 and p value of 0.04 but there was no statistically significant association in their mean overall quality of life scores. More so, there was a statistically significant difference in the mean overall quality of life and mean overall satisfaction with health scores of the employed, unemployed with a p value of 0.026 and 0.003 respectively as well as that of those who earn various monthly income estimates with a p value of 0.015 and 0.002 respectively. However,

there was no statistically significant association in the mean overall quality of life and satisfaction with health among the various educational status groups of the respondents.

There was a statistically significant association in the mean psychological, social relationships and environment domain scores of the respondents in various age groups with a p value of 0.049, 0.001 and 0.012 respectively. More so, there was a statistically significant association in the mean social domain score of the male and female respondents with a p value of 0.003. Also, there was a statistically significant association in the mean social relationships score of the married, single and others group of the respondents with a p value of 0.001 and lastly, there is a statistically significant association in the mean scores of the physical aspect of the respondents belonging to various religious groups with a p value of 0.022. There was a statistically significant association in the mean social relationships domain score of the respondents belonging to various ethnic groups with a p value of 0.001. Also, there was a statistically significant association in the mean social relationships score of the respondents with various educational status with a p value of 0.003. Also, there was a statistically significant association in the mean environmental domain scores of the employed and unemployed respondents with a p value of 0.009. However, there was no statistically significant association in the mean physical, psychological, social and environmental domain scores of the various monthly income groups of the respondents.

Table 2: Relationship between socio-demographic factors and mean scores on QoL scale among participants

Variables	OQoL	SQoL	PQoL	PsyQoL	SrQoL	EQoL
Age (years)						
≤20	3.40±0.81	2.40±1.08	55.15±13.62	55.75±12.17	59.85±14.92	51.50±13.61
21 – 40	3.40±0.96	3.20±0.87	55.87±15.03	54.09±14.07	58.01±20.59	56.84±12.83
41 – 60	3.42±0.91	2.64±0.79	55.71±13.77	50.88±13.27	49.71±21.57	57.14±15.05
61 – 80	3.25±0.94	2.58±0.97	54.33±16.21	50.58±11.46	49.00±26.17	52.25±13.53
≥81	4.00±0.00	2.50±0.58	50.00±6.928	65.50±10.97	72.00±25.40	41.00±3.464
F-statistic	0.503	13.692	0.225	2.409	4.610	3.278
p-value	0.675	<0.001	0.924	0.049	0.001	0.012
Gender						
Male	3.47±0.90	3.03±0.94	56.21±14.87	53.89±14.15	53.16±22.68	55.86±13.73
Female	3.32±0.96	3.32±0.96	54.91±14.25	52.80±13.04	59.21±18.48	56.24±13.44
t-test	1.636	1.867	0.929	0.833	3.017	0.287
p-value	0.102	0.063	0.353	0.405	0.003	0.774
Marital Status						
Married	3.37±0.89	2.94±0.87	54.66±14.40	52.40±12.88	53.48±22.18	56.28±13.52
Single	3.48±0.97	3.02±1.03	56.55±14.06	54.80±14.68	61.55±17.64	55.73±13.71
Others	3.37±1.02	2.83±1.02	59.17±16.96	55.63±15.03	53.90±20.78	55.29±13.92
F-statistic	0.746	0.663	2.063	1.949	6.716	0.138
p-value	0.475	0.516	0.128	0.144	0.001	0.872
Employment						
Employed	3.46±0.93	3.03±0.89	55.51±14.19	53.27±13.77	56.77±20.83	57.01±13.07
Unemployed	3.23±0.89	2.73±0.99	56.00±15.77	53.77±13.40	53.23±21.75	53.16±14.69
t- test	2.228	2.959	-0.309	-0.330	1.534	2.607
p-value	0.026	0.003	0.758	0.742	0.126	0.009
MI (₦)						
≤20,000	3.39±0.86	3.25±1.043	56.76±14.47	53.41±13.77	60.56±17.82	54.09±11.82
20,001 – 40,000	3.40±1.06	2.91±0.932	51.89±14.75	53.74±14.98	57.71±21.64	58.60±12.33
40,001 – 60,000	3.47±0.82	2.76±0.813	57.12±15.15	50.65±14.01	53.32±24.33	57.18±13.19
60,001– 80,000	3.00±0.76	3.36±0.658	52.36±14.91	53.00±14.67	55.09±21.70	57.55±12.39
80,001– 100,000	3.50±0.78	2.83±0.737	56.53±13.20	55.78±9.81	53.36±22.67	54.33±13.99
>100,000	3.89±1.02	2.80±0.868	52.40±12.49	50.43±12.94	54.63±16.71	60.20±14.12
F-statistic	2.368	3.881	1.897	0.998	1.371	2.069
p-value	0.015	0.002	0.094	0.419	0.234	0.069
Education						
None	3.62±0.64	2.92±1.02	54.54±10.69	51.46±12.12	49.69±18.73	52.62±12.27
Primary	3.31±0.93	3.01±0.85	57.20±15.57	55.30±12.20	50.32±23.43	55.34±13.46
Secondary	3.39±0.92	2.87±1.04	55.26±15.51	53.03±14.82	58.58±20.79	55.99±14.14
Post-Secondary	3.43±0.96	2.99±0.87	55.13±13.74	54.05±13.82	58.02±19.44	57.01±13.40
F-statistic	0.817	0.619	0.547	0.339	4.626	0.935
p-value	0.485	0.603	0.650	0.797	0.003	0.424

QoL-Quality of life; OQoL-overall QoL; SQoL-Satisfaction with health QoL; PQoL-physical domain QoL; PsyQoL-psychological domain QoL; SrQoL-social relationship domain QoL; EQoL-environmental domain

Relationship between HIV co-infection and mean scores on QoL among participants

As shown in table 3, there was a statistically significant association in the mean score for the physical domain of the quality of life of Tuberculosis respondents with HIV/AIDS co-morbidity as compared with the mean physical domain score of TB patients without HIV/

AIDS co-morbidity with a p value of 0.008. However, there was no statistically significant association in the mean overall quality of Life, satisfaction with health, psychological domain, social domain as well as environmental domain of respondents with HIV/AIDS co-morbidity and TB respondents without HIV/AIDS co-morbidity. See table 3

Tables 3: Relationship between HIV co-infection and mean scores on QoL among participants

QoL	TB-HIV co-infected	TB only	t-test	p-value
Overall Quality of Life	3.38±0.94	3.41±0.93	-0.246	0.806
Overall Satisfaction with Health	3.04±0.87	2.92±0.96	1.235	0.218
Physical Domain	58.42±14.98	54.42±14.28	2.657	0.008
Psychological	55.11±13.54	52.66±13.67	1.727	0.085
Social Relationships	55.53±22.30	56.01±20.59	-0.219	0.827
Environmental	56.89±13.37	55.66±13.68	0.877	0.381

TB-Tuberculosis; HIV-Human immunodeficiency Virus; QoL-quality of life; t-test-student t-test for comparing mean difference; bold significant at p-value<0.05

Discussion

This study observed a number of important issues with regard to the well-being of people with TB and brings to fore the compounding impacts of HIV co-infection and some identified socio-demographic factors on impairment of QoL. Specifically, up to two-third of participants reported fair level of QoL along with satisfaction with health, and varied degrees of impairment of QoL across specific domains was elicited, albeit the social relationship domain was worse affected. Socio-demographic factors like age, employment status; gender, marital status, ethnicity, monthly income and educational status constituted the significant determinants of the reported levels of QoL; while HIV co-infection had determinant impacts mainly on the physical well-being of people with TB.

Socio-demographic profile of participants

Based on the findings in this study, almost all the cases of TB infection occurred in ages less than 60 years (more than nine in every ten participants (99.1%) which is similar to WHO Global Tuberculosis Report 2014 which also reported peak prevalence in younger age groups.² However, a study done in Estonia had most of their respondents less than age 30 years;¹⁶

while another study conducted in Henan Province got a higher mean age.¹⁷ In contrary, the mean age in this study was found to be 36.49 years (±13.77), however was similar to other studies.⁽¹⁸⁻²¹⁾ Similar to this study, there is a higher male preponderance in the diseased state as reported in a study done among people with HIV/TB co-infection as well as those fielded in WHO global tuberculosis report.^{2, 4 22-24} For instance, in 2010, the male to female ratio was 1.5 among TB infected patients.²¹ Also, most of the respondents in this study group were married (61.6%) and this can be compared to a study done in North India which showed that about two-thirds of the participants were married among many other earlier studies which also supported the same finding.^{21, 25, 26} About three-fifth of the respondents in this study were Christians; this is adjudged to be closely linked with the predominance of both Yoruba and Ibo tribes in the study population and more reflective of Christianity as the more predominant religion among both ethnic groups. More than half of the respondents earn income lower than 40,000 naira (\$200) monthly and about two-third earned below the national monthly minimum wage of 20,000 naira (\$100); which would have constituted a great problem to the

control of this communicable disease. As it is, factors like cost of transportation to the clinic where they get their drugs still pose a threat to the control of the disease even though the medications are free.

Profile of QoL and the determinants among participants

In this study, the mean score of the overall QoL as well as participants' satisfaction with their health were 3.40 ± 0.93 and 2.95 ± 0.93 respectively which were similar to findings in New Delhi, where it was reported from a prospective study that people with TB had significantly lower mean score than the control group.²⁴ In the same vein, the psychological domain of the respondents had the lowest mean score, which is in line with what was fielded by previous researcher that there was reduction in the score on physical and psychological domain of QoL among people with TB. Overall, this can be linked with the loss of weight/wasting that is frequently seen in TB; thus distorting the appearance of such patients and since psychological domain focuses on the perception of the patients and their physical appearance.⁽²⁴⁾

Locally, previous study done found close to two-third of the respondents had a fair level of QoL in social domain and likewise in this study similar proportion reported fair level in the social aspect of QoL. In the same work, marital status was significantly associated with overall QoL,¹¹ but contradictorily in this study, it was not significantly associated with overall QoL. Employment status and monthly income were significantly associated with the QoL of the respondents as well as their satisfaction with their health respectively in this study. However, the age of the respondents also contributed to the significant association in the level of their satisfaction with their health. The respondents earning less than ₦20,000 (\$100) contributed more to influence poorer QoL. Similar findings have been observed on the influence of age, sex, marital status and income on the QoL of people with TB.²⁶ More over a cross-sectional study in Estonia found similar socio-demographic factors (including age under 30 years, female gender and being employed) to significantly increased QoL.

In line with this study, religion was the only socio-demographic factor that was significantly associated with the physical aspect of the QoL of the respondents in this study.¹⁶ Strikingly, age was the only socio demographic factor that was strongly

associated with the psychological aspect of the QoL of respondents in this study. It is noteworthy that socio-demographic factors such as age, sex, ethnicity, marital status and educational status of the respondents were significantly associated with the social aspect of the life of an individual. Also, only age and the employment status of the respondents were significantly associated with the environmental health aspect of the quality of health of the participants.

From this study, presence of HIV co-infection with TB was found to be significantly associated with physical aspect of the QoL of the participants, but it was not significantly attributed to influence the psychological, social and environmental components which can be explained by the increased awareness of the disease and advocacy against stigmatization. More so, people are better informed about the disease as not being a death sentence as long there is strict adherence to medication which was also demonstrated to be good in this study. This finding however is different from other studies done in India as well as a local study done previously, which revealed HIV co-infection to significantly affect all domains of QoL of people with TB.^{27, 28}

Limitations

The limitations that were identified in this study include its cross-sectional study design and clinical based data; thus suggests the need for caution in the extrapolation of its findings and may not be representative of the population of all people with TB in the community. Although, the fact that it is a multi-center study with wide regional coverage, modest sample size selected based on systematic random sampling and use of well-validated structured instrument to access QoL strengthen its findings.

Conclusion

Based on the findings in this study, it is suffice to say that more than two-third of the participants had fair overall quality of life as well as satisfaction with their health status. Also, more than one in every six participants had fair and good scores across all the domains (physical, psychological, social relationship and environmental). Socio-demographic factors were found to play determinant roles on various aspects of QoL; with age, employment status and monthly income affecting more domains than the other socio-demographic factors. Furthermore, co-infection of HIV with TB was found to significantly influence the

physical aspect of QoL of the participants. Lastly, the social domain was more influenced by the identified socio-demographic than the other QoL domains.

In view of the above findings, management of TB should involve other medical disciplines including psychosocial medicine specialists in order to address the psychosocial well-being with attendant improvement in QoL. Similarly, relevant policy on

de-stigmatization of TB and equitable access to care should be implemented by stakeholders involved in TB care. Routine assessment of QoL should be integrated into the management of chronic illnesses like TB, and HIV among others. Lastly, considering the high prevalence of TB in Nigeria, there is a need for development of disease specific survey instrument and promotion of further research on TB.

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