

Quality of Life of Patients with Tuberculosis in a Nigerian Teaching Hospital

Abdullateef Gbenga Sule, Loius O Odeigah, Kolawole Moradeyo Alabi, Baba A Issa, Razak Olatunji Shittu, Anthony Itopa Joseph, Olagunju Fatai Abiola, Butawa Nuhu Natie.

¹Department of Family Medicine, Ahmadu Bello University Teaching Hospital, Zaria.

²Department of Family Medicine, University of Ilorin Teaching Hospital, Ilorin, Kwara State, Nigeria

³Department of Family Medicine, University of Ilorin Teaching Hospital, Ilorin, Kwara State, Nigeria

⁴Department of Behavioural Sciences, University of Ilorin Teaching Hospital, Ilorin, Kwara State Nigeria

⁵Department of Family Medicine, Kwara State Specialist Hospital, Sobi, Ilorin, Kwara State, Nigeria

⁶Department of Family Medicine, University of Ilorin Teaching Hospital, Ilorin, Kwara State, Nigeria

ABSTRACT

Quality of Life of Patients with Tuberculosis in a Nigerian Teaching Hospital

Tuberculosis (TB) remains a major public health concern despite the decline in its mortality rate. There is a dearth of study on HRQOL among patients with tuberculosis in Nigeria. This study aimed to evaluate the HRQOL in pulmonary tuberculosis patients at a Nigerian university teaching hospital. A cross sectional study was conducted from December 2010 to April 2011 in the Tuberculosis (TB) clinic of the Department of Family Medicine University of Ilorin Teaching Hospital Ilorin, Kwara state, Nigeria. Data on HRQOL were collected from 154 PTB patients using the World Health Organization Quality of life Instrument Brief version (WHOQOL-BREF), which covers physical, psychological, social relationships and environment health domains. The data were interviewer-administered by the researcher and analysed using SPSS 16.0 statistical software. Most of the patients had fair grades in all the health domains assessed. Environment (11.10 ± 1.82) and psychological (11.44 ± 2.63) health domains were the worst affected in this study. There were associations between HRQOL and the educational status, age, gender and occupational class of the patients. The patients' weight status and sputum smear results were significantly related to their HRQOL. This study suggests that HRQOL of pulmonary tuberculosis patients was found to be fairly impaired in all the health domains despite at least two months of treatment with anti-tuberculosis drugs. The environment and psychological health of the patients were the most affected domains in this study.

Key Words: Health, Quality of life, Pulmonary, Tuberculosis, Nigeria

Sule AG, Odeigah LO, Alabi KM, Issa BA, Shittu RO, Joseph AI, Abiola OF, Natie BN. Quality of Life of Patients with Tuberculosis in a Nigerian Teaching Hospital, *TJFMPC* 2014;8(2):39-47. DOI:10.5455/tjfmpe.46982

Introduction

The World Health Organisation (WHO) defined quality of life as "individuals' perceptions of their positions in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns."¹

A patient with tuberculosis faces several physiological, psychological, financial and social problems. These problems have a great impact on the well being of the patient and impair the quality of life of the patient suffering from tuberculosis.

Quality of life indices, which focus on patients' own perception of disease, provide additional information that cannot be obtained from conventional clinical and functional measurements.²

Although, tuberculosis is no longer among the 10 leading causes of death, it is still among the top 15, killing 1.3 million people in 2012 and second only to human immunodeficiency virus (HIV)/acquired immunodeficiency syndrome (AIDS) among infectious diseases.³ The disease is concentrated in developing world, and 80% of all cases occur in the 22 highest-burden countries, Nigeria inclusive.⁴ Sputum negativity and weight gain are the only positive prognostic indicators usually considered in the disease management and not in other dimensions of health.³

Corresponding author:

Abdullateef Gbenga Sule

Department of Family Medicine, Ahmadu Bello University Teaching Hospital, Zaria.

E-mail: gbensule@yahoo.com

Received Date: November 15, 2013

Accepted Date: March 3, 2014

There are numerous aspects of active TB disease that may lead to a reduction in HRQOL. Standard anti-TB treatment requires prolonged therapy (at least 6-8 months) with multiple potentially toxic drugs that can lead to adverse reactions in a significant number of patients.⁵ There is considerable social stigma associated with active TB, leaving the individuals feeling neglected and isolated from their friends and families^{6,7,8} because they are perceived as sources of infection leading to a long-term impairment in patients' psychosocial well-being.^{9,10} Diagnosis of TB can also lead to depression and anxiety.¹¹ The patients also do demonstrate lack of knowledge regarding the disease process and its treatment, which may contribute to feelings of helplessness and anxiety.^{12,13,14}

There are many studies on health-related quality of life among tuberculosis patients around the world. One of these studies reported significantly lower mean scores than the controls for overall QOL and its domains.¹⁵ The most affected domains were physical and psychological while social domain had the highest scores in a study using WHOQOL-BREF instrument. While some studies reported to have poorer HRQOL in older people than younger ones,^{16,17} other study¹⁸ did not report a significant associations between gender, age and HRQOL in TB patients. On the other hand better HRQOL was correlated with higher income, higher education, better housing conditions, better social security and closer relationships with family members and friends.¹⁸

The impact of chronic health conditions like TB on the QOL of patients in sub-Saharan Africa with scarce resources to ameliorate disability may be quite different from that of the other parts of world where the studies were conducted. This study, therefore, provides an opportunity for transcultural comparison of HRQOL in TB using a widely accepted instrument, WHOQOL-BREF in a resource-poor developing country, Nigeria.

Materials and methods

A cross sectional study was carried out in the TB clinic of the Department of Family Medicine, University of Ilorin Teaching Hospital Ilorin. Ilorin is the capital of Kwara state, North Central Nigeria. The Clinic serves as a referral centre for primary and comprehensive health care centres within and around Kwara state. Enrolment into the Clinic is based on positive sputum smear results and/or radiographic features suggestive of TB, in patients who present with clinical signs and symptoms suggestive of tuberculosis. The hospital record shows that two hundred and fifty seven (257)

patients received treatment in the clinic in the previous year.

The sample size was determined by using Fisher's statistical formula for estimating minimum sample size in health studies.¹⁹ An approximated sample size of 154 was used for the study.

One hundred and fifty four patients that satisfied the inclusion criteria were selected using systematic random sampling technique.

All adult PTB patients, attending the TB clinic of the Department of Family Medicine at University of Ilorin Teaching Hospital, who have had at least two months of anti-tuberculosis drugs and gave their consent to participate in the study, were included. Excluded were patients with other chronic medical illnesses e.g. HIV, Hypertension, Diabetes, Chronic Obstructive Pulmonary Diseases (COPD). Also excluded were patients with diagnosed major psychiatric illnesses and patients with extra pulmonary Tuberculosis.

Instruments of the study

Socio-demographic characteristics: This section included the respondents' age, sex, and religious affiliation, level of education, marital status, occupation and ethnicity. The respondents were grouped into different occupational classes using Oyediji's socioeconomic classification model²⁵ this is a local instrument for social status stratification based on individuals' occupations and educational achievements. This has been found to be relevant and suitable for this study area.²⁰

WHOQOL-BREF: Quality of life was evaluated using the World Health Organization Quality of life (WHOQOL-BREF) instrument. The WHOQOL-BREF questionnaire assesses the QOL of patients over the preceding two weeks. This questionnaire has good psychometric properties^{1,21} and has been validated and used in previous studies in Nigeria.^{21,22} The Yoruba version of this instrument which has been validated and adjudged suitable and relevant for QOL studies in Nigeria^{22,23} was also used in this study. In contrast to many other quality of life instruments such as Dhingra and Rajpal (DR-12) and Short-Form 36 (SF-36), WHOQOL-BREF includes a domain on environment. This is considered necessary as environment plays a major role in determining health status, mediating disease pathogenesis and limiting or facilitating access to health care.

Categorization was done depending on whether the respondent's score in each domain was < (less than) the mean – 1 standard deviation (minus 1SD) which was graded 'poor', a score of mean $\pm$ 1 SD, 'fair' and a score of > mean + 1 SD, 'good'.

Ethical clearance to undertake the study was obtained from the Ethical Review Committee of

the University of Ilorin Teaching Hospital. And the subjects were adequately informed about the nature of the study before obtaining their consent. The pretesting revealed that interviewer-administration of the questionnaire would be the best option considering the varying educational status of the study population. In such situation the interviewer read out the questionnaire to non-literate respondents.

Data analysis

Statistical package for social science [SPSS version 16.0.] and Excel 2003 software were used for the statistical analysis. Cross tabulation, frequency statistics and chi-square test were used to evaluate the relationships between variables. A statistical significant level of less than 0.05 values was set.

Results

A total of 154 patients were recruited for the study. Most of the respondents (60.1%) were below the age of 38years and the mean age was 36 ± 13 years. Majority of the respondents (61%) were male. Most of the respondents in age group 18-

27years, (38.3%) had good grade, 28-37years, (48.9%) had fair grade, 38-47years, (40.7%) had good grade, 48-57years, (43.8%) had both good and fair grades each and above 58years (58.8%) had fair grade. Most males (43.6%), had fair grade while (41.7%) of females had good and fair grades each. The majority of the Yoruba ethnic group (43.1%) had fair grades, Hausa (37.5%) had both fair and poor grades each, Igbo (50.0%) had fair grades while (50.0%) of the minority ethnic groups had good grades. Majority of the respondents in all the age groups, both gender and the different ethnic groups in this study had fair grades except for the minority ethnic groups of which majority (50%) had good grades. None of the associations were statistically significant ($p > 0.05$) (Table 1).

Most of the respondents who had no formal education (51.6%), primary (42.5%), and secondary (42.1%) had fair grades but tertiary (40.0%) had good grades. The respondents who are single (39.7%) had good grades while married (50.6%), separated (50.0%), and widowed (50.0%) had fair

Table 1. Association between overall quality of life and respondents demographic characteristics

VARIABLES (N=154)	OVERALL QOL			χ^2	P
	GOOD n (%)	FAIR n (%)	POOR n (%)		
AGE				5.393	0.715
18- 27	18(38.3)	17(36.2)	12(25.5)		
28 – 37	15(31.9)	23(48.9)	9(19.2)		
38 – 47	11(40.7)	9(33.3)	7(26.0)		
48 – 57	7(43.8)	7(43.8)	2(12.4)		
≥ 58	4(23.5)	10(58.8)	3(17.7)		
SEX				2.048	0.359
Male	30(31.9)	41(43.6)	23(24.5)		
Female	25(41.7)	25(41.7)	10(16.6)		
ETHNICITY				4.151	0.656
Hausa	2(25.0)	3(37.5)	3(37.5)		
Yoruba	45(34.6)	56(43.1)	29(22.3)		
Igbo	1(25.0)	2(50.0)	1(25.0)		
Others	6(50.0)	5(41.7)	1(8.3)		

grades and (55.6%) of the divorced had poor grades. Majority of the respondents from religious affiliations, different educational levels, various marital status and the different ethnic groups in this study had fair grades. Most of the respondents in class II (64.3%) and class III (46.4%) had good grades while class IV (58.6%) and class V (54.8%) had fair grades. All the associations except for that between marital status and overall quality of life were not statistically significant ($p > 0.05$) (Table 2).

The highest score in the QOL rating was (12.54 ± 3.03) in the physical health domain while the lowest score was in the environment domain (11.10 ± 1.82) then followed closely by psychological domain with the score of (11.44 ± 2.63). Table 3. The largest group of respondents with good grade (36.4%) were in the health satisfaction while the largest respondents with poor grade (22.7%) were in social relationships (Table 4)

Table 2. Association between overall quality of life and respondents social characteristics

VARIABLES (N=154)	OVERALL QUALITY OF LIFE			X ²	P
	GOOD n (%)	FAIR n (%)	POOR n (%)		
MARITAL STATUS				19.964	0.010
Single	23(39.7)	19(32.8)	16(27.5)		
Married	29(36.7)	40(50.6)	10(12.7)		
Separated	1(25.0)	2(50.0)	1(25.0)		
Divorced	1(11.1)	3(33.3)	5(55.6)		
Widowed	1(25.0)	2(50.0)	1(25.0)		
OCCUPATION				5.439	0.489
Class I	--	--	--		
Class II	8(57.2)	3(21.4)	3(21.4)		
Class III	11(39.3)	11(39.3)	6(21.4)		
Class IV	20(28.6)	35(50.0)	15(21.4)		
Class V	16(38.1)	17(40.5)	9(21.4)		
RELIGION				0.309	0.857
Christianity	18(37.5)	21(43.8)	9(18.7)		
Islam	37(34.9)	45(42.5)	24(22.6)		
EDUCATION				3.361	0.762
No formal education	7(22.6)	16(51.6)	8(25.8)		
Primary	16(40.0)	17(42.5)	7(17.5)		
Secondary	14(36.8)	16(42.1)	8(21.1)		
Tertiary	18(40.0)	17(37.8)	10(22.2)		

Table 3. Respondents' mean quality of life scores by domains of quality of life

VARIABLES	MEAN	SD
DOMAIN 1(Physical)	12.54	3.03
DOMAIN 2 (Psychological)	11.44	2.63
DOMAIN 3 (Social relationships)	12.27	2.53
DOMAIN 4 (Environment)	11.10	1.82

Table 4. Graded quality of life outcomes of respondents in various domains

VARIABLES (N=154)	GOOD n (%)	FAIR n (%)	POOR n (%)
Overall QOL	55(35.7)	66(42.9)	33(21.4)
Health satisfaction	56(36.4)	80(51.9)	18(11.7)
Domain 1 (Physical)	30(19.5)	92(59.7)	32(20.8)
Domain 2 (Psychological)	24(15.6)	98(63.6)	32(20.8)
Domain 3 (social)	21(13.6)	98(63.7)	35(22.7)
Domain 4 (Environment)	30(19.5)	95(61.7)	29(18.8)

Table 5. Classification of accuracy of fit

Observed	Predicted		
	Overall quality of life		Percentage correct
	Poor	Good	
Quality of life Poor	4	18	18.2
Quality of life Good	2	76	97.4
Overall percentage			80.0

Table 6. Variables in the equation

Variables	B	S.E.	Wald	df	Sig.	Exp(B)
Age categorized	.484	.282	2.951	1	.086	1.623
Sex	1.105	.601	3.382	1	.066	3.019
Religion	.216	.623	.121	1	.728	1.242
Education	.227	.302	.566	1	.452	1.255
Marital Status	-.424	.316	1.794	1	.180	.655
Social class	-.223	.362	.378	1	.539	.800
Ethnicity	.499	.511	.953	1	.329	1.648
BMI	.181	.096	3.519	1	.061	1.198
Rx Duration	.269	.330	.668	1	.414	1.309
Constant	-5.946	3.552	2.802	1	.094	.003

The in binary logistic regression, overall percentage accuracy of the model is high 80.0%, with overall quality of life as the dependent variable and sociodemographic factors as the independent variables shown in Table 5. The odds of having more satisfaction with QOL in pts with PTB is more with the following factors namely, increase age odd ratio Exponential (B) 1.623, particular sex odd ratio Exp(B) 3.019, particular religion odd ratio Exp(B) 1.242, advance education odd ratio Exp(B) 1.255, particular ethnic group odd ratio Exp(B) 1.648 and longer treatment duration odd ratio Exp(B) 1.309 while odd of having satisfaction with QOL is less with married odd ratio Exp(B) 0.655 and

higher in occupational class respondents odd ratio Exp(B) 0.800 (Table 6).

Majority of the respondents in all the domains irrespective of the sputum smear results had fair grades. Five (7.8%) of the respondents with positive sputum smears and 25(27.8%) with negative sputum smears in domain 1 had good grades. Nineteen (21.1%) of respondents with negative sputum smears and 5(7.8%) with positive sputum smears had good grades in domain 2. Seventeen (26.6%) of respondents with positive sputum smear and 18(20.0%) with negative sputum smears in domain 3 had poor grades. Similarly in domain 4, 19 (29.7%) with positive

sputum smears and 10(11.1%) with negative sputum smears had poor grades. All the associations between the domains and sputum smear results except for domain 3 were statistically significant ($p < 0.05$) (Table 7).

Majority of the respondents in the various weight statuses in all the domains had fair grades. However, the percentage of respondents with fair grades are in descending order for weight gain, no change in weight and weight loss in all the domains. In the physical health domain, 67(72.8%), 16(17.4%) and 9(9.8%) of those with fair grades

had weight gain, no change in weight and weight loss respectively. Similarly, in the psychological health domain, 66(67.3%), 24(24.5%), and 8(8.2%) had weight gain, no change in weight and weight loss respectively. Those with fair grades, 65(66.3%), 24(24.5%), 9(9.2%) in social relationships domain and 59(62.1%), 29(30.5%) 7(7.4%) in environment domain had weight gain, no change in weight and weight loss respectively. All the findings were statistically significant ($p < 0.05$) (Table 8).

Table 7. Association Between Quality of Life Outcomes by Domains and Sputum Smear Results of the Respondents

VARIABLES (N=154)	SMEAR POSITIVE		SMEAR NEGATIVE			χ^2	P
	GOOD n (%)	FAIR n (%)	POOR n (%)	GOOD n (%)	FAIR n (%)	POOR n (%)	
DOMAIN 1	5(7.8)	35(54.7)	24(37.5)	25(27.8)	57(63.3)	8(8.9)	22.856 0.000
DOMAIN 2	5(7.8)	37(57.8)	22(34.4)	19(21.1)	61(67.8)	10(11.1)	14.570 0.001
DOMAIN 3	6(9.4)	41(64.1)	17(26.5)	15(16.7)	57(63.3)	18(20.0)	2.170 0.338
DOMAIN 4	7(10.9)	38(59.4)	19(29.7)	23(25.6)	57(63.3)	10(11.1)	11.052 0.004

Table 8. Association Between Quality of Life Domains and Weight Status of the Respondents

VARIABLES (N=154)				χ^2	P
	GOOD n (%)	FAIR n (%)	POOR n (%)		
PHYSICAL HEALTH				40.123	0.000
Weight gain	25(25.0)	67(67.0)	8(8.0)		
No weight gain	2(5.0)	16(40.0)	22(55.0)		
Weight loss	3(21.4)	9(64.3)	2(14.3)		
PSYCHOLOGICAL HEALTH				18.713	0.001
Weight gain	21(21.0)	66(66.0)	13(13.0)		
No weight gain	4(10.0)	20(50.0)	16(40.0)		
Weight loss	3(21.4)	8(57.2)	3(21.4)		
SOCIAL RELATIONSHIPS				16.418	0.003
Weight gain	17(17.0)	65(65.0)	18(18.0)		
No weight gain	4(10.0)	20(50.0)	16(40.0)		
Weight loss	4(28.6)	9(64.3)	1(7.1)		
ENVIRONMENT				14.611	0.006
Weight gain	25(25.0)	59(59.0)	16(16.0)		
No weight gain	0(0.0)	29(72.5)	11(27.5)		
Weight loss	5(37.5)	7(50.0)	2(14.5)		

Discussion

Measurement of the HRQOL adds a new dimension to the evaluation of TB programmes. With the development of effective treatment strategies where mortality is likely to be minimal, the focus of TB management has shifted to the reduction of illness-related morbidity. In this context, this study highlights the health-related quality of life and its determinants among tuberculosis patients attending the TB clinic.

In this study, the least affected was the physical health domain which assesses the impact of disease on the level of independence, activities of daily living, pain and discomfort, dependence on medicinal substance, lack of energy, sleep and rest, mobility and capacity to work. The environmental health domain which was the most affected assesses the financial resources, physical safety and security, quality of home environment, quality and accessibility to health and social care, transport and opportunities for leisure activities. On the other hand, the psychological domain which assesses the impact of self-esteem, positive and negative feelings, bodily appearance and spirituality follows closely, then the social relationships domain which assesses social support, personal relationship and sexuality.

This finding was contrary to those of the previous studies^{24,25} in which the physical health domain was the most affected by tuberculosis and also had the fastest recovery with treatment while the environment and social relationship were the least affected. The psychological health impairment was ranked second among the most impaired health domain by tuberculosis similar to the finding in this study, and the impairment tends to persist for a longer term than others.^{24,25}

The differences observed in this study, may be attributable to the fact that the study area Ilorin, is a city in sub-Saharan Africa with limited resources and different cultural and socio-demographic background compared to the Asian countries where the previous studies were done. Although, anti-TB drugs are free in this Centre, patients and/or their family members have to bear the financial burden of transportation fees, loss of wages, laboratory investigations, nutritional requirements and management of drug-related adverse conditions. Furthermore, the respondents in this study were pulmonary tuberculosis patients who have had treatment for at least two months, which is long enough for improvement in physical signs and symptoms (usually 2-3 weeks) for tuberculosis patients on treatment.⁴

The impairment in psychological domain highlights the fact that TB patients in this study like previous

studies^{24,25} may have reduced self-esteem and negative feelings about their disease conditions and how they are perceived by other members of their families and communities. These patients therefore, need the care and support of their family members, the community as well as Non-governmental Organizations (NGOs) to cope with the psychosocial impacts of the disease and/or its treatment. This would most likely improve adherence to anti-TB and subsequently reduce the increasing burden of drug-resistant tuberculosis.³ In contrast to the general population, health-related quality of life (HRQOL) of TB patients were still found to be fairly impaired in all health domains assessed in this study despite at least two months of anti-TB drugs. This supports the findings in a similar study, which concludes that TB patients have poorer HRQOL compared to the general population after treatment, despite achieving clinical and bacteriological cure.²⁵

Many studies reported conflicting evidence about the associations of socio-demographic factors and health-related quality of life among TB patients.^{24,26} In this study there were no statistical significance in the associations between socio-demographic factors and health-related quality of life.

The older participants in this study had low percentage of respondents with good grades especially in the physical and environmental health domains. Although this finding is not statistically significant it shows poorer HRQOL among older people in this study. This is understandable, as the decline in health and physical function has been assumed to be inevitable consequence of biological ageing. There were similar findings in previous studies but the physical and psychological domains were the worst affected in those studies.²⁷

In this study, associations were observed between overall QOL, health satisfaction and environment health domain with level of education of the respondents. These associations, although not statistically significant were similar to what was reported in a study, which shows that the better the level of education, the better the HRQOL of TB patients.¹⁸ This possibly highlights the fact that people with formal education tend to have better financial status and better understanding of the nature of the disease and its treatment hence have the ability to cope better.

This study revealed that lower occupational classes were associated with poorer HRQOL in most of the health domains. Similar relationship was found in previous studies,^{24,25} probably because the higher occupational classes have higher income. People

with better income may have better standards of living and possibly more enlightened, thus better HRQOL. The observation in this study shows that a lower occupational class is not a predictor of a poorer physical health. This probably reflects the fact that most of the respondents belong to the same low socio-economic class and cultural background, hence have similar responses to their physical health related issues. The respondents in occupational class IV were the worst affected in all health domains in this study. This highlights the fact that most of the respondent in class V; the unemployed, housewives and students are dependent on other people of usually higher occupational classes who share their burden of the disease while the respondents in class IV; mostly the labourers, petty traders and messengers usually bear the full weight of the burden of their disease condition alone.

In this study, participants that were previously married; separated, widowed and divorced had significantly poorer overall quality of life compared to the single and married participants. Earlier studies²⁵ did not consider the relationship between HRQOL and marital status.

In this study, there was a significant association between patient sputum smear results and HRQOL. A similar relationship was observed in another study,²⁴ in which patients who had sputum smear conversion after intensive phase of treatment had better HRQOL compared to those who did not convert. This further justifies the use of sputum smear conversion as a positive prognostic indicator in TB management programme.

This present study, revealed a significant relationship between the weight status and HRQOL. This also conforms to an earlier study that reported a positive correlation between weight gain and HRQOL.²⁵ This finding further highlights the importance of anti-TB drugs in the management of tuberculosis because they improve the physical signs and symptoms of patient suffering from tuberculosis e.g. improvement in appetite results in weight gain, and consequently better health-related quality of life of the patients.

Conclusion

This study observed that health-related quality of life of patients with tuberculosis after at least two months course of anti-tuberculosis drugs were fairly impaired in all domains. The two most affected health domains by tuberculosis in this study was environment health which assesses the influence of factors like financial resources, the work environment, accessibility and quality of

health and social care, transport, freedom, physical safety and security, and opportunities for leisure activities on HRQOL. It is followed by psychological health which assesses the impact of the patients' own thoughts about his/her body image and appearance, negative and positive feelings, self-esteem and personal beliefs on HRQOL.

The occupational class, age, gender and educational status were found to be the determinants of health related quality of life of patients with tuberculosis. There were also, significant relationships between HRQOL and the objective clinical parameters; weight gain, sputum smear conversion which are used as the positive prognostic indicators in TB management programme.

Acknowledgement

We are immensely grateful to Dr. S.A. Ayinmode, Consultant Family Physician, University of Ilorin Teaching Hospital (UITH), Ilorin, for his support in carrying out this work. Our special thanks go to Dr. S. Kuranga, Consultant Family Physician in charge of TB Clinic of the Department of Family Medicine UITH Ilorin

References

1. The World Health Organization Quality of Life Assessment (WHOQOL): development and general psychometric properties. *Soc Sci Med* 1998;46:1569-85.
2. Letrait M, Laurie A, Bean K. The asthma impact record (AIR) index: a rating scale to evaluate the quality of life of asthmatic patients in France. *Eur Resp J* 1996;9:1163-5
3. WHO report 2013: global tuberculosis control. WHO/CDS/TB/2013.316. Geneva: World Health Organization; Accessed on 8th January 2014. Available from: <http://www.who.int/mediacentre/factsheets/fs104/en/>
4. WHO. Global tuberculosis control: surveillance, planning, financing. Geneva: World Health Organization; 2006.
5. Yee D, Valiquette C, Pelletier M. Incidence of serious side effects from first-line anti-tuberculosis drugs among patients treated for active tuberculosis. *Am J Respir Crit Care Med* 2003;167:1472-7.
6. Yamada S, Caballero J, Matsunaga DS. Attitudes regarding tuberculosis in immigrants from the Philippines to the United States. *Fam Med* 1999;31:477-82.
7. Kelly P. Isolation and stigma: the experience of patients with active tuberculosis. *J Comm Health Nurs* 1999;16:233-41.

8. Long NH, Johansson E, Diwan VK. Fear and social isolation as consequences of tuberculosis in Vietnam: a gender analysis. *Health Policy* 2001;58:69-81.
9. Liefvooghe R, Michiels N, Habib S, Moran MB, De Muynck A. Perception and social consequences of tuberculosis: a focus group study of tuberculosis patients in Sialkot, Pakistan. *Soc Sci Med* 2005;41:1685-92.
10. Marra CA, Marra F, Cox VC, Palepu A, Fitzgerald JM. Factors influencing quality of life in patients with active tuberculosis. *Health Qual Life Outcomes* 2004;20:58.
11. Aydin IO, Ulusahin A. Depression, anxiety, comorbidity and disability in tuberculosis and chronic obstructive pulmonary disease patients: applicability of GHQ-12. *Gen Hosp Psychiatry* 2001;23:77-83.
12. Peterson TJ, Castle WM, Young JA. Street talk: knowledge and attitudes about tuberculosis and tuberculosis control among homeless adults. *Int J Tuberc Lung Dis* 1999;3:528-33.
13. Salomon N, Perlman DC, Friedmann. Knowledge of tuberculosis among drug users: relationship to return rates for tuberculosis screening at a syringe exchange. *J Subst Abuse Treat* 1999;16:229-35.
14. Marinac JS, Willsie SK, McBride D. Knowledge of tuberculosis in high-risk populations: survey of inner city minorities. *Int J Tuberc Lung Dis* 1998;2:804-10.
15. Meera D, Nandini S, Ingle GK. Impact of Tuberculosis on the Quality of Life. *Indian Journal of Community Medicine* 2008;33(1):58-60.
16. Chamla D. The assessment of patients' health-related quality of life during tuberculosis treatment in Wuhan, China. *Int J Tuberc Lung Dis* 2004;8:1100-6.
17. Guo N, Marra CA, Marra F, Moadebi S, Elwood RK, Fitzgerald JM et al. Health state utilities in latent and active tuberculosis. *Value Health* 2008;13:396-403.
18. Duyan V, Kurt B, Aktas Z, Duyan GC, Kulkul DO. Relationship between quality of life and characteristics of patients hospitalized with tuberculosis. *Int J Tuberc Lung Dis* 2005;9:1361-6.
19. Araoye MO. Subject selection. In: *Research methodology with statistics for health and social science*. Araoye MO, editor. Ilorin: Nathadex Publishers; 2003. p. 117-8.
20. Oyedele GA. Socioeconomic and cultural background of hospitalised children in Ilesha, Nig J Paediatr 1985;12:111-7.
21. Makanjuola AB, Obembe AO. Quality of life in patients with schizophrenia in Nigerian. *Nigerian Med Pract* 2005;36-42.
22. Ohaeri JU, Olusina AK, Al-Abassi AH. Path analytical study of the short version of the WHO quality of life instrument. *Psychopathology* 2006;39:243-47.
23. Akinpelu AO, Maruf FA, Adegoke BO. Validation of a Yoruba translation of the World Health Organization's quality of life scale – short form among stroke survivors in southwest Nigeria. *Afr J Med Med Sci* 2006;35(4):417-24.
24. Dhingra VK, Rajpal S. Health related quality of life (HRQL) scoring (DR-12 score) in tuberculosis: additional evaluative tool under DOTS. *J Commun Dis* 2005;37:261-8.
25. Chamla D. The assessment of patients' health-related quality of life during tuberculosis treatment in Wuhan, China. *Int J Tuberc Lung Dis* 2004;8:1100-6.
26. Marra CA, Marra F, Colley L, Moadebi S, Elwood RK, Fitzgerald JM et al. Health-related quality of life trajectories among adults with tuberculosis: differences between latent and active infection. *Chest* 2008; 133:603-53.
27. Wang Y, Lii J, Lu F. Measuring and assessing the quality of life of patients with pulmonary tuberculosis. *Zhonghua Jie He He Hu Xi Za Zhi* 1998;21:720-3