



Research

## Health-Related Quality of Life in Multidrug Resistant Tuberculosis Patients in Kaduna State, North-Western Nigeria: Comparisons among community and facility model of management

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Article history: Received 26 April 2022, Reviewed 15 June 2022, Accepted for publication 8 October 2022

### Abstract

**Background:** The community management of the drug resistant tuberculosis (MDR-TB) was introduced after several years of absolute facility model of care to reduce the logistic and social problems associated with hospital admissions of the MDR-TB patients. This study compares the health-related Quality of life (HRQOL) of patients receiving facility and community-based model of care.

**Methods:** This was a mixed methods design combining a quantitative cross-sectional survey, a focus group discussion and in-depth interviews with DR TB stakeholders. The study was conducted among 62 MDR TB patients who were managed for MDR TB in Kaduna State from January – June 2022. The QOL data were collected with the modified 36-item short-form (SF-36). Statistical significance was set at  $p < 0.05$

**Result:** The total quality of life (TQL) was  $69.14 \pm 16.29$ . The facility mean QOL for role limitation, RL ( $88.89 \pm 8.54$ ), Role emotional, RE ( $88.89 \pm 8.54$ ) and social functioning SF ( $81.25 \pm 7.62$ ) were significantly higher compared to the community model with RL ( $56.48 \pm 7.13$ ) RE ( $58.03 \pm 7.88$ ) and SF ( $67.69 \pm 3.79$ ) The physical component scores (95%CI =  $62.99-74.47$ ) and the Mental Component scores (95% CI =  $63.64 \pm 75.42$ ) were significantly higher in the facility compared to the community-based care. The FGDs and KII revealed that challenges with training for health care providers, poor supportive supervision and support for home visits were factors affecting community model of MDR-TB.

**Conclusion:** The patients managed at the facility had a better QOL than those at the community. There is a need for programmatic interventions to address the risk factors for poorer quality of life for the community model.

**Keywords:** MDR –TB, Community, Facility, models, comparative, QOL

### Introduction

The World Health Organization Global Tuberculosis report showed an estimated 10.0 million people developed active TB disease in 2019, with 1.4 million TB deaths<sup>1</sup>.

This undesirable TB morbidity is worsened by the emergence of Multidrug Resistance TB (MDR TB)<sup>2</sup> which occurs when there is resistance of the mycobacterium tuberculosis to at least two of the most effective first line anti-tuberculosis drugs; Rifampicin

and Isoniazid<sup>3</sup>. The issue of the MDR-TB demands urgent attention by policy makers in Nigeria in the face of the emerging threat of the extensively drug resistant TB (EDR TB)<sup>4</sup>. An estimated 3,600 MDR-TB cases occur annually among the notified pulmonary TB patients in Nigeria with very few proportions of the patients having access to effective MDR TB therapy, due to limited TB reference hospitals to manage the numerous TB patients in the country<sup>5</sup>. The Previously MDR-TB patients were managed only at the TB referral



hospitals, but the new WHO Model for MDR-TB care currently includes decentralized care for the patients to have option of the community model or facility-based management during the intensive phase<sup>6</sup>. The intensive phase is usually for a period of four months, but this can be extended up to six months in cases where there is no sputum conversion after the fourth month<sup>7</sup>. The continuation phase is done in the community for five months to complete the nine months regimen for the short course therapy<sup>8</sup>.

The Community model management of MDR-TB patients involves two crucial strategies: decentralization of hospital-based care from a distant TB referral centre to a local or community-based hospital closest to the patient's residence and early discharge of the patients from such facility for easy incorporation into community life<sup>9</sup>. For the Decentralization to be possible, the local hospital staff need to be trained in MDR TB management, there should be adequate provision of infrastructures for management of such patients, constant drug and commodity supplies and continued monitoring and supervision from the state ministry of health or a local TB regulatory agency or from the specialists at the TB referral centre<sup>10</sup>.

The community model also includes the support of a family member who will be the assigned care giver for the MDR TB patient. This individual will ensure drug compliance, regular follow up clinic attendance and immediate notification of the local hospital during worsening patient's condition or other indications that may warrant a need to switch from community to facility management for the MDR TB patient<sup>11,12</sup>.

Another crucial aspect of the community model is routine health care workers home visits to administer DOTS- plus and MDR TB support groups with the term of reference including psychosocial and compliance to therapy assistance<sup>13</sup>. Previous studies from other countries have shown that the community approach allows for better drug adherence, adequate monitoring of adverse reactions, regular sputum smear and culture examination, and multi-disciplinary management of the patients<sup>13,14</sup>.

The concept of the health-related quality of life (HRQOL) was developed to measure patients' physical, social and emotional wellbeing especially during the course of a debilitating diseases such as the MDR TB<sup>15</sup>. The HRQOL include various measurable domains such as General health, social and physical functioning, role limitations, role emotional, bodily pains, and vitality. These domains are aggregated as physical and mental component scores<sup>15</sup>. The HRQOL of the MDR TB patients is very important; the patients may be frustrated

due to the stress of the disease, poor family and community support, the side effects of the drugs and the continuous need of taking drugs, visits to hospital, stigmatization, and fear of death. Mental health disorders, social stress, and poor HRQOL are commonly reported among people with MDR TB<sup>16</sup>. Patient isolation, which was a widely successful treatment strategy for tuberculosis (TB), could expose patients to negative emotional circumstances affecting their psychosocial wellbeing<sup>17</sup>.

The community-based model of care for MDR TB if well implemented have the capacity to increases access to MDR TB care. This is because the primary health care principles of essential health care and community participation are involved<sup>18</sup>. Patients are treated close to their homes in a community hospital. Home visits conducted by the community DR-TB health workers to aids to follow up the patients<sup>18</sup>. This approach also makes contact tracing easy to identify and treat new more cases, reduce time to initiation of therapy, lowered default rate and address the problems of transportation to hospitalization in a distant referral hospital<sup>19</sup>.

Studies on the quality of life of the MDR TB is relatively scarce in Nigeria. However, few researchers had worked on aspects of the quality of life of the MDR TB patients<sup>20,21</sup>. This survey compares the quality of life of the MDR-TB patients at facility and community models of DR TB management in Kaduna State.

## Methods

This was a mixed method design combining a quantitative cross-sectional survey, a focus group discussion, and key in-depth interviews with four DR TB stakeholders. The study area was Kaduna State. The National Tuberculosis, Buruli Ulcers and Leprosy Training Centre (NTBLTC), Saye Zaria was the site for the facility management of the DR TB patients in Kaduna state. The NTBLTC Nigeria was established in 1991 as the Human Resource Development Unit of the National Tuberculosis, Buruli Ulcers and Leprosy Control Programme (NTBLCP) of the Federal Ministry of Health, Nigeria. It serves both as a training centre and a referral hospital with an estimated 180 bed capacity for drug-susceptible TB, TB/HIV, MDR-TB, Leprosy and Burullu ulcer. The outpatient sites for the community management of the DR TB are located at the Barau Dikko Teaching Hospital, Kaduna, Gwamnan Awan and Kafanchan General Hospitals Kaduna, Nasiya Hospital Rigasa and WILBRESUN Hospital, Narayi, Kaduna.

The minimum sample size was calculated using the formular for comparative cross-sectional study design<sup>22</sup>



$n = (Z\alpha/2 + Z\beta)^2 * (p1(1-p1) + p2(1-p2)) / (p1 - p2)^2$  while taking into consideration the total population of the MDR TB patients eligible for the study. The QOL data was collected with the modified 36-item short-form (SF-36) adapted for use in clinical research from the medical outcome study<sup>23</sup> (Available at [org/health-care/surveys\\_tools/mos/36-item-short-form/survey-instrument.html](http://org/health-care/surveys_tools/mos/36-item-short-form/survey-instrument.html)). The SF-36 includes One Multi-Item Scale that Assesses 8 Health Scales: Physical Functioning (PF), Role Physical (RP), Bodily Pains (BP), General Health (GH), Vitality (VT) Social Functioning (SF), Role Emotional (RE) and Emotional Wellbeing (EW). The SF-36 dimensions were reduced to 2 aggregate summaries, a physical component summary (PCS) and a mental component summary (MCS), which represent physical functioning condition and emotional condition, respectively. The PCS and the MCS were the outcome variables for HRQOL. The PCS aggregated items from PF, RL, BP and GH. While the MCS aggregated items from RE, EW, VT, and SF. In the general population, the mean for each summary scale is 50 points, with a SD of 10 points<sup>23</sup>. For the SF-36 scoring system, the scales were assessed quantitatively, and component scores were calculated based on the guidelines, with a higher score indicating a better state of health<sup>23</sup>. A preference question for either the facility or the community model of treatment and the reason for the choice was included on the HRQOL questionnaire.

A mean score of at least 60 was adjudged good quality of life, while any score below 60 was considered poor HRQOL. The cut off points for categorizing HRQOL in previous studies had been set at >60%<sup>24-26</sup>.

These study population were patients who were on treatment for at least two months intensive phase. The critically ill patients, who could not respond to the QOL questions due to their clinical state and the newly diagnosed MDR TB cases were excluded from the study. The focused group discussion (FGD) was conducted on a subset of eight participants at the Barau Dikko Teaching Hospital, Kaduna on 26/04/2022. The goal of the FGD was to capture in depth information that would be complementary to the quantitative survey. The focus group discussion guide used for the survey contained 12 questions which explored the current health status of the participants, lifestyle modifications, medication adherence, and perception of health status, perception of the challenges of the medical services and suggestions on strategies for improvement of the health care services and the use of alternative medicine. The principal investigator read the FGD notes and transcripts and analyzed the qualitative data. FGD sessions lasted 60 minutes and were tape-recorded.

Informed consent was obtained from the participants before the commencement of the FGD. After the focus group discussion, interviews with four key informants were also conducted. These KII allowed the principal investigators to gain more insights from the providers' perspective on the findings of the quantitative studies and on issues raised by patients in the focus group discussions. Informed consent to participate in and record interviews was also obtained at the beginning of each interview which lasted approximately 30 minutes. The descriptive and inferential analysis was done with the IBM SPSS Statistics for Windows, Version 25.0. (Armonk, NY: IBM Corp) and StataCorp STATA/SE 12 (StataCorp.2011; Stata Statistical Software: Release 12, College Station, TX; StataCorp LP).

The frequencies and the percentages of the socio-demographic and clinical profiles of the patients were computed, while bivariate analysis and chi-square test statistic were used for test of associations, while the comparison of two-means for the quality of life were tested using the 2-sample t-test. The primary outcomes variable was the mean quality of life. The qualitative findings were analysed using thematic analysis.

Ethical clearance to conduct the study was obtained from Barau-Dikko Teaching Hospital Health Research Ethic Committee (BDTH – HREC) with reference number BDTH/2021/032/vol 1.

## Results

A total 62 patients with drug resistant TB participated in the study.

**Table 1:** Demographic and clinical characteristics of the patients (n=62)

Characteristics	Freq	Percent
Age		
<40	45	72.6
>40	17	27.4
Sex		
Male	42	67.7
Female	20	32.3
Religion		
Islam	49	79
Christianity	13	21
Tribe		
Hausa	43	69.4
Others	19	30.6
Married	36	58.1
Not currently married	26	41.9
Education		
Primary	19	30.6

Characteristics	Freq	Percent
Secondary	25	40.3
Tertiary	11	17.7
No formal education	7	11.3
Place of treatment		
Facility	27	43.5
Community	35	56.5
Quality of life		
Good	34	54.8
Poor	28	45.2

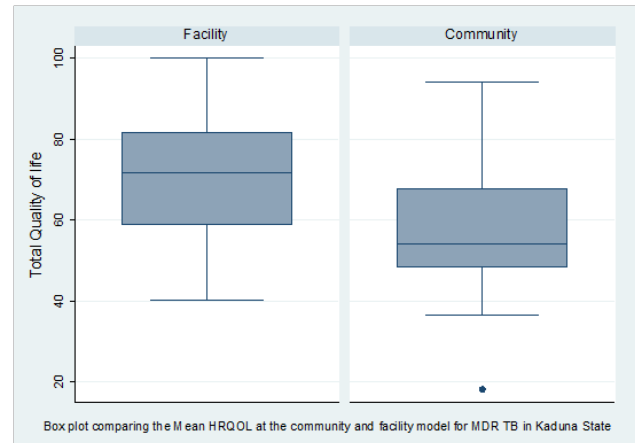
The mean age was of the respondents was 32.5 years. Majority of the patients were Hausa 43(69.3%), married 36(58.1%) and were Muslims 49(79%). Majority had at least a primary level of education. Only 11.3% of the respondent had no formal education. The community model attended to 35(56.5%) of the patients, while the rest 27(43.5%) were managed at the facility. (Referral hospital) for the intensive phase. Thirty-four of the patients (54.8%) were assessed to have good HRQOL, while other 28(42.5%) had poor HRQOL. (Table 1)

**Table 2:** Summary of overall scale and domains HRQOL of MDR TB patients in Kaduna State n = 62

Scales	(Mean± SE)
TQL	64.8±2.34
PF	62.4±3.8
RP	49.6 ±5.18
RE	59.8 ±5.33
VT	68.85±4.10
EW	80.86 ±8.23
SF	68.13±3.14
BP	67.67±3.78

GH	61.92±2.83
PCS	65.94±2.60
MCS	65.28±2.52

The total quality of life (TQL) was 64.28±2.34, Physical functioning (PF) was 62.4±3.8, role physical (RP) 49.6±5.18, role emotional RE 59.8±5.33, Vitality 68.85±4.10, Emotional well-being, EW 80.86±8.23, social functioning, SF 68.13 ±3.84, bodily pain 67.67±3.78, General Health. 61.92± 2.83, mean physical component score; PCS 65.94±2.60 and mental component scores MCS 65.28±2.52. (Table 2)



**Fig 1:** The box plot for the MDR TB HRQOL

The box plots (Fig 1) shows that the mean HRQOL of the patients managed at the facility during the intensive phase was greater than for the patients managed absolutely in the community.

**TABLE 3:** Binary logistic regression analysis of the HRQOL and socio demographic features of the patients

Predictive factors	Community n=35		AOR	95% CI	p	Facility n=27		AOR	95%	P
	Good HRQOL (%)	Poor HRQOL (%)				Good HRQOL (%)	Poor HRQOL (%)			
Age										
<40	8(32)	17(68)	1.64	0.26-10.46	0.61	14(70)	6(30)	1	1	
>=40	6(60)	4(40)				6 (85.7)	1(14.3)	2.44	0.17-35.31	0.51
Sex				0.11-6.07	0.63			1		
Male	11(46)	13(54)	1			15 (75)	5 (25)		0.15-58.94	
Female	03(27)	8(73)	0.83			3(42.9)	4(57.1)	3.01		0.47
Religion										
Islam	7(28)	18(72)	1		0.97	17(70.8)	7(29.2)	1	0.07-208.75	
Christianity	7(70)	3(30)	1.01	----		3 (100)	0 (0)	3.79		0.52
Tribe										
Hausa	7(30)	16(70)	1	----	0.97	16 (80)	4(20)	1	0.01-2.49	0.19
Others	7(58)	5(42)	1.07			4(57.1)	3 (42.9)	0.16		
Marital status										

Married	8(38)	13(62)	1	0.23	0.38	11(73.3)	4(26.7)	1		
Single	6(43)	8(57)	3.29			9 (75.0)	3(25.0)	0.69	0.05-8.92	0.78
Education										
Primary	05(38)	8(62)	1			5(83.0)	1(17.0)	1		
Secondary	03(25)	9(75)	0.246	0.02-5.21	0.36	9(69.2)	4(30.8)	<0.0001		0.98
Tertiary	05(71)	2(29)	10.35	0.35-307.9	0.18	3(75.0)	1(25.0)	<0.0001		0.99
No formal	01(33)	2(67)	12.25	0.008-182	0.51	3(75.0)	1(25.0)	<0.0001		0.97
Occupation										
Housewife	0(0)	3(100)	1			5(71.4)	2(28.6)	1		
Trading	4(31)	9(69)	0.65	.05-9.23		3(100)	0 (0)	<0.0001		0.99
Farmer	2(67)	1(33)	1.21	0.01-116.1		1(50)	1(50)	<0.0001		0.97
Artisan	1(50)	1(50)	1.05	0.01-98.67		2(50)	2(50)	<0.0001		0.98
Civil servant	2(67)	1(33)	0.96	0.03-36.39		1(50)	1(50)	<0.0001		0.99
Unemployed	5(45)	6(55)	1.73			8(88.9)	1(11.1)	1		1

The binary logistic regression analysis shows no association between the socio demographic features and the quality of life of the DR TB patients either at the community or in the facility (Table 3)

**Table 4:** Comparison of each domain of the QOL for patients at the community and the referral hospitals in Kaduna State

Domains	Community (Mean+SE)	Referral hospital (Mean+SE)	Mean difference	95% CI	T-test	P value
Physical functioning	64.08 ± 4.72	60.11 ± 6.36	3.98	54.71-69.99	-0.51	0.61
Role limitation	47.17 ± 7.00	52.85 ± 7.79	5.68	39.28- 61.40	0.54	0.59
Role emotional	57.69 ± 7.39	62.59 ± 7.76	4.90	49.15-70.50	0.45	0.65
Vitality	61.47 ± 3.44	75.95 ± 4.01	14.49	62.27- 73.28	2.74	0.01
Emotional well being	68.87 ± 7.60	96.40 ± 15.85	27.52	64.38-97.33	1.68	0.09
Social functioning	62.83 ± 4.04	75.01 ± 4.71	12.18	61.85-74.41	1.96	0.05
Bodily pain	59.98 ± 5.10	77.64 ± 5.11	17.66	60.11-75.24	2.40	0.01
General health	59.08 ± 3.11	65.60 ± 5.10	6.51	56.25-67.60	1.14	0.25
Physical Component Score (PCS)	233.39 ± 13.82	261.44 ± 15.76	28.05	224.688-266.52	1.33	0.18
Mental Component Score (MCS)	235.72 ± 13.72	268.31 ± 16.45	32.58	228.57-271.25	1.53	0.13

**\*Statistically significant**

The facility means QOL (MQOL) for role limitation, RL (88.89±8.54), Role emotional, RE (88.89±8.54) and social functioning (81.25±7.62) were significantly higher compared to the community model at the facility. The physical component scores (95%CI =62.99-74.47) and the Mental Component scores (95%CI=63.64-75.42) were significantly higher in the facility compared to the community model (Table 4)



## Discussion

The quality of life of the patients managed at the facility and the community were just about average. There is a need therefore, for a holistic health care packages that will include psychosocial support<sup>27</sup>, consistent health education, financial support, family, and community support to improve the quality of life of this patient<sup>28</sup>. The study showed that the patients' quality of life was not dependent on socio demographic features like the age or sex of the patients but rather influenced by the nature of the DR-TB and patients' perception of their illness.

However, there was a slight increase in the quality of life for patients who had facility admission care than for those who were completely managed in a community model of MDR TB management. This finding is different from that of a previous survey in Africa, where the community model was preferable, and patients considered the community treatment as an enabler for emotional support and individual care. A South African study also described the superiority of the community model<sup>29</sup> while another study from Kenya emphasized the benefits of the community model to include family support, trust and dedicated care<sup>30</sup>.

It is however pertinent to note that good as the community model might be, which informed the WHO programmatic shift to include this model in MDR TB management<sup>31</sup>, if the required structure, resources, and supervision is not provided, the objective of such model of treatment may not be achieved<sup>32</sup>. One of the patients during the interview said that *"I have a bit of challenges sometimes when I come to collect drugs as it sometimes takes up to five days before the drugs become available"*. Such a delay in drug and commodities could affect a patient emotionally resulting in a poor quality of life. The KII with the focal persons on DR-TB revealed that poor prioritization of MDR TB health care workers training. A MDR TB stakeholder noted that

*"...three of us attended a programmatic training on MDR TB in Jos 3 years ago, since then we have not attended any other training"*. When this kind of situation persists, the community model may not report any significant positive outcome. The clinicians and other health workers at the MDR TB clinics should be well acquainted with the comprehensive management of the DR TB patients and offer the services the patients promptly and efficiently, but this is only possible via adequate training.

The facility model was stronger in this study. This fact is further strengthened by the domains of role limitation and role emotional which were significantly higher at the facility than the community model of management. This implied that both models are still very crucial for the MDR TB patients in especially settings where the structure of community model is weak. When there is a need for referral, the service should be offered on time. The community model home visit might not also be well supported as a key stakeholder noted that *"no support for*

*home visitations anymore. Before they supported with funds for us to visit patients at home, but now they are not supporting ..."*

Other stakeholders also reported non availability of funding for home visits for the community model.

The KII also found out that in all the service points there were no staff trained on psychosocial support and adherence counselling. These cadre of staff were only available at the NTBLC. The interview also revealed that AFB culture could not be done in any of the peripheral DR TB sites in the state. Referral would need to be made to the NTBLC delaying time of sputum collection to availability of results in situations when AFB culture were needed to make decisions.

**Limitations:** The study has some limitations. This study was conducted in the health facilities and using patient's records. The research might be liable to selection bias since we did not know about the quality of life of clients who did not attend the MDR TB clinic during the period of the study. Oral reports from the participants were also liable to information bias due to participant self-reporting and patients' recall ability. Some respondents might not have disclosed some sensitive information about their quality of life.

**Conflict of interest:** There was no conflict of interest.

**Authors' Contribution:** OA is the principal investigator for the study; He conceptualize the study and contributed to the study design, data collection, manuscript writing and data analysis as well as drafted the background segment of the manuscripts. AS and CT-W contributed to the manuscript writing and data analysis while KS was involved in the data analysis, discussion, and conclusion section of the manuscript. All the authors made critical inputs into the revision and finalization of the manuscript. All authors read and approved the final manuscript.

## Conclusion

The implication of this study is the need for government and other TB stakeholders to prioritize support for investment in community model of MDR-TB by so that the program can achieve the objective of providing treatment access to MDR TB patients at the community level.

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