

# Health Related Quality of Life and its Effective Factors in Tuberculosis Patients Receiving Directly Observed Treatment Short-Course (DOTS)

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## Abstract

**Objectives:** This study aimed to assess the health-related quality of life (HRQoL) and related factors among TB patients receiving Directly Observed Treatment Short course (DOTS) in District Tuberculosis Centre, Vellore, Tamil Nadu.

**Methods:** A cross-sectional study was conducted in the District Tuberculosis Centre, Vellore between January and June, 2018. Health related quality of life was measured using the Short Form-36 (SF-36) questionnaire which measured HRQoL in 8 domains. Statistical analysis was performed using the Statistics Package for Social Scientists (SPSS; Windows version 21.0). The nonparametric tests including Mann-Whitney and Kruskal-Wallis were performed to find out differences between different variables.

**Results:** A total of 268 participants were recruited for the study. Highest HRQoL scores were observed in the domain of physical functioning (67.19 + 7.31) followed by domain on limited physical activity due to physical problems (64.97 ± 13.23).

The lowest scores were in the domain of general health (58.89+ 17.07) followed by domain of bodily pain (59.45 ± 13.24).

**Conclusion:** The results of the study concluded that TB had negative impact on patients HRQoL with general health being the most affected. The present study underscores the need for targeted, culturally relevant psychosocial support interventions for persons treated for TB disease, especially during the early months of treatment.

**Keywords:** Tuberculosis, SF-36 Questionnaire, Quality of life

## Introduction

Tuberculosis (TB) is the leading infectious disease in India and caused 28 lakh cases and 4.8 lakh deaths due to TB in 2018.<sup>1,2</sup> TB patients face a multitude of

problems that are social, economic, physical and mental in nature which if not addressed can lead to poor disease or poor treatment outcomes. Hence there is a need for a more comprehensive assessment of patients' health status.<sup>3</sup>

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Health-related quality of life (HRQoL) involves assessing a person's perception of his or her physical and mental health. TB patients often have physical and mental distress leading to poor disease outcome or poor treatment outcome because of decreased ability to take treatment.<sup>4,5</sup>

The 36-Item Short Form Health Survey questionnaire (SF-36) is tool used for evaluating the Health-Related Quality of Life (HRQoL). This has 36 questions and measures QOL in 8 domains.<sup>6,7,8</sup> This study was undertaken with the aim of assessing the HRQoL of TB patients using the SF- 36 questionnaire.

### Materials and Methods

A prospective cross-sectional, facility-based study was conducted in the Designated Microscopy Centre (DMC) attached to the District Tuberculosis Centre in Vellore district, Tamil Nadu. Ethical clearance was obtained from the Institutional ethics committee.

The appropriate sample size needed was calculated based on previous studies which showed the mean and standard deviation (SD) QOL score as 36.1 (6.6).<sup>9</sup> The sample size was calculated as 268 to achieve 95% confidence interval with 5% margin of error.

This study was conducted from January to June, 2018. All adult drug sensitive TB patients who registered for treatment during the study period were eligible for the study. Using convenience sampling method, consecutive patients fulfilling the inclusion criteria and willing to participate in the study were administered with an informed consent.

The Quality of Life - Short-Form Health Survey (SF-36) designed by Ware et al was used to study the quality of life.<sup>7</sup> This questionnaire has 36 questions and measures HRQoL in 8 domains: physical functioning, role limitation due to physical problems, bodily pain, general health, vitality, social functioning, role limitation due to emotional problems and emotional well-being.<sup>7</sup> The questionnaire was administered by trained health care providers. Scoring was done based on the item response data.<sup>8, 9, 10</sup> Scoring began after ensuring that the survey form was complete and the study subject's answers were unambiguous. Item response values were then recorded. Based on

previous published literature, several steps were used for this process, including changing out of range values to missing, recoding values for 10 items, substituting person-specific estimates for the missing items. After this, a total raw score was computed for each domain scale. The total raw score was sum of the final response values of all items on a given scale. Health domain scale total raw scores were transformed to 0-100 scores using the formula:  $((\text{Actual raw score} - \text{Lowest possible raw score}) / \text{Possible raw score range}) \times 100$ . Health domain scale 0-100 scores were transformed to scores by using health domain scores. A linear -score transformation is used so that each health domain scale has a mean of 0 and a standard deviation of 1 with mean from the 0-100 score for that scale, then dividing the difference by the given scale's standard deviation. The scores were transformed to a score by multiplying each score by 10, and then 50 was added to this resulting product. Health domain scores were used to score Physical and Mental Component Summary measures.<sup>3</sup>

Data was entered into Microsoft Excel. Statistical analysis was performed using the Statistics Package for Social Scientists (SPSS; Windows version 21.0.). Descriptive statistics comprising frequency and percentages was calculated. The nonparametric tests including Mann-Whitney and Kruskal-Wallis were performed to find out differences between different variables.

### Findings

There were a total of 396 patients who were eligible for the study, of which 268 (67.7%) patients consented for the study. Of the 268 patients, 159 (59.3%) were males and 109 (40.7%) were females, 154 (57.5%) were from rural area and 114 (42.5%) were from urban area. The mean age and standard deviation (SD) of the study population was 47.21 ( $\pm$  12.24) years. Most of the study population (68.3%) were married. Occupation wise, unemployment was seen in a large proportion 129(48.1%) of the subjects, while 76 (28.4%) were unskilled workers. Majority of the patients 164 (61.2%) had pulmonary TB while 104 (38.8%) patients had extra pulmonary TB. There were 172 (64.2%) who were new cases while 96 (35.8%) were retreatment patients who were either relapse, treatment failure and those who had returned after default (but were still drug sensitive). The mean

duration of treatment was 6.12 ( $\pm$  2.41) months. There were 144 (53.7%) smokers and 124 (46.3%) were non-smokers.

A detailed description of demographic characteristics is given in (Table 1)

**Table 1: Characteristics of the study population**

Demographic details		Frequency (n =268)	Percentage (%)
Age	18-20 years	6	2.2
	21-30 years	68	25.4
	31-40 years	121	45.2
	41-50 years	54	20.2
	51-60 years	12	4.4
	> 60 years	7	2.6
Sex	Male	159	59.3
	Female	109	40.7
Marital status	Single	30	11.2
	Married	183	68.3
	Divorced/ Widowed	55	20.5
Place of Residence	Rural	154	57.5
	Urban	114	42.5
Occupation	Unemployed	129	48.1
	Unskilled	76	28.4
	Semi-skilled	40	14.9
	Skilled	23	8.6
Education	Illiterate	46	17.2
	Primary	73	27.2
	Secondary	112	41.8
	High School	30	11.2
	College degree	7	2.6
Currently Smoking	No	124	46.3
	Yes	144	53.7
Currently consuming Alcohol	No	132	49.3
	Yes	136	50.7
Site of TB	Pulmonary	164	61.2
	Extra pulmonary	104	38.8
Treatment category	New	172	64.2
	Retreatment	96	35.8
Duration of current treatment	$\leq$ 2 months	119	44.4
	>2months	149	55.6

Health related quality of life was measured using the Short Form-36 (SF-36) questionnaire.

The results showed that lowest scores for health-related quality of life were observed in the domain of general health (58.89 $\pm$  17.07) followed by domain of bodily pain (59.45  $\pm$  13.24). Highest scores were observed in the domain of physical functioning (67.19  $\pm$  7.31) followed by domain on limited physical activity following physical problems (64.97  $\pm$  13.23).

A detailed description is given in Table 2.

**Table 2: Mean scores for different domains of health-related quality of life (HRQoL) among study population**

QOL dimension	Mean (SD)	Median
Physical function	67.19 (7.31)	66
Limited physical activity following emotional problems	60.53 (11.76)	59
Limited physical activity following physical problems	64.97 (13.23)	61
Vitality and fatigue	60.76 (11.42)	60
Mental health	63.64 (8.98)	62
Social functioning	61.37 (12.31)	61
Body pain	59.45 (13.24)	57
General health	58.89 (17.07)	55
Total score for QOL	62.91(12.93)	60

A comparison of the HRQoL domains among men and women showed that men had a significantly higher HRQoL score compared to women ( $p < 0.03$ ). Also, subjects residing in urban areas had a significantly higher HRQoL score compared to those residing in rural areas ( $p < 0.001$ ). Those who had taken TB treatment for a longer duration ( $\geq$  2 months) had a significantly better health related quality of life ( $p < 0.02$ ). Those who were taking TB treatment for the first time had a significantly better HRQoL compared to those who had taken treatment previously ( $p < 0.05$ ).

A detailed description is given in Table 3.

**Table 3: Comparison of mean SF-36 domain scores socio-demographic characters of the study population.**

Factor	Mean $\pm$ Standard deviation of QOL		Independent t test result
Age	$\leq 40$ years 69.13 $\pm$ 8.46	$>40$ years 67.96 $\pm$ 9.12	p value $< 0.45$
Gender	Male 66.59 $\pm$ 10.89	Female 55.12 $\pm$ 9.11	p value $< 0.03$
Marital status	Married 63.21 $\pm$ 6.89	Unmarried/ Widowed/Divorced 69.18 $\pm$ 8.56	P value $< 0.21$
Occupation	Skilled 65.97 $\pm$ 8.56	Unskilled 63.78 $\pm$ 7.43	P value $< 0.24$
Place of residence	Urban 67.35 $\pm$ 10.23	Rural 54.66 $\pm$ 9.27	p value $< 0.001$
Duration of treatment	$\leq 2$ months 60.34 $\pm$ 8.78	$> 2$ months 66.34 $\pm$ 6.32	p value $< 0.02$
Site of TB	Pulmonary 57.13 $\pm$ 8.25	Extra pulmonary 59.59 $\pm$ 7.17	p value $< 0.71$
Treatment category	New 60.27 $\pm$ 10.39	Retreatment 56.97 $\pm$ 10.04	p value $< 0.05$
Smoker	Yes 62.43 $\pm$ 8.93	No 61.56 $\pm$ 9.71	p value $< 0.36$
Alcohol consumption	Yes 63.25 $\pm$ 7.34	No 61.87 $\pm$ 6.56	p value $< 0.31$

### Discussion

The results of this study highlighted a significant impact on several domains of HRQoL of TB patients. The highest HRQoL scores were observed for the domain of physical functioning whereas lowest HRQoL scores were observed for the domain of general health, followed by bodily pain and role limitations due to emotional issues.

The present study highlighted women had a significantly poorer HRQoL across all domains compared to men. This could be explained by fact that women have lower levels of physical strength and are more sensitive to changes in their health compared to men. Similar results were reported in a study conducted in America, where women had more health issues and were more likely to report fair or poor health than men.<sup>11</sup>

This study found that patients residing in urban area had a significantly better quality of life compared to those in rural areas. This could possibly be due to a lower economic status and inadequate level of nutrition in rural patients. These findings are similar to a study done by Marra et al.<sup>12</sup>

The study found that subjects who had taken TB treatment for more than 2 months had a significantly better quality of life. This could be due to a reduction in TB symptoms, adjustment to the medication and positive effect of therapeutic interventions on quality of life of TB patients. These findings are in accordance with studies conducted in India, Canada and Pakistan.<sup>8,11,13,14,15</sup>

This study found that those who were taking TB treatment for the first time had a significantly better HRQoL compared to those who had taken treatment

previously. These findings are in accordance to a study done in Orissa, which showed that there was a significant difference found among new TB cases and retreatment TB cases.<sup>16</sup>

### Conclusion

The results of the present study concluded that patients with TB patients had poor HRQoL. The disease had a negative impact on HRQoL of TB patients across all domains. Patients who were females and those living in rural areas were found to have a poorer HRQoL. Besides this, those who had taken treatment for 2 months or less and those who had taken TB treatment in the past also had a poorer HRQoL.

The present study underscores the need for targeted, culturally relevant psychosocial support interventions for persons treated for TB disease, especially during the early months of treatment.

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