

Original Research Article

Quality of life and its determinants among pulmonary tuberculosis and multidrug-resistant tuberculosis patients receiving DOTS therapy in Lucknow District, Uttar Pradesh: a cross-sectional study

Anurag Gautam*

Community Health Centre Faridpur, Department of Medical Health and Family Welfare, Bareilly, Uttar Pradesh, India

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*Correspondence:

Dr. Anurag Gautam,

E-mail: dranuraggautam@gmail.com

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ABSTRACT

Background: Tuberculosis (TB) continues to be a major public health challenge in India despite substantial progress under the National Tuberculosis Elimination Programme (NTEP). While treatment outcomes are commonly assessed using bacteriological and clinical indicators, the impact of TB on patients' quality of life (QoL) remains inadequately explored. Multidrug-resistant tuberculosis (MDR-TB) further compounds the physical, psychological, and social burden experienced by patients. Objectives were to assess the quality of life among pulmonary tuberculosis (PTB) and multidrug-resistant tuberculosis (MDR-TB) patients and to identify determinants influencing QoL in Lucknow district, Uttar Pradesh.

Methods: A cross-sectional analytical study was conducted among 214 tuberculosis patients receiving treatment under urban DOTS centres of Lucknow district. The study period was September 2014 to October 2015. Of the total participants, 157 were PTB patients and 57 were MDR-TB patients. Data regarding socio-demographic characteristics, treatment history, psychosocial issues, stigma, and healthcare-related factors were collected using a structured questionnaire. Quality of life was assessed using the medical outcomes study short form-36 (SF-36). Multiple linear regression analysis was performed to identify predictors of QoL.

Results: PTB patients demonstrated significantly better QoL scores compared with MDR-TB patients (42.7 ± 18.8 versus 34.6 ± 17.8). Physical health was more adversely affected than mental health in both groups. Significant differences were observed between PTB and MDR-TB patients in physical functioning, role physical, bodily pain, general health, vitality, and social functioning. Poor social relationships emerged as the strongest predictor of reduced QoL among PTB patients, whereas unsatisfactory DOTS centre services were the strongest predictor among MDR-TB patients.

Conclusions: Tuberculosis significantly impairs quality of life, with MDR-TB patients experiencing a greater burden. Psychosocial support, stigma reduction, strengthening DOTS services, and improving patient-provider interactions should be integrated into TB control strategies to enhance patient-centred outcomes.

Keywords: DOTS, India, MDR-TB, NTEP, Quality of life, SF-36, Tuberculosis

INTRODUCTION

Tuberculosis remains one of the leading infectious causes of morbidity and mortality worldwide.¹ Despite significant advances in diagnosis, treatment, and public health interventions, the disease continues to pose substantial

health, social, and economic challenges. India accounts for the highest burden of tuberculosis globally and remains central to international TB elimination efforts.²

Historically, tuberculosis control programmes have focused on microbiological cure, treatment completion,

and reduction in mortality. However, these conventional indicators fail to capture the broader impact of disease on patients' daily functioning and well-being. Tuberculosis affects physical health, psychological status, social interactions, occupational productivity, and family life.

The emergence of multidrug-resistant tuberculosis has further complicated disease management. MDR-TB patients experience prolonged treatment duration, greater adverse drug reactions, social isolation, and economic hardship. Consequently, quality of life assessment has become increasingly important in understanding the true burden of tuberculosis.

Health-related quality of life (HRQoL) represents a multidimensional construct encompassing physical, mental, emotional, and social functioning. The medical outcomes study short form-36 (SF-36) is a widely validated instrument for measuring these domains and has been extensively used in chronic disease research.³

Limited data are available regarding QoL among tuberculosis patients in northern India, particularly comparing PTB and MDR-TB patients. Understanding determinants of QoL can facilitate the development of patient-centred interventions and strengthen tuberculosis control programmes.

Therefore, the present study was undertaken to assess quality of life and its determinants among PTB and MDR-TB patients receiving treatment under DOTS centres in Lucknow district.

METHODS

Study design and setting

A cross-sectional analytical study was conducted among tuberculosis patients receiving treatment through urban DOTS centres in Lucknow district, Uttar Pradesh. The study was conducted from 1st September 2017 to 30th August 2018.

Study population and sample size

The study included confirmed PTB and MDR-TB patients registered under the National Tuberculosis Control Programme. A total of 214 tuberculosis patients were enrolled, comprising 157 PTB patients and 57 MDR-TB patients.

Eligibility criteria

Patients aged 18 years or older with diagnosed PTB or MDR-TB who were willing to participate were eligible for inclusion.

Seriously ill patients unable to respond to the questionnaire and patients refusing consent were excluded.

Data collection tool

Information was collected using a pretested structured questionnaire covering socio-demographic characteristics, personal habits, treatment history, psychosocial issues, stigma-related factors, and healthcare-related factors. Quality of life was assessed using the medical outcomes study short form-36 (SF-36).

Quality of life assessment

The SF-36 evaluates eight domains: physical functioning, role physical, bodily pain, general health, vitality, social functioning, role emotional, and mental health. The first four domains form the physical component summary (PCS), while the latter four constitute the mental component summary (MCS).

Statistical analysis

Data were analyzed using SPSS software. Descriptive statistics included frequencies, percentages, means, and standard deviations. Independent-sample t-tests and multiple linear regression analyses were performed. Statistical significance was considered at $p < 0.05$.

Ethical considerations

Ethical approval was obtained from the institutional ethics committee of King George's Medical University, Lucknow. Written informed consent was obtained from all participants before enrolment.

RESULTS

Socio-demographic characteristics

The socio-demographic characteristics of the study participants are presented in Table 1. The majority of PTB patients (52.2%) and MDR-TB patients (68.4%) belonged to the 18–29-year age group. The mean age was 31.8 ± 12.3 years among PTB patients. Male predominance was observed in both PTB (61.1%) and MDR-TB (56.1%) groups. Most participants belonged to lower socioeconomic strata; 73.9% of PTB patients and 45.6% of MDR-TB patients belonged to class IV socioeconomic status.

Table 1: Socio-demographic characteristics of PTB and MDR-TB patients.

Characteristics	PTB (n=157), N (%)	MDR-TB (n=57), N (%)
Age 18-29 years	82 (52.2)	39 (68.4)
Male sex	96 (61.1)	32 (56.1)
Socioeconomic class IV	116 (73.9)	26 (45.6)

Treatment and psychosocial characteristics

Most PTB patients (80.3%) were newly diagnosed cases, whereas 77.2% of MDR-TB patients reported previous anti-tubercular treatment exposure. Approximately 47.1% of PTB patients reported dissatisfaction with DOTS centre services compared with 64.9% of MDR-TB patients. Perceived stigma, neglect, and social discrimination were frequently reported. Among MDR-TB patients, 98.2% perceived adverse effects on family responsibilities.

Comparison of quality of life domains

PTB patients exhibited significantly higher QoL scores across most physical and mental domains than MDR-TB patients. The detailed comparison is presented in Tables 2 and 3.

Table 2: Comparison of physical health-related quality-of-life domains between PTB and MDR-TB patients.

Domain	PTB Mean±SD	MDR-TB Mean±SD	P value
Physical functioning	37.2±27.5	22.6±14.6	0.001
Role physical	46.5±22.1	1.44±0.4	0.001
Bodily pain	56.2±27.6	42.3±25.0	0.001
General health	41.8±14.3	32.4±15.8	0.001
Physical component summary (PCS)	41.8±21.9	32.1±15.8	0.003

Table 3: Comparison of mental health-related quality-of-life domains between PTB and MDR-TB patients.

Domain	PTB Mean±SD	MDR-TB Mean±SD	P value
Vitality	37.4±22.9	27.0±19.8	0.002
Social functioning	49.2±20.8	42.3±22.5	0.030
Role emotional	44.6±22.6	39.7±21.0	0.460
Mental health	45.4±15.4	40.8±18.8	0.070
Mental component summary (MCS)	43.6±18.4	36.9±20.3	0.023

Predictors of quality of life

Among PTB patients, multiple regression analysis demonstrated that monthly family income, duration of DOTS treatment, substance abuse, dissatisfaction with DOTS services, perceived neglect, and poor social relationships explained 48.1% of the variability in QoL (adjusted $R^2=0.481$). Poor social relationships emerged as the strongest predictor.

Among MDR-TB patients, low socioeconomic status, duration of treatment, family history of TB, effect on

family responsibilities, perceived neglect, and dissatisfaction with DOTS services explained 56.3% of the variability in QoL (adjusted $R^2=0.563$). Unsatisfactory DOTS services emerged as the strongest predictor.

DISCUSSION

The present study demonstrates that tuberculosis exerts a profound adverse impact on multiple dimensions of quality of life. Physical functioning, social functioning, emotional well-being, and general health perception were significantly compromised among affected individuals.

The younger age predominance observed in this study is consistent with previous reports from India and other developing countries, reflecting the concentration of disease among economically productive age groups. This has important implications for workforce productivity and socioeconomic development.

Male predominance among both PTB and MDR-TB patients aligns with national epidemiological trends. Higher exposure to occupational risk factors, smoking, migration, and healthcare-seeking behaviour may partially explain this pattern.

A key finding was the significantly lower QoL among MDR-TB patients compared with PTB patients.⁴ MDR-TB patients exhibited poorer scores across almost all physical and mental domains. The prolonged duration of treatment, higher pill burden, adverse drug effects, and greater social stigma likely contribute to this disparity.

Physical health domains were more severely affected than mental health domains in both groups. Physical functioning emerged as the most compromised domain among PTB patients, whereas role limitations due to physical problems were particularly severe among MDR-TB patients. These findings highlight the substantial functional limitations experienced by TB patients.¹⁰

The study also underscored the importance of social determinants in shaping quality of life outcomes. Poor social relationships emerged as the strongest determinant of QoL among PTB patients.⁵ Social isolation, discrimination, and stigma can negatively affect treatment adherence and psychological well-being.^{6,7}

Among MDR-TB patients, dissatisfaction with DOTS services was identified as the strongest predictor of poor QoL.⁸ This finding emphasizes the need to strengthen patient-centred service delivery. Waiting times, accessibility issues, provider communication, and treatment support mechanisms may significantly influence patient experiences.⁹

The positive association between duration of treatment and quality of life suggests gradual recovery of health status with successful therapy.^{11,12} This reinforces the importance of adherence support throughout the treatment course.

The influence of socioeconomic status observed in this study further highlights the need for comprehensive social protection measures for TB patients.⁷ Economic hardship can impair nutrition, healthcare access, and treatment adherence, thereby affecting quality of life.⁸

The principal strengths of the study were the inclusion of both PTB and MDR-TB patients, use of the validated SF-36 instrument, comprehensive assessment of psychosocial determinants, and application of multivariable regression analysis. The principal limitations were the cross-sectional design, which limits causal inference; the single-district setting, which may limit generalizability; and the use of self-reported measures, which may introduce response bias.

Implications for family medicine and primary care

Primary care physicians are often the first point of contact for tuberculosis patients. Routine assessment of quality of life can facilitate early identification of vulnerable individuals requiring psychosocial intervention. Integration of counselling services, stigma reduction programmes, family support strategies, and patient-friendly DOTS services may substantially improve treatment outcomes and patient satisfaction.

CONCLUSION

Tuberculosis significantly impairs quality of life, particularly among MDR-TB patients. Physical health domains are more severely affected than mental health domains. Poor social relationships, perceived neglect, socioeconomic disadvantage, and dissatisfaction with DOTS services are major determinants of reduced quality of life. Strengthening patient-centred tuberculosis care through psychosocial support, stigma reduction, and improved healthcare services is essential for improving overall well-being and achieving national TB elimination goals.

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