



A COMMUNITY BASED ASSESSMENT OF OUTCOME AND QUALITY OF LIFE AMONG MULTIDRUG RESISTANT TUBERCULOSIS RESIDING AT KALABURAGI DISTRICT: - PROSPECTIVE ANALYTICAL CROSS-SECTIONAL STUDY”

Article History:

Name of Author:

Manjunatha VK¹, Ajay Kumar G², Meenakshi M Dhadave³

Affiliation: ¹Senior Resident, Department of Community Medicine, SSAHE, SSMS&RC, Bangalore Rural, Karnataka, India

²Professor and Principal, Gims, Kalaburagi, Karnataka, India

³Associate Professor and In Charge HOD, Department of Community Medicine, Gims, Kalaburagi, Karnataka, India

Corresponding Author:

Dr Manjunatha V K*1

Senior Resident, Department of Community Medicine, SSAHE, SSMS&RC, Bangalore Rural, Karnataka, India

Email ID: kaligoudmanju@gmail.com

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Abstract: Background: Tuberculosis (TB) remains one of the leading causes of mortality worldwide and is the foremost cause of death from a single infectious agent, surpassing HIV/AIDS. Despite effective treatment, millions of new TB cases are reported annually. Drug-resistant TB, particularly multidrug-resistant TB (MDR-TB), poses a serious public health challenge. Globally, most drug-resistant TB cases are resistant to rifampicin, and a significant proportion of these cases are classified as MDR-TB. While disease control traditionally focuses on clinical outcomes, comprehensive healthcare must also address patient well-being. Hence, evaluating the sociodemographic and clinical profiles, as well as quality of life (QOL), among MDR-TB patients is essential. **OBJECTIVES:** 1. To determine the socio-demographic profile and risk factors of the patients and the Outcome of the MDR-TB therapy. 2. To find out the quality of life of MDR-TB patients in Kalaburagi district. **MATERIALS AND METHODS:** A community-based prospective analytical cross-sectional study was conducted using a census sampling method in Kalaburagi district from May 2024 to November 2025. All registered MDR-TB patients receiving treatment during the study period were included. Data were collected using a pre-designed, pre-tested, and validated questionnaire to document socio-demographic and clinical profiles as well as treatment outcomes. Quality of life was assessed using the WHOQOL-BREF instrument. Data were analyzed using Epi Info version 6.0 and SPSS version 20.0. Statistical significance was determined using ANOVA, with a p-value <0.05 considered significant. **RESULTS:** The study included 55 patients. Most participants were in the 30–40-year age group (32.74%), with 69% males and 31% females. The majority lived in rural areas (76.36%), were uneducated (74.54%), married (89.09%), belonged to Class IV socioeconomic status (56.36%), and lived in nuclear families (60.03%). About 27.27% of patients had a history of smoking, 32.73% consumed alcohol, 9.09% chewed tobacco, and 14.55% had other associated medical conditions. At the time of the study, 52.73% were still on treatment, 18.18% had interrupted treatment, 10.91% were cured, 9.09% completed treatment, 7.27% died, and 1.82% progressed to XDR-TB. Quality of life assessment showed that the psychological and social domains were more affected than the physical and environmental domains. The impact on all four domains—social, psychological, environmental, and physical—was statistically significant ($P < 0.01$). **CONCLUSION:** These findings highlight the need for regular treatment, use of personal protective measures, better awareness about diagnosis and treatment, and continued counselling for patients and their family members.

Keywords: Tuberculosis, Multi-Drug-Resistant TB, Quality of life,

physical, social, environmental, psychological

INTRODUCTION

Tuberculosis (TB) is a chronic infectious disease caused by *Mycobacterium tuberculosis*, commonly referred to as the tubercle bacillus or acid-fast bacillus. First identified by Dr Robert Koch in 1882, TB primarily affects the lungs but can involve multiple organs. The disease predominantly affects individuals in the economically productive age group of 15–59 years, thereby exerting significant social and economic consequences. [1,2] Multidrug-resistant tuberculosis (MDR-TB) is defined as resistance to at least isoniazid and rifampicin, the two most potent first-line anti-tubercular drugs. Although MDR-TB is treatable using second-line medications, treatment is prolonged, costly, and often associated with severe adverse effects. In some cases, resistance extends further, leading to extensively drug-resistant TB (XDR-TB), which significantly limits therapeutic options. MDR-TB remains a major threat to global health security. [3]

Tuberculosis (TB) remains one of the leading causes of death worldwide. In 2022, nearly one million people died due to TB, including individuals living with HIV. During the same year, about one million children developed TB, and approximately 230,000 children, including those with HIV, died from the disease. TB is the leading cause of death among people with HIV and the second most common infectious cause of death globally. Ending the TB epidemic by 2030 is a major health goal under the Sustainable Development Goals. [3] Globally, around 0.45 million people developed multidrug-resistant or rifampicin-resistant TB (MDR-TB/RR-TB) in 2022. In India, approximately 0.049 million MDR-TB/RR-TB cases and about 0.053 million TB-HIV co-infection cases were reported in the same year. Worldwide, about 0.187 million HIV-positive individuals died due to TB in 2022, while India reported nearly 0.011 million such deaths. [4,5] Karnataka covers a population of about 70 million. According to the TB Annual Report 2023, the state reported 1,126 mono-resistant TB cases with 118 deaths and 586 MDR-TB/RR-TB cases with 94

deaths in 2021. The treatment success rate for drug-resistant TB in 2020 was around 59%, indicating that many patients discontinue treatment, leading to poor outcomes. [5]

Multidrug-resistant tuberculosis (MDR-TB) is a form of TB that is resistant to isoniazid and rifampicin. [6] The two most effective first-line anti-tubercular drugs. TB drug resistance is classified as mono-resistant, poly-resistant, multidrug-resistant (MDR), extensively drug-resistant (XDR), and rifampicin-resistant (RR), and is identified using phenotypic or genotypic testing methods. Drug-resistant TB mainly develops due to improper treatment, including incomplete therapy, incorrect drug prescription, poor drug quality, irregular drug intake, previous TB treatment, and residence in areas with a high burden of drug resistance. The Central TB Division developed “Nikshay”, a web-based system for reporting and monitoring all TB cases across India. The Standards for TB Care in India were also introduced to guide proper TB diagnosis, treatment, and care in both public and private healthcare sectors. Due to gaps in planning and funding, the Joint TB Monitoring Mission (JMM) was formed, bringing together national and international experts to assess TB control efforts. The JMM recognized India’s major achievements under the RNTCP, including testing over 80 million people and treating 15 million TB patients, which helped save millions of lives. Subsequently, the National Strategic Plan (NSP) 2017–2025 was launched to further strengthen TB control and elimination efforts. [7,8]

In 2017, India set a national goal to eliminate tuberculosis (TB) by 2025 and launched the National Strategic Plan (NSP) 2017–2025. The plan focuses on strong strategies and adequate resources to reduce TB cases and deaths, in line with global End TB targets and the Sustainable Development Goals. The vision of the NSP is a TB-free India with zero TB-related deaths, disease, and poverty, and its goal is to rapidly reduce the TB burden while working towards TB elimination by 2025.[8] People living with HIV are

26–31 times more likely to develop TB, while diabetes mellitus increases the risk of TB nearly threefold. Undernutrition and food insecurity are major risk factors for TB, and improving nutrition is essential for TB prevention. Tobacco smoking increases the risk of TB by two to three times and is linked to poor treatment outcomes.[9] TB is treatable and curable; however, people with TB can die if they do not receive proper treatment. Drug-resistant TB occurs when bacteria become resistant to the drugs used to treat TB. This means that the drug can no longer kill the TB bacteria. [10]

Apart from physical illness, patients with multidrug-resistant tuberculosis (MDR-TB) experience significant social and economic difficulties. The disease also affects their overall quality of life, not just clinical health. Therefore, assessing patients' well-being is important and can be done by measuring quality of life (QOL). The World Health Organization (WHO) defines QOL as a person's perception of their position in life within their cultural and value systems, and in relation to their goals and expectations. To assess QOL, WHO developed the WHOQOL-100 and WHOQOL-BREF tools, which are suitable for use in different cultural settings and allow comparison across populations. These tools are widely used in clinical care, research, and health policy planning. [11,12,13,14]

MDR-TB has a serious impact on the quality of life of both patients and their families. Improving the quality of life of MDR-TB patients is important for ethical and public health reasons. At present, social support for MDR-TB patients is mainly focused on those receiving treatment, but its benefits may extend beyond improving treatment adherence. There is limited social science research exploring the role of social support in TB prevention and care. Only a few studies have assessed the quality of life of TB and MDR-TB patients. Therefore, this study aims to better understand the factors influencing MDR-TB and drug resistance. Since comprehensive healthcare should address both disease burden and overall well-being, this study was conducted to assess the quality of life of MDR-TB patients in Kalaburagi district.

OBJECTIVES:

1. To determine the socio-demographic profile and risk factors of the patients and the Outcome of the MDR-TB therapy.
2. To find out the quality of life of MDR-TB patients in Kalaburagi district.

METHODS:

Study Design and Setting:

A community-based, prospective, analytical cross-sectional study was conducted in Kalaburagi district,

Karnataka, India. The study utilized data from the registers maintained at the District Tuberculosis Centre (DTC), Kalaburagi. The study period extended from May 2024 to November 2025. All eligible multidrug-resistant tuberculosis (MDR-TB) patients registered under the National Tuberculosis Elimination Programme (NTEP) and receiving treatment during the study period were considered.

Study Population and Sample Size

The study population comprised all diagnosed MDR-TB patients who were registered at the District Tuberculosis Centre and were undergoing treatment during the study period. A census sampling method was adopted, and hence, all eligible patients meeting the inclusion criteria were included in the study sample.

Inclusion Criteria

- All confirmed MDR-TB patients registered at the District Tuberculosis Centre, Kalaburagi, during the study period
- Patients who were on treatment and willing to participate in the study
- Patients who provided written informed consent

Exclusion Criteria

- Patients unwilling to participate in the study
- Patients who were transferred out of the Kalaburagi district during the study period
- Patients who died before the investigator could contact them
- Pediatric tuberculosis cases (aged 0–14 years)

Data Collection Procedure & Tool:

Prior approval was obtained from the District Tuberculosis Officer (DTO), Kalaburagi, and ethical clearance was granted by the Institutional Ethics Committee of Gulbarga Institute of Medical Sciences (GIMS), Kalaburagi. Eligible patients were identified from the DTC registers and traced to their residences with the assistance of the Senior Treatment Supervisors (STS) of the respective tuberculosis units. Written informed consent was obtained from all participants before data collection. Information was collected through face-to-face interviews using a pre-designed, pre-tested, and validated semi-structured questionnaire, which consisted of two parts: Part A: Section included information on socio-demographic characteristics, for socioeconomic status using Modified Kuppuswamy Classification-2025, and clinical profile, preventive practices, sputum disposal methods, adverse drug reactions, and treatment outcomes. Part B: Quality of life was assessed using the WHOQOL-BREF questionnaire, developed by the World Health Organization. This instrument consists of 26 items covering four domains: Physical health, psychological health, social relationships, and Environmental health. Participants were instructed to

respond based on their experiences during the preceding two weeks.

	Not at all	Not much	Moderately	A great deal	Completely
Do you get the kind of support from others that you need?	1	2	3	4	5

The patient circled the number that best fit how much support they received from others over the last two weeks. Therefore, they circled the number 4 if they received a great deal of support from others. Please read each question, assess your feelings, and circle the number on the scale for each question that best answers the question for you. [21]

VERY POOR	POOR	NEITHER POOR	NOR GOOD	GOOD	VERY GOOD
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Anthropometric Measurements

Body weight was measured using a standard calibrated weighing scale to the nearest 0.5 kg, with participants wearing minimal clothing and no footwear. Height was measured using a measuring tape to the nearest 0.5 cm, with participants standing erect against a wall, barefoot, with heels together and looking straight ahead. [11,12,21-24]

Outcome Measures

Treatment outcomes were categorized as cured, treatment completed, treatment failure, treatment interruption, lost to follow-up, death, or conversion to extensively drug-resistant tuberculosis (XDR-TB), as per NTEP guidelines.

Statistical Analysis

Collected data were coded and entered into Microsoft Excel and subsequently analysed using Epi Info version 6.0 and SPSS version 20.0. Descriptive statistics such as frequencies, percentages, mean, standard deviation, and standard error. Inferential analysis was carried out using Analysis of Variance (ANOVA) to assess associations between socio-demographic variables and quality of life domains. A p-value <0.05 was considered statistically significant.

ETHICAL CONSIDERATIONS:

Ethical approval was obtained from the Institutional Ethics Committee of GIMS, Kalaburagi and Confidentiality of participant information was maintained throughout the study.

Parameters	No. of Cases(n=55)	Percentage (100%)
Age (Years)		
<30	14	25.46
30-40	18	32.74
40-50	13	23.64
50-60	6	10.90
60-70	3	5.45
> 70	1	1.81
Gender		
Male	38	69
Female	17	31
Locality		

Rural	42	76.36	
Urban	13	23.64	
Education			
Un Educated	33	60.03	
Primary	3	5.45	
Middle	6	10.90	
High	10	18.18	
PUC	2	3.63	
UG	1	1.81	
Occupation			
Business/Farmer	19	34.54	
Skilled	5	9.09	
Un Skilled	14	25.47	
Un Employed	15	27.25	
Student	2	3.65	
Marital status			
Married	49	89.09	
Unmarried	6	10.91	
Religion			
Hindu	46	83.60	
Muslim	9	16.40	
Socio-Economic Status based on Modified Kuppaswamy Classification	CLASS II (upper middle)	5	9.09%
	CLASS III (lower middle)	19	34.55%
	CLASS IV (upper, lower)	31	56.36%
Immunization Status			
Immunized	46	83.64	
Not immunized	9	16.36	
Type Of Family			
Nuclear	41	74.54	
Joint	8	14.54	
Separated	6	10.92	
Environmental Conditions			
Type of House			
Kachha	14	25.45	
Pucca	31	56.36	
Semi Pucca	10	18.19	
Adequate Ventilation			
Yes	31	56.37	
No	24	43.63	
Indoor Pollution			

Yes	35	63.64
No	20	36.36

Table 2: Clinical Profile

History of Smoking	No. of Cases	Percentage (100%)
Yes	15	27.27
No	40	72.73
Duration of Smoking (yrs.)	No. of Cases (n=15)	Percentage (100%)
< 10	5	33.34
10-20	7	46.65
20-30	2	13.34
>= 30	1	6.67
Quantity	No. of Cases (n=15)	Percentage (100%)
< 1 Pack	10	66.67
1 - 2 packs	4	26.66
2 - 3 packs	1	6.67
History of Alcoholism	No. of Cases (n=55)	Percentage (100%)
Yes	18	32.73
No	37	67.27
Duration of alcoholism	No. of Cases (n=18)	Percentage (100%)
>10yrs	10	55.55
<10yrs	8	44.45
Quantity/day	No. of Cases (n=18)	Percentage (100%)
< 250 ml	7	38.88
250 -500 ml	10	55.53
>= 500 ml	1	5.55
History of Tobacco Chewing	No. of Cases (n=55)	Percentage (100%)
Yes	5	9.09
No	50	90.91
Duration of Tobacco consumption(yrs.)	No. of Cases (n=5)	Percentage (100%)
< 10	3	60.00
>= 10	2	40.00
Co-morbidities	No. of cases (n=55)	Percentage (100%)
Yes	8	14.55
No	47	85.45
HIV	3	37.50
Psychiatric Problems	1	12.50
Diabetes Mellitus	4	50.00
Source of health information	No. of Cases (n=55)	Percentage (100%)
ANM	1	1.81

Doctor	50	90.92
Health Worker	4	7.27
Contact with TB	No. of Cases (n=55)	Percentage (100%)
Family	16	29.09
Neighbors	5	9.10
Co workers	3	5.45
Don't Know	31	56.36
Awareness	No. of Cases (n=55)	Percentage (100%)
No	25	45.46
Yes	30	54.54
Method of precaution	No. of Cases (n=55)	Percentage (100%)
Hand Kerchief	13	23.64
Piece of cloth (sari/towel)	12	21.82
Mask	3	5.45
Nothing	27	49.09
Drug Reactions	No. of Cases (n=55)	Percentage (100%)
Yes	35	63.64
No	20	36.36
Drug Reactions	No. of Cases (n=55)	Percentage (100%)
Yes	35	63.64
No	20	36.36
Drug Reactions	No. of Cases (n=35)	Percentage (100%)
Joint Pains	8	22.86
Nausea	5	14.29
Dizziness	4	11.43
Hearing Loss	3	8.57
Headache	2	5.71
Depression	1	2.86
Others	12	34.28

Table 3: Method of sputum disposal

Practising the method of sputum Disposal	Types	No. of Cases (n=55)	Percentage (100%)
	Yes	32	58.00
	No	23	42.00
Methods Of Sputum Disposal	No. of Cases (n=55)		Percentage (100%)
Container/Cover	7		12.72
Drainage	4		7.28
Soil	33		60.00
Not using any method	10		18.19
Not getting Sputum	1		1.81

Table 4: Socio-demographic factors among the cured on MDR Therapy

Socio-demographic characteristics of the cured MDR-TB patients	No. Of Patients (n=5)	Percentage (100%)
AGE	<30	1(16.7%)
	30-40	2(33.3%)
	40-50	1(16.7%)
	50-60	1(16.7%)
	>=60	1(16.7%)
SEX	MALE	5(83.3%)
	FEMALE	1(16.7%)
LOCALITY	RURAL	5(83.3%)
	URBAN	1(16.7%)
RELIGION	HINDU	5(83.3%)
	MUSLIM	1(16.7%)
SOCIOECONOMIC STATUS	CLASS II	0(0.00%)
	CLASS III	3(66.6%)
	CLASS IV	2(33.3%)

QUALITY OF LIFE OF MDR-TB PATIENTS

Table 5: Mean and standard deviations of all domains in association with socio-demographic factors

SOCIODEMOGRAPHIC FACTORS		NO. OF CASES	DOMAIN I		DOMAIN II		DOMAIN III		DOMAIN IV	
			MEA N	SD	MEA N	SD	MEA N	SD	MEA N	SD
AGE	<30	14	89.11	16.05	57.29	14.18	31.14	7.05	89.14	21.82
	30-40	18	80	25.36	59.56	19.35	31.11	6.8	95.11	18.59
	40-50	14	84.57	22.35	60.57	20.08	34.57	5.99	91.14	16.17
	50-60	6	84	18.42	64.33	7	36	2.53	98.67	9
	>=60	3	69.03	34.02	61.83	23.44	24	4	86.67	23.44
SEX	MALE	38	81.26	23.49	60.21	18.57	31.16	7.33	89.68	18.89
	FEMALE	17	88.47	17.77	58.85	15.3	34.35	4.01	98.82	14.61
LOCALITY	RURAL	42	80.19	22.33	56.67	16.78	31.33	6.78	89.14	18.18
	URBAN	13	94.15	17.56	69.23	16.92	34.77	5.51	103.4	13.05
RELIGION	HINDU	46	82.17	22.93	59.04	18.07	31.56	6.13	91.56	19.16
	MUSLIM	9	90.22	15.51	62.67	14.83	35.11	7.15	97.33	10.19
SOCIOECONOMIC STATUS(CLASSES)	II	5	86.4	24.59	59.2	21.79	32	9.79	100.8	14.25
	III	19	88.84	18.02	64	17.28	31.58	7.41	89.05	21.37
	IV	31	79.74	23.66	57.03	17.03	32.52	5.73	93.29	16.31
HISTORY OF	YES	15	72.8	24.89	57.87	19.35	30.67	7.66	88.53	17.29

SMOKING	NO	40	87.5	19.64	60.3	16.98	32.7	6.2	94	18.32
HISTORY OF ALCOHOLISM	YES	18	75.78	26.62	61.78	21.66	31.33	7.67	94.44	19.02
	NO	37	87.24	18.59	58.59	15.32	32.54	6.12	91.57	17.76
HISTORY OF TOBACCO	YES	5	73.82	24.16	50.91	18.51	30.54	8.44	86.91	17.07
	NO	50	85.91	20.99	61.82	16.76	32.54	6.14	93.91	18.21
COMORBIDITIES	YES	5	75.2	36.49	58.4	30.54	32	6.93	92.8	24.4
	NO	50	84.32	20.39	59.76	16.17	32.16	6.66	92.48	17.62

Table 6: Analysis of Variance among all domains by using the ANOVA test

DOMAINS		SUM OF SQUARES	Df	MEAN OF SQUARES	F Ratio	P Value
DOMAIN 1	BETWEEN	1849.018	6	308.17	13.859	<0.001
[Physical]	ERROR	8404.945	378	22.235		
DOMAIN 2	BETWEEN	4539.733	5	907.947	41.345	<0.001
[Psychological]	ERROR	7115.055	324	21.96		
DOMAIN 3	BETWEEN	4320.194	2	2160.097	185.404	<0.001
[Social]	ERROR	1887.418	162	11.6507		
DOMAIN 4	BETWEEN	4364.8	7	623.54	33.406	<0.001
[Environment]	ERROR	8063.418	432	18.66		

Table 7: Comparison of mean scores among all domains

DOMAINS	Mean	Std. Deviation	F Ratio	P-Value
DOMAIN 1 [Physical]	83.491	21.977	13.859	<0.001
DOMAIN 2 [Psychological]	59.636	17.508	41.345	<0.001
DOMAIN 3 [Social]	32.145	6.62	185.404	<0.001
DOMAIN 4 [Environment]	94.133	19.477	33.4065	<0.001

RESULTS:

A total of 55 multidrug-resistant tuberculosis (MDR-TB) patients were included in the study. The findings are presented under the following categories: socio-demographic characteristics, clinical profile, treatment outcomes, and quality-of-life assessment. Among the study participants, the largest proportion belonged to the 30–40 years age group (32.74%), followed by those aged 40–50 years (23.64%), below 30 years (25.46%), 50–60 years (10.90%), 60–70 years (5.45%), and above 70 years (1.81%). Male participants constituted 69%, while females

constituted 31%. The majority of patients were residents of rural areas (76.36%), with 23.64% residing in urban localities. Regarding educational status, 60.03% of the patients were illiterate. Others had completed primary (5.45%), middle school (10.90%), high school (18.18%), pre-university course (3.63%), or undergraduate education (1.81%). In terms of occupation, 34.54% were farmers or business owners, followed by unemployed individuals (27.25%), unskilled workers (25.47%), skilled workers (9.09%), and students (3.65%). Most participants were married (89.09%), and the predominant religion was

Hinduism (83.6%), followed by Islam (16.4%). Based on the Modified Kuppuswamy socioeconomic classification, 56.36% belonged to Class IV, 34.54% to Class III, and 9.09% to Class II. A majority of participants belonged to nuclear families (74.54%), while 14.54% lived in joint families and 10.92% in separated households. Regarding housing conditions, 56.36% resided in pucca houses, 18.19% in semi-pucca houses, and 25.45% in kutcha houses. Adequate household ventilation was present in 56.37%, whereas 63.64% of households reported indoor air pollution. A history of smoking was reported by 27.27% of patients, while 72.73% were non-smokers. Among smokers, nearly half had been smoking for 10–20 years (46.65%), and most consumed less than one pack per day (66.67%). Alcohol consumption was reported by 32.73% of patients, with 55.55% of them having a history exceeding ten years. Tobacco chewing was reported by 9.09% of participants. Comorbid conditions were present in 14.55% of patients. Among these, 50% had diabetes mellitus, 37.5% were HIV-positive, and 12.5% had psychiatric illnesses. The primary source of information regarding tuberculosis was doctors (90.92%), followed by health workers (7.27%) and ANMs (1.81%). A history of contact with TB patients was reported by 43.64%, most commonly within family members (29.09%). Awareness about tuberculosis and its complications was observed in 54.54% of patients, whereas 45.46% lacked adequate awareness. Nearly half of the participants (49.09%) reported not following any preventive measures, such as covering the mouth while coughing. Safe sputum disposal practices were followed by 58% of participants, most commonly by covering sputum with soil (60%). Adverse Drug Reactions: Adverse drug reactions to MDR-TB therapy were reported by 63.64% of patients. The most frequently observed reactions included joint pain (22.86%), nausea (14.29%), dizziness (11.43%), hearing loss (8.57%), headache (5.71%), depression (2.86%), and other reactions such as psychiatric symptoms (34.28%). At the time of assessment, 52.73% of patients were still undergoing treatment. Treatment interruption was noted in 18.18%, while 10.91% were declared cured. Treatment completion was observed in 9.09%, 7.27% of patients had died, and 1.82% had progressed to extensively drug-resistant tuberculosis (XDR-TB). Among cured patients, the majority were males, belonged to the 30–40 years age group, resided in rural areas, and belonged to Class III socioeconomic status. Quality of life was assessed across four domains using the WHOQOL-BREF instrument. The Environmental domain recorded the highest mean score (94.13 ± 19.47), followed by the Physical domain (83.49 ± 21.98). The psychological domain had a moderate mean score (59.63 ± 17.51), while the social domain showed the lowest mean score (32.15 ± 6.62). Higher quality of life scores were observed

among younger patients, females, urban residents, individuals without substance abuse, and those without comorbidities. Analysis of variance (ANOVA) revealed statistically significant differences across all four domains of quality of life. Significant associations were observed for:

- Social domain ($F = 185.404$; $p < 0.001$)
- Psychological domain ($F = 41.345$; $p < 0.001$)
- Environmental domain ($F = 33.406$; $p < 0.001$)
- Physical domain ($F = 13.859$; $p < 0.001$)

These findings indicate that multidrug-resistant tuberculosis has a significant impact on multiple dimensions of patients' quality of life. The environmental conditions, more than half of the participants (56.36%) lived in pucca houses, followed by 25.45% in kachha houses and 18.19% in semi-pucca houses. Adequate ventilation was present in 56.37% of houses, while 43.63% had inadequate ventilation. Indoor air pollution was reported in 63.64% of households, whereas 36.36% had no indoor air pollution. To assess the risk among household contacts, the immunisation status of patients' children was recorded. Most children (83.64%) were immunised, while 16.36% were not. Awareness and information about the disease, the majority of patients (90.92%) received primary information related to laboratory confirmation and treatment from doctors. A smaller proportion obtained information from health workers (7.27%) and ANMs (1.81%). [Tables:1-7]

DISCUSSION

This survey aimed to study the quality of life of MDR-TB patients and their outcomes, which were evaluated by using the WHOQOLBREF questionnaire. It has several dimensions. The effect of disease on each dimension can be assessed using instruments. Genetic factors, specific to chronic diseases, like hypertension, leprosy, asthma, and depression, have been studied using the WHOQOLBREF scale, which has four domains, used to assess the impact of MDR-TB on the QOL and also an in-depth understanding of the effect of the disease on various dimensions of health. MDR-TB is a very dangerous condition that affects the quality of life of patients who get infected. [23]

In the present study, (32.74%) 30-40, (23.64%) 40-50, (25.46%) <30, (10.90%) 50-60 years of age. But the study conducted by Sunitha Tripathy et al study found that (85%)16-45 years, where most of them were in the economically productive age group. The maximum number of patients (59%) 16-30 years, (8%) 0-15 years and (3%) > 60 years age group.[25] But different results were observed by Chunxiao Zhang et al research, ≤ 29 (13.59%), 30–59 (22.3%) and ≥ 60 years (64.11%). [32] Our study found that 69.00% male, and 31% were female patients with a sex ratio of 7:3. Similar results were noted from Sunitha Tripathy et al,

79% males and 21% were females. Thus, the male-female ratio was approximately 4:1. [25] Similar results were observed in M. Giridhar Kumar et al, 86% were male patients and 7(14%) were female patients.[33] Singla R et al study also found similar results, with the majority of males, with an age of $27.6 \mu \pm 10.5$ SD years, there were 25 males and 21 females. [15] Similar results were found by Nafees Ahmed et al, where females were 24.7%, and males were 75.3%. [34] Chunxiao Zhang et al research also found a similar finding. [32] Similar results were shown by L. Surkova et al in Belarus. 934 TB patients, of whom 660 were men ($70.67 \mu \pm 1.5$ SD), and 274 were women ($29.33 \mu \pm 1.5$ SD). Males were significantly more than the females. [35] But results that were observed in Vega et al, males were 49.3%, and females were 50.7%, which were different from this study. [36] In the present study, the literacy rate was 39.97%. where an increase in literacy rate of 76.6% was seen in Punith Patel et al. [24]. In our study, 89.09% married, and 10.91% were unmarried. Similarly, Taha Ayyub et al research also showed that the majority were married 60.6% and 39.4% single.[18] In the given study, 76.36% were residing in rural areas, and 23.64% in urban areas. Similarly, found in Raman Sharma et al, the majority of them were residing in 61.6% rural areas and 38.3% in urban areas.[26] In our study, the majority of them were farmers and business people, 34.54%, followed by 25.47%, 27.25%, 9.09%, and 3.65% unskilled, unemployed, skilled, and student, respectively. M. Dhuria et al also showed similar findings, with the majority of them being labourers 17.8%, followed by shopkeepers 12.2%, business 4.4%, unemployed 8.9%, and students (1.1%). [29] Whereas in Singla R et al have different findings, like 54.3% were unemployed. [15] The recent study found that the majority of them were Hindu (83.6%) and Muslim (16.4%). Similarity found in Lawrence Camillus Raj Kumar et al multicentric study, 77% Hindu, 17.2% Muslim, 5.4% Christian, and 0.3% belonged to other faiths. [23] As per modified Kuppaswamy's classification, the majority of them were upper lower class IV (56.36%). Similarity found in the Singla R et al study, 54.3% of the upper and lower classes. [15] The majority were nuclear families with 74.54%, followed by joint families 14.54% and separated families 10.92%. Almost similar findings, Jamil Raazi et al presented that 70.37% belong to a nuclear family, and 29.63% belong to a joint family. [17] Among all cases, 27.27% history of smoking, and 32.73 % history of alcoholism. Likewise, Jamil Raazi et al reported that the most common substance abuse was tobacco, 44.44%, and 16.66% history of alcoholism. [17]

Our study, 14.55% had a history of co-morbidities, among them 50.00% Diabetes Mellitus, 37.50% HIV, 12.50% psychiatric problems, and 85.45% were not associated with co-morbidities. If compared to Jamil

Raazi et al study, a decreased percentage without comorbidities, 62.96% and 37.03% were observed with comorbidities. Among them, 6.06% were Diabetes Mellitus, [17] out of 35 patients, weakness 34.28% was the most common type, followed by joint pains 22.86%, Nausea 14.29%, Dizziness 11.43%, Hearing Loss 8.57%, Headache 5.71% and Depression (2.86%). But different seen in Arif I Dela et al, gastrointestinal symptoms 24.5% most common, followed by weakness 21.23%, psychological 14.38%, joint pain and respiratory symptoms 14.38%. [19] Our study, 42.00% followed safe sputum disposal practices, & 58.00% did not follow any methods. T. Rekha et al found that slightly more than 50% Safe sputum disposal practices. [28] 54.54% of them were unaware of the treatment and complications, and 45.46% knew about TB, treatment and its duration, and complications. Fazlu Rehman et al reported that an increased percentage, 59% unaware of severe complications, treatment and side effects of drugs in TB medication. 58% believed that TB was a short-lived infectious disease and curable, whereas 28% had opposite, negative thoughts; also said that TB was not at all curable. [20] **History of contact with TB:** In the present study, 29.09% had a family history of TB, followed by 9.10% neighbours, and 5.45% coworkers in the workplace. Rekha, P. Singh et al have a different observation from our research, with a 19% Family history of TB. [28], But Law et al. research found that the treatment-naïve subgroup of MDR-TB patients were significantly younger with a higher proportion of females, non-permanent residents, frequent travellers, previously treated subgroups, and had contact history, but fewer ever-smokers.[30] The present research, 10.91% were declared cured, 9.09% treatment completed, 7.27% died, 18.18% treatment on interruption, 1.82% treatment failure and 52.73% were still on treatment but differently reported from Deepak Aggarwal et al, 55% were declared cured, 7.9% completed treatment, 16.4% died, 9.3% defaulted on treatment, 3.6% had treatment failure and 7.9% were shifted to EXDR-TB therapy.[21] Malik M. Pamar et al research showed the different results with treatment outcomes: 60.9%, while 39.0% were still on treatment.[15] out of 2264 patients, 34.5% treatment success, 28.4% died, 29.6% lost to follow-up, and 7.5% experienced treatment failure or were changed to XDR-TB treatment.[16] Sangita V. Patel et al showed different findings. After 24 months of treatment, out of 145 patients, 33.10% declared cured, 5.50% completed their treatment, 29.70% died during the treatment, and 21.10% defaulted during treatment.[22]

Age-wise distribution, among cured MDR-TB with sputum-negative conversion showed that 33.3% belonged to the 30–40 years age group, while equal proportions, 16.7% each, were observed in the <30 years, 40–50 years, 50–60 years, and >60 years age

groups. A majority of the cured patients were males (83.3%). These findings differ from the study conducted by Deepak Aggarwal et al, where the mean age among cured patients was 30.3 ± 13.1 years, and males constituted 59% of the cured cases. [21] Among 55 MDR-TB cases, 33% had a history of treatment interruption, and 65% were relapse cases. The major reasons for treatment interruption among defaulters were adverse drug effects and migration related to work. In contrast, Johnson J et al reported that among 52 MDR-TB cases, 69.2% had a history of treatment default, while only 21.2% were relapse cases. The common reasons for default in their study included travel, adverse drug reactions, lack of symptomatic relief, and treatment-related costs. [31] These variations across studies may be attributed to differences in patient demographics, occupational mobility, healthcare access, and programmatic support in different regions. Age-wise distribution of Quality of Life (QOL) showed that patients aged 50–60 years obtained higher mean scores across all four domains compared to other age groups, indicating a comparatively better QOL. In contrast, patients aged above 60 years had lower mean scores, reflecting poorer QOL. These findings differ from the study by Lawrence Raj Kumar et al, where younger MDR-TB patients aged 18–30 years showed higher mean scores in all domains, suggesting better QOL in younger age groups. However, both studies consistently reported lower QOL scores among patients above 60 years of age. [23] Regarding religion, the majority of MDR-TB patients in the present study were Hindu (83.6%), followed by Muslims (16.3%). Patients belonging to the Muslim religion showed higher mean scores across all domains compared to Hindus. Similar observations were reported by Lawrence Raj Kumar et al., where patients from minority religious groups demonstrated higher mean scores in most domains. Muslims (17.2%) had higher mean scores across domains except the environmental domain, where Christians (5.4%) scored higher. [23] Present study, among the MDR-TB patients, in gender gender-wise distribution of domains, female scores were higher when compared to male patients. Both male (31.1) and female (34.3), the social domain recorded the lowest mean scores, indicating significant social impairment due to MDR-TB. Similar results were found in the study carried out by Lawrence Raj Kumar et al, multicentric research, both males (52.4) and females (47.6) had lower mean scores in the social domain when compared to other domains. [23] In our study, males have lower mean scores in all domains except in the psychological domain (60.21%) when compared to females. Different results were observed in Meera Dhuria et al., who reported that females were more economically and socially affected than males. [29] The given study showed lower mean scores in the social domain, followed by the psychological domain. Mean scores of the QOL were

highly significant for all the domains and the overall quality of life. is a significant impact ($P > 0.01$) on psychological (F-ratio = 41.345) and social domain (F-Ratio = 185.404). Similar results were found in R Sharma et al, where the environmental followed by psychological domains were the worst affected. The mean differences in scores for MDR-TB 6.83 & PTB 4.81 cases were highly significant for all the domains and the overall QOL. There is a significant impact ($P > 0.01$) on Psychological (F-ratio = 49.201) and Environmental domain (F-Ratio = 65.311). [26] The Present study showed that high mean scores for environmental (94.133) and physical (83.491) domains were highly significant with MDR-TB. There is significance among all the domains in my study, but differences were observed in Taha Ayyub et al, with the low mean scores, in all domains, and there is a significant impact on the Physical and Psychological domain ($p = 0.28$ & 0.38). [18] Our study had high mean scores for environmental (94.133) and physical (83.491) domains, and statistically significant, but different results were found in Balgude & Sontakke et al The physical domain, followed by the psychological was the worst affected.³⁷ The highest mean score was environmental (94.133) and the lowest score in the social domain (32.145), but Sule et al showed different like the highest score in the QOL rating being (12.54 ± 3.03) in the physical health, while the lowest score in the environment (11.10 ± 1.82) then followed by the psychological domain (11.44 ± 2.63). [27]

CONCLUSION

The study assessed the quality of life (QOL) of patients with MDR-TB in Kalaburagi district, Karnataka. Although the government provides free treatment and health workers create awareness about TB, many patients do not fully utilise these services. Social stigma, temporary relief of symptoms during treatment, and other factors lead to poor treatment adherence, failure of first-line therapy, and development of drug resistance, also showed that QOL was affected in all four domains—physical, psychological, social, and environmental. Among these, the social domain had the lowest scores, indicating problems with personal relationships, social support, and sexual life. Social stigma related to TB caused patients to feel isolated, anxious, and fearful of disclosure. Many patients experienced psychological distress, including low self-esteem, negative feelings about health and survival, and anxiety. Patients also reported restrictions in movement, reduced participation in daily activities, and strained relationships with family and friends due to a lack of support over time. Drug-resistant TB remains a major challenge in TB control. Treatment adherence depends on multiple factors related to

patients, healthcare providers, and the community. To reduce loss to follow-up, efforts should focus on managing drug side effects, introducing shorter treatment regimens, reducing pill burden, providing motivational counselling, offering flexible DOT timings, strengthening family and social support, and improving disease awareness. Factors significantly associated with MDR-TB included productive age group, male gender, previous TB treatment, incomplete treatment, contact history with MDR-TB cases, co-morbidities, and substance abuse. A large proportion of patients lacked awareness about the causes of TB and safe sputum disposal practices.

RECOMMENDATIONS:

Educational materials should be developed to improve public awareness about TB. Counselling should be provided to both patients and their family members regarding disease transmission, treatment, and prevention. Family members should be encouraged to support patients throughout the long and demanding treatment period. Psychological and social support should be strengthened to improve patients' quality of life. Awareness about proper nutrition should be increased, as patients are on long-term, high-dose antibiotic treatment.

STRENGTHS:

The present study is more focused on individual

Clinico-epidemiology, drug reactions, and Quality of life among MDR-TB cases.

LIMITATIONS:

Recall bias may be present due to the subjective nature of responses. As this was a community-based prospective analytic cross-sectional study, causal relationships could not be established.

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LIST OF ABBREVIATIONS:

AIDS	Acquired Immune Deficiency Syndrome
ATT	Antitubercular Treatment
ADRS	Adverse Drug Reactions
BMI	Body Mass Index
CXR	Chest X-ray Radiographs
DRTB	Drug-Resistant Tuberculosis
DMC	Diagnostics Microscopic Centre
DTO	District Tuberculosis Office
DOTS	Directly Observed Treatment, Short-Course
DBT	Direct Benefit Transfer
FDC	Fixed-Dose Combination
HR-TB	Isoniazid Drug-Resistant Tuberculosis
HIV	Human Immunodeficiency Virus
MDR-TB	Multiple Drug-Resistant Tuberculosis
NPY	Ni-Kshaya Poshana Yojana
NTEP	National Tuberculosis Elimination Program
NTB	Nutrition Tuberculosis App
NSP	National Strategic Plan
QOL	Quality Of Life
PMDT	Programmatic Management of Drug-Resistant Tuberculosis
RNTCP	Revised National Tuberculosis Control Program
RR-TB	Rifampicin Drug-Resistant Tuberculosis
TB	Tuberculosis
WHO	World Health Organisation
WHOQOLBREF	World Health Organisation Quality of Life - brief version
XDR-TB	Extensive Drug-Resistant Tuberculosis



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