Assessment of Degree of Breathlessness Among Pulmonary Tuberculosis Patients: A Cross-Sectional Study

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Abstract: *Background: Breathlessness is a common symptom in pulmonary tuberculosis (TB), impacting patients' quality of life and functional capacity. Objective: To assess the degree of breathlessness among pulmonary TB patients. Methods: A cross-sectional study was conducted among pulmonary TB patients of Community health centre of Haridwar district, Uttarakhand. Data on breathlessness severity were collected using a standardized scale and analyzed descriptively. Results: Of the 130 patients, 76% were not troubled with breathlessness except during strenuous exercise, 12% became short of breath when hurrying or walking up a slight hill, 7% had to stop after walking at their own pace for about fifteen minutes on level ground and 5% stopped after covering more than hundred yards or just a few minutes of activity on level ground. None were too short of breath to walk around the block or take off their clothes. Conclusion: Most of the pulmonary TB patients had only mild breathlessness; fewer had moderate and severe restrictions. These findings demonstrate the necessity of early recognition and treatment of respiratory symptoms to achieve remission.*

Keywords: Pulmonary tuberculosis, breathlessness, Health related Quality of life, Cross-sectional

Abbreviation: PTB- Pulmonary tuberculosis, TB- tuberculosis, mMRC dyspnea Scale- Modified Medical Research Council Dyspnea Scale

1. Introduction

Tuberculosis (TB), tuberculosis is a disease caused by the bacterium Mycobacterium tuberculosis and most often affects the lungs - if not treated successfully, is fatal within 5 years in 50-65% of cases. Transmission is frequently droplets respiratoric. Mycobacteria Other mycobacteria from family Mycobacteriaceae and the order Actinomycetales. Clinically, the major pathogenic species is M. tuberculosis. TB now majority are human-to-human transmission of TB through the inhalation of organisms in aerosols generated by patients with active PTB cough or sneeze, and sometimes also when patient speaks or from close encounters with TB patient contaminated secretions. (The nuclei are small droplets, which rapidly dry up and most of them less than a few hours could be airborne (diameter < 5-10 μm) and may reach tract terminal respiratoria when they inhale. There are some 3000 odd of lining that you can infect in any cough. Transmission is influenced by the likelihood of close contact with TB cases, intensity and duration of such contacts, the capacity of infectious cases and co-existence within similar neighborhoods [1]. Pulmonary tuberculosis (TB) is still one of the most important infectious diseases in the world, with a significant morbidity and mortality burden, even though both the diagnostic and therapeutic strategies have improved. Worldwide, it is estimated that 2 billion people have latent TB infection and in year 2021 alone, tuberculosis resulted in 1.6 million deaths with 187,000 occurring among people living with HIV [9]. It ranks as the second overall cause of infectious disease-related death after COVID-19 with a growing epidemic of multi-drug-resistant TB and HIV coinfection adding to its burden [9].

TB most commonly leads to lung destruction; however, it can affect other areas of the body as well. But breathlessness is also a key clinical characteristic with immediate effects for the patient's functional capability and quality of life [2]. The Modified Medical Research Council (mMRC) dyspnea scale is a validated, commonly used instrument for characterizing the severity of breathlessness, which has implication in predicting disease progression and enabling supportive interventions [3].

The findings from previous research supports the importance of assessing dyspnea among TB populations. Achadiono et. al. (2016) found that pulmonary TB sequelae was significantly related to decreased exercise capacity, as reflected by higher dyspnea scale scores and limitations in daily activities [1]. Similarly, Retnowulan et. al. (2018) that patients with post TB lung disease experienced different types of breathlessness, the intensity of which was significantly associated with a reduced physical performance and overall quality of life [10]. Recent studies demonstrated that exertional dyspnea is one of the common symptoms among TB patients suffering from lung disease with significant physical disability and functional impairment, especially in those with complications including secondary pneumothorax [6].

2. Materials and Methods

Study Design and Setting
The present study is a cross-sectional observational study carried out among patients with pulmonary tuberculosis attending Community health centre of Haridwar district, Uttarakhand. The study took place at the outpatient and

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inpatient departments of the facility, and presented a cross section of patients actively seeking care for pulmonary TB. The criteria for selecting of the study setting are the availability of subjects, feasibility of conducting the study and the investigator's familiarity with the setting because of clinical exposure. The design was selected to map the distribution of breathlessness intensity at one point in time which facilitate descriptive analysis of patient-reported respiratory symptoms.

Participants
Consecutively 130 cases of pulmonary TB were recruited over the study period. Adult patients with confirmed pulmonary tuberculosis, who could give informed answers to the interview constituted the inclusion criteria and who have undergone treatment in continuation phase. Patients with severe cognitive impairment, who were unwilling to participate & who were diagnosed with multidrug resistant TB (MDR-TB) and extensively drug-resistant TB (XDR-TB) were not included. This strategy of sampling resulted in a study population representative of the clinical spectrum of TB attending community health centre.

Data Collection
The degree of breathlessness was assessed using a structured questionnaire adapted from the Medical Research Council (MRC) dyspnea scale, a validated instrument widely employed for grading respiratory limitation, consisting of 5 scales from 0 to 4 showing the degree of shortness of breath from no shortness of breath to severe levels. Data were collected through direct patient interviews conducted by trained personnel, ensuring consistency in administration and minimizing interviewer bias. Responses were recorded systematically to maintain accuracy and reliability.

Data Analysis
Descriptive strategies were used to analyze the data. We reported frequencies and percentages to describe the distribution of breathlessness severity in the overall study sample. These findings were summarized to illustrate the sociodemographic and clinical features for different severity levels of dyspnea.

Ethical Considerations
Ethical approval for the study was obtained from the Institutional Ethics Committee of Shri Swami Bhumanand College of Nursing and Paramedical Institute. All participants were informed about the purpose of the study, and written informed consent was obtained prior to enrollment. Confidentiality of patient information was strictly maintained, and data were anonymized to protect participant identity.

3. Results

Description of socio demographic data
Table 1; demographics of study participants, provides an extensive analysis of 130 respon- dents on ten main variables. The sample is approximately evenly distributed across gender, with 52% female and 48% male. The majority are married (62%) and literate (68%); however, a significant proportion are illiterate (32%). There is low employment and 28% are working and 72% jobless It has socio-economic

implications. The population is overwhelmingly rural (91%), therefore the study focusses on rural populations. Lifestyle characteristics indicate that 25% are smokers, and 14% are alcohol drinkers, with 84% being non-vegetarians. The remainder (19%) say they have other health issues, indicating a relatively healthy group. Receiving of care is mainly done from primary caregivers (98%), indicating the presence of strong family or immediate support system. Such data, provide a clear picture of the social characteristics, economic conditions and health status of the population which is useful for designing appropriate interventions or policies.

Socio economic determinants
The sociodemographic characteristics of this group underline that inequality continues to be a determinant of the TB epidemic. The fact that the vast majority resided in rural areas (91%) underscores the disproportionate impact on poorer, under-resourced settings where diagnostic facilities and adherence support for treatment are scanty [11]. The high unemployment rate (72%) is also indicative of the socioeconomic vulnerability of affected patients, underlining the two-way relationship between poverty and tuberculosis [11]. These results highlight the need for TB control strategies to move beyond biomedical measures and embrace social protection interventions including nutritional supplementation and economic support.

Lifestyle risk
Lifestyle factors compound this vulnerability. Tobacco use was observed in one fourth of patients, and has been repeatedly linked to delayed sputum conversion, higher relapse rate, and inferior treatment response [4]. In the same way, consumption of alcohol, presented in 14% of our series, has also been associated with treatment failure and relapse [5,6]. These figures underscore the need to integrate behavioral interventions (e.g., cessation support, counseling and community-based risk reduction) into TB programs. The high prevalence use of primary caregiver (98%) suggests the importance of family support in maintaining adherence but also implies possible caregiver burden. Formal caregiver education and engagement activities might enhance this aspect of care [11].

Integrated care
Comorbidities occurred in almost one-fifth of patients, rendering management more difficult. Such integrated people-centered approaches that connect TB services to wider non-communicable and infectious disease programs are necessary to stem the fragmentation of care and enhance its effectiveness [7,8]. Collectively, these findings serve to underline that TB control is not possible through purely biomedical interventions. Caregiver support multi-faceted approach covering social determinants, and lifestyle modification is essential for the progress toward global TB elimination targets.

Table 1: Description of frequency and percentage distribution of pulmonary tuberculosis based on socio demographic variables, N=130

| S.no.	Demographic Variables	Frequency (F)	Frequency Percentage (F%)
1	**Gender**		
	(a) Male	63	48
	(b) Female	67	52
2	**Marital Status**		
	(a) Married	81	62
	(b) Unmarried	49	38
3	**Level of Education**		
	(a) literate	88	68
	(b) Illiterate	42	32
4	**Job Status**		
	(a) Employed	37	28
	(b) Unemployed	93	72
5	**Type of Residency**		
	(a) Urban	12	9
	(b) Rural	118	91
6	**Smoking Status**		
	(a) Smoker	32	25
	(b) Non-Smoker	98	75
7	**Alcoholic Status**		
	(a) Alcoholic	18	14
	(b) Non- Alcoholic	112	86
8	**Type of diet**		
	(a) Vegetarian	21	16
	(b) Non-vegetarian	109	84
9	**Other Health Problem**		
	(a) Yes	25	19
	(b) No	105	81
10	**Caregiver**		
	(a) Primary	127	98
	(b) Secondary	3	2

Description of Degree of breathlessness

Table 2 depicts, the scale groups individuals according to the degree of their breathlessness, which can vary from being troubled only on strenuous exercise to too breathless to leave the house. The majority (76%) of patients experience only mild breathlessness when at the height of their activities, while 12% became symptomatic during hurrying or walking uphill. Some 7 percent are modestly limited, having to stop after walking a mile or 15 minutes; another 5 percent have greater impairment - stopping after only 100 yards. Evidently, no one in the sample is experiencing severe level of shortness of breath suggesting that severe respiratory impairment is not present in this group. In general, this data indicates a mild (or no) shortness of breath among most of the participants but less than a tenth with moderate or severe symptoms. This distribution is helpful when evaluating functional capacity and need for clinical or public health intervention.

The findings of the degree of breathlessness in this investigation can be accounted for by a complex interplay of disease pathology, socioeconomic status, lifestyle hazards and clinical profile of population. Pulmonary tuberculosis mainly affects lung parenchyma, however in this group the patients were early in the symptoms or with preserved respiratory function, that is why 76% of them referred for only breathlessness during moderate effort. The small proportion of patients who did not experienced severe breathlessness (too breathless to leave the house or too breathless to undress) indicates that in this network, advanced respiratory insufficiency was an infrequent phenomenon, possibly because diagnosis and access to treatment became available early on at the community health center. 68 The socioeconomic factors also have a role as the most of patients were rural dwellers (91%) and unemployed (72%), which frequently is linked with late access to healthcare system and increased vulnerability. Yet, strong support from the primary caregiver (98%) possibly facilitated adherence to treatment and avoided progression to severe disability in patients. Lifestyle risks (smoking, 25%, and alcohol use, 14%) have negative impact on TB outcomes1011 and they probably contributed to the fewer patients (12%–5%) with moderate breathlessness. Moreover, comorbidities present in 19% of patients might have aggravated respiratory restrictions.

In summary, the frequency of low breathlessness is due to retained lung function in the majority and those with moderate severity are probably either those with more severe lung damage, lifestyle risk factors or comorbid disease. The results stress that although severe respiratory disability was lacking, early identification and treatment of breathlessness is still essential to avoid decline in the disease condition as well as in health-related quality of life.

Table 2: Degree of breathlessness among pulmonary tuberculosis patient

S.no.	Degree of breathlessness	Frequency	Percentage (%)
1	Not troubled by breathlessness except on strenuous exercise	99	76
2	Shortness of breath when hurrying on the level or walking up a slight hill	15	12
3	Walk slower on level, stops after a mile or so, or stop after 15 minutes	9	7
4	Stop for breath after walking 100yds or after few minutes on level	7	5
5	Too breathless to leave the house, or breathless when undressing	0	0
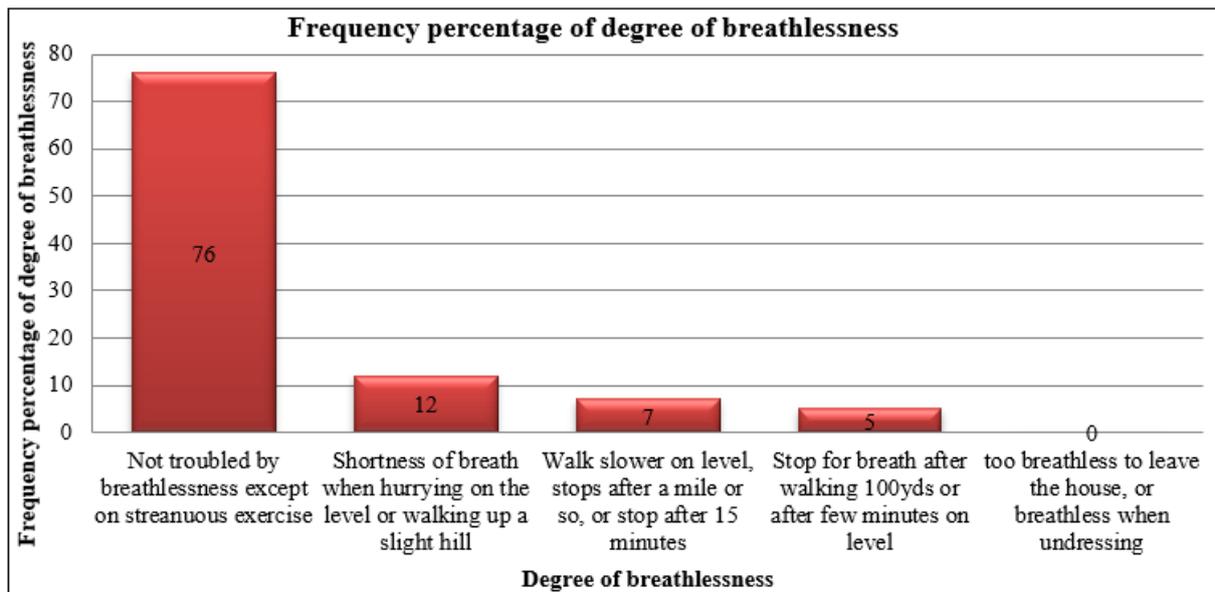
Figure 1: Frequency percentage distribution of degree of breathlessness

4. Discussion

The results demonstrate that most members of this group have only mild dyspnea, mostly during heavy labor, and increasingly less moderate or severe restriction. Perhaps most importantly, nobody falls into the group of very severe breathlessness indicating that no patient in this population appears to be severely disabled for respiratory function. The distribution as a whole also emphasizes a relatively mild functional impairment, the majority having good respiratory function, while only a modest proportion had higher degrees of limitation in day-to-day activities.

A routine service to screen patients for breathlessness with TB can be used to identify those at risk of functional decline and who may benefit from interventions such as pulmonary rehabilitation, nutritional support and psychosocial counseling.

5. Conclusion

This paper creates a fuller picture of the range of respiratory symptoms that patients with PTB suffer. Although most respondents only experienced mild breathlessness, a substantial minority faced moderate to severe dyspnoea, which is likely to seriously affect their daily lives and general health. These data highlight the importance to formally and systematically assess breathlessness in the context of tuberculosis care, rather than rely solely on microbiological or radiographic markers of cure. Introducing routine symptom screening in clinical practice could potentially not only allow the identification of patients at higher likelihood for a lower quality of life (QoL) but also help support and intervene earlier to strengthen QoL-based approaches for tuberculosis care.

In addition to dyspnea management at the patient level, there are important health system and public policy implications resulting from ongoing assessment of dyspnea. Such periodic assessments may inform data-driven decision making for policies that have to do with appropriating resources for rehabilitation and strategic thinking in terms of the embedding of symptom management into national tuberculosis programs. Furthermore, it would allow broader outcome measures in TB research leading to a better understating of the disease. Specific interventions (eg, pulmonary rehabilitation, psychological counselling or adjunctive therapies) should be considered in future research for patients with persistent breathlessness. It is imperative for us to investigate how these interventions affect adherence and recovery trajectories, as well as the long-term health-related consequences.

In summary, the challenge of breathlessness in pulmonary TB management goes beyond relief of symptoms; it is a key element for patient-centered care and plays a role in improving patients' overall QOL. The inclusion of standardized breathlessness assessments into TB care pathways can help to reorient the delivery of health care towards what matters from a patient perspective, and in so doing significantly enhance the impact of TB prevention and control efforts at scale.

6. Implications

The severity of the breathlessness distribution suggests that most patients are still ambulatory and such can only be symptomatic during heavy exertion. For clinicians, this means that clinical monitoring and management should aim at early identification of these presenting from moderate to severe levels (12%–5%) since the latter may be more prone to deterioration over time or reduced quality of life. The absence of severe breathlessness reinforces the statement that, at this point in time, acute respiratory failure is no longer an urgent concern for this population and clinical efforts could be directed towards preventive interventions, personalized exercise therapy and symptom management rather than the aggressive treatment of disability.

7. Strengths

The study, in addition, provides useful information with respect to the functional impact of pulmonary tuberculosis as it screens breathlessness; employing universally accepted Modified Medical Research Council (MMRC) dyspnea scale. One important strength is the standard instrument that was administered and used among face-to-face interviews with patients, enabling sound evaluation of symptoms. The study population in this work was predominantly from a community health center in Haridwar, and we were able to obtain data that are relevant locally with regard to the associations of clinical presentation with socioeconomic and lifestyle factors. Furthermore, the descriptive analyses provide information on the spread of distributions in terms of experiencing breathlessness and confirm that a low level of functional limitation is represented within this sample.

8. Limitations

This study has several limitations that should be acknowledged. First, the cross-sectional design captures breathlessness at a single point in time, which restricts the ability to infer causality or track changes in respiratory symptoms throughout the course of tuberculosis treatment. Second, the reliance on self-reported data using the Modified Medical Research Council (mMRC) dyspnea scale may introduce recall bias or subjective variability in patient responses. Third, we conducted our study in one district health centre and the results may not apply to other settings with different demographic and socioeconomic or healthcare profiles. Furthermore, confounding factors such as the nutritional status, the severity of disease and coexisting respiratory comorbidities were not uniformly adjusted for, which may influence the degree of reported breathlessness. Finally, the sample size is relatively small (adequate for descriptive conclusions) and may not be completely indicative of cases with different pulmonary TB in varied setups.

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Key Messages

- **Rural vulnerability**: The overwhelming rural predominance (91%) underscores the need to strengthen diagnostic and treatment infrastructure in resource-limited settings.
- **Socioeconomic burden:** High unemployment (72%) reflects the intersection of poverty and TB, reinforcing the importance of integrating social protection and nutritional support into TB programs.
- **Lifestyle risks:** Smoking (25%) and alcohol use (14%) are significant contributors to poor treatment outcomes and relapse, necessitating behavioral interventions within TB care.
- **Integrated care imperative:** Co-morbidities (19%) and reliance on primary caregivers (98%) highlight the need for person-centred, integrated approaches that link TB services with broader health and social systems.
- The study population is predominantly characterized by mild exertional breathlessness, with only a minority experiencing moderate to severe limitations and no evidence of extreme respiratory disability.

References

[1] Achadiono W. Functional capacity and dyspnea in pulmonary tuberculosis sequelae patients. Acta Interna J Intern Med. 2016 Dec;6. 123-129 Available from: http://jurnal.ugm.ac.id/jain.

[2] Wbleman P. Respiratory health in focus: pulmonary tuberculosis research and management. J Pulm Respir Med. 2024;14:669. doi:10.37421/2161-105X.2024.14.669.

[3] Fletcher CM, Elmes PC, Fairbairn AS, Wood CH. The significance of respiratory symptoms and the diagnosis of chronic bronchitis in a working population. BMJ. 1959;2(5147):257–66.2. World Health Organization. Global Tuberculosis Report 2025. Geneva: WHO; 2025.

[4] Burusie A, Enquesilassie F, Addissie A, Dessalegn B, Lamaro T. Effect of smoking on tuberculosis treatment outcomes: a systematic review and meta-analysis. PLoS One. 2020;15(9): e0239333.

[5] Heshmati B, Omidi S, Mohammadi Y. Impact of alcohol consumption, substance use, and smoking on treatment outcomes in tuberculosis: a systematic review and meta-analysis. Syst Rev. 2025; 14: 139.

[6] Weiangkham D, Umnuaypornlert A, Saokaew S, Prommongkol S, Ponmark J. Effect of alcohol consumption on relapse outcomes among tuberculosis patients: a systematic review and meta-analysis. Front Public Health. 2022; 10: 962809.

[7] Law S, Baddeley A, Carlqvist A, Mavhunga F, Viney K, Daftary A. Person-centred care for people with tuberculosis-associated comorbidities: a multi-country qualitative study. BMJ Open. 2025;15(11): e 123456.

[8] Tabackman A, Cowan S, Calderwood C, Sinha P. Reframing TB care: a perspective on multimorbidity-centered care for people with TB. Trop Med Infect Dis. 2025;11(2):37.

[9] Syeda S, Bronze MS. Tuberculosis (TB): Background, Pathophysiology, Etiology. Medscape. Updated Oct 31, 2024.

[10] Retnowulan R. Dyspnea severity and quality of life in post-tuberculosis lung disease [thesis]. Jakarta: Universitas Indonesia; 2018.

[11] World Health Organization. Global Tuberculosis Report 2025. Geneva: WHO; 2025.