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A Cross-Sectional Study to Assess the Proportion and Determinants of Face Mask Usage Among Tuberculosis Patients at a Tertiary Care Manorama Raje TB Hospital in Indore, India

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Abstract

Background: Tuberculosis (TB) is a major airborne infectious disease in India. Use of face masks by TB patients is an effective source-control measure to reduce transmission. However, compliance remains suboptimal due to multiple sociocultural and knowledge-related factors.
Objectives: To assess the proportion of face mask usage and identify determinants influencing mask-wearing behaviour among TB patients.
Methods: A hospital-based cross-sectional study was conducted among 150 confirmed pulmonary TB patients attending Manorama Raje TB Hospital, Indore. Data were collected using a pre-tested structured questionnaire. Descriptive statistics and chi-square tests were applied using SPSS. A p-value <0.05 was considered statistically significant.
Results: Only 28.7% of patients reported consistent mask use. Mask usage was significantly associated with higher education level ($p<0.05$) and good knowledge of TB transmission ($p<0.01$). Major reasons for non-compliance included discomfort (42%) and social stigma (28%).
Conclusion: Mask usage among TB patients was low. Strengthening health education and addressing stigma are crucial to improve compliance and reduce TB transmission.
Keywords: Tuberculosis, Face mask, Infection control, Cross-sectional study, India.

Introduction

Tuberculosis (TB) remains one of the most significant public health challenges in **India**. Despite being a **preventable and curable disease**, India contributes the **largest share of TB cases globally**, making TB control a national priority According to the **World Health Organization (WHO)**, TB is one of the top infectious killers worldwide. India accounts for **about one-quarter to one-third of the global TB burden**, highlighting its central role in achieving global TB elimination targets.

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Tuberculosis (TB) remains a significant public health problem in India, Airborne transmission through droplet nuclei is the primary mode of spread. Face masks act as an effective source control by reducing the expulsion of infectious aerosols from TB patients. Despite national guidelines advocating mask usage, adherence among patients remains inadequate. Understanding the determinants of mask usage is essential for designing effective interventions.

Materials and Methods

Study Design and Setting

A hospital-based cross-sectional study was conducted at Manorama Raje TB Hospital, Indore, Madhya Pradesh.

Study Population

Confirmed pulmonary TB patients attending outpatient or inpatient services during the study period.

Sample Size

Sample size was calculated using the formula:

$n = Z^2 \times P(1-P) / d^2$

At 95% confidence level (Z = 1.96), expected prevalence (P = 0.5), and margin of error (d = 0.08), the final sample size was **150 patients**.

Data Collection Tool

A structured, pre-tested questionnaire (English and Hindi) covering:

- Sociodemographic details
- Clinical characteristics
- Knowledge regarding TB transmission
- Mask usage practices and reasons for non-compliance

Data Analysis

Data were entered in Microsoft Excel and analysed using SPSS version 26.0. Continuous variables were summarized using mean and standard deviation, while categorical variables were expressed as frequencies and percentages. Bivariate analysis was performed using the Chi-square test to assess the association between consistent mask usage and independent variables such as age group, gender, education level, and knowledge of TB transmission.

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Variables with p-value <0.20 in bivariate analysis were entered into a multivariable binary logistic regression model to identify independent predictors of consistent mask usage. Adjusted odds ratios (AORs) with 95% confidence intervals (CI) were calculated. Model fitness was assessed using the Hosmer–Leme show goodness-of-fit test. A p-value <0.05 was considered statistically significant.

Results

Table 1: Sociodemographic Characteristics of Study Participants (n=150)

Variable	Category	Frequency (%)
Age (years)	Mean ± SD	38.5 ± 12.1
Gender	Male	88 (58.7)
	Female	62 (41.3)
Education	Primary or less	53 (35.0)
	High school	60 (40.0)
	College & above	37 (25.0)

Table 2: Pattern of Face Mask Usage Among TB Patients

Mask Usage	Frequency	Percentage
Always	43	28.7
Sometimes	68	45.3
Never	39	26.0

Figure 1: Bar graph showing mask usage pattern (Always / Sometimes / Never).

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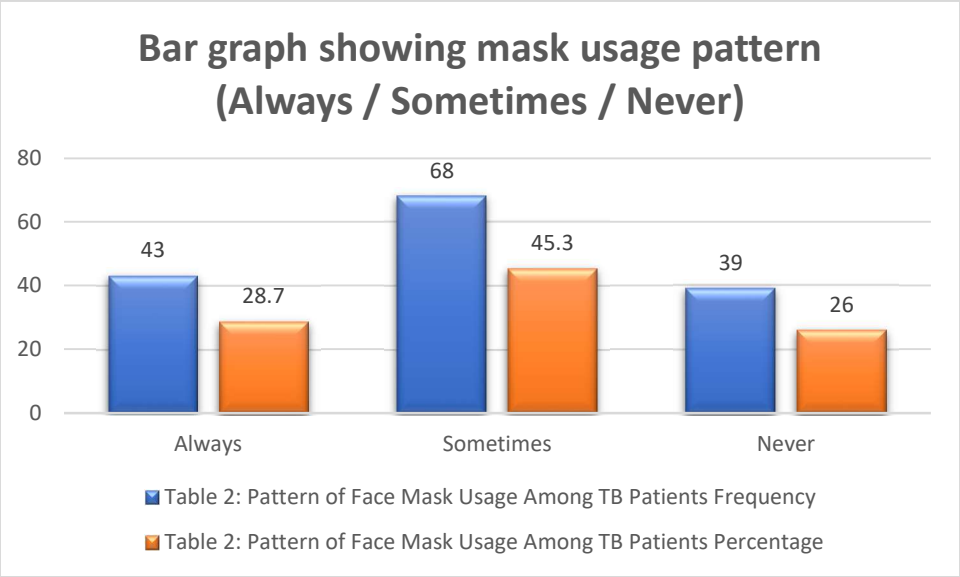

Table 3: Association Between Education Level and Consistent Mask Usage

Education Level	Consistent Mask Use n (%)	Inconsistent / No Use n (%)	Total (n)	χ^2 value	p-value
Primary or less	8 (15.1)	45 (84.9)	53		
High school	17 (28.3)	43 (71.7)	60	9.12	0.028*
College & above	18 (48.6)	19 (51.4)	37		
Total	43 (28.7)	107 (71.3)	150		

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Reason for Non-Compliance	Frequency (n)	Percentage (%)
Discomfort / difficulty in breathing	45	42.1
Social stigma / embarrassment	30	28.0
Forgetfulness	16	15.0
Perceived no need after starting treatment	11	10.3
Non-availability / cost of masks	5	4.6
Total	107	100.0

Figure 3: Pie chart showing reasons for non-compliance.

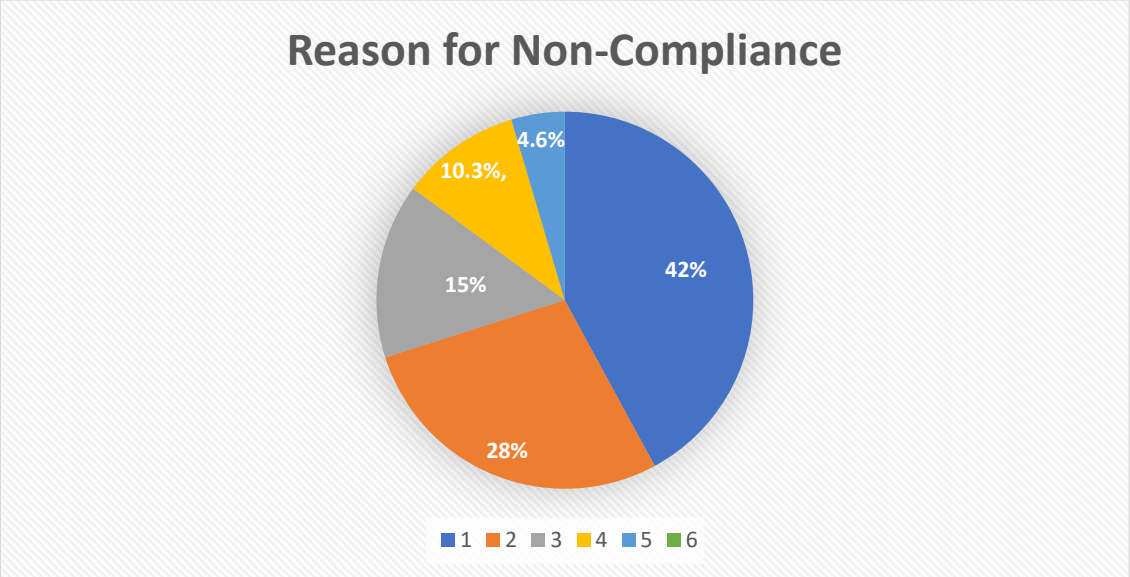

Table 5: Multivariable Logistic Regression Analysis for Determinants of Consistent Mask Usage

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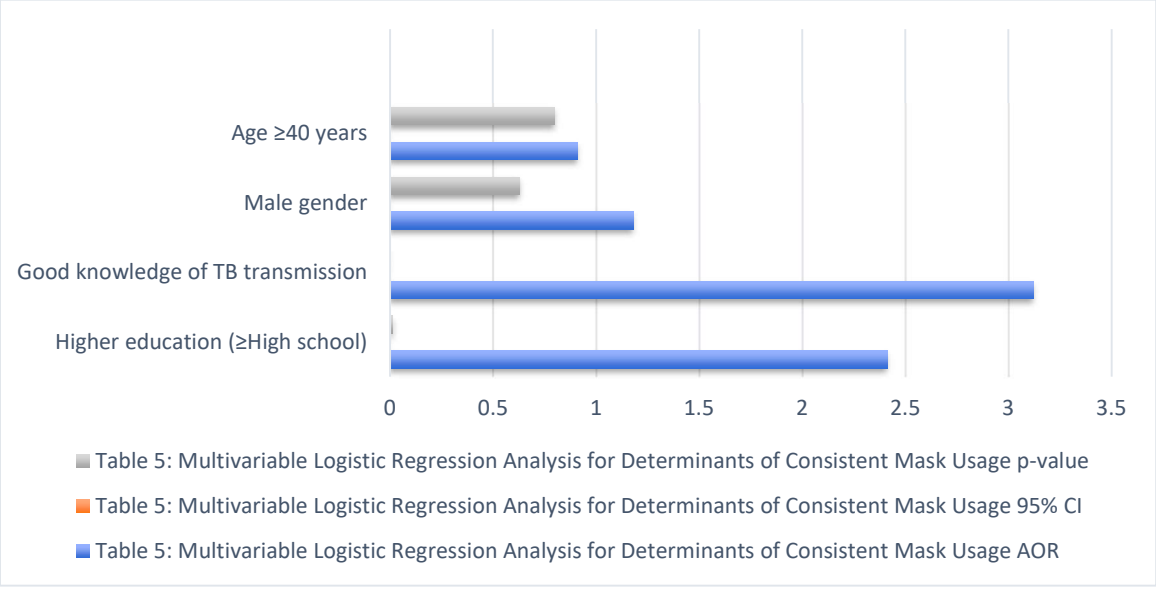
Variable	AOR	95% CI	p-value
Higher education (≥High school)	2.41	1.18–4.93	0.015
Good knowledge of TB transmission	3.12	1.52–6.41	0.002
Male gender	1.18	0.59–2.35	0.63
Age ≥40 years	0.91	0.45–1.86	0.80

Hosmer–Lemeshow test p = 0.64 (model fit acceptable).



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Discussion

The present study demonstrates low compliance with face mask usage among TB patients, similar to findings from other Indian and international studies. Higher education and better knowledge regarding TB transmission were significantly associated with consistent mask use. Discomfort and social stigma emerged as major barriers, highlighting the need for patient-centered education and normalization of mask use in communities.

Conclusion

Only one-third of TB patients consistently used face masks. Education level and knowledge about TB transmission were key determinants of compliance. Addressing discomfort, improving awareness, and reducing stigma through targeted health education can significantly enhance infection control and reduce TB transmission.

Recommendations

- Strengthen patient education during DOTS visits
- Free and easy availability of masks at TB centers
- Community-based stigma reduction campaigns
- Counseling on correct and comfortable mask usage

Strengths of the Study

- Adequate sample size based on statistical calculation
- Use of multivariable logistic regression to control for confounders
- Reporting of adjusted odds ratios with 95% confidence intervals enhances interpretability
- Model diagnostics performed to ensure statistical robustness

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