Original Research

HEALTH-SEEKING BEHAVIOR OF TUBERCULOSIS PATIENTS IN BHUBANESWAR, ODISHA, INDIA

Saumyasree Pradhan[1], Barsharani Mohapatra[2], Monika Jena[3], Nitushree Kund[4], Nihar Nalini Senapati[5], Amarendra Mohapatra[6]
[1]Department of Public Health, Utkal University, Bhubaneswar, Odisha, India
[2]Department of Public Health, Utkal University, Bhubaneswar, Odisha, India
[3]Department of Public Health, Utkal University, Bhubaneswar, Odisha, India
[4]Department of Public Health, Utkal University, Bhubaneswar, Odisha, India
[5]PGIMER, Capital Hospital, Bhubaneswar
[6]Regional Medical Research Centre (ICMR), Bhubaneswar Odisha, India
Correspondence Address: Saumyasree Pradhan
Correspondence mail id: saumyasreep@gmail.com

ABSTRACT

Introduction: Tuberculosis (TB) is an infectious disease with a significant global impact, without treatment, the death rate from TB disease is high (about 50%) **Aims**: The study conducted in Bhubaneswar aimed to assess tuberculosis disease burden, health-seeking behaviour, and to find the gap of non-compliance in the medicine. **Methods**: A cross-sectional survey was conducted among TB patients in UPHCs Sahid Nagar and IRC Village of Bhubaneswar, Odisha. All new adult smear positive PTB patients diagnosed and treated in any of the government health facilities within these block PHC areas between 1 July to 31 September 2023, were identified, traced and interviewed using a pre-tested, semi-structured, coded interview. **Results**: On drug compliance, it was found that patients in the age group above 50 were compliant with treatment 86.2% by taking medicine regularly then their comparison age groups. Education beyond high school positively impacted compliance (100%), as did dependency status (88.9%). Alcohol addiction was prevalent among 47% of male patients and 11.4% of females, while smoking rates were 33.3% among males and 4.5% among females. Dependents consumed less alcohol (17.5%) than employed (55.8%), and younger patients smoked more (36.4%) than older age groups (31.7%). Non-educated patients smoked more (32.5%) than educated counterparts. Self-employed individuals smoked more (75%) than employed (37.2%). Chi square test highlighted that employment correlated with higher alcohol consumption (55.8%), impacting drug compliance negatively. **Conclusion:** Elderly patients, females, and those educated beyond high school exhibited better treatment completion rates. The study recommends targeted educational interventions to enhance TB treatment.

Keywords: Tuberculosis, Incidence, Symptoms, Communicable Disease, Health-seeking behaviour.

INTRODUCTION

Tuberculosis (TB) is an infectious disease, that constitutes a significant global health concern and stands as a prominent contributor to illness and mortality on a worldwide scale (CDC, 2020) . HIV/AIDS was surpassed by tuberculosis (TB) as the leading infectious disease, primary cause of mortality prior to the coronavirus pandemic (COVID-19). This disease is instigated by the presence of Mycobacterium tuberculosis, a type of bacteria known to cause TB. Typically, these bacteria target the lungs, but they have the potential to inflict harm on various other parts of the body. Common symptoms encompass a persistent cough lasting over three weeks, accompanied by fever and chills, night sweats, loss of appetite, fatigue, and, in severe instances, the presence of blood in the sputum coupled with chest pain. TB is transmitted through the air when an individual with TB affecting the lungs or throat coughs, sneezes, or talks (CDC, 2020). In the year 2021, approximately 10.6 million individuals worldwide contracted tuberculosis (TB), comprising six million men, 3.4 million women, and 1.2 million children. Tuberculosis is widespread across all countries and age groups (Olenja, 2003; Shaikh and Hatcher, 2004; Zhang et al., 2007; Buregyeya et al., 2011; WHO, 2013). Odisha had a TB incidence of 159 cases per

lakh population annually in 2017, which was higher than the 138.33 cases per lakh population annually nationwide (Hussain et al., 2020). TB is a major problem in the region, as evidenced by the fact that Odisha came in second place out of the top ten states in the nation for incidence of the disease. District-wise details reveal that Gajapati has the highest incidence of 275/lakh/year in the State and is followed by Mayurbhanj, Malkangiri, Rayagada and Sundargarh (Thomas et al., 2021). Between 2020 and 2022, the number of cases increased from 45,699 to 60,439. Although 52,514 cases were found in 2021, 53,368 and 48,490 cases, respectively, were recorded in 2019 and 2018 (Hussain et al., 2020). This may be due to the increase in TB testing facilities in the state. The study aims to determine the health-seeking behavior of tuberculosis patients in and around Bhubaneswar of Khurda District. Although there have been several studies assessing the extent of such discrimination, there is little published research explicitly investigating the causes of the stigma and discrimination associated with TB (Baral, Karki and Newell, 2007). The objective of the study is to determine the TB disease burden in the community, to determine the health-seeking behaviour of TB patients, to determine the lifestyle and socioeconomic status of urban slum people and to find the gap of non-compliance in the medicine.

METHODS

A community-based cross-sectional study was designed to explore the objectives by mixed methods was conducted between July 2023 and September 2023. It contains qualitative, quantitative and cross-sectional studies. Data were gathered by a scheduled questionnaire survey through focus group discussion (FGD) and in-depth interview methods (IDI). The schedule questionnaire contains both open-ended and closed-ended questions. Closed-ended questions having single or multiple-answer selection allowing the inclusion of more variables

(Kumar et al., 2011). The respondents took less time to answer closed-ended questions compared to open-ended questions (Archer, Lemeshow and Hosmer, 2007). All women and men aged 0 to above 50 in the study settings were considered as study participants. Analysis was done using SPSS version 20 and results were interpreted by using bar diagrams and tables. As the patient load was low, all the cases were taken into account. The study involved non-invasive procedures. Permission was obtained from the Chief District Medical Officer of Khurda and the Khurda District TB Officer under letter no. 387 dated 08.08.2023. Informed consent was obtained from all participants before collecting data. The research was conducted with the knowledge and approval of the University authorities. This study forms part of the final semester project work for Master in Public Health students at Utkal University.

RESULTS

As a whole, 110 tuberculosis patients from Sahid Nagar and IRC village UPHC of Bhubaneswar in Khurda district were included in the study. Qualitative data were collected through focus group discussion and are depicted below.

Case Study 1

Badal Reddy - A Case of Pulmonary Tuberculosis

Badal Reddy is a 17-year-old boy from Nandini Pali, Munda sahi, Bhubaneswar, Odisha living with his parents. His father is currently unemployed and consumes alcohol every day, his mother has gone to work all these years. Badal complained of increasing dyspnea, fever, coughing, and chest pain when he first visited the TB clinic. He had pulmonary tuberculosis (TB) on February 17, 2023, according to the results of his sputum test. He tested negative for HIV. According to history, he smoked and drank alcohol for the previous 2.5 years, but otherwise remained in good health until 2022. He has no education. He was successfully treated

at this time with standard TB medications after being diagnosed with active typical tuberculosis. Upon exhibiting symptoms of the illness, further medications tailored to treat this particular infection were provided. As part of routine medical monitoring, it was suggested that he took these drugs for a minimum of a year. As he smoked and drank too much alcohol every day, his treatment doesn't seem to be working because he is unable to take medication on a regular basis due to a lack of guidance and the addictive behaviors mentioned above. His habitual smoking and daily alcohol consumption posed significant barriers to regular medication adherence. Due to the irregular intake of medications compounded by his addictive behaviours, Badal's response to treatment was suboptimal. The efficacy of the anti-tubercular medications was compromised, leading to concerns about treatment failure and disease progression. Discussion: This case underscores the critical importance of addressing behavioral factors such as smoking and alcohol dependence in tuberculosis management. The lack of effective intervention and support in managing these addictive behaviors contributed significantly to the treatment challenges faced by Badal. Efforts to improve treatment outcomes in tuberculosis

must include comprehensive strategies to address behavioral risk factors and enhance patient adherence to medication protocols. Addressing social determinants of health, such as familial support and access to healthcare guidance, is crucial in achieving successful treatment outcomes for patients like Badal Reddy. Moving forward, healthcare interventions should prioritize integrated approaches that include behavioral counseling, addiction management support, and enhanced patient education to optimize treatment adherence and overall health outcomes in tuberculosis management.

Demography of the study

As a whole, 110 tuberculosis patients were interviewed. Most patients were between the age group of 30-49 (41), 80 patients were married and, in a relationship, while 30 were single. Sixty-six patients were male whereas 44% were female. Illiterate patients were more in number (40). Altogether 66 had a family size of three to five people, and 28 had less than two family members in their family. Most people (66) were dependent and the rest were employed. Most of the respondents (N=66) were from the low-income group whereas 39.1% (N=43) were from the medium-income group (Table 1).

Table1. Socio demographic characteristics

Socio-demographic characteristic		Frequency (n)	%
Age			
	0-18	11	10
	18-29	29	26.4
	30-49	41	37.3
	50 & above	29	26.4
Marital status			
	Single	30	27.3
	Married	80	72.7
	Separated/divorced	0	
	Widowed	0	
Gender			
	Male	66	60
	Female	44	40
Education			
	Graduates & above	27	24.5

Socio-demographic characteristic		Frequency (n)	%
	High School	27	24.5
	Primary	16	14.5
	No formal education	40	36.4
Household size			
	2 people or less	28	25.5
	3-5 people	66	60
	>5 people	16	14.5
Occupation			
	Employed	43	39.1
	Self-employed	4	3.6
	Dependent on a person in the family	63	57.3
Socioeconomic class			
	High	1	0.9
	Medium	43	39.1
	Low	66	60

The health-seeking behaviors of tuberculosis patients are depicted in Table 2. Out of the total patients (110), 72 cases were pulmonary and the rest were extrapulmonary. Among 110 patients, 101 patients had not completed the treatment whereas only nine completed their treatment. Regarding symptoms, 42 patients were suffering from cough,7 patients were with cough and 8 persons were expressing weight loss and 4,14 and 9 patients had symptoms like bleeding, night sweats and tiredness.

The other 26 were expressing both cough and fever. TBHV was providing medicine to all the patients. On asked about alcohol consumption, 36 admitted that they were taking alcohol whereas 74 denied taking alcohol. Similarly, 24 had smoking habits whereas 86 had no smoking habits. Most patients (97) had not attended the awareness program and 80 patients did not know the name of the medicine. Some of them (11) were expressing side effects of medicine.

Table 2. Health seeking behavior of tuberculosis patient

Taking medicine regularly		Frequency	Percent
	Yes	90	81.8
	No	20	18.2
Type of TB disease	Pulmonary	72	65.5
	Extra pulmonary	38	34.5
Treatment status	Completed	9	8.2
	Not completed	101	91.8
Symptoms	Fever	42	38.2
	Cough	7	6.4
	Weight loss	8	7.3

Taking medicine regularly		Frequency	Percent
	Bleeding	4	3.6
	Night sweats	14	12.7
	Tiredness	9	8.2
	Both cough and fever	26	23.6
Who provides medicine?	ASHA	21	19.1
	TBHV	89	80.9
Alcohol habit	Yes	36	32.7
	No	74	67.3
Smoking habit	Yes	24	21.8
	No	86	78.2
Have you attended the awareness program?	Yes	13	11.8
	No	97	88.2
Do you know the name of TB medicine?	Yes	30	27.3
	No	80	72.7
Have your family and you faced any problem due to stigma?	Yes	1	0.9
	No	109	99.1
Medicine side effect	Yes	11	10
	No	99	90

Statistical Analysis

On drug compliance, it was found that patients in the age group above 50 were complete with treatment, 86.2% (p=0.789), by taking medicine more regularly than their comparison age groups. Interestingly females were also more compliant, 100% (p=0.0000), than males (69.7%) (Table 3). In the study area it is observed that education has a positive impact on drugs , that is those who have completed high school and above were complete, 100% (p=0.035), in comparison to other groups. The study reveals the fact that dependents were 88.9% (p=0.03) complete compared to employed, 76.7%.

This survey reveals that alcohol addicts were 47% and 33.3% were smokers among the male diseased, whereas 11.4% of females were alcohol addicted and 4.5% of females were smokers. Those who were dependent (17.5%) were taking less alcohol than those who were employed (55.8%). Regarding smoking habits, persons who were less than 18 years old (36.4%) were smoking more than those having the age group 30-49 (31.7%). Patients with no education (32.5%) were compliant more in the case of smoking habits than their respective groups. Self-employed patients (75%) were smoking more than the patients who were employed (37.2%) (Table 3).

Table 3. Chi square analysis between different variables

Category		Taking Medicine Regularly				Alcohol Habit				Smoking Habit			
		Yes	No	Chi square Value	P Value	Yes	No	Chi square Value	P Value	Yes	No	Chi square Value	P Value
Age	0-18	8(72.7%)	3(27.3%)	1.053	0.789	5(45.5%)	6(54.5%)	4.747		4(36.4%)	7(63.6%)	7.058	0.7

Category		Taking Medicine Regularly				Alcohol Habit				Smoking Habit			
		Yes	No	Chi square Value	P Value	Yes	No	Chi square Value	P Value	Yes	No	Chi square Value	P Value
	18-29	24(82.8%)	5(17.2%)			10(34.5%)	19(65.5%)		0.191	4(13.8%)	25(86.2%)		
	30-49	33(80.5%)	8(19.5%)			16(39)	25(61)			13(31.7%)	28(68.3%)		
	Above 50	25(86.2%)	4(13.8%)			5(17.2%)	24(82.8%)			3(10.3%)	26(89.7%)		
		Yes	No	Chi square Value	P Value	Yes	No	Chi square Value	P Value	Yes	No	Chi square Value	P Value
Gender	Male	46(69.7%)	20(30.3%)	16.296	0.000	31(47%)	35(53%)	15.202	0.000	22(33.3%)	44(66.7%)	12.826	0.000
	Female	44(100%)	0(0%)			5(11.4%)	39(88.6%)			2(4.5%)	42(88.6%)		
Education	Graduate	21(77.8%)	6(22.2%)	8.634	0.0035	1(3.7%)	26(96.3%)	13.915	0.003	4(14.8%)	23(85.2%)	5.362	0.147
	High school	27(100%)	0(0%)			12(44.4%)	15(55.6%)			3(11.1%)	24(88.9%)		
	Primary	11(68.8%)	5(31.2%)			6(37.5%)	10(62.5%)			4(25%)	12(75%)		
	No education	31(77.5%)	9(22.5%)			17(42.5%)	23(57.5%)			13(32.5%)	27(67.5%)		

Category		Taking Medicine Regularly				Alcohol Habit				Smoking Habit			
		Yes	No	Chi square Value	P Value	Yes	No	Chi square Value	P Value	Yes	No	Chi square Value	P Value
Occupation	Employed	33(76.7%)	10(23.3%)	11.542	0.03	24(55.8%)	19(44.2%)	17.188	0	16(37.2%)	27(62.8%)	19.721	0
	Self-employed	1(25%)	3(75%)			1(25%)	3(75%)			3(75%)	1(25%)		
	Dependent	56(88.9%)	7(11.1%)			11(17.5%)	52(82.5%)			5(7.9%)	58(92%)		

Upon analysis, it was found that 86.2% of patients aged above 50 were consistently taking their medicine, compared to 72.7% in the 0-18 age group, 82.8% in the 18-29 age group, and 80.5% in the 30-49 age group. Among females, 44 patients (100%) were adherent to their medicine regimen, compared to 46 males (69.7%). Regarding education, 27 patients (100%) who completed high school were taking their medicine regularly, compared to 56 dependents (88.9%), 33 employed individuals (76.7%), and one self-employed individual (25%). Out of 110 patients, 36 (32.7%) reported consuming alcohol, with 45.5% of those below 18 years old (N=5) doing so, compared to 47% of males and 11.4% of females. Among those who completed high school, 44.4% reported alcohol consumption, while only 3.7% of graduates did. Illiterate patients reported alcohol consumption at a rate of 42.5%, compared to 17.5% of dependents and 55.8% of employed individuals. Regarding smoking habits, patients below 18 years old (N=4, 36.4%) smoked less than those aged 30-49 (N=13, 31.7%). Males (N=22, 33.3%) smoked more than females (N=2, 4.5%). Illiterate patients (N=13, 32.5%) smoked more than those with primary education (N=4, 25%). Self-employed patients (N=3, 75%) smoked more than employed patients (N=16, 37.2%). Medication side effects were observed more frequently among older patients (N=4, 13.8%), followed by the 18-29 age group (10.3%), and no side effects were reported in patients below 18 years old. Females (N=6, 13.6%) experienced more side effects than males (N=5, 7.6%). Graduates (N=1, 3.7%) and illiterate patients (N=6, 10%) reported side effects and some side effects, respectively. Dependents (N=8, 12.7%) experienced more side effects than employed patients (N=3, 7%) (Table 4).

Table 4. Cross-tabulation between different dependent and independent variables

Category		Taking Medicine Regularly Yes	No	Alcohol Habit Yes	No	Smoking Habit Yes	No	Medicine Side Effects Yes	No
Age	0-18	8(72.7%)	3(27.3%)	5(45.5%)	6(54.5%)	4(36.4%)	7(63.6%)	0(0%)	11(100%)
	18-29	24(82.8%)	5(17.2%)	10(34.5%)	19(65.5%)	4(13.8%)	25(86.2%)	3(10.3%)	26(89.7%)
	30-49	33(80.5%)	8(19.5%)	16(39)	25(61)	13(31.7%)	28(68.3%)	4(9.8%)	37(90.2%)
	Above 50	25(86.2%)	4(13.8%)	5(17.2%)	24(82.8%)	3(10.3%)	26(89.7%)	4(13.8%)	25(86.2%)
Gender	Male	46(69.7%)	20(30.3%)	31(47%)	35(53%)	22(33.3%)	44(66.7%)	5(7.6%)	61(92.4%)
	Female	44(100%)	0(0%)	5(11.4%)	39(88.6%)	2(4.5%)	42(88.6%)	6(13.6%)	38(86.4%)
Education	Graduate	21(77.8%)	6(22.2%)	1(3.7%)	26(96.3%)	4(14.8%)	23(85.2%)	1(3.7%)	26(96.3%)
	High school	27(100%)	0(0%)	12(44.4%)	15(55.6%)	3(11.1%)	24(88.9%)	0	27(100%)
	Primary	11(68.8%)	5(31.2%)	6(37.5%)	10(62.5%)	4(25%)	12(75%)	4(15%)	12(85%)
	No education	31(77.5%)	9(22.5%)	17(42.5%)	23(57.5%)	13(32.5%)	27(67.5%)	6(10%)	34(90%)
Occupation	Employed	33(76.7%)	10(23.3%)	24(55.8%)	19(44.2%)	16(37.2%)	27(62.8%)	3(7%)	40(93%)
	Self-employed	1(25%)	3(75%)	1(25%)	3(75%)	3(75%)	1(25%)	0	4(100%)
	Depended	56(88.9%)	7(11.1%)	11(17.5%)	52(82.5%)	5(7.9%)	58(92%)	8(12.7%)	55(87.3%)

Among all the socio-demographic variables age group is highly significant and associated with symptoms of tuberculosis as the Pearson chi square value is high than others and P value is less than 0.05. After age, occupation is also co-related with symptoms as P value is less than 0.05. Education and gender did not show any kind of significance (Table 5).

Table 5. Chi square analysis of socio-demographic variables and symptoms of TB patients.

Category	Chi square value	P Value
Age	43.54	0.001
Education	26.29	0.093
Gender	8.023	0.236
Occupation	21.82	0.04

ANOVA test was conducted with the education and taking medicine regularly, symptoms and do you know the name of TB medicine. It was found that

education and know the name of TB medicine are highly associated with each other as the F value is high (Table 6).

Table 6. Descriptive analysis of education with respect to different dependent variables.

Category		N o	Mea n	Std. Deviatio n	Std. Erro r	95% Confidence Interval for Mean		F value	Significan ce
						Lowe r Boun d	Uppe r Boun d		
Taking medicine regularly	Graduat e	27	1.22	.424	.082	1.05	1.39	3.010	0
	High school	27	1.00	0.000	0.000	1.00	1.00		
	Primary	16	1.31	.479	.120	1.06	1.57		
	No educatio n	40	1.23	.423	.067	1.09	1.36		
Sympto ms	Graduat e	27	3.96	2.426	.467	3.00	4.92	1.926	0.130
	High school	27	3.37	2.256	.434	2.48	4.26		
	Primary	16	4.81	2.509	.627	3.48	6.15		
	No educatio n	40	3.18	2.630	.416	2.33	4.02		
Do you know the name of TB medicine ?	Graduat e	27	1.30	.465	.090	1.11	1.48	16.63 6	0
	High school	27	1.78	.424	.082	1.61	1.95		
	Primary	16	1.94	.250	.063	1.80	2.07		
	No education	40	1.90	.304	.048	1.80	2.00		

ANOVA test was conducted with the age and taking medicine regularly, symptoms and do you know the name of TB medicine. It was found that education and symptoms are highly associated with each other as the F value is high (Table 7).

Table 7. Descriptive analysis of age with respect to different variables

AGE		N	Mean	Std. Deviatio n	Std. Error	95% Confidence Interval for Mean		F Val ue	Signif icanc e
						Lower Bound	Upper Bound		
Taking medici ne	0-18	11	1.27	.467	.141	.96	1.59	0.3 41	0.795
	19-29	29	1.17	.384	.071	1.03	1.32		
	30-49	41	1.20	.401	.063	1.07	1.32		

AGE		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		F Value	Significance
						Lower Bound	Upper Bound		
regularly	50 and above	29	1.14	.351	.065	1.00	1.27		
Symptoms	0-18	11	4.00	2.608	.786	2.25	5.75		
	19-29	29	3.00	2.299	.427	2.13	3.87	1.178	0.322
	30-49	41	4.10	2.577	.402	3.28	4.91		
	50 and above	29	3.55	2.544	.472	2.58	4.52		
Do you know the name of TB medicine?	0-18	11	1.64	.505	.152	1.30	1.98		
	19-29	29	1.72	.455	.084	1.55	1.90	0.204	0.893
	30-49	41	1.76	.435	.068	1.62	1.89		
	50 and above	29	1.72	.455	.084	1.55	1.90		

DISCUSSION

These results depict that though a large number of patients were taking medicine regularly, they did not complete their treatment. This may be because of their lack of knowledge and ignorance. They may be unaware of the mode of administration of drugs for tuberculosis patients. At the initial stage, they were taking medicine, but as soon as they felt better, they were not taking medicine. Another reason was that many of the male persons were taking alcohol and they forgot to take medicine. Results suggest that gender, education, and occupation have significant associations with the likelihood of taking medicine regularly, having alcohol habits, and smoking habits. However, for age, there seem to be no significant associations with these habits. Gender appears to be significantly associated with TB knowledge, healthcare-seeking behaviors, and the timeliness of healthcare actions. This association aligns with findings from other studies, such as Sadiq and Muynck (2001), which highlight that men generally have greater knowledge about TB, are more likely to seek timely healthcare, and often choose higher-quality providers. In our study, men also demonstrated better adherence to medication compared to women. These gender-based disparities emphasize the need for innovative approaches to disseminate TB-related information specifically tailored to women. Such approaches could improve awareness, address gaps in TB knowledge, and enhance access to health services for women.

Furthermore, consistent with studies conducted in Chennai and Madurai (Charley, 2010; Samal, 2016), our research identified several key reasons for delays in seeking TB care. These included lack of awareness about the severity of symptoms, workplace pressures, dissatisfaction with available healthcare facilities, financial constraints, distance to healthcare centers, dependence on alcohol, and inconvenient clinic hours. Addressing these barriers is crucial to improving timely access to TB care.

Many of them do not know about the programs offered by Govt. of India, even many of them do not know the name of TB medicine. From this, it was

concluded that the government should promote an awareness program for the benefit of tuberculosis patients. A systematic review with meta-analysis confirms that education and training for HCWs and volunteers can improve TB case detection (Amare et al., 2023; Arini, Primastuti and Basha, 2024). A study in Gabon found a strong correlation between occupation and knowledge regarding TB (Vigenschow et al., 2021). In addition, an essential component in supporting early detection and prevention of TB transmission is a support system from family, colleagues, and the community through health information seeking (Novita, Wiyono and Yuliastuti, 2022) Several factors may influence patients to visit health facilities, including education, employment status, health insurance, and perception of the disease (Puspitasari, Roesdiyanto and Rizka, 2023). Health seeking behavior and related delays are of utmost importance in TB care from two important perspectives; firstly TB requires timely treatment and secondly it requires protracted treatment. Required level of knowledge and positive health behavior helps the patients in taking timely help from an appropriate health facility. RNTCP being a centrally sponsored program health seeking from a public health facility is highly desirable.

CONCLUSION

The study was conducted with a relatively small sample size of 110 TB patients within two UPHCs in Bhubaneswar, limiting the generalizability of findings to the entire population of Odisha. A larger, more diverse sample across various districts could offer broader insights and strengthen the representativeness of the study. The cross-sectional nature of the study captures a single snapshot of TB patients' behaviors and compliance. Longitudinal studies would be better suited to understanding changes in health-seeking behaviors, compliance, and outcomes over time and would allow for causal inferences regarding lifestyle changes and treatment adherence. The reliance on self-reported data from interviews introduces the risk of social desirability bias, where patients may underreport alcohol use, smoking habits, or non-compliance with treatment. Future studies could include objective measures or triangulation methods, such as observing drug adherence directly or consulting secondary sources, like pharmacy refill records, to reduce this bias. Patients with tuberculosis were often feared and faced discrimination, primarily due to concerns about the airborne nature of the infection. However, some acknowledged that the stigma was also linked to the assumption of co-infection with HIV. In some cases, individuals reported that TB patients were even driven away from their communities. Despite this, a few participants noted that close family members provided care and support for TB patients (Buregyeya et al., 2011). In the chi square analysis, it is evident that those patients who are employed were taking alcohol in a higher percentage (55.8%) than their dependent counterparts (17.5%) which impedes drug compliance in a community. It is observed that elderly patients (50 and above years), females and those who completed high school were better completed than their counterparts. The government should enhance its awareness initiatives through various channels, including extensive campaigns, leveraging diverse social media platforms, and organizing cultural events like folk dance performances. It is presumed that intensive IEC targeted toward the slum may help to improve the situation further. The study highlights a clear need for targeted educational programs to improve treatment compliance and TB awareness, particularly for high-risk groups. This includes engaging slum communities and low-education populations who showed limited awareness of TB treatment requirements and government programs. Effective health education can address the misconceptions and stigma associated with TB, encourage timely medical intervention, and promote sustained adherence to treatment (Khan et

al., 2020). The findings underscore the importance of community support systems for improving compliance. Establishing peer support groups, especially in urban slums, could help reduce stigma, provide emotional support, and offer regular treatment reminders for TB patients. Studies show that community engagement can significantly enhance treatment adherence and reduce discrimination (Buregyeya et al., 2011; Novita, Wiyono and Yuliastuti, 2022). Increasing coverage of program implementation to include general hospitals and private sector, the designing of special health educational programmes and interventions directed toward tuberculosis patients to increase their general awareness about the disease and its treatment were recommended (Mohamed et al., 2007). A contextual understanding of communities' knowledge, attitudes, health-seeking behaviors, and care-seeking patterns suggests the need to raise awareness about TB symptoms, modes of transmission, prevention, diagnosis, treatment, and the importance of destigmatizing the disease through health education (Khan et al. 2020).

ACKNOWLEDGMENT

REFERENCES

Amare, D., Getahun, F.A., Mengesha, E.W., Dessie, G., Shiferaw, M.B., Dires, T.A. and Alene, A., 2023. Effectiveness of healthcare workers and volunteers training on improving tuberculosis case detection : A systematic review and meta-analysis. *PLoS ONE*, 18(3), e0271825. https://doi.org/10.1371/journal.pon

e.0271825

Archer, K.J., Lemeshow, S. and Hosmer, D.W., 2007. Goodness-of-fit tests for logistic regression models when data are collected using a complex sampling design. *Computational Statistics & Data Analysis*, 51, pp.4450–4464. https://doi.org/10.1016/j.csda.2006.07.006

Arini, M., Primastuti, H.I. and Basha, M.A.B.M.K., 2024. Improving knowledge of non-communicable disease program managers in tuberculosis-diabetes mellitus control and care. *The Indonesian Journal of Public Health*, 19(1), pp.15–27. https://doi.org/10.20473/ijph.vl19i1.2024.15-27

Baral, S.C., Karki, D.K. and Newell, J.N., 2007. Causes of stigma and discrimination associated with tuberculosis in Nepal : a qualitative study. *BMC Public Health*, 10, pp.1–10. https://doi.org/10.1186/1471-2458-7-211

Buregyeya, E., Kulane, A., Colebunders, R., Wajja, A., Kiguli, J., Mayanja, H., Musoke, P., Pariyo, G. and Mitchell, E.M.., 2011. Tuberculosis knowledge , attitudes and health-seeking behaviour in rural. *The International Journal of Tuberculosis and Lung Disease*, (May 2014). https://doi.org/10.5588/ijtld.10.0211

CDC, 2020. *Tuberculosis Risk Factors*.

Charles, N., Thomas, B., Watson, B., Sakthivel M, R., V, C. and Wares, F., 2010. Care seeking behavior of chest symptomatics: a community based study done in South India after the implementation of the RNTCP. *PloS ONE*, 5(9), p.e12379.

Hussain, T., Tripathy, S.S., Das, S., Satapathy, P., Das, D., Thomas, B. and Pati, S., 2020. Prevalence , risk factors and health seeking

behaviour of pulmonary tuberculosis in four tribal dominated districts of Odisha : Comparison with studies in other regions of India. *PLoS ONE* 15(4): e0227083. https://doi.org/10.1371/journal.pon e.0227083

Khan, A., Shaikh, B.T. and Baig, M.A., 2020. Knowledge, Awareness, and Health-Seeking Behaviour regarding Tuberculosis in a Rural District of Khyber Pakhtunkhwa, Pakistan. *BioMed Research International*, *2020*(1), p.1850541.

Kumar, Y.S., Mishra, G., Gupta, S. and Shastri, S., 2011. Level of Cancer Awareness among Women of Low Socioeconomic Status in Mumbai Slums. *Asian Pacific J Cancer*, 12, pp.1295–1298.

Mohamed, A.., Yousif, M.., Ottoa, P. and Bayoumi, A., 2007. Knowledge of Tuberculosis : A Survey among Tuberculosis Patients. *Sudanese Journal of Public Health*, 2(1), pp.21–28.

Novita, B.D., Wiyono, S. and Yuliastuti, M., 2022. The risk perception of tuberculosis infected diabetes mellitus patients. *The Indonesian Journal of Public Health*, 17(1), pp.12–26. https://doi.org/10.20473/ijph.vl17il. 2022.12-26

Olenja, J., 2003. Editorial Health seeking behaviour in context. *East African Medical Journal*, pp.98–100. https://doi.org/10.4314/eamj.v80i2. 8689

Puspitasari, S.T., Roesdiyanto and Rizka, D.M., 2023. Correlation of predisposing, enabling, and need factor of program keluarga harapan participants toward utilizing primary healthcare 1. *The Indonesian Journal of Public Health*, 18(1), pp.106–116. https://doi.org/10.20473/ijph.vl18i1 .2023.106-116

Shaikh, B.T. and Hatcher, J., 2004. Health seeking behaviour and health service utilization in Pakistan :

challenging the policy makers. *Journal of Public Health*, 27(1), pp.49–54. https://doi.org/10.1093/pubmed/fdh 207

Sadiq, H. and Muynck, A.D., 2001. Health care seeking behavior of pulmonary tuberculosis patients visiting TB Center Rawalpindi. *JPMA. The Journal of the Pakistan Medical Association*, *51*(1), pp.10-16.

Samal J. , 2016. Health Seeking Behaviour among Tuberculosis Patients in India: A Systematic Review. *Journal of Clinical Diagnosis Research*, 10(10):LE01-LE06. doi: 10.7860/JCDR/2016/19678.8598

Thomas, B.E.T., Thiruvengadam, K., Raghavi, S., Rani, S., Vetrivel, S., Rao, V.G., Yadav, R., J, B., Paluru, V., Purthy, A.J., Hussain, T., Kumar, A., Krishna, I., Joseph, A., Bansal, A.K., Anand, P., Das, P., John, K.R., K, R.D., Sunish, P., Moral, R., Azhagendran, S., Chandrasekaran, V., Toteja, G.S., Das, M. and Khan, A.M., 2021. Understanding health care-seeking behaviour of the tribal population in India among those with presumptive TB symptoms. *PLoS ONE*, 2675, pp.1–15. https://doi.org/10.1371/journal.pon e.0250971

Vigenschow, A., Edoa, J.R., Adegbite, B.R., Agbo, P.A., Adegnika, A.A., Alabi, A., Massinga-loembe, M. and Grobusch, M.P., 2021. Knowledge , attitudes and practices regarding tuberculosis amongst healthcare workers in Moyen-Ogooué Province , Gabon. *BMC Infectious Diseases*, 21(486), pp.1–7.

WHO, 2013. *Global Tuberculosis Report*.

Zhang, T., Liu, X., Bromley, H. and Tang, S., 2007. Perceptions of tuberculosis and health seeking behaviour in rural Inner Mongolia , China. *Health Policy*, 81, pp.155–165. https://doi.org/10.1016/j.healthpol. 2005.12.009