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Original Research Article

Screening for tuberculosis among sanitation workers in a tertiary care hospital, Delhi, India: a cross-sectional study

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ABSTRACT

Background: The surveillance of TB reduces disease transmission by shortening the duration of infectiousness and this reduces the incidence of TB infection and consequently contributes to reduced incidence of TB disease. The study aimed to screen for tuberculosis among the sanitation workers in a tertiary care hospital and assess the associated factors to provide the burden of tuberculosis among sanitation workers.
Methods: The present study was conducted in Safdarjung Hospital, one of the largest Tertiary care hospital in India, located in the Southern part of Delhi. This was a cross-sectional study conducted among the sanitation workers currently employed in the hospital. 362 workers were included in the study using a convenient sampling (non-probability) method. The participants were interviewed with a pretested, semi-structured, semi-open ended questionnaire, which was based on the guidelines of screening of TB of Revised National Tuberculosis Control Program (RNTCP). The data was entered in Google forms and analyzed for completeness and cleaned for errors and missing values. Data analysis was done using licensed SPSS software version 21.0.
Results: Out of total 362 workers who were screened for TB, 28 (7.7%) gave a positive history for presumptive TB. The symptoms reported among them were cough more than 2 weeks (85.7%), fever or night sweats more than 2 weeks (46.4%), significant weight loss (53.5%), hemoptysis (14.2%), and symptoms regarding EPTB (53.5%).
Conclusions: It is important to protect the health care workers working in hospital setting as they are under higher risk and screening should be conducted at regular intervals.

Keywords: Active screening, Health care workers, Presumptive tuberculosis, Sanitation workers

INTRODUCTION

Worldwide, TB is one of the top 10 causes of death. Around 10 million people globally developed TB disease in 2017 out of which 1.6 million deaths occurred. Disease surveillance in TB is challenging in high population countries. In 2017, approximately 28,00,000 new cases developed accounting for about a quarter of the world's TB cases, while burden remained relatively static in 2018 with estimated new cases of 27 lakh.[1] Currently, TB incidence is declining by about 1-2% per year. However, to achieve the NSP goal by 2025, we need to have an accelerated annual decline in TB incidence by about 10%. For this, we need to optimize the utilization of the existing strategies and ensure universal access through free diagnosis and treatment services and strengthen the surveillance of tuberculosis. Active case finding was formulated as the main pathway towards eliminating TB.

The requirements for moving towards TB elimination have been integrated into the four strategic pillars of

"Detect treat prevent build" (DTPB). The implementation needs aggressive screening among high-risk groups.[2] The report of the first national drug resistance survey states that drug resistance is comparatively higher among vulnerable populations.[3] The surveillance in TB is fraught with challenges and notification-based models of surveillance is dependent on the information provided to the public health system, and the health-seeking behavior of the person. There will be a gap in terms of missing notifications and those who are yet to seek health care. To reach as close to the ideal scenario as possible and looking beyond the notification-based models, active case finding should be undertaken in vulnerable populations and intensified case finding in people who come in contact with the health system.[4,5] The screening of disease is essential in the vulnerable groups of the population. The workers in the health care settings are four times more prone to TB than the reported national average.[6] The routine surveillance of TB cases strengthens the TB impact measurement. The sanitation workers in a Hospital setting like tertiary care are exposed to disease risk in higher proportion than the general population. Due to the paucity of literature about the burden of tuberculosis among sanitation workers in the hospital setting, the study was conceived to screen for tuberculosis among sanitation workers and the find the associated factors of tuberculosis among sanitation workers.[7,8]

METHODS

The present study was conducted in one of the largest tertiary care hospital in India, located in the southern part of Delhi. This was a cross-sectional study conducted among the Sanitation workers currently employed in the Hospital. The study was undertaken in August-September 2019. 362 workers were included in the study using a convenient sampling (non-probability) method. The participants were interviewed with a pretested, semi-structured, semi-open-ended questionnaire which was based on the guidelines of screening of TB in accordance with revised national tuberculosis control program (RNTCP) and world health organization (WHO). The data was collected on sociodemographic characteristics, presumptive TB symptoms, contact history, anthropometric measurements and other associated risk factors. Patients found positive for presumptive TB (Cough/Fever with night sweats more than 2 weeks, significant weight loss, Hemoptysis, contact TB history) were referred to directly observed treatment, short-course (DOTS) center for diagnosis and treatment of tuberculosis.[9] The body mass index was classified according to the Indian council for medical research i.e. underweight (<18.5), normal (18.5-22.9), overweight (23-24.9) and obese (≥25).[10]

Ethical clearance was obtained from the institute ethics committee of Vardhman Mahavir Medical College and Safdarjung Hospital, New Delhi. A written informed consent was obtained apriori and privacy of subjects and confidentiality of information was maintained. The data was entered in google forms, checked for completeness, missing values, analysed for completeness, and cleaned for errors, if any. Data analysis was done using licensed SPSS software version 21.0.11

RESULTS

A total of 362 Sanitation workers were included in the study (Figure 1).

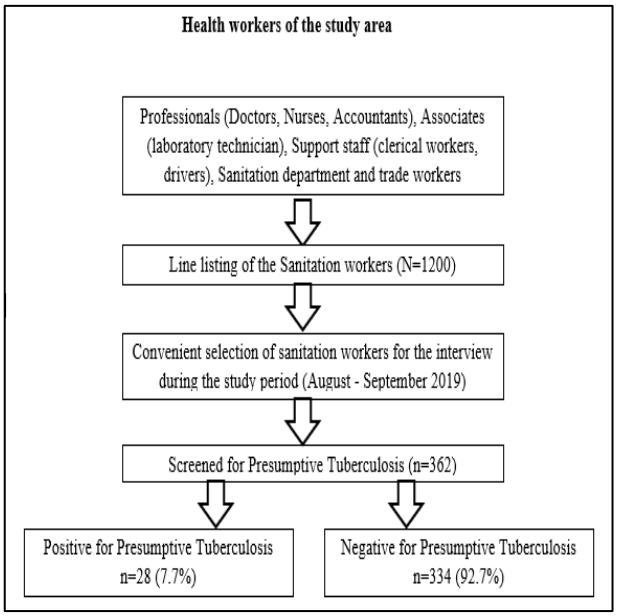

Figure 1: Flow diagram demonstrating the selection of study participants.

The median (IQR) age of study participants was 32 (26-37) years ranging from 14 to 68 years. The majority of them were in the age group of 21-40 years. 78.7% of participants were males and the majority belonged to the Hindu religion (97.5%). 91.2% were literate, 23.2% had completed education up to 8th class, 30.7% completed 10th class and 9.1% were graduates.75.7% of participants were currently married. The majority of them were living in a nuclear family (55.2%). According to B.G. Prasad socioeconomic status classification, 23.2% belonged to class 1, 47.1% to class 2, 25.7% to class 3 and 3.6% to class 4 (Table 1).

Among the study participants, 5% (18) reportedly had a past history of TB. 3% (11) of the participants gave a positive family history of TB in the past 1 year. Overcrowding was reported to be present in 52.7% of participant's homes according to person room criteria.

According to body mass index classification, 11.6% (42) of the participants were underweight, 38.4% (139) were normal, 18.2% (66) were overweight while 31.8% (115) were obese (Table 2). 39% (141) of study participants were current Tobacco users and 35.4% (128) reported consuming alcohol currently.

3.3% (12) of them were diabetic and 3.6% (13) were hypertensive (Table 3). All the sanitation workers who were diabetic and hypertensive were currently under treatment. 90 (24.9%) of participants had been screened for HIV in the past and all reported to be negative.

Out of a total of 362 workers who were screened for TB, 7.7% (28) gave a positive history for presumptive TB and they were referred to the DOTS center for further investigations. 85.7% reported having a cough for more than 2 weeks, 46.4% reported fever or night sweats for more than 2 weeks, so on and so forth (Table 4).

Table 1: Socio-demographic profile of study participants.

Characteristics	Frequency	%
Age (years)		
<20	14	3.9
21-30	154	42.5
31-40	151	41.7
41-50	38	10.5
51-60	4	1.1
>60	1	0.3
Sex		
Male	285	78.7
Female	77	21.3
Religion		
Hindu	353	97.5
Muslim	5	1.4
Christian	4	1.1
Literacy status		
Illiterate	32	8.8
Primary (5th completed)	46	12.7
Middle (8th completed)	84	23.2
High (10th completed)	111	30.7
Senior secondary (12th completed)	52	14.4
Graduate	33	9.1
Postgraduate	4	1.1
Marital status		
Currently married	274	75.7
Never married	81	22.4
Widowed/Divorced	7	2
Type of family		
Nuclear	200	55.2
Joint	135	37.3
Single	27	7.5
Socioeconomic status		
I	84	23.2
II	172	47.5
III	93	25.7
IV	13	3.6
Overcrowding		
Present	191	52.8
Absent	171	47.2

Table 2: Personal history of study participants.

Characteristics	Frequency	Percentage (%)
Tobacco use		
Current user	141	39
Ever user	18	5
Never user	203	56
Alcohol use		
Current user	128	35.4
Ever user	44	12.2
Never user	190	52.4
BMI category		
Underweight (<18.5)	42	11.6
Normal (18.5-22.9)	139	38.4
Overweight (23-24.9)	66	18.2
Obese (≥25)	115	31.8

Table 3: Co-morbid history of study participants.

Characteristics	Frequency	Percentage (%)
History of diabetes mellitus		
Yes	12	3.3
No	350	96.7
History of hypertension		
Yes	13	3.6
No	349	96.4
Screening status of HIV		
Screened	90	24.9
Never screened	272	75.1

Table 4: Distribution of study participants according to presumptive TB status* (n=28).

Characteristics	Frequency	Percentage (95%CI)
Cough more than 2 weeks	24	85.7 (68.5-94.3)
Fever or night sweats for more than 2 weeks	13	46.4 (29.5-64.1)
Significant weight loss	15	53.5 (35.8-70.4)
Haemoptysis	4	14.2 (5.7-31.4)
Symptoms regarding EPTB	15	53.5 (35.8-70.4)
Contact TB history in past 1 year	8	28.5 (15.2-47.1)

* Multiple response(s) possible

DISCUSSION

The present study was conducted among sanitation workers in a hospital setting. A total of 362 sanitation workers were screened for tuberculosis. The majority of

study participants were in the age group of 21-30 years with a median age of 32 years comparable to a study conducted by Devasahayam et al in hospital setting among nursing professionals.[12] A study from New Delhi conducted in hospital setting among health care workers with a majority of participants in 31-40 years (42%) with a mean age of 39.1 years is similar to the present study finding.[6] Wang et al conducted a prevalence of tuberculosis among health care workers with the majority of participants <30 years (31.8%) followed by 31-40 years.[13] The majority of sanitation workers in the current study were males (78.7%) comparable to 59% males in study findings of Khayyam et al, 52.4% in a community-based study in Faridabad by Sharma et al.[14] The higher proportion of males in the present study is possibly due to the guideline that some category of work such as urinal and water closet cleaning in the public health facilities should be undertaken by male sanitation workers only.[15] The majority of study participants were literate in the present study while participants in hospital-based study of Devasahayam et al had completed 12th class and currently pursuing a professional course. In a prevalence study in China conducted by Wang et al, majority of the subjects completed bachelor's degree in the medical profession and 72.9% among them were professionals.[13] 75.7% of workers in this study were married and 55.2% were living in a nuclear family is comparable to study findings of Khayyam et al in which 86% of study participants were married and 62% in nuclear family.[12]

39% of participants in this study were current Tobacco users comparable to 31% tobacco users among health care workers in the study undertaken by Khayyam et al and TB prevalence among smokers was higher than non-smokers in study findings of Wang et al with 10.6% proportion of smokers.[6,13] The past history of TB was among 5% in this study which was higher than the study conducted by Sharma et al showing 0.79%.[14] The finding can be explained by the difference in the study population of the studies, where the sanitation workers in a hospital setting are exposed to infectious disease patients and are at higher risk in comparison to the general population.

24.9% have been screened for HIV in the past, which is similar to the study reported by Devasahayam et al among Health care workers in which 18.8% were screened.[12] The present study also estimated the co-morbidities like diabetes and hypertension among sanitation workers which shows 12% and 13% were diabetic and hypertensive respectively and currently on treatment.

7.7% of the study participants were found to have presumptive TB. Out of 15000 people mapped for screening in Delhi for tuberculosis in 2018 under RNTCP, 4900 were actively screened, from which 324 were found to be positive for presumptive TB. The current study finding is comparatively higher than the prevalence of presumptive TB which was found to be 6.61% in population-based active screening in Delhi in 2018. The study prevalence was much higher than the overall prevalence of India (0.81%) in 2018.[7] Another population-based study conducted by Sharma et al in Faridabad among 98599 subjects also showed the prevalence of presumptive TB to be 1.8% which is lower than the present study.[14] The current study is comparable to that of Khayyam et al in a hospital setting, which showed the risk of TB among health care workers to be 727/100000.[6] This can be explained by the vulnerable study population in a hospital setting involved in this study compared to population based data under NIKSHAY. However, the prevalence of presumptive TB was higher (12.5%) in a population-based study in South India conducted by Muniyandi et al among 90815 population.[16] Another population-based study shows the prevalence of 210 per 100000 population and among Health care workers in China the prevalence was found to be 760/100000.[13] The community based survey conducted by Rao et al in central India showed 8.3% of the participants were symptomatic and Khayyam et al finding showed the prevalence of TB was four times higher than the reported national average.[6,17] Similar kind of surveillance was conducted among the vulnerable tribal community by Vyas et al, showing presumptive TB prevalence as 13%.[18]

Among the presumptive TB cases in the present study, majority (85.7%) reported cough as chief symptom followed by fever (46.4%). History of contact of TB was given by 28.5% of study participants. The study report of Sharma et al shows that 65% of the presumptive cases had cough, 6.4% had fever and 9% had history of hemoptysis.[13] The study on health care workers by Khayyam et al reported 6% had a family history of TB and 2% of the study population had a past history of TB.[6] It is comparable to study findings of Lee et al in which cough is reported by 89.2%, fever by 6.9% from an active case finding report conducted in the Philippines.[19] The major symptoms reported in a study conducted by Shargie et al in Ethiopia were cough 99.3% (433), sputum 97.7% (426), and fever 85.8% (374).[20] In the present study, majority of study participants showed cough as a primary symptom which is similar to above study findings.

The study theme is one of the major research priorities in Tuberculosis Disease Surveillance and control. This research comprised the vulnerable population in the health care setting who have not been studied in recent times. All those workers diagnosed with presumptive TB were evaluated clinically, thereby decreasing the probability of missing infections. The study also collected information on comorbidities like diabetes and hypertension, substance use, screening of HIV, and cancers among these workers. However, the present study design was cross-sectional, and study population was sampled using non-probability sampling, which reduces the generalizability of results with the possibility of under or overestimation of population. It is important to protect the health care workers working in a hospital setting as they are at higher risk.[21,22] Under the highlights of TB

control programmes, active screening of health care workers should be conducted at regular intervals and efforts should be taken to implement control strategies to prevent nosocomial transmission of TB and make the health care setting safer for both patients and health care workers.[23]

CONCLUSION

The study showed 7.7% of the health workers had a positive history of presumptive tuberculosis. Our study indicates a compelling need to strengthen infection control practices for Tuberculosis in Hospital settings. Effective infection control measures with regular active surveillance in all categories of Health care workers should be conducted. Further researches shall be carried out in a broader level to find the predictors of tuberculosis among Health care workers.

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