International Journal of Community Medicine and Public Health
Sinha AK et al. Int J Community Med Public Health. 2021 Aug;8(8):3864-3870
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: https://dx.doi.org/10.18203/2394-6040.ijcmph20213014

Original Research Article

Systematic screening of pulmonary tuberculosis among HIV high risk groups in two districts of Chhattisgarh: a feasibility study

Ashish Kumar Sinha[1]*, Sumeet Tripathi[2], Kshitij Khaparde[3], Avinash Chaturvedi[4], Swapnil Vasant Shinkar[1]

[1]Department of Community Medicine, Pt. JNM Medical College, Raipur, Chhattisgarh, India
[2]Department of Physiology, Pt. JNM Medical College, Raipur, Chhattisgarh, India
[3]World Health Organization, Country Office for India, New Delhi, India
[4]District Tuberculosis Office, Government of Chhattisgarh, Chhattisgarh, India

Received: 19 May 2021
Accepted: 14 June 2021

***Correspondence:**
Ashish Kumar Sinha,
E-mail: ashishsinha.md@gmail.com

ABSTRACT

Background: HIV is an important risk factor for the development of tuberculosis. People living with HIV are 21-34 times more likely to develop TB than their uninfected counterparts. Efficient approach for detecting more cases along with shortened duration of infectivity involves a systematic screening of pulmonary TB in settings where high risk groups are concentrated even before the diagnosis HIV infection. Lack of proper screening strategy for HRGs might result in their exclusion from timely intervention which may prove lethal without treatment.
Methods: A cross sectional study was carried out in two districts of Chhattisgarh during September-December 2019.Training cum sensitization sessions were conducted for peer educators, outreach workers, counselors and project managers prior to the survey and were trained for systematic screening of pulmonary TB, sputum collection and transportation to GeneXpert®MTB/RIF lab and other relevant data collection for pulmonary TB diagnosis.
Results: A total of 3963 HRGs were intended to be included in the study, 3418 were screened with 86.2% compliance rate. Out of all HRGs screened (3418), 81 (2.4%) were found presumptive pulmonary TB, of them 2 (0.05%) were microbiologically confirmed, 5 cases were found with incomplete treatment (all were IDUs). Prevalence of tobacco use, alcohol use, diabetes and hypertension were observed in 5.3% and 7.2%, 1.2% and 1.1 respectively.
Conclusions: Although yield for pulmonary TB in this study was not much, the study has demonstrated that active case finding for accessing such a hidden population through existing manpower can assure better acceptability and feasibility in resource poor settings.

Keywords: HIV, High risk group, Systematic screening, Pulmonary TB, GeneXpert®MTB/RIF, ICF

INTRODUCTION

Tuberculosis is one of the most ancient diseases caused by Mycobacterium tuberculosis discovered by Sir Robert Koch.[1] Acquisition of infection can be prevented by effective chemotherapy by 90% within 48 hrs.[2] India accounts for about a quarter of the global TB burden. Worldwide India is the country with the highest burden of both TB and MDR TB.[3] There are an estimated 79,000 multi-drug resistant TB patients among the notified cases of pulmonary TB each year. India is also the country with the second highest number (after South Africa) of estimated HIV associated TB cases. In 2016 an estimated 28 lakh cases occurred and 4.5 lakh people died due to TB.[3] The estimated mortality due to TB is 480,000 (CI: 380000-590,000) and varies across different parts in the country depending upon background HIV prevalence in the general population. Approximately 5% of the incident.[4]

In Chhattisgarh, the Revised National Tuberculosis Control Programme (RNTCP) was launched in 4 districts in 2002 which was then expanded in a phase wise manner to other districts. State successfully implemented national framework for joint TB-HIV collaborative activities from the year 2012 onwards.

The interaction between TB and HIV presents an additional challenge to TB control. HIV is an important risk factor for development of Tuberculosis disease. People living with HIV are 21-34 times more likely to develop TB than the HIV uninfected.[1]

According to the WHO document recommendation, Intensive case finding (ICF) which involves regularly screening all people of high risk groups for HIV infection like Female sex workers (FSW), man having sex with man (MSM), Intravenous drug users (IDUs), prisons, military barracks for the symptoms and signs of TB, followed by prompt diagnosis and treatment, being of the most efficient approach for detecting more cases and with shortened duration of infectivity as it involves systematic screening of pulmonary TB in settings where high risk groups are concentrated.[4]

Lack of proper screening strategy for tuberculosis for high risk groups (i.e.; FSW, MSM, IDUs) along with compromised immunity may results in tuberculosis infection progressing to the disease.

Case detection of tuberculosis in high risk group of HIVs is one step further in active case finding of TB. The undiagnosed cases in these high-risk groups could be lethal without early diagnosis and timely treatment will help in identifying the TB cases even before the HIV infection diagnosis. Various risk factors of TB infection like overcrowding, low immunity due to lack of good nutrition as well as poor health seeking behavior etc are supposedly present in the high-risk groups. So, screening of TB cases even before diagnosis of HIV infection might enhance the case detection.

The objectives of this study were- (a) to know compliance among study participants to take part in the study; (b) to know the associated clinic-behavioral factor associated with HIV high risk group; (c) to find out the proportion HRGs were presumptive pulmonary TB cases; and (d) to find out pulmonary TB cases out of presumptive cases after sputum samples subjected to GeneXpert®MTB/RIF.

METHODS

A cross sectional study was planned in two districts (i.e.; Raipur and Durg) of Chhattisgarh spanning from September to December 2019 in department of community medicine Pt. JNM Medical College, Raipur. Study participants were HIV high risk groups (i.e.; Commercial sex workers, MSMs, TGs and IDUs) were included in this study.

Inclusion criteria

All the high-risk groups (i.e.; Commercial sex workers, MSMs, TGs and IDUs) registered at the selected TI NGO were included.

Exclusion criteria

High risk groups already diagnosed of HIV infection (PLHIVs) were excluded.

In study area there were 4 targeted intervention projects running through NGOs. High risk groups were screened by trained survey team off TI NGO through systematic screening technique under RNTCP guidelines meant for active case finding technique. Training cum sensitization was organized for peer educators, outreach workers, counselors, project managers prior to the survey.

In this training, peer educators, outreach workers, counselors, project managers were trained for systematic screening of pulmonary TB (i.e.; four cardinal symptoms of pulmonary TB, cough of any duration, weight loss, loss of appetite, evening rise of temperature) should be considered as presumptive pulmonary TB.

They were also trained for sputum collection and transportation to GeneXpert®MTB/RIF lab for testing at nearest public health facility. Written informed consent was obtained before data collection. 10% data were verified at field level for its correctness and completeness by PI, PO TSU and program managers of respective TI NGOs.

RESULTS

Out of all 3963 HRGs, 3418 were screened with 86.2% compliance rate with maximum (91%) in FSW and lowest (48.6%) in MSM/TG. Mean age was observed 27.69 SD. 6.1, 33.97 SD 10.6, 25.14 SD 4.74 and 24.16 SD 4.58 in FSW, IDU, MSM and TG respectively. 95% were Hindu, 84.6% were married, 39.1% were homeless, 60.9% living in below poverty line. 48.3% were observed to have malnutrition.

Tobacco use was observed in 36.1% HRGs, of them 5.3% were using both smoke and smokeless form of tobacco whereas 62% were addicted (consuming daily) for the same. Alcohol use was observed in 42.2% HRGs, and 7.2% were addicted (consuming daily) for the same.

Out of all HRGs screened (3418), 81 (2.4%) were found presumptive pulmonary TB, only 2 (.05%) were microbiologically confirmed (both cases were in IDUs), 5 cases were found with incomplete treatment (IDUs). Prevalence of diabetes and hypertension was observed in 1.2% and 1.1 respectively on the other hand 63.8% and 66.6% didn't their status for the same.

Table 1: NGO and typology wise compliance status of study participants among HRGs.

Name of TI NGO	Typology	Total registered	Total participants screened	% Compliance
New path education society, Durg	FSW	1244	1049	84.3
Vikas Anusandhan Sansthan, Durg	MSM /TG	465	226	48.6
Pankhudi and OST centre, Bhilai	IDU	314	293	93.3
Chetna child and women welfare society, Raipur	FSW	1312	1242	94.7
Arshil Shikshan Va Prashikshan welfare society	FSW	628	608	96.8
Total		3963	3418	86.2

Table 2. Age, sex and religion wise distribution of high risk groups.

Variables	High risk group				Total (%)
	FSW (%)	IDU (%)	MSM (%)	TG (%)	
Sex					
Female	2897 (100)	0	0	0	2897 (100)
Male	0	295 (%)	119 (%)	0	414 (100)
Transgender	0	0	0	107	107 (100)
Religion					
Hindu	2861 (98.8)	179 (60.7)	113 (93.40)	95 (90.50)	3248 (95.00)
Christian	3 (0.10)	5 (1.70)	0 (0.00)	1 (1.00)	9 (0.30)
Muslim	31(1.10)	39 (13.20)	6 (5.00)	6 (5.70)	82 (2.40)
Sikh	2 (0.1)	72 (24.40)	2 (1.7)	3 (2.9)	79 (2.3)
Age group (years)					
Younger adults (<25)	975 (33.70)	69 (23.40)	71 (58.70)	66 (62.90)	1181(34.60)
Older adults (>25)	1922 (66.30)	226(76.60)	50 (41.30)	39(37.10)	2237(65.40)
	Mean=27.69	Mean=33.97	Mean=25.14	Mean=24.16	
	SD=6.1	SD=10.6	SD=4.74	SD=4.58	

Table 3: Socio-demographic profile of HRGs of study participants.

Socio-demographic variables	FSW (%)	IDU (%)	MSM (%)	TG (%)	Total
Marital status					
Divorce	47 (1.60)	4 (1.40)	0	0	51 (1.50)
Married	2619 (90.4)	162 (54.9)	42 (34.7)	67 (63.8)	2890 (84.6)
Separated	9 (0.3)	2 (0.7)	1 (0.8)	0	12 (0.4)
Unmarried	191(6.60)	124 (42.0)	78 (64.5)	38 (36.2)	431 (12.6))
Widow	31 (1.1)	3 (1.0)	0	0	34 (1.0)
Living status					
Homeless	1240 (42.8)	38 (12.9)	29 (24.0)	29 (27.6)	1336 (39.1)
Own home	1657 (57.2)	257 (87.1)	92 (76.0)	76 (72.4)	2082 (60.9)
Occupational status					
Business	598 (20.6)	66(22.4)	38 (31.4)	15 (14.3)	717 (21.0)
Farmer	23 (0.8)	2 (0.70)	1 (0.8)	0	26 (0.8)
Farming labour	170 (5.9)	4 (1.4)	0	0	174 (5.1)
House worker	531 (8.30)	1 (0.30)	0	0	532 (15.60)
Non-farming labour	1017 (35.1)	56(19.0)	3 (2.50)	6(5.7)	1082 (31.7)
Other	2 (0.001)	51 (17.30)	0	0	53 (1.60)
Employed	534 (18.4)	88 (29.8)	24 (19.8)	70 (66.7)	716 (20.9)
Student	6 (0.2)	4 (1.4)	35 (28.9)	10 (9.50)	55 (1.6)
Unemployed	16 (0.60)	23 (7.80%)	20 (16.50)	4 (3.8)	63 (1.8)
BPL status					
Don't belong to BPL	791 (27.30)	157 (53.20)	18 (14.90)	64 (61.00)	1030 (30.10)
Belong to BPL	2106 (72.70)	138 (46.80)	103 (85.10)	41 (39.00)	2388 (69.90)

Table 4: Distribution of presumptive TB cases and microbiologically confirmed pulmonary TB cases among study participants (HRGs) under study.

Typology	Total registered	Total participants screened	% Compliance	Total presumptive case (%)	Microbiologically confirmed cases (%)	Microbiologically negative incompletely treated cases
FSW	3184	2899	91.0	55 (6.6)	0 (0)	0
MSM/TG	465	226	93.3	12 (5.3)	0	0
IDU	314	293	93.3	14 (4.8)	2 (14.28)	5
Total	3963	3418	86.2	81 (2.4)	2 (0.05)	0

Table 5: Distribution of co-morbid conditions among study participants (HRGs) under study.

Variables	FSW (%)	IDU (%)	MSM (%)	TG (%)	Total (%)
Body mass index (kg/ m^2)					
Normal: 18.5-25	1525 (52.6)	128 (43.4)	45 (37.2)	69 (65.7)	1767 (51.7)
Abnormal: <18.5 and >25	1372 (47.4)	167 (56.6)	76 (62.8)	36 (34.3)	1651 (48.3)
Status of diabetes					
Yes	32 (1.1)	10(3.4)	0	0	42 (1.2)
No	825 (28.5)	183 (62.0)	104 (86.0)	85 (81.0)	1197 (35.0)
Don't know status	2040 (70.4)	102 (34.6)	17 (14.0)	20 (19.0)	2179 (63.8)
Status of hypertension					
Hypertensive	25 (0.90)	10 (3.40)	0	3 (2.90)	38 (1.10)
Non-hypertensive	774 (26.70)	187 (63.40)	66 (54.50)	77 (73.30)	1104 (32.30)
Don't know status	2098 (72.40)	98 (33.20)	55 (45.50)	25 (23.80)	2276 (66.60)

Table 6: Distribution of tobacco abuse among study participants (HRGs) under study.

Variables	High risk group				Total (%)
	FSW (%)	IDU (%)	MSM (%)	TG (%)	
Tobacco use					
Not using	1892 (65.3)	97 (32.9)	118 (97.5)	77 (73.3)	2184 (63.9)
Using	1005 (34.7)	198 (67.1)	3 (2.5)	28 (26.7)	1234 (36.1)
Type of tobacco abuse					
Both	27 (2.7)	29 (14.60)	0 (0)	9 (32.1)	65 (5.3)
Smoke	566 (56.3)	48 (24.2)	0 (0)	2 (7.1)	616 (49.9)
Smokeless	412 (41)	121 (61.1)	3 (100)	17 (60.8)	553 (44.8)
Status of tobacco addiction					
Addiction present (daily use)	618 (61.5)	138 (69.7)	0	9 (32.1)	765 (62.0)
Addiction not present	387 (37.4)	60 (29.8)	3 (33.3)	19 (42.9)	469 (36.3)
Alcohol use					
Present	1275 (44.0)	138 (46.8)	3 (2.5)	26 (24.8)	1442 (42.2)
Absent	1622 (56.0)	157 (53.2)	118 (97.5)	79(75.2)	1976 (57.8)
Status of alcohol addiction					
Addiction present (daily use)	90 (7.1)	14 (10.1))	0	0	104 (7.2)
Addiction not present	1185 (92.1)	124 (89.9)	3 (100)	26 (100.0)	1338 (92.8)
Total	1275 (100.0)	138 (100.0)	3 (100.0)	26 (100.0)	1442 (100.0)

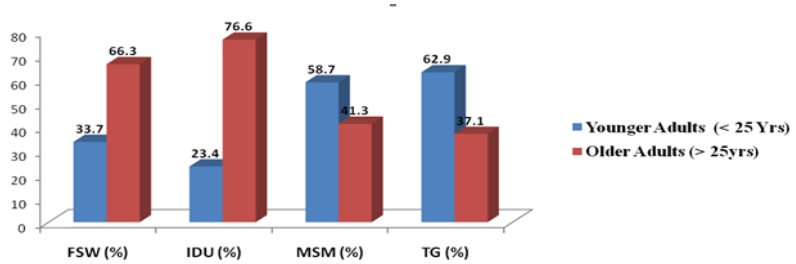

Figure 1: Age wise distribution in percent of high risk groups.

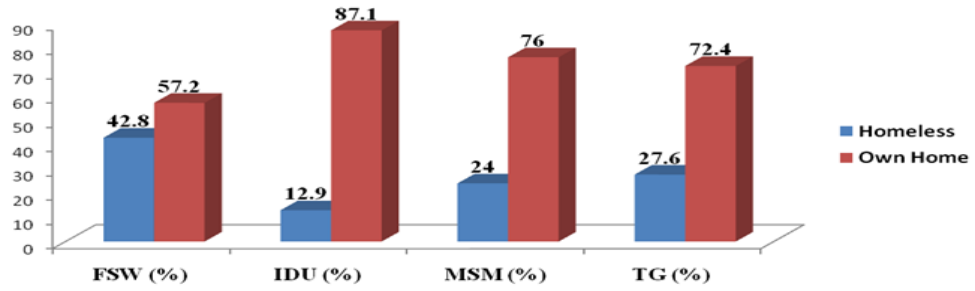

Figure 2: Status of home and homeless of HRGs among study participants.

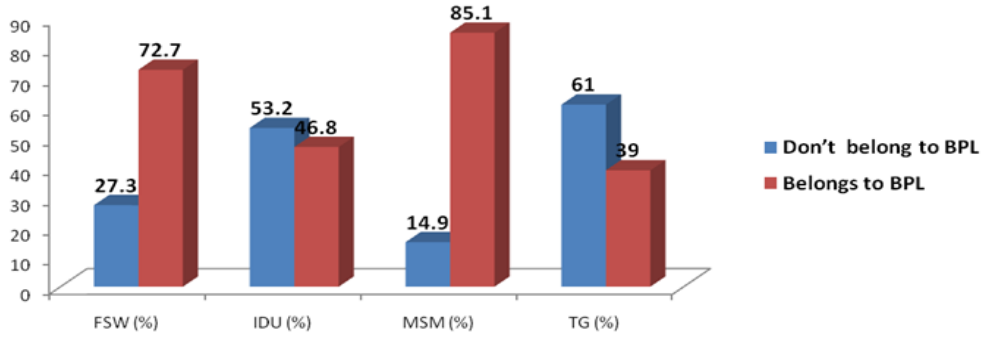

Figure 3: Status BPL of HRGs among study participants.

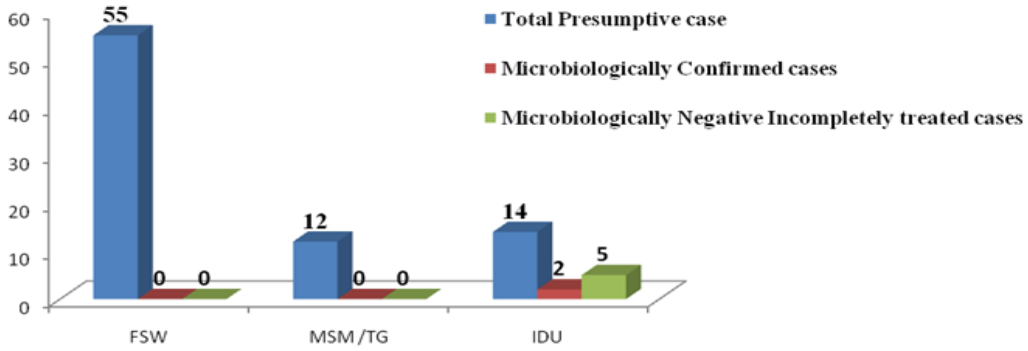

Figure 4: Distribution of presumptive TB cases and microbiologically confirmed pulmonary TB cases among study participants (HRGs) under study.

DISCUSSION

Out of all 3963 HRGs, 3418 were screened with 86.2% compliance rate, such compliance rate was quite high in our study as compared to a similar study focused on high risk group in Malawi being 70% whereas in Bolivian study done by Chiang et al depicted that sex workers are more likely to report for TB screening.[6] Out of all HRGs screened 2.4% were found presumptive pulmonary TB cases, out of all presumptive cases only 0.05% were microbiologically confirmed, This being quite low as compared to the findings Montreal study 28% in a similar population and 5% among the prisoners of Malawi.[5,7] Although the yield of ACF was not much current study but it was quite significant in IDUs. Out of 4.8% presumptive cases 14.8% were microbiologically confirmed cases. This observation being low in comparison to similar study done by Kiria et al where it was 436 (8.7%) defined as TB suspects and TB was confirmed in 175 cases, 109 (62%) had pulmonary TB.[8]

Many risk factors which determines the development of pulmonary TB was found prevalent among the study participants. These risk factors were malnutrition, homelessness, living in below poverty line, diabetes mellitus, hypertension, tobacco and alcohol abuse prevalent among study participants in current study. Current study reveals that 39.1% study participants were homeless and might be at risk of developing TB as observed in another study done in London as high prevalence of TB in such population.[9] A study done by Lonnroth et al the risk of active tuberculosis was found to

be substantially elevated in people who drink alcohol and this risk of exposure was prevalent in 7.2% high risk population of current study.[10] Meta-analysis done by Khalakdina et al revealed the evidence that smoking is a risk factor for TB infection and TB disease, the current study witnessed that 62% of such population might be at risk.[11] Which could be attributed to deprived of quality food high levels of food insecurity indicates critical need for intervention. As per the WHO recommendation malnutrition increases the risk of TB, keeping this in view, 48.3% of our study population was affected by malnutrition might develop TB disease in near future.[12]

The double burden of diabetes mellitus (DM) and TB has attracted increasing attention as screening for TB using regular chest X-ray examinations is feasible by regular follow up one may ensure active case finding in these population.[13] In our study this monitoring could be possible in 1.2% study population with diabetes mellitus. Along with food insecurity substance abuse and noncommunicable diseases are also evidenced in the current research might contribute as risk factor for the development of TB disease.

CONCLUSION

Although the yield for pulmonary TB in this study was not much but this study has demonstrated that the acceptability and feasibility to access a hidden population through existing manpower in resource poor settings can still assure active case finding in this highly vulnerable group. Malnutrition was quite high among HRGs. Substance abuse (e.g. tobacco and alcohol) was also significantly prevalent among HRGs, of them few were addicted too. The prevalence of diabetes and Hypertension was low but majority of them were ignorant of their status for the same.

Recommendations

The strategy of accessibility of high risk group by their care provider needs to be implemented in other districts as well for systematic screening and ICF of pulmonary TB, especially for among IDUs as a significant proportion such case were remain undetected among them. Hence for this IDUs should be kept under periodic surveillance for pulmonary TB. This can be achieved by periodic training and sensitization of care providers of HRGs to achieve the larger objectives of National Tuberculosis Elimination program through accessing these hidden population.

ACKNOWLEDGEMENTS

We acknowledge the support of Dr. R.R. Sahani, Dr. S.K. Binjhwar, Mr. Vikrant Verma, Mr. Subhajit Pakira, Dr. K.K. Pandey, Dr. Munish Bhagat, Mr. Dhirendra Kashyap, Dr. Deepak Sarkar. We also make kind words of gratitude's to all Program Managers of TI NGOs as Khemlata Khobragade, Bhuwanesh Shriwash, Ranjeeta Gadhe, Anupam Tamarkar, Amol Shinde and team of concern district and their field staff and Archna Thakur as project office assistant.

Funding: NHM Chhattisgarh, State TB Cell
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. WHO. Global tuberculosis control: WHO report, 2011. Available at: https://apps.who.int/iris/handle10665447. Accessed on 10 May 2021.
2. The Gobal Fund. The Global Fund to Fight AIDS, TB and Malaria (GFATM): Collaborative TB/HIV activities information Note, 2012. Available at: https://www.theglobalfund.org/en/. Accessed on 10 May 2021.
3. WHO. Global Tuberculosis, 2017. Available at: https://www.who.int/tb/publications/global_report/gtbr2017_main_text. Accessed on 10 May 2021.
4. Centre Tuberculosis Division, GOI. Nikshay,2021. Available at: https://tbcindia.gov.in/. Accessed on 10 May 2021.
5. Brassard P, Bruneau J, Schwartzman K, Senecal M, Menzies D. Yield of tuberculin screening among injection drug users. Int J Tuberc Lung Dis. 2004;8(8):988-93.
6. Chiang SS, Paulus JK, Huang CC, Newby PK, Castellon QD, Boynton JR, et al. Tuberculosis screening among Bolivian sex workers and their children. J Epidemiol Glob Health. 2015;5(2):205-10.
7. Nyangulu DS, Harries AD, Kangombe C, Yadidi AE, Chokani K, Cullinan T, et al. Tuberculosis in a prison population in Malawi. Lancet. 1997;350(9087):1284-7.
8. Kiria N, Gegia M, Kalandadze I. Tuberculosis screening among intravenous drug users (IDU) in Georgia; European Respirat J. 2011;38:4898.
9. Story A, Murad S, Roberts W, Verheyen M, Hayward AC, London Tuberculosis Nurses Network. Tuberculosis in London: the importance of homelessness, problem drug use and prison. Thorax. 2007;62(8):667-71.
10. Lonnroth K, Williams BG, Stadlin S, Jaramillo E, Dye C. Alcohol use as a risk factor for tuberculosis - a systematic review. BMC Public Health. 2008;8:289.
11. Bates MN, Khalakdina A, Pai M, Chang L, Lessa F, Smith KR. Risk of tuberculosis from exposure to tobacco smoke: a systematic review and meta-analysis. Arch Intern Med. 2007;167(4):335-42.
12. WHO. Guideline: Nutritional care and support for patients with tuberculosis, 2013. Available at: pps.who.int/iris/bitstream/handle/10665/94836/9789241506410_eng.pdf?sequence=1. Accessed on 10 May 2021.

13. Ji Y, Cao H, Liu Q, Li Z, Song H, Xu D, et al. Screening for pulmonary tuberculosis in high-risk groups of diabetic patients. Int J Infect Dis. 2020;93:84-9.

Cite this article as: Sinha AK, Tripathi S, Khaparde K, Chaturvedi A, Shinkar SV. Systematic screening of pulmonary tuberculosis among HIV high risk groups in two districts of Chhattisgarh: a feasibility study. Int J Community Med Public Health 2021;8:3864-70.