International Journal of Community Medicine and Public Health
Burma SP et al. Int J Community Med Public Health. 2019 Aug;6(8):3314-3320
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: http://dx.doi.org/10.18203/2394-6040.ijcmph20193447

Original Research Article

Active detection of tuberculosis: tackling the problem head on in the remote area of Andaman and Nicobar Islands

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Received: 30 May 2019
Revised: 16 July 2019
Accepted: 17 July 2019

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ABSTRACT

Background: Community based active case finding for tuberculosis (TB) is an essential step in the fight forward for eliminating TB. One of the steps in targeting TB intervention is early diagnosis and treatment of patients by reducing the reservoir of infection in the community. Active case finding (ACF) targeting the entire population by house to house survey was done in Nicobar district of these islands.
Methods: A community-based, cross-sectional, descriptive study was conducted with the trained mobile teams from 17.07.2017 to 31.07.2017 in the Nicobar District. The algorithm of the case detection included screening patients by symptoms, then by sputum microscopy for confirmation. X-ray was done in patients who were symptomatic but sputum negative. If both smear and chest X-ray results were negative but still symptomatic, then cartridge-based nucleic acid amplification test (CBNAAT) was done.
Results: A total population of 18526 was mapped of which 14784 (79.8) could be screened. A total of 209 people were identified by the mobile teams with symptoms who were examined by sputum microscopy. Among them 7 cases were identified to be sputum smear positive, 2 X-ray positive and 2 were diagnosed by CBNAAT.
Conclusions: This study shows that the active case finding method is feasible and acceptable by the community. The results obtained are encouraging for the implementation of ACF through mobile team activity in all these islands in order to meet the target of WHO's End TB Strategy.

Keywords: Active case finding, Tuberculosis, Nicobar district

INTRODUCTION

Andaman and Nicobar islands, one of the seven union territories of India is archipelago of 572 islands in the Bay of Bengal; comprises two island groups, the Andaman Islands and the Nicobar Islands. These islands are a home for six primitive tribes which constitute about 10 of the population and also the immigrants from mainland India. Car Nicobar is the administrative headquarters for the Nicobar District and has a population of 36,842 according to 2011 census. Nicobarese families are patriarchal and as a rule live in large joint families called Tuhet. They live in circular shaped huts with a high thatched pent roof. The hut is raised on piles 5-7 feet from the ground consisting of one large boarded floor, without divisions. The houses have no windows and there is only one single sleeping space for all the occupants of the hut.

The National Tuberculosis Control Programme started in these islands from 1962, and then in 1997 Revised National Tuberculosis Control Programme was implemented. The targets set by World Health Organization of detecting 70 of estimated cases and successfully treating 85 of the detected cases have been achieved by the islands in 2005. Despite the success achieved over the past decade the notification rates have stagnated. Though there is a lack of definitive evidence that systematic screening for TB leads to epidemiological impact, screening persons at high risk for TB has increasingly become a major global health priority, as it ensures that those with TB receive prompt treatment and may reduce ongoing transmission.[1-4] A variety of active case-finding strategies for tuberculosis (TB) were tested and proved to be effective over the past century.[5]

Early diagnosis and treatment of TB remains the essential step in reducing the reservoir of infection in the community. While the routine TB services are essential particularly for case management, it has proven inadequate to control TB because available services are not always accessible to poor and vulnerable populations where TB often concentrates.[6,7] In light of this challenge, a renewed interest in active case finding (ACF) as a complementary strategy to improve case detection has emerged.[8,9,10] In a large study carried out in India using ACF resulted in the detection of a large number of presumptive pulmonary TB cases who were not accessed by the regular National TB programme with variation across different states.[11]

TB is the 9th leading cause of death worldwide and the leading infectious cause, ranking above HIV/AIDS.[11] The World Health Organization's End TB Strategy and also Sustainable Development Goals envisage achieving 90 reduction in TB deaths and an 90 decrease in TB incidence by 2035 compared to 2015.[12] Active case finding was proposed under RNTCP to enhance the case finding of the remaining 25 of the missed cases.[13,14] Systematic screening of those at high risk for TB is a key component of the end TB strategy. Active case finding (ACF) can help in early and efficient case detection among vulnerable population.

The incidence of Tuberculosis in the Nicobar district is 3.1 per 1000 polulation which is very high as compared to the rest of the country 2.1 per 1000 population. (167 cases in 2017 and 115 cases in 2018 total population 37000). As it is a hard to reach area and the incidence of Tuberculosis is very high and the living conditions which favour the spread of Tb like sharing the same hall for sleeping, overcrowding and ill ventilated houses, the ACF strategy has been undertaken in this district to start with.

The objective of this study was to detect the missed out cases from the vulnerable population of the Nicobar district through mobile teams, contribution of patients through active case finding, characteristics of the patients detected and their treatment outcomes.

METHODS

A community-based, cross-sectional, descriptive study was conducted was conducted from 17.07.2017 to 31.07.2017 in the Nicobar District. A total of 10 teams had performed house-to-house survey using the structured proforma. Before conducting the survey, detailed area map was prepared by individual team. The team consisted of Ashas, Anganwadi workers, multi-purpose health workers of that area. They were trained before the survey. Village selection for active case finding was based on Hard to Reach and Vulnerable population. 7 villages were selected from Car Nicobar island, 4 from Campbell Bay, 6 from Nancowrie, 3 from Katchal, 5 from Teressa. Thus a total of 25 villages were chosen from 5 islands of the Nicobar district. A house to house screening was done to cover the entire population of these villages. The algorithm followed was to screen for presence of Presumptive TB with any of the four symptoms suggestive of Pulmonary Tuberculosis – cough or fever ≥ 2 weeks, history of hemoptysis anytime in last 6 months, significant weight loss, chest pain ≥ 1 month as per RNTCP criteria.[10] If any of these presumptive symptoms were present, they were motivated to undergo sputum examination. They were educated to bring out mucopurulent sputum and spot samples were collected by the survey team, the second container was given to collect early morning sputum and the same was collected by the survey team on the next day. Sputum examinations were done of which even one positive is considered as confirmation of Tuberculosis and put on treatment. Chest X-ray was advised for sputum negatives or if the individual cannot expectorate and reviewed by the chest physician. If both smear and chest X-ray results were negative but still symptomatic, then cartridge-based nucleic acid amplification test (CBNAAT) was done. Those who were diagnosed were started on treatment. Socio demographic data like age, sex, address also was collected.

Health Care pertaining to Tuberculosis in Andaman and Nicobar islands are that there are 9 TB units, 13 Designated Microscopy Centers, 233 Dots Centers of which 3 TB units, 4 Designated Microscopy Centers and 35 Dots Centers are in Nicobar District.

The data collected was entered in MS excel and analysed using SPSS statistical software IBM SPSS 20.0 (Chicago), after which it was tabulated, analysed and interpreted using frequencies and percentages.

RESULTS

The total population of these villages was 18526 of which 14784 (79.80) could be screened for symptoms of Tuberculosis. In some of the villages that is Kalasi,

Bengali Basthi and Alurong of Teressa island all the people could be screened as shown in Table 1.

The age and sex distribution of the total number of people screened for symptoms of Tuberculosis is depicted in Table 2. Males and females were almost equally represented with slight preponderance of males.

A total of 209 people were detected with one or more symptoms of Tuberculosis of which151 people were detected with cough for more than 2 weeks, 33 with fever and night sweats, 43 with weight loss, 31 with hemoptysis and 72 with chest pain. The highest number of people with one or more symptoms was found in the Car Nicobar island (Table 3).

A total of 209 people with symptoms of Tuberculosis were examined for sputum microscopy, X-ray, CBNAAT and 11 were found positive from various villages as depicted in Table 4.

Tuberculosis cases detected by routine case finding and active case finding through mobile teams is depicted in Table 5.

There is a wide range of variation in the contribution in these islands with highest in Car Nicobar island and zero contribution in Teressa island. Overall the average contribution in the Nicobar district by active case finding is 6.59.

A total of 11 patients were diagnosed with Tuberculosis of which 7 were females. Most of the patients belonged to 15-45 year age group. Most of the patients diagnosed were sputum positive. All the patients were cured or treatment completed at the end of treatment as depicted in Table 6.

Table 1: Total population and the number of people screened for TB.

Name of island and villages	Total population	No. of people screened for symptoms
		N (%)
Car Nicobar Island	9521	8558 (89.89)
Arong village	1303	1256 (96.39)
Sawai village	1567	1550 (98.92)
Chuckchucha village	1351	1114 (82.46)
Mus village	1655	1574 (95.11)
Small Lapathy village	2188	1836 (83.91)
Tapoiming village	894	708 (79.19)
Teetop village	563	520 (92.36)
Katchal Island	1231	1209 (98.21)
Upper Katchal	348	344 (98.85)
E-Wall	256	261 (101.95)
Japan Tekery	627	604 (96.33)
Teressa Island	2057	1968 (95.67)
Raihion, Chowra	386	301 (77.98)
Alheat, Chowra	219	215 (98.17)
Kalasi	489	489 (100.00)
Bengali Basthi	644	644 (100.00)
Alurong	319	319 (100.00)
Campbell Bay Island	3383	1741(51.46)
Chimgam village	113	113 (100)
Joginder Nagar	922	525 (56.94)
Rajiv Nagar -II Pilobhai	1760	730 (41.48)
Gandhi Nagar	588	373 (63.44)
Nancowrie Island	2334	1308 (56.04)
Bada Enaka	436	394 (90.37)
Chimpin	622	293 (47.11)
Tapong	345	106 (30.72)
Pillpillow	436	209 (47.94)
Balu Basthi	126	66 (52.38
Munak	369	240 (65.04)
Grand total	18526	14784 (79.80)

Table 2: Age and sex distribution of total number of people screened for symptoms.

Island	Village	Below 15				Above 15				Total
		Male		Female		Male		Female		
		No.	%	No.	%	No.	%	No.	%	
Car Nicobar	Arong	78	6.18	90	7.17	547	43.49	542	43.11	1257
	Sawai	123	7.91	126	8.10	539	34.78	763	49.20	1550
	Chuckchucha	402	36.05	165	14.82	289	25.98	258	23.16	1114
	Mus	244	15.53	226	14.35	566	35.98	537	34.14	1574
	Small Lapathy	81	4.39	104	5.65	907	49.41	744	40.55	1836
	Tapoiming	78	10.95	128	18.05	276	38.95	227	32.05	708
	Teetop	217	41.83	169	32.48	70	13.38	64	12.31	520
	Total	1344	15.70	1057	12.35	3097	36.19	3060	35.76	8558
Katchal	Upper katchal	56	16.01	56	16.01	131	37.64	106	30.34	348
	e-Wall	38	14.79	39	15.18	92	35.80	88	34.24	256
	Japan Tickery	48	7.67	60	9.62	284	45.35	234	37.36	627
	Total	143	11.58	156	12.64	506	41.11	427	34.67	1231
Teressa	Haiheon Chowra	31	8.00	22	5.78	180	46.67	153	39.56	386
	Alheat Chowra	19	8.52	12	5.68	107	48.86	81	36.93	219
	Bengali Teressa	29	4.55	20	3.13	305	47.34	290	44.98	644
	Kalasi Teressa	26	5.41	23	4.78	204	41.79	235	48.02	489
	Alurong Teressa	10	3.22	16	5.14	155	48.55	137	43.09	319
	Total	110	5.35	92	4.48	949	46.15	905	44.02	2057
Campbell Bay	Chingam Village	11	9.84	6	5.74	49	43.44	46	40.98	113
	Joginder Nagar	110	11.97	91	9.84	376	40.83	344	37.36	922
	Rajiv Nagar	194	11.02	216	12.28	685	38.90	665	37.80	1760
	Pilobha	16	19.28	10	12.05	23	27.71	34	40.96	83
	Gandhi Nagar	60	10.23	36	6.05	258	43.95	234	39.77	588
	Total	399	11.51	335	9.66	1405	40.53	1328	38.31	3466
Nancowrie	Bada Enaka	78	17.89	57	13.16	168	38.42	133	30.53	436
	Tapong	72	20.95	3	1.01	134	38.85	135	39.19	345
	Pillpillow	17	3.80	22	5.06	210	48.10	188	43.04	436
	Balu Basti	23	18.32	25	19.85	39	31.30	38	30.53	126
	Munak	46	12.40	57	15.36	131	35.58	135	36.66	369
	Champin SC	96	15.38	144	23.08	191	30.77	191	30.77	622
	Total	314	13.45	315	13.49	872	37.36	833	35.70	2334

Table 3: Total number of people detected with symptoms of TB.

Name of the island	People with cough >2 weeks	Fever with night sweats	Weight loss	Hemoptysis	Chest pain
Car Nicobar	99	19	31	25	48
Katchal	2	1	1	0	1
Teressa	13	5	3	3	7
Campbell Bay	15	5	7	2	13
Nancowrie	22	3	1	1	3
Total	151	33	43	31	72

Table 4: Total number of people examined for sputum and the number diagnosed among them.

Name of the islands and villages	No. of people examined for sputum	No. of TB patients diagnosed
Car Nicobar island	141	7
Arong village	24	1
Sawai village	36	2
Chuckchucha	18	0
Mus	24	3

Continued.

Name of the islands and villages	No. of people examined for sputum	No. of TB patients diagnosed
Small Lapathy	9	0
Tapoiming	15	1
Teetop	15	0
Katchal Island	2	1
Upper Katchal	0	0
E-Wall	0	0
Japan Tekery	2	1
Teressa Island	17	0
Raihion, Chowra	3	0
Alheat, Chowra	6	0
Kalasi	6	0
Bengali Basthi	2	0
Alurong	0	0
Campbell Bay Island	26	1
Chimgam village	1	1
Joginder Nagar	10	0
Rajiv Nagar -II Pilobhai	10	0
Gandhi Nagar	5	0
Nancowrie Island	23	2
Bada Enaka	1	1
Chimpin	14	1
Tapong	4	0
Pillpillow	0	0
Balu Basthi	4	0
Munak	0	0
Grand Total	209	11

Table 5: Contribution of TB cases by ACF in the year 2017.

Name of the Island	Total cases detected by PCF and ACF	TB cases detected by ACF	Contribution (%)
Car Nicobar	108	7	6.48
Katchal	2	2	100
Teressa	2	0	0
Campbell Bay	12	1	8.33
Nancowrie	43	1	2.33
Total	167	11	6.59

Table 6: Characteristics of TB patients diagnosed by ACF in 25 villages of 5 islands of Nicobar district.

Variable	Number (%)
Total number of patients diagnosed with TB	11
Sex	
Male	4 (36.36)
Female	7 (63.64)
Age group in years	
<15	0 (0.00)
15–54	10 (90.91)
>55	1 (9.09)
Type of TB disease	
Sputum positive	7 (63.64)
Extra pulmonary	2 (18.18)
CBNAAT	2 (18.18)
TB treatment outcome	
Cured	7 (63.64)
Treatment completed	4 (36.36)

DISCUSSION

It was seen from our study that nearly 80 of the people could be screened for symptoms of tuberculosis from the 25 villages of the 5 islands varying from more than 90 in Carnicobar, Katchal and Teressa island to less than 60 in Campbell bay and Nancowrie islands.

The current study involved all the people regardless of their age. In a similar study conducted by Riyaz et al they had included all the members of the community in Puducherry for active case finding. Of the 2252 houses, they covered 1746 resulting in a response rate of 77.5 and included 6606 residents.[15]

In our study it was observed that out of 14784 people who could be surveyed, 209 (1.4) were symptomatic of whom 11 (5.3) were diagnosed with Tubercuclosis. In a house to house symptom survey study at addis ababa, ethiopia done by Demissie et al it was observed that out of 12 000 residents in four kebeles, or urban neighborhoods, surveyed, it was revealed 173 (1.4) symptomatic cases, of whom 23 (189/100 000) were sputum smear-positive for acid-fast bacilli (AFB).[15,16] During the rapid village survey done by Schuurman et al Khon Kaen Province, Thailand 1117 people were contacted and 7 (627/100 000) smear-positive cases were detected. An additional 19613 were seen in the total village survey, and only one additional TB case was detected.[17] In a study conducted at Myanmar by Ohnmar et al it was observed that out of 9349 people with symptoms suggestive of TB, 504 were diagnosed with Tuberculosis.[18]

In our study it was revealed that the overall contribution to total TB case detection by active case finding was 6.59. In the above mentioned study conducted at Myanmar, it was observed that the contribution to total TB case detection in the respective townships was 25.3.[18]

The treatment success rate of all the cases diagnosed by active case finding in our study were 63.64 cured and the rest 36.36 had completed the treatment. In the above mentioned study conducted in Myanmar the overall treatment success rate for all new TB cases was 93 (401/431) whereas the rates for death, loss-to-follow-up and failure were 2.3, 2.3, and 0.9, respectively.[18]

Active case finding could be further strengthened in the islands by equipping the mobile team with a mobile Chest X-ray machine along with the technicians. This strategy should be extended in call the other islands of Andaman and Nicobar islands as the people here live in a close knit society with a greater risk of transmission.

CONCLUSION

There is a large pool of undetected cases in the community at any given point of time and Active Case Finding can detect cases early. This study, employing mobile teams, for screening of the entire population of the selected villages for one or more symptoms of Tuberculosis had shown a good yield of the cases and treatment outcomes. These results are encouraging for the implementation of ACF through mobile team activity in all these islands in order to meet the target of WHO's End TB Strategy.

ACKNOWLEDGEMENTS

Authors sincerely thank Zacharia Data entry operator RNTCP and Arup Kumar Roy: Senior Treatment Supervisor RNTCP for their valuable co-operation.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Corbett EL, Marston B, Churchyard GJ, De Cock KM. Tuberculosis in sub-Saharan Africa: opportunities, challenges, and change in the era of antiretroviral treatment. Lancet. 2006;367(9514):926–37.
2. Herbert N, George A, Baroness Masham of Ilton, Sharma V, Oliver M, Oxley A, et al. World TB Day 2014: finding the missing 3 million. Lancet. 2014;383(9922):1016–8.
3. World Health Organization. Recommendations for investigating contacts of persons with infectious tuberculosis in low- and middle-income countries. Geneva: WHO; 2012.
4. Kranzer K, Afnan-Holmes H, Tomlin K, Golub JE, Shapiro AE, Schaap A, et al. The benefits to communities and individuals of screening for active tuberculosis disease: a systematic review. Int J Tuberc Lung Dis. 2013;17(4):432–46.
5. Getahun H, Raviglione M. Active case finding for TB in the community: time to act. Lancet. 2010.
6. Lonnroth K, Corbett E, Golub JE, Godfrey-Faussett P, Uplekar M, Weil D, et al. Systematic screening for active tuberculosis: rationale, definitions and key considerations. Int J Tuberc lung Dis. 2013;17: 289–98.
7. Obermeyer Z, Abbott-Klafter J, Murray CJL. Has the DOTS strategy improved case finding or treatment success? An empirical assessment. PLoS One. 2008;3:e1721.
8. Lönnroth K, Castro KG, Chakaya JM, Chauhan LS, Floyd K, Glaziou P, et al. Tuberculosis control and elimination 2010–50: cure, care, and social development. Lancet. Elsevier Ltd. 2010;375:1814–29.
9. Kranzer K, Afnan-Holmes H, Tomlin K, Golub JE, Shapiro A, Schaap A, et al. The benefits to communities and individuals of screening for active tuberculosis disease: a systematic review. Int J Tuberc Lung Dis. 2013;17:432–46.

10. Systematic screening for active tuberculosis: Principles and recommendations. World Health Organization, Geneva 2013.
11. Prasad BM, Satyanarayana S, Chadha SS, Das A, Thapa B, Mohanty S, et al. Experience of active tuberculosis case finding in nearly 5 million households in India. Public Health Action. 2016;6(1):15–8.
12. World Health Organization. Tuberculosis Fact sheet; 2016.
13. World Health Organization (WHO). End TB Strategy. Global Strategy and Targets for Tuberculosis Prevention, Care and Control After 2015; 2014O/HTM/TB/2015.19. Geneva (Switzerland); 2015.
14. Central Tuberculosis Division. Technical and Operational Guidelines on Treatment of Tuberculosis. New Delhi: Central Tuberculosis Division; 2016.
15. Mani M, Riyaz M, Shaheena M, Vaithiyalingam S, Anand V, Selvaraj K, et al. Is it feasible to carry out active case finding for tuberculosis in community-based settings? Lung India. 2019:36(1):28-31
16. Demissie M, Zenebere B, Berhane Y, Lindtjorn B. A rapid survey to determine the prevalence of smear-positive tuberculosis in Addis Ababa. Int J Tuberc Lung Dis. 2002;6:580–4.
17. Schuurman EMW, Srisaenpang S, Pinitsoontorn S, Bijleveld I, Vaeteewoothacharn K, Methapat C. The rapid village survey in tuberculosis control. Tuberc Lung Dis. 1996;77:549–54.
18. Myint O, Saw S, Isaakidis P, Khogali M, Reid A, Hoa NB, et al Active case-finding for tuberculosis by mobile teams in Myanmar: yield and treatment outcomes. Infectious Diseases of Poverty. 2017;6:77.

Cite this article as: Burma SP, Jahnavi G, Lal P, Thatkar PV. Active detection of tuberculosis: tackling the problem head on in the remote area of Andaman and Nicobar Islands. Int J Community Med Public Health 2019;6:3314-20.