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Original Article

Effect of duration of cough (≥3 weeks Vs ≥2 weeks) on yield of sputum positive tuberculosis cases and laboratory load

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Abstract:
Background & objective: Early detection and prompt treatment is the basis of tuberculosis control through reducing the reservoir of infection. The objective of the present study was to study the effect of reducing the screening criteria of chest symptomatics from existing ≥ 3 weeks to ≥ 2 weeks on case detection of smear positive tuberculosis and laboratory load. **Methods**: The present cross-sectional study was carried out at General Out-Patient Department (GOPD) of Kasturba Hospital, Sewagram. All the chest symptomatics with cough of two weeks or more than two weeks duration attending in GOPD were screened for pulmonary tuberculosis by examining the three sputum smears in designated microscopy center as per RNTCP guidelines. The data was entered and analyzed using epi_info 6.04d. **Results:** Number of sputum positive cases detected using RNTCP guideline (cough ≥ 3 weeks) for screening the chest symptomatic for AFB was 104. When, the screening guideline was modified from cough ≥ 3 weeks duration to cough ≥ 2 weeks duration, it yielded 138 cases. The yield of sputum positive cases of tuberculosis was increased by 32.7%. This also increased the laboratory load by 54.8%. **Conclusion:** The modifications of existing screening criteria from cough ≥ 3 weeks to cough ≥ 2 weeks increased the yield of sputum positive cases by 1.3 times and the laboratory (microscopy center) load by 1.5 times.
Key Words: Smear-positive tuberculosis; Chest symptomatic; Cough duration; Yield; Laboratory load

Introduction:

Pulmonary tuberculosis contributes around 85% of total TB cases & these cases serve as main reservoir of infection.[1] The recommended strategy in developing countries where 95% of the tuberculosis cases occur is to detect sputum positive cases and treat them promptly to reduce the reservoir, ultimately leading to control of tuberculosis.[2]

India, which accounts for one-fifth of global incidence of tuberculosis and tops the list of 22 high burden countries, is implementing Revised National Tuberculosis Control Program (RNTCP). As per the program guidelines, all patients presenting with cough of ≥ 3 weeks duration are to be screened for tuberculosis by carrying out three sputum examinations.[3] Santha et al reported the increase in yield if the duration of cough for screening was reduced to ≥ 2 weeks.[4]

The present study was undertaken at DOTS-cum-Microscopy center of RNTCP program to study the effect of reducing screening criteria of chest symptomatics from existing ≥ 3 weeks to ≥ 2 weeks on case detection of sputum positive tuberculosis and laboratory load.

Methodology:

Study setting

The present study was carried out at General Out-patient Department (GOPD) of Kasturba Hospital, Sewagram, in central India. The DOTS-cum-Microscopy center is also situated in the GOPD. All new patients attending Kasturba Hospital Sewagram are routed through GOPD. Hence, it was easy to screen all new chest symptomatics for tuberculosis.

Data Collection

All the chest symptomatics with cough of two weeks or more than two weeks duration attending in GOPD were screened for pulmonary tuberculosis by examining the three sputum smears in designated microscopy center as per RNTCP guidelines. Patients previously diagnosed as a case of tuberculosis, those less than 15 years of age and those on anti-tuberculosis treatment were excluded from the study. Data was collected from January 2006 to August 2007. The data was collected after obtaining written informed consent. The study protocol was approved by the institutional ethical committee.

Statistical analysis

The data was entered and analyzed using epi_info 6.04d. The Chi-square test was used to test difference in proportion. The level of statistical significance was defined as $p < 0.05$. Increase in yield was calculated as the difference in number of sputum positive cases by new (cough ≥ 2 weeks) and old criteria (cough ≥ 3 weeks) divided by number of sputum positive cases by old criteria.

Results

During the study period, total of 1308 patients with cough ≥ 2 weeks were screened for AFB at RNTCP microscopy center. The sputum positivity rate among chest symptomatics having cough ≥ 2 weeks was 10.6%. Out of these, 845 patients had cough of ≥ 3 weeks duration. Sputum positivity rate among chest symptomatics having cough ≥ 3 weeks was 12.3%. The difference in sputum positivity rates was not statistically significant ($p = 0.228$). (Table 1)

Table 1: Sputum positivity and increased yield of cases

Variables	Duration of cough				Increased yield in %
	2 weeks and more		3 weeks and more		
	Number of chest symptomatics	Number of smear positives	Number of chest symptomatics	Number of smear positives	
Age (years)					
15-29	439	45 (10.3)	239	31 (13.0)	45.2
30-59	538	56 (10.4)	269	43 (16.0)	30.2
≥ 60	331	37 (11.2)	247	30 (12.2)	23.3
Sex					
Male	905	105 (11.6)	580	83 (14.3)	26.5
Female	403	33 (8.2)	265	21 (7.9)	57.1
Total	**1308**	**138 (10.6)**	**845**	**104 (12.3)**	**32.7**
Figures in parentheses are percentages					

Number of sputum positive cases detected using RNTCP guideline (cough ≥ 3 weeks) for screening the chest symptomatic for AFB was 104. When, the screening guideline was modified from cough ≥ 3 weeks duration to cough ≥ 2 weeks duration, it yielded 138 cases. The yield of sputum positive cases increased by 32.7% [(138-104)/104].

By using RNTCP guidelines for screening a chest symptomatic, the microscopy center had a load of 2535 slides (845*3). As per modified criteria (cough ≥ 2 weeks), the microscopy center had the load of 3924 slides (1308*3). This increased the load of the laboratory (designated microscopy center) by 54.8%. If only 2 slides were to be collected per patient then the laboratory load would have been 2616; an excess of only 3.2%.

So, the modifications of existing screening criteria from cough ≥ 3 weeks to cough ≥ 2 weeks increased the yield of sputum positive cases by 32.7% and the laboratory (microscopy center) load by 54.8%.

Discussion:

Tuberculosis (TB) is the number one single infectious disease killer**,** taking nearly 3 million lives per year. So great is concern about TB that in 1993, the World Health Organization (WHO) declared TB a "global emergency".[5] India has dubious distinction of being the largest contributor of tuberculosis cases to the world. It accounts for one fifth of a global incidence of TB and tops the list of 22 high burden countries. In India, more than 40% of population is infected with TB bacilli. In India every day, more than 40 000 people become newly infected with the tubercle bacilli, more than 5000 develop TB disease, more than 1000 people die of TB.[6] Considering the epidemiology of tuberculosis, reducing the reservoir of infection remains the only practical approach to control the tuberculosis in the absence of good vaccine to protect susceptibles and effective ways to curtail the air-borne transmission.

Resorvoir of tuberculosis infection can be reduced by early detection and prompt and complete treatment of sputum positive cases. RNTCP in India has built-up nation-wide network of designated microscopy centers for early detection and DOTS centers for prompt and complete treatment.[7] It aims to achieve and maintain cure rate of at least 85% and case detection rate of at least 70%. Currently, RNTCP uses a definition of chest symptomatic as a person having cough of 3 weeks or more.[6] The optimal duration of cough chosen by the country to recommend sputum smear examination depends on prevalence of tuberculosis, utilization of health facilities by the population and laboratory work load so that the quality can be maintained. But, the current definition misses out many sputum positive cases.[8] In the present study the magnitude being 32.7%. Thomas et al reported the figure to be 38%. Santha et al reported it to be 42%.[4] These are the cases who are symptomatic, presented at the health facility of their own but would have been missed had the current definition been used. Such a missed opportunity may prove detrimental for the success of the program. Such cases, if treated symptomatically might loose faith on the health system and may go out of the RNTCP net and continue to be infectious for longer durations forfeiting the basic principle of tuberculosis control.

This change in definition of chest symptomatic would increase the laboratory load by 54.8% as per the current guidelines of three sputum samples. Masse et al in his systematic review concluded that the third sputum sample increases the sensitivity to the range of only 2-5%.[9] Hence, recommended to reduce the number of specimens examined from current three to two and to be collected on the same day. If this recommendation is accepted, then there will be no significant increase in laboratory load (3.2%) even if the criteria of three or more weeks is brought down to two or more weeks.

RNTCP has matured over the period of time. The targets are being achieved regularly though there are some states which are not performing as the other states.[7] This is a high time to modify the definition of chest symptomatic to cough ≥ 2 weeks from the current definition of cough ≥ 3 weeks by gearing the program to handle the load of chest symtomatics to the tune of one and half times of the current load. This will culminate into detection of approximately 1.3 times more sputum positive cases and help in early control of tuberculosis menace.

References:

1. Government of India. Managing the RNTCP programme in your area, a training course, Module(1-4). Central TB division, Directorate generate of Health Services, Ministry of Health and Family Welfare, New Delhi April 2005;1-3.
2. Friedman T, editor. Toman's Tuberculosis Case detection, treatment, and monitoring –questions and answers. 2nd edition. Geneva, World Health Organization.
3. Central TB Division. Directorate General of Health Services (DGHS). Ministry of Health and Family Welfare. Government of India. Technical guidelines for tuberculosis control, Delhi: DGHS, 2000.
4. Santha T, Garg R, Subramani R, Chandrasekaran V, Selvakumar N, Sisodia RS, et al. Comparison of cough of 2 and 3 weeks to improve detection of smear positive tuberculosis cases among out-patients in India. *Int J Tuber Lung Dis* 2005;1:61-68.
5. WHO declares tuberculosis a global emergency. URL: http://www.springerlink.com/content/mq5q65l3336273m5/fulltext.pdf?page=1
6. Government of India. Operational Guidelines for Tuberculosis Control. Central TB Division, DGHS, New Delhi, India. 2001.
7. Government of India; RNTCP Performance Report, India Second Quarter. Central TB Division, Directorate General of Health Services, New Delhi. 2007;3-5.
8. Thomas A, Chandrasekaran V, Joseph P, Rao VB, Patil AB, Jain DK. Increased yield of mear positive pulmonary TB cases by screening patients with > 2 weeks cough, compared to > 3weeks and adequacy of 2 sputum smear examinations for diagnosis. *Indian J Tuberc* 2008;55:77-83
9. Masse SR, Ramsey A, Ng V, Henry M, Hopewell PC, Cunningham J, et al. Yield of serial sputum specimen examinations in the diagnosis of pulmonary tuberculosis: a systematic review. *Int J Tuber Lung Dis* 2007;11(5):485-495