ORIGINAL ARTICLE

The Sputum Smear Conversion Rate of Pulmonary Tuberculous Patients after Initial Phase of Treatment

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Abstract:

The sputum smear conversion rate (SCR) is an operational indicator for the directly observed treatment short course (DOTS) strategy of national tuberculosis control programme. This study was undertaken to determine the smear conversion rate among the sputum smear positive pulmonary tuberculous patients undergoing DOTS.

Methods: This prospective study was conducted on pulmonary tuberculous patients at the selected DOTS centers in Dhaka city during March 2007 to June 2007. Study place was selected purposively. Data were collected from the respondents by face to face interview, from their TB registrar books, TB treatment cards, using structured questionnaire and check list.

Result: A total of 122 registered TB patients were enrolled in the study. Among them 75 (61.7%) were male and 47 (38.35%) were female. Mean age of the respondents was 33.42 years (SD ± 13.68). in this study populations 76 (62.29%) were found smear positive and 46 (37.7%) sputum smear negative at the beginning of anti TB treatment. Of them 76 (62.3%) were taking category -1 anti-TB regimen. At the end of 2nd and / 3rd months of DOTS treatment regimen 15 (12.3%) were remain sputum positive and 107 (87.70%) sputum negative and the sputum smear conversion rate was found 80.29%.

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Introduction:

Tuberculosis is an infectious disease, caused by bacilli called mycobacterium tuberculosis. Pulmonary tuberculosis is the most common form and occurs in 80% of cases[1]. Tuberculosis was declared a Global Emergency by the WHO in 1993. Every year 8 million new cases of TB (pulmonary and extra-pulmonary) occur, of which about 95% are in developing countries. Of the 1.7 billion people estimated to be infected with TB bacilli, 1.3 billion live in developing countries. About 1 to 2 million peoples die of TB every year, constituting 26% of avoidable deaths worldwide. The greatest burden of the mortality and morbidity is borne by adults of 15-60 years who constitute the

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most productive members of society[2]. Tuberculosis is a major public health problem in Bangladesh. It is estimated that 300,000 new cases crop up each year, of which about half of them are infectious. It is further estimated that about 70,000 people die every year[3]. In 1993, World Health Organization (WHO) recommended a standard strategy for control of the disease that since 1993, is known as the Directly Observed Treatment Short Course (DOTS) strategy. Bangladesh introduced this strategy in 1993 and had expanded at all upazilas in collaboration with the partner NGOs by June 1998[1]. However, poor adherence to TB medication regimens is a common problem. Development of drug resistant TB and the possibility of death are the fatal consequences of irregular treatment[4]. Approximately 425000 new cases of MDR-TB are identified each year, and alarming rates of XDR-TB have recently been reported[5].

The standardized TB treatment regimens

There are many different possible anti-TB treatment regimens. The World Health Organization (WHO) and the International Union Against Tuberculosis and Lung Disease (UATLD) recommend standardized TB treatment regimen. National TB control programme (NTP) in the country recommends which regimens to use. Treatment regimens have an initial (intensive) phase of 2 months and the continuation phase of 4-5 months after initial phase[6].

Sputum smear at the end of initial phase

The vast majority of patients have a negative sputum smear at the end of the initial phase. If the sputum smear is still positive at the end of the initial phase, the initial phase treatment with the same 4 drugs is to be continued for 4 more weeks. It is unlikely still to be positive after the 3 months of initial treatment[6].

Sputum conversion rate

The sputum conversion rate (SCR) is the percentage of smear positive pulmonary TB cases registered in a specified period that converted to smear negative status after the standard two months of the intensive phase of treatment. WHO recommends its use as a useful indicator for TB control programs in monitoring the TB program performance, and as a trigger for rigorous assessment in patients with still positive smears[7]. Smear conversion rate at two months of intensive phase and at three months of extended intensive phase is a significant operational indicator as it shows the capacity of the programme to maintain

the patients on treatment. It also provides an objective evidence for the patient response to therapy and hence the treatment outcome[8].

Objectives

To find out the sputum conversion rate after completion of initial phase of anti TB treatment of pulmonary TB patients under DOTS in some selected DOTS centers of Dhaka city.

Maerial and Methods:

A prospective cohort study was carried out among category-1 sputum smear positive pulmonary tuberculosis patients registered at the DOTS centers of Gandaria, Wari, Shampur and Dhaka National Hospital in Dhaka city. A total 122 pulmonary TB patients were registered at their respective DOTS center during March 2007 to June 2007. Among them 76 patients were found sputum smear positive. Sputum result and treatment outcome were recorded from TB register and patient's treatment cards. All the study subjects were interviewed using a pre-design semi-structured interview schedule within two months of their registration at the DOTS centers. Subsequent visits to the DOTS centers were made to collect the information on sputum results at 2nd / 3rd months of initial phase. Sputum Conversion Rate was defined as per operational guidelines under the National TB Control Programme (NTCP). Sputum conversion rate= (no of sputum smear positive before treatment - no of sputum positive after treatment)/(no of sputum smear positive before treatment) X 100.

After data collection, data were checked, cleaned, edited, and analyzed with SPSS Windows software version 12.

Result:

Socio-demographic information such as age, sex and socio-economic status were summarized in table-1. The mean age of the respondents was found 33.42 years (SD ± 13.68 years). In this study male were 76 (62.30%) and female 46 (37.70%). Among the respondents married 78(63.93%) and 30 (24.59%) were illiterate, 51 (46.72%) had primary education. In the study group 40(32.79%) were service holder, and 30(24.59%) house worker. Among study respondents 48 (39.34%) had less than 3000 TK monthly income, 70(57.38%) in-between 3001-5000 Tk , 46(37.71%) lived in kancha house, 58 (47.54%) in semipacca house.

As shown in table-2, among the study population 76 (62.30%) were found sputum smear positive at

the beginning of treatment. The table -3 showed, among the respondents 118 (76.62%) received category-1, 13(08.44%) category-2 and 23 (14.93%) category-3 treatment regimen. Among the respondents 67(54.92%) were adherent to treatment and 55(45.08%) non-adherent as showed in table-4. Among the 76 sputum smear positive patients 15(19.74%) remain sputum smear positive and 61 (80.26%) converted to negative after initial phase of category-1 treatment. And sputum conversion rate was found 80.26% after the completion of initial phase of treatment as shown in table-5.

(Sputum conversion rate= (no of sputum smear positive before treatment-no of sputum positive after treatment)/(no of sputum smear positive before treatment)X 100.

    = 76-15/76 X 100

    =80.26%.)

Table-I

Distribution of demographic characteristics of the respondents.

Variable	Frequency	Percent
Age groups		
0-14 years	3	2.46%
15-44 years	90	73.77%
≥45 years	29	23.77%
Mean age ±SD	33.42 ±13.68 years.	
Sex		
Male	76	62.30%
Female	46	37.70%
Marital status		
Married	78	63.93%
Unmarried	40	32.79%
Divorce	04	03.28%
Education		
Illiterate	30	24.59%
primary	51	46.72%
Secondary	25	20.49%
Higher secondary	07	5.74%
Graduate	03	2.46%
Occupation		
Servicemen	40	32.79%
Students	20	16.39%
housework	30	24. 59%
Businessmen	17	13.93%
Unemployed	15	12.30%
Economical status		
Monthly income <3000 TK	48	39.34%
Monthly income 3000-5000 TK	70	57.38%
Monthly income >5000 TK	46	37.71%
Housing status		
Kancha house	46	37.71%
Semipacca house	58	47.54%
Pacca house	18	14.75%

Table-II

Distribution of patients according to sputum smear test at the beginning of treatment (n=122).

Variables	Frequency	Percent
Sputum smear test		
Smear positive	76	62.30%
Smear negative	46	37.70%

Table-III

Distribution of patients according to their category of anti TB drugs treatment (n=122).

Variables	Frequency	Percent
Category- 1	76	62.30%
Caegory-2	13	10.66%
Category-3	33	27.04%

Table-IV

Distribution of patients according to adherence to treatment (n=122).

Variables	Frequency	Percent
Adherence to treatment		
Adherent	67	54.92%
Non-adherent	55	45.08%

Table-V

Distribution of patients according to sputum smear test at the end of initial phase of treatment (n=76).

Variables	Frequency	Percent
Sputum smear test		
Smear positive	15	19.73%
Smear negative	61	80.26%

Sputum Conversion Rate= (76-15)/76 X 100 =80.26%.

Discussion:

In our study sputum smear conversion rate was found 80.26%. Falix R Kayigamba etal from Rwanda found sputum conversion rate 80% in his study, which was consistent with our study[9] . Rieder etal from Paris (1996) showed sputum conversion of 75% with a range from 61.7% to 90.9% in patient with initially strongly and weakly positive smear

respectively after the 2 months intensive phase[10]. Lienhardt etal from Gambia (1998) observed sputum smear conversion at the end of two month after the start of treatment was 90%[11]. Singla et al from New Delhi (2005) reveals sputum conversion at the end of 2 months were 76 .8% and at the end of 3 months 89.5%[12]. Bwirie R et al from India(2008) found sputum conversion at the end of 1st months 71% and at the end of 2nd month 84% and at the end of 3rd month 92%[13]. Simmi Tiwari at el from India (2006) showed sputum conversion after 2 months intensive phase was 71.6%[14].

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