

A Study to Find Out prevalence of Sputum AFB Positivity in Patient Having Cough for More Than two weeks in Dhiraj Hospital (Tertiary Rural Health Center)

Dr. Vaibhav Krishna¹, Dr. Arti Shah², Dr. Stani Francis³, Dr. Kusum.V. Shah⁴,
Dr. Bhavesh Patel⁵

(Final Year Resident)¹, (Professor)², (Professor & Head)³, (Professor)⁴, (Assist Prof)⁵
(Respiratory Medicine. Sumandeep Vidyapeeth University, Piparia, Vadodara, Gujarat, India)

Abstract:

Background And Objectives: Tuberculosis (TB) is disease caused by Mycobacterium tuberculosis, and rarely by other "tuberculosis complex". It is the number one killer infectious disease in developing countries. World Health Organization (WHO) reported in 1990 tuberculosis as a Global Burden of Disease and seventh most common morbidity-causing disease in the world, and expected to be the same position up to 2020. It is one of the oldest diseases known to affect humans. It is a major health problem in India.

Method And Methodology: This study is a duration based study done over a period of April-2015 to June-2016. 150 patients who attended the Department of Respiratory Medicine, with the symptoms of cough of more than two weeks of duration suggestive of PULMONARY TUBERCULOSIS were included in the study and diagnosis was evaluated on the basis of sputum AFB smear.

Result: Total 150 patients were enrolled in study presenting with symptom of cough of more than two weeks, 64% were males and 36% were females. 54.66% of the patients were proven to be smear positive on the basis of sputum ZN stain having male predominance. Prevalence of diabetes in females were 19.20% and males were 3%. Strong family history has been observed approximately 37.80% in total smear positive patients. Cavity and Non homogenous opacities were the most predominating finding on chest X-ray accounting for 37.81% and 57.31 respectively. Right upper zone was the most common site on chest X-ray.

Conclusion: Thus, this study concludes that sputum for ZN stain for detecting bacilli is one of the most important tool in evaluating the patients presenting with cough with expectoration of more than two weeks. Early detection of tuberculosis is most important tool for preventing mortality and morbidity in the community. Patients presenting with the symptoms suggestive of tuberculosis should always be considered as alarming symptoms.

Keywords: Pulmonary Tuberculosis, smear positive, AFB(Acid Fast Bacilli)

I. Introduction

Mycobacterium Tuberculosis is one of the most common causative organism for Tuberculosis, and rarely by other organisms of the "Tuberculosis complex". It is the most common killer infectious disease in developing countries. "World Health Organization" (WHO) reported in 1990 Tuberculosis as a Global Burden of Disease and seventh most common morbidity-causing disease in the world, and expected to be the same position up to 2020. It is one of the oldest diseases known to affect humans. It is a major health problem in India.^[1]

Tuberculosis is one of the debilitating diseases known to affect humans. It is a major health problem in India. It is known to man as "Raj Yakshma", King of diseases, in RigVeda.^[2,3]

India is the second-most populous country in the world, and has more new TB cases annually. India ranks 17th among 22 Countries in terms of TB incidence rate (Source: WHO global TB report 2010). 9.4 million TB cases estimated global annual incidence of 9.4 million TB cases in 2009, 2 million were approximately was noticed in India. India accounts fifth (21%) rank in global burden of TB. In 1990 TB mortality was 42/100,000 population which has been decreased to 23/100,000 population in 2010 as per the WHO Global TB Report 2009 and the prevalence of TB in 1990 was 568/100,000 population which has been reduced to 249/100,000 population by the year 2010 as per the "WHO Global TB Report", 2010. These are encouraging trends are pointing that the Revised National Tuberculosis programme (RNTCP) is on the right path and working towards achieving the "United Nations "Millennium Development Goals" (MDGs) relating to TB by 2015. Approximately 75 new smear positive cases per 100,000 populations incidence was noticed in the country.^[4]

Considering the huge potential of TB to turn into a widespread epidemic, it was decided by the community experts to tackle the problem of TB in a systematic manner. Hence, the National “Tuberculosis Programme of India” (NTP) was initiated in 1962. This programme was planned for domiciliary treatment using self-administered standard drug regimens. Despite the existence of the NTP, there was very little outcome on the TB burden till 1992. In 1992 it was concluded that the NTP could not achieve the objectives. A revised strategy to control TB was pilot-tested in 1993 recommended by an expert committee and thereafter increased in phased manner.

Due to the failure of NTP, revised national tuberculosis programme was started in 1997 and rapidly expanded with promising results. More than 90 percent of the country was covered by June 2005 by revised programme. Paediatric regime was prepared and has been introduced under the programme for the treatment of paediatric patients suffering from TB since 2006. Now RNTCP in India is providing 100 % Direct Observed Treatment Strategy (DOTS).^[4]

According to Technical Operational guideline 2016, global incidence of tuberculosis accounts for 9.6 million and India accounts for 2.2 million. Prevalence in India estimated to be 2.5 million and mortality accounts for 2.2 lakhs.^[5]

Since the inception of RNTCP (1997) till 1st April 2009, “individuals with cough for 3 three weeks or more with or without other symptoms suggestive of TB were identified as pulmonary TB suspects”^[6] But WHO 2007 “Strategic and Technical Advisory Group for Tuberculosis” (STAG-TB) revised the definition of pulmonary TB (PTB) suspect as any person with cough for 2 weeks or more, which is under operation in India since 1st April 2009.^[7]

By this early detection of tuberculosis it has made early detection and treatment and prevention of this communicable disease and spread of tuberculosis in the community.

In this study we tried to find out the prevalence of new smear pulmonary tuberculosis in patients of cough of more than two weeks of duration.

II. Material & Methods

Setting

Department of Respiratory Medicine, S.B.K.S Institute Of Medical Science And Research Centre, Piparia, Vadodara.

Institutional Ethics Committee Approval: Obtained

Study Design: Observational Cross-Sectional Study

Period Of Study: Over A Period Of April-2015 To June-2016.

Sample Size: Cases 150

Inclusion criteria:

- All new adult patients visiting to OPD in Dhiraj General Hospital for cough more than 2 weeks.
- All patient of age group more than or equal to 18yrs

Exclusion criteria:

- Subject not willing to participate in the study.
- Patients currently diagnosed as Tuberculosis in other setup or on Tuberculosis treatment/ follow up.
- Subject not willing to undergo at least one sputum smear examination.
- Patient with known case of bronchial asthma, COPD, ILD were not included in the study.

III. Study Protocol

A total of 150 patients with symptoms suggestive of pulmonary tuberculosis who attended the Department of Respiratory Medicine, S.B.K.S Medical Institute Science and Research Centre, Piparia, Vadodara, were selected as cases and were enrolled into the study.

The patients with the following symptoms suggestive of tuberculosis were evaluated and were analysed.

Symptoms includes:

- Cough of more than 2 weeks of duration
- Expectoration
- Breathlessness
- Fever
- Loss of weight
- Decreased appetite
- Hemoptysis

Patients presenting with following symptoms were evaluated for pulmonary tuberculosis. Detailed history and examination were carried out in each patients and evaluated for any other systemic illness. All patients with cough of more than two weeks were sent for sputum AFB smear, Chest x-ray, CBC, Serology, RBS.

IV. Results and observation

Total 150 patients were enrolled in the study and were evaluated on the basis of sign and symptoms, age, sex, occupation, Chest X-ray and sputumAFBsmear examination and were classified further as smear positive or smear negative pulmonary tuberculosis.

Data evaluation of patient with smear positivity

Total of 82 patients came out to be sputum positive among 150 patients selected. Among all smear positive patients.15 (28.8%) patients were male age group of 41-50 years, and 21 patients (25.61%) were female age group of 31-40 years.

Among total smear positive 52 patients were males (63.42%) and 30 patients were females (36.58%).

All patients who were smear positive were having complains of cough with expectoration. 37 males patients (71.20%) and 17 females patients (56.70%) reported fever with mean duration of 10.58 ± 9.38 and 9.63 ± 10.71 respectively. Breathlessness was noticed in 43 males (82.70%) and 22 females (73.30%) patients with mean duration of 21.06 ± 18.59 and 20.17 ± 20.70 . Overall analysis showed cough with expectoration as major presenting symptom among the patient with tuberculosis.

Among other symptoms, loss of appetite was noted in 44 males (84.60%) and 26 females (86.70%).

Diabetes was noted in 10 males (19.20%) patients and 3 females (10.00%) patients. Among all positive patients13 males (25.00%) and 6 females (20.00%) patients were have strong family history of pulmonary tuberculosis.

Smear AFB smear Positive patients have NH opacity and cavitary lesion as the most common finding accounting for 47 (57.31%) and 31(37.81%) respectively.

Right lung and B/L (NH opacity) lung field more commonest finding on chest X-ray accounting for 36.59% and 40.24% respectively. Among all smear positive patient 1 patient contribute to normal chest X-ray though sputum smearAFB positive.

IV.Figure And Tables

Table 1: Age & sex

Table 2: Symptoms

Table 3: Other symptoms

Table 4: Co-morbidities

Table 5: Chest X-ray findings

Table 6: Location wise Chest X-ray distribution

Table 1: Age & sex

Characterization	Male (N = 52) [63.42%]	Female (N = 30) [36.58 %]	Total (N = 82) [100.00%]
Age Group			
18-30	7 (13.50%)	12 (40.00%)	19 (23.17%)
31-40	11 (21.20%)	10 (33.30%)	21 (25.61%)
41-50	15 (28.80%)	3 (10.00%)	18 (21.95%)
41-60	14 (26.90%)	2 (6.70%)	16 (19.51%)
61-70	3 (5.80%)	3 (10.00%)	6 (7.32%)
71-80	2 (3.80%)	0 (0.00%)	2 (2.44%)

Table 2: Symptoms

Characterization	MALE (N = 52) [63.42%]			FEMALE (N = 30) [36.58 %]			P VALU E (T- TEST)	TOTAL (N = 82) [100.00%]		
	Yes (%)	No (%)	Duration (days) (mean±sd)	Yes (%)	No (%)	Duration (days) (mean±sd)		Yes (%)	No (%)	Duration (days) (mean ± sd)
Cough / Expect	52 (100.00 %)	0 (0.00%)	54.98 ± 38.57	30 (100.00 %)	0 (0.00%)	62.77 ± 45.96	0.43	82 (100.00 %)	0 (0.00 %)	57.83 ± 41.31
Fever	37 (71.20%)	15 (28.80)	10.58 ± 9.38	17 (56.70%)	13 (43.3)	9.63 ± 10.71	0.84	54 (68.85%)	28 (34.1)	10.23 ± 9.83

BLS	43 (82.70%)	9 (17.30%)	21.06 ± 18.59	22 (73.30%)	8 (26.70%)	20.17 ± 20.70	0.689	65 (79.27%)	17 (20.73%)	20.73 ± 19.26
-----	----------------	---------------	------------------	----------------	---------------	------------------	-------	----------------	----------------	------------------

Table 3: Other symptoms

Characterization	Male (N = 52) [63.42%]		Female (N = 30) [36.58 %]		P Value (Chi-Square Test)	Total (N = 82) [100.00%]	
	Yes	No	Yes	No		Yes	No
Loss Of Appetite	44 (84.60%)	8 (15.40%)	26 (86.70%)	4 (13.30%)	1.00	70 (85.40%)	12 (14.60%)
Weight. Loss	35 (67.30%)	17 (32.30%)	20 (66.70%)	10 (33.30%)	1.00	55 (67.10%)	27 (32.90%)
Hemoptysis	15 (28.80%)	37 (71.20%)	5 (16.70%)	25 (83.30%)	0.29	20 (24.40%)	62 (75.60%)
Pedal Edema	11 (21.20%)	41 (78.80%)	1 (3.30%)	29 (96.70%)	0.04	12 (14.60%)	70 (85.40%)

Table 4: Comorbidities

Characterization	Male (N = 52) [63.42%]		Female (N = 30) [36.58 %]		P Value (Chi-Square Test)	Total (N = 82) [100.00%]	
	Yes	No	Yes	No		Yes	No
Diabetes Mellitus	10 (19.20%)	42 (80.80%)	3 (10.00%)	27 (90.00%)	0.36	13 (15.90%)	69 (84.10%)
Hypertension	10 (19.20%)	42 (80.80%)	2 (6.70%)	28 (93.30%)	0.19	12 (14.60%)	70 (84.50%)
Family History	13 (25.00%)	39 (75.00%)	6 (20.00%)	24 (80.00%)	0.80	19 (23.20%)	63 (76.80%)
Smoker	29 (55.80%)	23 (44.20%)	5 (16.70%)	25 (83.30%)	0.00	34 (41.50%)	48 (58.50%)
Alcohol	24 (46.20%)	28 (53.80%)	1 (3.30%)	29 (96.70%)	0.00	25 (30.50%)	57 (69.50%)

Table 5: Chest X-Ray findings

Chest X-Ray (S.Afb+Ve)	Frequency	Percent
Cavity	31	37.81
Emphysematous	1	1.22
Homogenous opacity	2	2.44
Nad	1	1.22
Non-Homogenous Opacity (Consolidation)	47	57.31
	82	100.00%

Table 5: Location wise distribution

Location (S.Afb +Ve)	Frequency	Percent
Bilateral Lung	33	40.24%
Left Upper Zone	8	9.75%
Left Lower Zone	4	4.87%
Left Middle Zone	3	3.66%
Normal	1	1.22%
Right Lower Zone	1	1.22%
Right Middle Zone	2	2.44%
Right Upper Zone	30	36.59%
Total	82	100.00%

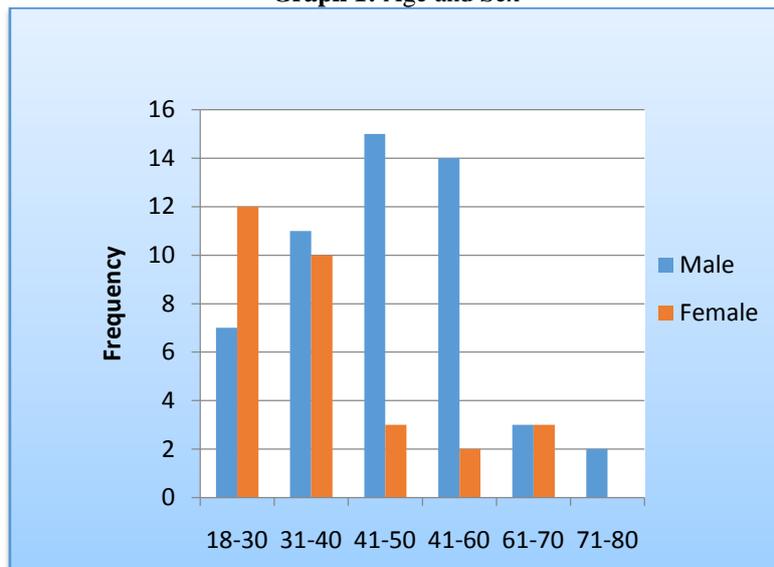
List of figures:

Figure 1: Age & Sex

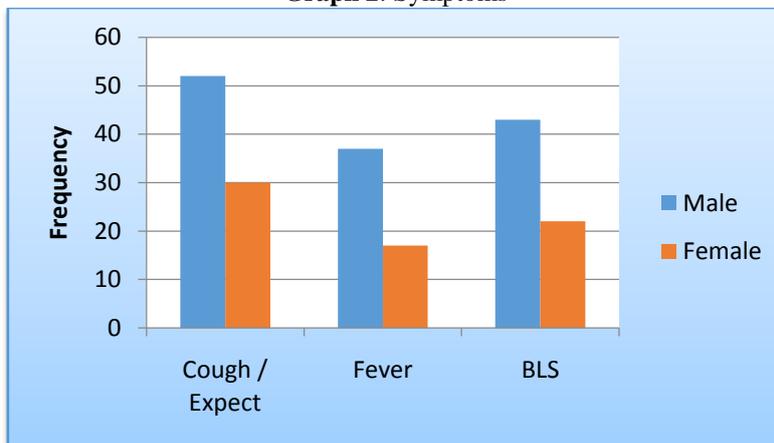
Figure 2: Symptoms

Figure 3: Co-morbidities

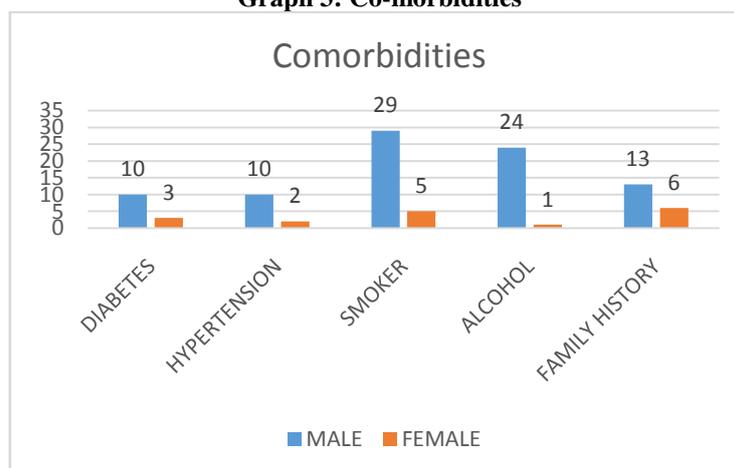
Graph 1: Age and Sex



Graph 2: Symptoms



Graph 3: Co-morbidities



IV. Discussion

Tuberculosis incidence and prevalence is very high in India accounts for higher mortality and morbidity.

An operational study (1966) by Baily et al, proved that 65 % cases of pulmonary Tuberculosis prevalence in the district^[38]. Many similar studies has been done which proved that cough with expectoration of more than two weeks had greater smear positivity as compared to 3 week.^[8]

An operational study was carried out by Jagota et al (1991-93) in 11 PHI Units of Tumkur district, Karnataka State, which included 1966, 38 set of patients. The proportion of outpatients of only cough more than 2 weeks was 3.6%.^[9]

A study was conducted in seven state in Sudan by El-Sony et al, concludes, tuberculosis patients had principal symptom being cough for more than 2 weeks.^[10]

Santha et al during 2001 undertook a multi-centre study in India to estimate the prevalence of cough among adult out-patients (≥ 15 years age) attending governmental health facilities and to compare the yield of smear positive Tuberculosis cases among outpatients with “cough of more than 2 weeks and 3 weeks”. Out-patients with a cough ≥ 2 weeks were subjected to sputum microscopy. Of 55561 outpatients interviewed, 2210 (4%) had a cough of more than 2 weeks and 267 (12%) were smear-positive. Compared to this 1370 (2.5%) out-patients had a cough of more than 3 weeks and 182 (13%) were smear-positive. Thus by screening outpatients with both duration, positive detection rate increased by 46%

During the study period, 840 more symptomatics were screened with cough of more than 3 weeks of duration and 85 came out to be positive. Using cough ≥ 2 weeks the Tuberculosis positive rate detection is higher as compared to three weeks of duration.^[11]

Aleyamma Thomas et al conducted a cross sectional multi-centric study on individuals aged ≥ 15 years, adopting a multi-stage stratified sampling procedure, in five states of India during 2005-06. All the chest symptomatics were referred for sputum examination. A total of 96787 out-patients were registered. Among them, 69,209 (72%) were new out department patients. The proportion of individual with cough ≥ 2 weeks and ≥ 3 weeks were 2.3% (1625) and 3.7% (2560) respectively. Using ≥ 2 weeks criterion, instead of ≥ 3 weeks criteria for screening of chest symptomatics, there was an overall increase of 58% (range 50-69%) in chest symptomatics whereas the detection of smear-positive Tuberculosis cases was increased by 23% (range 18 to 40%). Among 211 patients, 210 were positive at least by one smear from the initial two specimens. Yield of sputum positive Pulmonary Tuberculosis cases can be improved by screening patients with ≥ 2 weeks cough and two specimens are adequate for diagnosis.^[12]

Another study conducted by Sujina.et.al in 2012 Government Medical College, Thiruvananthapuram, Kerala, India showed that sputum positivity is more in 2 weeks cough patients as compared to 3 weeks.^[13]

As all above studies have shown that 2 weeks duration cough has increase in finding smear positivity which was similar to my study, hence patients with cough with expectoration should be evaluated, diagnosed and treated as earl

V. Limitation

Study conducted to show the incidence of sputum positivity among patient presenting to OPD with cough with expectoration of more than two weeks.

- I would like to acknowledge that a relatively small number of patients were evaluated in my study.
- Age less than eighteen were not included, otherwise there may have been better evaluation of prevalence of the pulmonary tuberculosis.
- Regular follow up of the patients were not made.
- Similar study including large number of patients needed to be performed for better estimation of prevalence of NSP pulmonary TB

Thus, this study concludes that sputum for AFB smear examination is one of the most important tool in evaluating the patients presenting with cough with expectoration of more than two weeks. Early detection of tuberculosis is most important for preventing mortality and morbidity in the community. Patients presenting with the symptoms suggestive of tuberculosis should always be considered as alarming symptoms. Patients presenting with cough with expectoration of more than three weeks have very less proportion of positivity as compared to two weeks.

Hence patients presenting with the signs and symptoms of tuberculosis should always be evaluated and diagnosed to prevent the mortality and morbidity and initiate early treatment according to the proposed guidelines.

VI. Conclusion

Thus, this study concludes that sputum for AFB smear examination is one of the most important tool in evaluating the patients presenting with cough with expectoration of more than two weeks. Early detection of tuberculosis is most important for preventing mortality and morbidity in the community. Patients presenting with the symptoms suggestive of tuberculosis should always be considered as alarming symptoms.

Patients presenting with cough with expectoration of more than three weeks have very less proportion of positivity as compared to two weeks.

Hence patients presenting with the signs and symptoms of tuberculosis should always be evaluated and diagnosed to prevent the mortality and morbidity and initiate early treatment according to the proposed guidelines.

References

- [1]. Technical and Operational Guidelines for Tuberculosis Control. 1st ed. 2005.
- [2]. Kapur V, Whittam T, Musser J. Is *Mycobacterium tuberculosis* 15000 years old? *J Infect Dis.*1994; 170:1348-9.
- [3]. Hayman j. *Mycobacterium ulcerans*: an infection from Jurassic time? *Lancet.* 1984; 2:1015-6.
- [4]. Central TB Division (CTD): Directorate General Of Health Services, Ministry Of Health And Family Welfare, Government Of India. RNTCP Status Report. 1st ed. 2011. Print.
- [5]. India, Ministry. "Technical And Operational Guidelines For TB Control In India 2016 :: Central TB Division". *Tbcindia.gov.in*. N.p., 2016. Web. 22 Nov. 2016.
- [6]. Technical And Operational Guidelines For Tuberculosis Control. 1st ed. 2005. Print.
- [7]. Central TB Division (CTD): Directorate General Of Health Services, Ministry Of Health And Family Welfare, Government Of India. RNTCP Status Report. 1st ed. 2009. Print.
- [8]. Baily, GVJ, Savic D, Gothi GD, Naidu VB, Nair SS. Potential yield of pulmonary Tuberculosis by direct microscopy in a district of South India, *Bull.Wld. Org.* 1967; 37: 875
- [9]. Jagota P, Mahadev B, Srikantaramu N, Balasangameshwara VH, Sreenivas TR. Case-finding in district tuberculosis programme: Potential and Performance. *Ind.J. Tub.* 199; 45: 39-46.
- [10]. El-Sony AI, Mustafa SA, Khamis AH, Sobhi S, Enarson DA, Baraka OZ et al. Symptoms in patients attending services for diagnosis of pulmonary Tuberculosis in Sudan. *Int J Tuberc Lung Dis* 2003; 7(6):550-5.
- [11]. 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 Tuberc Lung Dis* 2005; 1:61-8.
- [12]. Aleyamma T, Chandrasekaran V, Pauline J, BaskarRao V, Patil AB, Jain DK, et al. Increased yield of smear positive pulmonary tuberculosis cases by screening patients with >2 weeks cough, compared to >3 weeks and adequacy of 2 sputum smear examinations for diagnosis. *Indian J Tuberc* 2008; 55: 77-83.
- [13]. Muthukkutty SC, Vijayakumar K, Anish TS, Karthik V, Joy TM. The proportion of patients with short duration cough (2-3 weeks) among newly detected smear-positive pulmonary TB patients; the yield of strategic change in the case detection of revised national tuberculosis control programme in an urban community setting of South India. *International Journal of Health & Allied Sciences.* 2012 Oct 1;1(4):239.