Prevalence of Pulmonary Tuberculosis by Microscopy in the Catchment Area of F.H. Medical College, Agra- An Eye Opener

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Abstract- *Tuberculosis is a disease that causes high morbidity and mortality and continues to be a major health problem all over the world specially developing countries like India. It causes illness in large number of people of all ages every year and is one of the major causes of death from infectious diseases. The objective of the study was to find out prevalence of pulmonary tuberculosis in the catchment area of F.H. Medical College, Agra. Sputum samples were collected from 1,983 symptomatic patients. Slides stained by Ziehl-Neelsen method were examined for the presence of Acid fast bacilli. Still this is the simplest way of diagnosing pulmonary tuberculosis in developing countries. 452 (22.79%) cases were positive while 1,531 (77.21%) were negative. Disease was more common in males (24.87%) as compared to females (18.67%). Prevalence was more among patients of 21-40 years of age (30.17%) and patients belonging to rural area show predominance of tuberculosis over urban population. Quite a high prevalence of tuberculosis in the study shows that a lot needs to be done at all levels to achieve the target i.e. to make India free from tuberculosis by 2025.*
Keywords:- *pulmonary tuberculosis, prevalence, Ziehl-Neelsen method.*

I.   Introduction

Tuberculosis is a chronic infectious disease caused by Mycobacterium tuberculosis. It mainly affects lungs causing pulmonary tuberculosis and spreads through air by droplets. It can also affect other organs such as lymph nodes, intestine, meninges and bones but such cases are generally non-infectious.[1] It generally affects humans in productive age group of 15-50 years leading to massive health and economic burden.[2] Although tuberculosis is a worldwide health problem but India is the country with highest tuberculosis burden in the world. Over 95% of tuberculosis deaths occur in developing countries. More than one quarter of global tuberculosis cases and deaths occurs in India.[3,4] In India it affects mainly the poor population. Majority of the patients are laborers, slum dwellers and malnourished. Tuberculosis is a second leading cause of death from infectious disease after the HIV infection (Human immunodeficiency virus) (WHO, 2013).[5] HIV infection makes a patient more susceptible to tuberculosis. It increases the morbidity and mortality in HIV patients. In HIV infected patients, infection of tuberculosis generally progresses to disease.[6]

There are many methods of diagnosing a case of tuberculosis. Conventional methods such as sputum smear examination by microscope, culture and histopathology while advanced methods include modern technique of culture of M.tuberculosis by BACTEC method, MGIT (Mycobacteria Growth Indicator Tube) and methods which detect Mycobacterial DNA such as PCR and Gene Expert. All the methods have some limitations, one over the other. At present, microscopic examination of sputum smear is simplest way of diagnosing active pulmonary tuberculosis.[7]

In a resource strained and developing country like India, majority of laboratories still rely upon microscopic examination of sputum smear in cases of pulmonary tuberculosis. Revised National Tuberculosis Control Programme (RNTCP), based on the internationally recommended Directly Observed Treatment Short-course (DOTS) strategy, has been started in 1997 and then expanded across India until the entire nation has been covered by the RNTCP in March 2006.[8] It has brought down the incidence of tuberculosis tremendously and no doubt progress has been made in this direction but a lot is to be done to achieve the target of making the country free from tuberculosis free by 2025. Timely detection of tuberculosis is necessary to identify infectious cases which helps in limiting the transmission of infection and also helps in the effective implementation of tuberculosis control programme.[9]

To know the current status of tuberculosis in the community at ground level, present study was conducted among patients attending outpatient department (OPD) of F.H. Medical College, Etmadpur, Agra.

II. Material And Methods

During the course of 2 years and 6 months (January 2017 to June 2019), sputum samples were collected from 1,983 suspected patients of pulmonary tuberculosis. Their age, sex and demographic information were also recorded. Patients were asked to give two sputum samples. Smear was made, heat fixed and stained by Ziehl-Neelsen staining method. Stained slides were examined under oil immersion.

III. Results

A total of 1,983 suspected patients of tuberculosis were studied to find out the prevalence of the disease. Monthwise distribution of samples with their results is shown in Table 1. Among these patients, there were 1,319 (66.52%) males and 664 (33.48%) females. Out of total 1,983 cases, 452 (22.79%) cases were positive for tuberculosis and 1,531 (77.21%) cases were negative (Table 2).

Table 1:- Month wise distribution of samples & their results

| Month	TB suspects examined	Smear Positive cases	Smear Negative cases
January 2017	34	11	23
February 2017	14	3	11
March 2017	35	9	26
April 2017	31	5	26
May 2017	8	1	7
June 2017	48	12	36
July 2017	50	19	31
August 2017	61	10	51
September 2017	53	9	44
October 2017	44	8	36
November 2017	64	9	55
December 2017	53	9	44
January 2018	58	10	48
February 2018	63	16	47
March 2018	77	11	66
April 2018	59	20	39
May 2018	89	27	62
June 2018	76	26	50
July 2018	62	20	42
August 2018	65	15	50
September 2018	84	22	62
October 2018	94	23	71
November 2018	51	9	42
December 2018	13	2	11
January 2019	79	18	61
February 2019	130	23	107
March 2019	122	21	101
April 2019	133	20	113
May 2019	125	31	94
June 2019	108	33	75
Grand Total	1,983	452 (22.79%)	1,531 (77.21%)
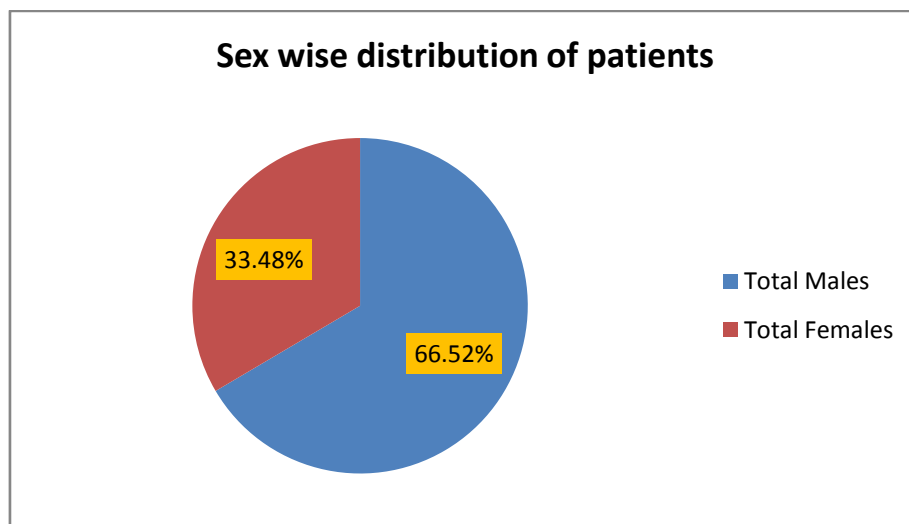
Figure 1:- Sex wise distribution of patients

Table 2:- Positivity rate in the patients examined

No. of patients examined	No. of positive cases	No. of negative cases
1,983	452 (22.79%)	1,531 (77.21%)

It was observed in the study that prevalence was more in males as compared to females. Among male patients, positivity was 24.87% while it was 18.67% in females. This is depicted in Table 3.

Table 3:- Prevalence of pulmonary tuberculosis on the basis of gender

Gender	Positive (%)	Negative (%)	Total
Male	328 (24.87%)	991 (75.13%)	1,319
Female	124 (18.67%)	540 (81.33%)	664
Total	**452**	**1,531**	**1,983**

When age factor was considered, it was noticed that maximum number of patients were between 21-40 years of age group (30.17%) and the minimum number of patients were from more than 60 years of age group i.e.14.17%. This is shown in Table 4.

Table 4:- Age wise prevalence of pulmonary tuberculosis

Age group	Total	Positive (%)
Upto 20yrs	225	59 (26.22%)
21-40yrs	643	194 (30.17%)
41-60yrs	748	147 (19.65%)
More than 60 yrs	367	52 (14.17%)

Demographically it was found that majority of the patients belong to rural population. Out of 1,983 patients, 437 (22.04%) were from urban population while 1,546 (77.96%) were from rural population. This is depicted in the pie diagram (Figure 2).
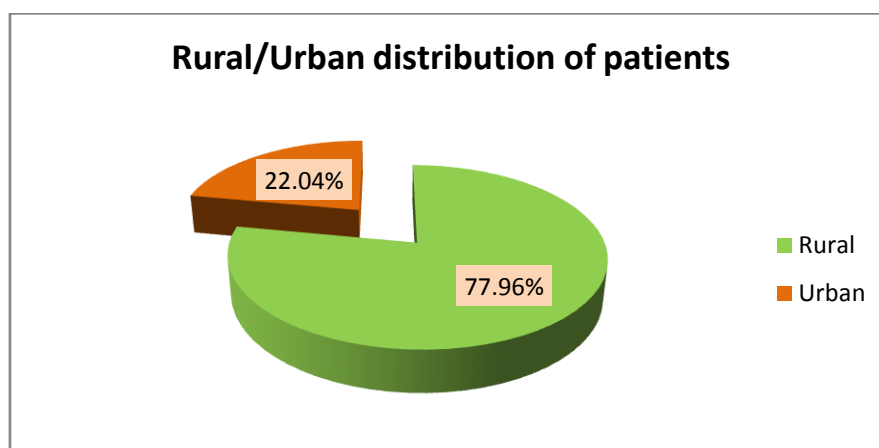

Figure 2:- Rural/Urban distribution of patients

IV.   Discussion

The overall prevalence of pulmonary tuberculosis has been found to be 22.79% in our study. When compared with the results of prevalence of tuberculosis in other study conducted by Tibebe Seyoum Keflie et al,[10] prevalence was 27.17%. Similarly, Shrestha D et al[11] in Dharan reported 21.8% smear positive cases in their study. Ghatole et al[12] found 22.5% prevalence in their study. Rai et al,[13] in their study reported a lower prevalence of 13.1%. Similarly, 13.6% prevalence was observed by Shrestha S et al[14] in their study. Higher prevalence was observed by Negi et al[15] i.e. 33.8%. Prasanthi et al[16] in Secunderabad, Gandhi Hospital conducted a similar study and found 50.0% prevalence. Discrepency in prevalence rates of different studies is most likely due to inconsistent endemicity of the disease in different areas and difference in other demographic parameters. When prevalence of tuberculosis was analyzed on the basis of gender, we found that positivity was 24.87% in males as compared to 18.67% in females. In a study conducted by Shrestha S et al,[14] 16.0% of males were found to be positive while only 8.7% positivity was noticed in females. Similar results were observed by Shreshta D et al[11] and Chern et al[17] in their studies. More prevalence of tuberculosis in males may be due to more number of males reporting to the clinics and hospitals. Less prevalence in females may be attributed to the following reasons- fear of stigma of tuberculosis is more in females, which prevents them from disclosing their illness and seeking medical advice, less chances of getting married and getting poor care from the families. Age wise prevalence of tuberculosis was also studied and it was found that in the present study, maximum number of

positive cases were from 21-40 years of age group (30.17%) and minimum number of positive cases were in more than 60 years of age group (14.17%). However, in study conducted by Shrestha S et al,[14] maximum number of cases were from 41-60 years of age group. More prevalence of tuberculosis in productive age group may be due to more movement of this age group of patients, which increases their chances of exposure to tubercular cases.

V.   Conclusion

Tuberculosis has been known since ages. Every aspect of the disease has been thoroughly studied. There is a vaccine in the form of BCG for its prevention. Million of rupees are being spent through National Tuberculosis Control Programme sponsored by WHO. Conventional and advanced techniques such as Gene expert are available for the diagnosis of tuberculosis and free treatment is being provided to the patients under RNTCP. In spite of taking all the measures at different levels, it has been observed that tuberculosis is still the commonest infectious disease responsible for high morbidity and mortality in all ages, specially the productive age group.

Our government has set a target of making our country free from tuberculosis by 2025 which appears to be a distant dream. In the present study, we have found quite a high prevalence of pulmonary tuberculosis (sputum positive). Had we included the cases of extrapulmonary tuberculosis, the prevalence would have been much higher. This also raises the question on effectiveness of BCG vaccination and also puts a big question mark on the implementation of tuberculosis control programme effectively.

Keeping this in mind, it is suggested that epidemiologists and experts involved in the implementation of tuberculosis control programme, must give a second thought before it becomes too late. We also feel that similar kind of studies should be conducted by other centers to find out the prevalence of the disease in the community at large.

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