International Journal Dental and Medical Sciences Research
Volume 4, Issue 5, Sep-Oct 2022 pp 189-194 www.ijdmsrjournal.com ISSN: 2582-6018

A study on Pulmonary Tuberculosis in a tertiary care hospital, NCR, India.

Dr. Prachee Singh ,
Assistant Professor, Department of Microbiology, Rama Medical college,Hospital& Research center, Hapur (NCR).

Submitted: 10-09-2022 Accepted: 20-09-2022

ABSTRACT-
The **objective** of this study is to know the prevalence of Pulmonary TB in cases brought to tertiary care hospital with specification of age and gender **.**
Material &Method-Sputum acid-fast bacilli (AFB) smear microscopy was done byZiehl-Neelsen (ZN) method.
Results & Discussion- The study is carried out on 194total valid samples.5.15% of total samples are found positive for pulmonary TB. 3.22% of male and 8.57%of female are positive. 7.84% out of male patientsare positive in the age bracket of 41-60 years where as positive cases are present in all age bracket in female patients. The maximum cases are recorded in female patients in age group of 21-60 years. The pulmonary TB was higher (5.33%) inhospitalized (IPD) patients in comparison to OPD patients (4.54%). Out of IPD cases 4.16%male and 7.40% female patients are found positive. The results of this study depict the maximum share of positive pulmonary TB cases are female patients. The positive cases from the OPD patients are 4.54% which is lesser than IPD cases(5.33%). Female patients in OPD recorded highest 13.33% positive cases.
Conclusion- 5.15% samples out of tested samples are found positive . The percentage of positive cases of pulmonary TB out of tested samples in present study is higher than that of national average(4.2%) but lower than state (UP) average (10.8%).Female share of positive cases is 8.57% whereas male positive cases are 3.22%. The male positive patients are only in the age bracket of 41-60 years. Female patients in OPD recorded highest 13.33% positive cases.
Key words-Pulmonary TB, TB, Bacillary TB, RNTCP (revised national TB control program), TB control program in India, COVID19.

I. INTRODUCTION-

Tuberculosis is caused by Mycobacterium tuberculosis. It has affected humans for thousands of years.[1] According to global TB Report 2020-21 released in 2022 ,a global total of about 10 million people fell ill with TB in 2020, with a best estimate of 9.9 million (95% uncertainty interval [UI]: 8.9–11 million), equivalent to 127 cases ([UI]: 114–140) per 100 000 population[2]

India reported a sharp 19 per cent rise in tuberculosis cases in 2021 over the previous year, revealed the India TB Report 2022 released. The total number of incident TB patients (new and relapse) notified during 2021 were 19, 33,381 as opposed to that of 16, 28,161 in 2020. At the same time, there has been an increase in the mortality rate due to all forms of TB between 2019 and 2020 by 11 per cent in India. In absolute numbers, the total number of estimated deaths from all forms of TB excluding HIV, for 2020 was 4.93 lakh, which was higher by 13 per cent than the 2019 estimate.[3]

The National TB Prevalence Survey 2019-21 reveals that the prevalence of microbiologically confirmed pulmonary TB in people aged 15 and above is 316 per one lakh, with the highest prevalence of 534 per one lakh in Delhi and the lowest 151 per one lakh in Kerala. The prevalence of all forms of TB for all ages in India was 312 per lakh population for the year 2021 and the highest prevalence for all forms of TB was 747 per lakh in Delhi and the lowest was 137 per lakh population in Gujarat. According to the Global TB Report 2021, the estimated incidence of all forms of TB in India for 2020 was 188 per 1 lakh population.[3]

TB report 2022 reveals 4.2% positive cases out of total tested sample of 1.752 cr. (0.8% of total estimated population of 139.616crores) . Uttar pradesh state in this report 10.8%positive cases in 0.3% samples tested out of estimated population of 23.609 crores. In Hapur district 3096 cases were found positive out of tested cases. The population of Hapur district is 1338211(327349 urban) as per 2011 census. The reporting of TB cases in Hapur is lessor than that of national and state average.[3,15]

The Revised National Tuberculosis Control Program was started in India in 1997. There has been no nationwide survey to assess the prevalence of pulmonary tuberculosis. According to one study,

International Journal Dental and Medical Sciences Research
Volume 4, Issue 5, Sep-Oct 2022 pp 189-194 www.ijdmsrjournal.com ISSN: 2582-6018

the pooled prevalence of bacteriologically positive pulmonary tuberculosis was 295.9 (95% confidence interval: 201.1–390.6) per 100,000 population. The prevalence was higher among males than females and in rural areas compared to urban areas. The prevalence of pulmonary tuberculosis varied based on sex and distribution of population in rural and urban areas. There is a need of nationwide population-based survey to estimate the burden of tuberculosis to inform control measures and facilitate monitoring and evaluation.[4]

The objective of the study is to examine the prevalence of pulmonary TB in largely rural area population and to find out results for different age brackets sex wise .The study may further pave the way for policy makers ,clinicians and authority involved in TB elimination programme based on findings of the study.The study is one step forward in the direction of strategy plan for tuberculosis elimination by 2025. [16]

Study Design-

The study is Prospective, observatory and cross sectional.The samples in this study are drawn from various IPD and OPD specialities of tertiary care centre. The tests of samples are conducted at Microbiology lab of the tertiary care center.

Sample size-

The samples are collected from the patients either visited hospital for OPD consultation or for indoor patients hospitalised. The study is carried out for three months duration with sample size of 194 valid samples. (Total sample 205 but 11 sample found invalid and removed from study).

Methods

Procedures for Testing-

Sputum acid-fast bacilli (AFB) smear microscopy is the primary tool for detecting pulmonary tuberculosis.[5]

The Ziehl-Neelsen (ZN) method is used for staining sputum smears. Revised National Tuberculosis Control Programme (RNTCP) guidelines recommend the use of 1% carbol fuchsin in the ZN method [6]. However, recent World Health Organization (WHO) guidelines recommend using carbol fuchsin at a concentration of 0.3%[5]. The sensitivity and specificity of the Ziehl-Neelsen stain for pulmonary tuberculosis can be up to 70% and 97.1%, respectively, several factors can interfere with accurate and valid reporting of results[7].

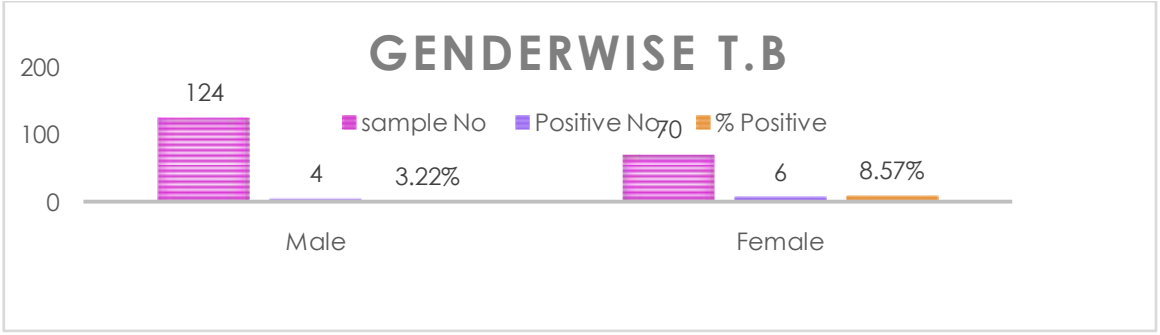
II. RESULTS

Table1

Positive cases of Pulmonary TB-

Total sample(No.)	Positive cases (No.)	% Positive cases
		
194	10	5.15%

In present study , out of 194total valid sample ,only 10 samples (5.15%) are found positive for pulmonary TB.



International Journal Dental and Medical Sciences Research
Volume 4, Issue 5, Sep-Oct 2022 pp 189-194 www.ijdmsrjournal.com ISSN: 2582-6018

Table2

Gender wise Prevalence of pulmonary TB-

Gender	Total sample(No.)	Positive cases(No.)	% positive cases
Male	124	04	3.22%
Female	70	06	8.57%
Total	194	10	5.15%

In this study , 04 cases (3.22%) out of 124 samples of male patients are positive whereas 06 samples (8.57%) out of 70 female samples are positive. 06 samples out of total 10 positive cases are of female, meaning thereby the female share of positive cases is 60% .

Table3-

Age wise pulmonary TB cases in Male patients-

Age Bracket	Total sample (No.)	Total positive cases(No.)	% positive cases
0-20 yrs	11	00	-
21-40yrs	34	00	-
41-60yrs	51	04	7.84%
➢ 60yrs	28	00	-
Total	124	04	3.22%

The male patients(124) are tested out of which 04 are found positive that too in the age bracket of 41-60 years(7.84%). There is no positive case diagnosed in other age group even in the patients having age more than 60years.

Table 4

Age wise pulmonary TB cases in Female patients-

Age Bracket	Total sample (No.)	Total positive cases(No.)	% positive cases
0-20yrs	17	01	5.88%
21-40yrs	17	02	11.76%
41-60yrs	22	02	09.09%
>60yrs	14	01	07.14%
Total	70	06	8.57%

Female patient (70) are tested out of which 06 are found positive. The maximum 02 cases out of 17 patients (11.76%) in 21-40 years age bracket and 02 cases out of 22 patients (9.09%) are diagnosed in 41-60 years age bracket. The study shows that TB is present in all age bracket in female patients. The maximum cases are recorded in patients of 21-60 years age group.

Table5

Positive T.B cases in Hospitalised and outdoor Patients-

IPD/OPD	**Total patients(No.)**	**Positive cases(No.)**	**% positive cases**
OPD	**44**	**02**	**4.54%**
IPD	**150**	**08**	**5.33%**
Total	**194**	**10**	**5.15%**

The pulmonary TB was maximum (5.33%) in hospitalised (IPD) patients comparison to OPD patients which has recorded 4.54% positive cases.

Table 6

Gender wise IPD cases of TB –

Gender	**Total IPD sample(No.)**	**Positive sample(No.)**	**% positive**
Male	**96**	**04**	**4.16%**
Female	**54**	**04**	**7.40%**
Total	**150**	**08**	**5.33%**

International Journal Dental and Medical Sciences Research
Volume 4, Issue 5, Sep-Oct 2022 pp 189-194 www.ijdmsrjournal.com ISSN: 2582-6018

Out of IPD cases of 96 male patients ,only 04 (4.16%) are found positive where as 04 cases(7.40%) out of 54 female patients are found positive. The results of this study depict the maximum share of positive pulmonary TB cases are female patients.

Table7

Gender wise OPD cases of TB-

Gender	Total OPD sample(No.)	Positive sample(No.)	% positive
Male	**29**	**00**	**00%**
Female	**15**	**02**	**13.33%**
Total	**44**	**02**	**4.54%**

The positive cases from the OPD patients are 4.54% which is lesser than IPD cases which are recorded 5.33% case. Female patients in OPD recorded highest 13.33% positive cases

III. DISCUSSION-

In present study , out of 194total valid sample ,only 10 samples (5.15%) are found positive for pulmonary TB**.(refer Table-1).** If we compare the figures of India TB report 2022 ,4.2% (73772) positive cases were diagnosed out of total tested cases of 0.8% (1752903) of total national estimated population (139.61crores). The percentage of positive cases of pulmonary TB in present study is higher than that of national average but lower than state average (UP) (10.8%)[3].

The prevalence of pulmonary TB in northern district in India estimated of 24.1 per 100,000 populations (95% CI 12.8-35.4) according to one study carried out in the year 2015. The observed prevalence of bacteriologically positive PTB in this study is lower than empiric national estimates, probably as a result of successful implementation of tuberculosis control measures in the area.[8]

Another study carried out in Faridabad district in 2015 A total of 105,202 subjects were enumerated in various clusters of the Faridabad district. There were 50,057 (47.58%) females and 55,145 (52.42%) males. Of these 98,599 (93.7%) were examined by the study group (47,976 females; 50,623 males). The overall prevalence of sputum smear or culture positive pulmonary tuberculosis in study was found to be 101.4 per 100,000 population. The results showed that the prevalence of sputum positive pulmonary tuberculosis was higher in Faridabad district than the notification rates recorded by the World Health Organization for the contemporary period, a disparity that could be explained by a difference in case detection strategy employed for the study.[9]

A house based survey was conducted during 2007–2009 in a representative sample of population in Wardha district implementing Directly Observed Treatment Short Course strategy for tuberculosis (TB) control since 2001. A total of 86 bacillary cases were detected during the survey. Prevalence of bacillary PTB was estimated at 188.7 (140.3–236.9) per 100,000 populations. There was a decline of 61% in the prevalence of PTB over a period of 22 years.[10]

The TB situation in Jabalpur district, central India, is observed to be comparable to the TB situation at the national level (255.3 versus 249). There is however, a need to maintain and further strengthen TB control measures on a sustained and long term basis in the area to have a significant impact on the disease prevalence in the community.[11]

Active pulmonary tuberculosis is relatively common among COVID-19 patients and increases the risk of severe COVID-19 and COVID-19-related mortality.[12]

In this study , 04 cases (3.22%) out of 124 samples of male patients are positive whereas 06 samples (8.57%) out of 70 female samples are positive. 06 samples out of total 10 positive cases are of female, meaning thereby the female share of positive cases in this study is 60% which is very much on higher side**(Refer Table-2)** looking to national female average share of total TB cases ,which is 33% approx. Gender differentials in tuberculosis (TB) have been reported worldwide. Men are more likely to be diagnosed with TB than women, with a male-to-female ratio of 1.6:1, globally.[13]

The male patients(124) are tested out of which 04 are found positive that too in the age bracket of 41-60 years(7.84%). There is no positive case diagnosed in other age group even in the patients having age more than 60years.**(Table -3)**According to one study, In males, the highest notification rate was 52.2 per 100,000 inhabitants (95% CI 49.9–54.5) in the 40–49 age group.[14]

Female patient (70) are tested out of which 06 are found positive. The maximum 02 cases out of 17 patients (11.76%) in 21-40 years age bracket and 02 cases out of 22 patients (9.09%) are diagnosed in 41-60 years age bracket. The study shows that TB is present in all age bracket in female patients. The maximum cases are recorded

in patients of 21-60 years age group.**(Table 4)**. According to one study, the highest notification in female was 23.4 (95% CI 21.7–25.2) in the 20–29 age group[14]

The pulmonary TB was maximum in (5.33%) hospitalized (IPD) patients comparison to OPD patients which has recorded 4.54% positive cases**.(Refer Table5).**

Out of IPD cases of 96 male patients only 04 (4.16%) are found positive where as 04 cases(7.40%) out of 54 female patients are found positive. The results of this study depict the maximum share of positive pulmonary TB cases are female patients. **(Refer Table6).**

The positive cases from the OPD patients are 4.54% which is lesser than IPD cases which are recorded 5.33% case. Female patients in OPD recorded highest 13.33% positive cases**.(Table 7)**

IV. CONCLUSION-

The percentage of positive cases of pulmonary TB in present study is higher(5.15%) than that of national average (4.2%) but lower than state average (10.8%) in reference of tested samples.Female share of positive cases is 8.57% which is on higher side. Female positive cases are found in all age group. Female patients in OPD recorded highest 13.33% positive cases.The higher percentage of positive cases in female is most likely due to lack of health consciousness and having rural background.

The male share of positive cases is 3.22%.The male patients found positive are only in the age bracket of 41-60 years. There is no positive case diagnosed in other age group in the male patients.

REFERENCES-

[1]. Hershkovitz I, Donoghue HD, Minnikin DE, May H, Lee OY, Feldman M, et al. Tuberculosis origin: The neolithic scenario. Tuberculosis (Edinb) 2015;95 Suppl 1:S122-6.

[2]. WHO Global TB report 2021Global tuberculosis report 2021 (who.int) https://www.who.int/publications/i/item/9789240037021

[3]. WHO India TB Report 2021https://tbcindia.gov.in/index1.php?lang=1&level=1&sublinkid=5613&lid=3658

[4]. Sathiyamoorthy, et al.: Pulmonary tuberculosis in India, Lung India • Volume 37 • Issue 1 • January-February 2020, DOI: 10.4103/lungindia.lungindia_181_19

[5]. Karin, W. 1998. Laboratory services in tuberculosis control. Part II. Microscopy. WHO Tech. Bull. 98:258. [Google Scholar]

[6]. Central TB Division, Directorate General of Health Services, Ministry of Health and Family Welfare. 1998. Revised National Tuberculosis Control Programme manual for laboratory technicians. Ministry of Health and Family Welfare, New Delhi, India. [Online.] http://www.tbcindia.org/LABMANUAL.pdf.

[7]. Abdelaziz MM, Bakr WM, Hussien SM, Amine AE. Diagnosis of pulmonary tuberculosis using Ziehl-Neelsen stain or cold staining techniques? J Egypt Public Health Assoc. 2016 Mar;91(1):39-43. [PubMed]

[8]. Aggarwal AN, Gupta D, Agarwal R, Sethi S, Thakur JS, Anjinappa SM, et al. Prevalence of pulmonary tuberculosis among adults in a North Indian district. PLoS One 2015;10:e0117363

[9]. Sharma SK, Goel A, Gupta SK, Mohan K, Sreenivas V, Rai SK, et al.Prevalence of tuberculosis in Faridabad district, Haryana state, India. Indian J Med Res 2015;141:228‑35.

[10]. Narang P, Mendiratta DK, Tyagi NK, Jajoo UN, Tayade AT, Parihar PH, et al. Prevalence of pulmonary tuberculosis in Wardha district of Maharashtra, central India. J Epidemiol Glob Health 2015;5:S11‑8.

[11]. Rao VG, Bhat J, Yadav R, Gopalan GP, Nagamiah S, Bhondeley MK, et al. Prevalence of pulmonary tuberculosis – A baseline survey in central India. PLoS One 2012;7:e43225.

[12]. Aggarwal AN, Agarwal R, Dhooria S, Prasad KT, Sehgal IS, Muthu V (2021) Active pulmonary tuberculosis and coronavirus disease 2019: A systematic review and meta-analysis. PLoS ONE 16(10): e0259006. https://doi.org/10.1371/journal.pone.0259006

[13]. WHO Global tuberculosis report 2016 WHO, Geneva (2016) Available at http://apps.who.int/ [accessed 27.10.17] Google Scholar

[14]. R. Marçôa, A.I. Ribeiro, I. Zão, R. Duarte,Tuberculosis and gender – Factors influencing the risk of tuberculosis among men and women by age group, Pulmonology ,Volume 24, Issue 3,2018,Pages 199-202,ISSN 2531-

0437,https://doi.org/10.1016/j.pulmoe.2018.03.004.(https://www.sciencedirect.com/science/article/pii/S2531043718300667)

[15]. Districtwise T.B cases in UP(Ref-https://tbfacts.org/tb-uttar-pradesh/.)

[16]. National strategic plan for tuberculosis elimination 2017–2025 https://tbcindia.gov.in/WriteReadData/NSP%20Draft%2020.02.2017%201.pdf special report series No.34, 1955–1958, 1959. ICMR, New Delhi