



A SNAPSHOT OF THE PROFILE OF PATIENTS ATTENDING A TERTIARY CARE HOSPITAL FOR TUBERCULOSIS AND RESPIRATORY DISEASES AT NEW DELHI - A CROSS-SECTIONAL RETROSPECTIVE STUDY

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ABSTRACT

Background: The United Nations Sustainable Development Goals (SDG) has included targets towards ending the tuberculosis epidemic by 2030. The strategies towards ending TB includes different milestones and targets for reduction in incidence of tuberculosis as well as deaths. The present study is a retrospective, cross-sectional study which provides an insight into the data captured at OPD by the Hospital Management Information System (HIS) of the Institute. **Methods:** The present study includes the data on patients attending OPD during 1st January 2022 to 31st December 2022 at a tertiary care hospital situated in New Delhi. The relevant information on patient profile is obtained from the Hospital Management Information System (HIS), developed and implemented by the Institute for capturing, storing, processing and disseminating information across various departments in the Institute. There have been 60,265 new registrations and 1,21,920 revisits made at OPD during the year. The present study provides an overview of the clinical and socio-demographic profile of these n = 1,82,185 patients (total sample size included in the study) visiting the hospital for care and treatment of respiratory illness, primarily, for Tuberculosis. Several descriptive and analytical data analysis techniques are used to assess the profile of patients. **Results:** The average age of the patients is 35 and median is 32. The age distribution is unimodal and the mode is calculated as 22, i.e. the maximum number of patients are of age 22, even younger than the overall average of the patients. However, patients from Geriatric age-group (more than 60) also visits in OPD. The total number of geriatric patients visited at OPD during 2022 is 32,505 (accounting for 18% of the total visits during the year). It may also be noted that the elderly patients have increased number of follow-up visits at OPD for better care at the hospital for tuberculosis and other respiratory health issues. The maximum number of geriatric patients (i.e. 13.4%) come from states outside Delhi, in comparison to Area (11%) and Non-area (12%) locations. Most of the OPD patients are from adult age group i.e. 15-59. **Conclusion:** The study encompasses through the socio-demographic profile of all the symptomatic patients visiting OPD and a glimpse of clinical profile after final diagnosis of the patients. The study focuses on the efficient use of Hospital Management Information System (HIS) of the Institute at OPD and does not include other modules of the HIS viz inpatient department (IPD), thoracic surgery and other special clinic modules, which are under development. Though the overall percentage of symptomatic male patients (55%) are more than the female symptomatic patients (45%), the age-group 15-24 shows higher attendance of female patients than their male counterparts, in all locations. Among the patients diagnosed with tuberculosis, 62% are suffering from pulmonary tuberculosis and 38% are suffering from extra-pulmonary tuberculosis i.e. the TB disease occurring in other places than lungs. In patients diagnosed with extra-pulmonary tuberculosis, Tubercular Pleural Effusion and Lymph Node Tuberculosis are the most occurred conditions

KEYWORDS :

INTRODUCTION

Tuberculosis (TB) is a communicable disease caused by a type of bacteria called Mycobacterium tuberculosis (MTB). Nearly a quarter of the total population of world is estimated to be infected with tuberculosis. According to reports of WHO [1], this deadly bacterium has claimed nearly sixteen lakh lives in 2021 globally. The United Nations Sustainable Development Goals (SDG) [2] has included targets towards ending the tuberculosis epidemic by 2030. The strategies towards ending TB includes different milestones and targets for reduction in incidence of tuberculosis as well as deaths. According to Global TB Report 2022 published by WHO, India is one of the high burden TB countries among the global lists of high burden countries (for TB, HIV-associated TB and MDR/RR-TB) to be used by WHO, during 2021–2025 [4]. Several strategies and policy implementations have been adopted by the Government of India to lower the burden of TB in India. To estimate the prevalence of tuberculosis both in National and State level, National TB Prevalence Survey [5] was conducted in 2019–2021. The National Tuberculosis Elimination Programme (NTEP) is the Public Health initiative of the Government of India to achieve TB related targets of SDG. It is thus important for different stakeholders to assess and evaluate the progress of the country towards achieving the targets of ending tuberculosis by 2030 and to make relevant policy decisions and implementations regarding the same.

The primary objective of the study is to get an overview of the profile of the patients which includes the age and gender-specific background, the area of residence and finally the burden of the tuberculosis disease at a tertiary care hospital, which may subsequently help the policymakers to make relevant decisions towards achieving the targets

of ending tuberculosis. Another purpose of the study is to demonstrate the importance of digital information being captured by the hospital information management system and its relevance in patient care. The importance of medical records of patients in efficient flow of health care has been well documented in literature [6,7,8]. Digital information on the patients' health history, symptoms, findings of physical examination, laboratory reports, information on diagnosis, treatment, hospital stay, outcomes of treatment etc are relevant in providing insights into health needs of the population as a whole and subsequently contributes towards improving the quality of medical care provided by the hospital. The present study provides a snapshot of the profile of patients coming to Outpatients Department (OPD) at a tertiary care referral hospital situated in New Delhi, India. The Institute provides preventive, diagnostic, curative and rehabilitative services to patients of tuberculosis and respiratory diseases. The analysis of data, as captured by the Hospital Management Information System (HIS) of the hospital, regarding patients' demographic and clinical profile during the calendar year 2022 shall provide a glimpse of the status of tuberculosis burden in the society.

Methods

The present study includes the data on patients attending OPD during 1st January 2022 to 31st December 2022 at the tertiary care hospital situated in New Delhi. The relevant information on patient profile is obtained from the Hospital Management Information System (HIS), developed and implemented by the Institute for capturing, storing, processing and disseminating information across various departments in the Institute. There have been 60,265 new registrations and 1,21,920 revisits made at OPD during the year. The present study provides an overview of the clinical and socio-demographic profile of these n =

1,82,185 patients (total sample size included in the study) visiting the hospital for care and treatment of respiratory illness, primarily, for Tuberculosis. The raw data of the patients were extracted by the concerned experts through structured query language (SQL), in which conditional commands have been prompted in the back-end programme of the database for relevant extraction of the data. The details of personal information of the patients entered at the registration desk in OPD is considered for the study. The data are accessed through HIS for the period of 1st January 2022 to 31st December 2022. The missing cells in various fields regarding patient details are excluded from the analysis. The analysis of demographic and clinical data of patients obtained through HIS for inclusion in the study do not present any patient identification.

Several descriptive and analytical statistical techniques were used to assess the profile of patients. Understanding the shape of the age-distribution is essential in any statistical investigations. Measurement of different central tendency measures and dispersion measures help to assess where the data are mostly clustered and where are the unusual observations are occurring. Skewness is a descriptive measure in Statistics which determines the extent of asymmetry in the data. Kurtosis determines the heaviness of the tail of the distribution. The box and whisker plot and histogram are used to gauge the overall distribution of age of patients visiting OPD. The age-sex pyramid is presented to assess the two-way distribution according to age and gender. Simple and multiple bar charts, pie charts are drawn to present the relevant data. Proportion z-test for testing significance of differences in proportions and chi-square test for testing the significance of association between different factors are used to obtain p-values. Skewness and kurtosis measures are calculated for assessing the age distribution of the data. Outliers are obtained for presence of any unusual observation in the data. Inter-quartile range and standard deviations are obtained as a measure of dispersion for the data under consideration. The Summarization of data in tabular formats, diagrammatic representation of the data and relevant statistical tests of significance were done in softwares viz Microsoft Excel 2021 MSO (Version 2306 Build 16.0.16529.20164) 64-bit and R studio version 4.3.1 (64-bit).

RESULTS

The demographic profile of the patients attending the hospital OPD are presented in the statistical plots viz boxplot, histogram etc. The boxplot and histogram in Figure 1 show the data to be positively skewed (skewness coefficient = 0.47, kurtosis coefficient = 2.52). Visits of very old patients (outliers) at OPD ranging from 88 to 101 have also occurred during the year. The age-sex structure of the patients coming to OPD were analysed with the diagrammatic representation viz. age-sex pyramid in Figure 2 (Negative percentages are shown in the left of the margin according to the convention of Age-Sex pyramids. -x% may be read as x%). It shows that there are more female patients than the male counterparts in the 15-24 age-group of those who are visiting the hospital OPD for the first time. Table 1 provides the demographic profile of patients according to age, sex and location. The p-values for the tests of significance show that there are significant association between age and gender of the patients visiting OPD. There are three types of patients who visit OPD, a) Area (DOTS) (patients from specified NTEP area of the Institute visited directly to the hospital), b) Non-Area (beyond specified area, but within Delhi) and c) Outsiders (outside Delhi). The proportion of patients differ significantly for area, non-area and outside Delhi. Figure 3 represents the percentage of new and revisit cases at OPD according to different age categories. Figure 4 represents the profile of patients after diagnosis. The distribution of extra-pulmonary tuberculosis cases diagnosed at OPD during 2022 are presented in Figure 5.

DISCUSSION

The present study is a retrospective, cross-sectional study which provides an insight into the data captured at OPD by the Hospital Management Information System (HIS) of the Institute. The study includes all the symptomatic patients visiting at OPD during 1st January 2022 to 31st December 2023. The number of patients considered in the study is 1,82,185, including 60,265 new registrations at OPD. It is observed from the descriptive analysis of the data that age-distribution of the symptomatic patients are asymmetric, positively skewed i.e. patients who visit the hospital OPD are clustered towards younger age group. The kurtosis value (< 3) indicates that the age distribution is a flattened curve than the normal curve, having a wider spread (standard deviation is 17.36) of the data over mean and thus having heavy tails i.e. there are sufficient number individuals in the

children and geriatric age-group. The average age of the patients is 35 and median is 32. The age distribution is unimodal and the mode is calculated as 22, i.e. the maximum number of patients are of age 22, even younger than the overall average of the patients. However, patients from Geriatric age-group (more than 60) also visits in OPD. The total number of geriatric patients visited at OPD during 2022 is 32,505 (accounting for 18% of the total visits during the year). It may also be noted that the elderly patients have increased number of follow-up visits at OPD (figure 3) for better care at the hospital for tuberculosis and other respiratory health issues. It is also noteworthy that the maximum number of geriatric patients (i.e. 13.4%) come from states outside Delhi, in comparison to Area (11%) and Non-area (12%) locations. Most of the OPD patients are from adult age group i.e. 15-59. Though the overall percentage of symptomatic male patients (55%) are more than the female symptomatic patients (45%), the age-group 15-24 shows higher attendance of female patients than their male counterparts, in all locations. According to a 2019 report from the Ministry of Statistics and Programme Implementation (MOSPI) [9], the mean age at marriage of women in India is 22.3 years, which is contained in 15-24. The girls in this age-group are either about to get married in near future or in their early reproductive period. Families or in-laws of the girls are more concerned about their health for the social acceptability. It might have caused the larger proportion of female symptomatic patients attending OPD in this age-group. However, detailed study is needed for gaining deeper insight in this matter. Among the finally diagnosed patients at OPD during 2022, 58% of the patients are diagnosed with Tuberculosis (TB) and 42% of the patients are diagnosed with other diseases (Non-TB). Among the patients diagnosed with tuberculosis, 62% are suffering from pulmonary tuberculosis and 38% are suffering from extra-pulmonary tuberculosis i.e. the TB disease occurring in other places than lungs. In patients diagnosed with extra-pulmonary tuberculosis, Tubercular Pleural Effusion and Lymph Node Tuberculosis are the most occurred conditions (Figure 5).

The profile of patients presented in the study provides a glimpse of the socio-demographic and diagnostic profile of patients who visits the OPD for Tuberculosis and respiratory symptoms. It provides an insight to the different stakeholders for reassessment of the need for making relevant policy decisions towards ending the disease of tuberculosis and meet the targets of the sustainable development goals. The need of digital data in patient care and management and its relevance in health analytics are also discussed in this study.

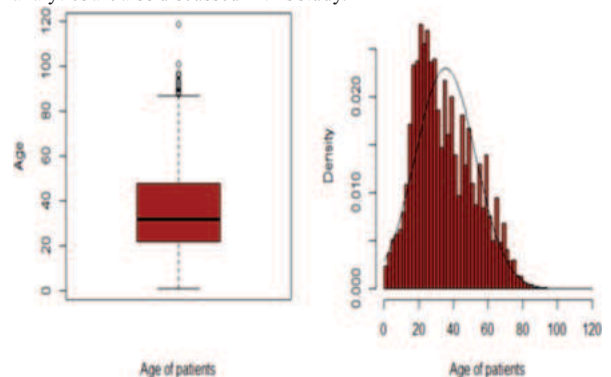


Figure 1: Age Distribution Of The Patients Attending OPD For First Time At The Hospital During 2022

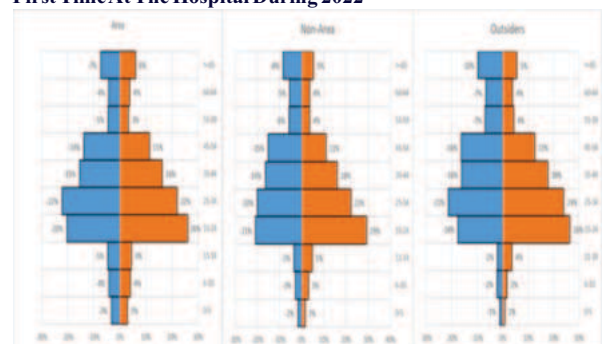


Figure 2: Age-sex Pyramid (Area-Wise) Of The Patients Attending OPD For First Time At The Hospital During 2022 (Blue Bars For Male And Orange Bars For Female)

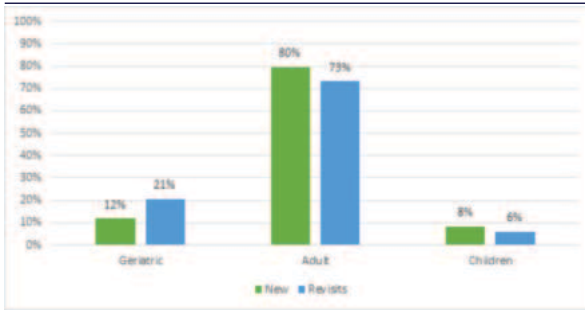


Figure 3: Distribution Of Patients Visiting OPD During 2022, Both New And Revisits, According To Age Category

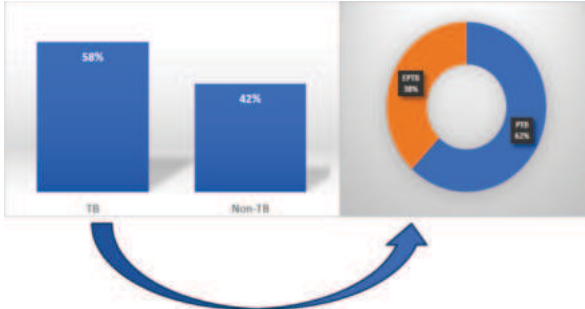


Figure 4: Percentage Of Symptomatic Patients Diagnosed With Tuberculosis (pulmonary i.e. Ptb And Extra-pulmonary i.e. Eptb) And Non-tuberculosis (Non-TB) At The Hospital OPD During 2022

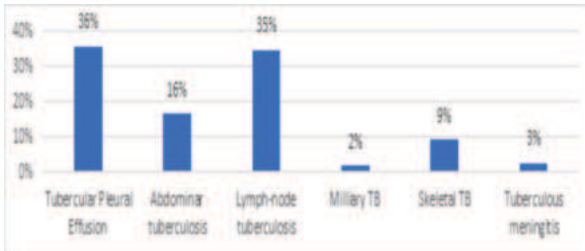


Figure 5: Distribution Of Extra-pulmonary Tuberculosis Cases Diagnosed At OPD During 2022

Table 1: Demographic Profile Of Patients Visiting OPD (new Registrations) During 2022

Characteristics	Measures and Frequency (%)	Tests of significance
Age	Mean = 35.37 Standard deviation = 17.36 Inter-quartile range (IQR) = 26	(Test for association between age and gender of patients) Chi-squared statistic = 372.61, Degrees of freedom = 2, p-value < 0.01
Geriatric (>60)	7162 (12%)	
Adult (15-59)	48052 (80%)	
Children (0-14)	5051 (8%)	(3-sample test for equality of proportions without continuity correction) Chi-squared statistic = 20157, Degrees of freedom = 2, p-value < 0.01
Gender		
Male	32,851 (54.5%)	
Female	27414 (45.5%)	
Location		
Area	10,927 (18.1%)	
Non-area	33,156 (55%)	
Outsiders	16,182 (26.9%)	

Limitations and Future Research

This study provides only a snapshot on the socio-demographic and diagnostic profile of patients visiting OPD of the hospital during 2022. The study encompasses through the socio-demographic profile of all the symptomatic patients visiting OPD and a glimpse of clinical profile after final diagnosis of the patients. The study focuses on the efficient use of Hospital Management Information System (HIS) of the Institute

at OPD and does not include other modules of the HIS viz in-patient department (IPD), thoracic surgery and other special clinic modules, which are under development. The present study may be extended further to include more in-depth information on patients regarding symptoms, comorbidities, diagnosis and treatment outcome. A longitudinal study may also be conducted in future to include the follow-up data of the HIS and to compare different aspects of tuberculosis care given to the patients at the hospital.

Conflicts of Interest Statement: There is no conflict of interests among the authors.

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