RESEARCH

INCIDENCE OF RIFAMPICIN RESISTANCE AMONG TUBERCULOSIS PATIENTS IN A TERTIARY CARE CENTRE OF KOPPAL DISTRICT

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Abstract

Background: In 2015, the World Health Organization (WHO) estimated 480,000 incident multidrug resistant TB (MDR-TB; resistance of both isoniazid and rifampicin) cases globally. To study the Incidence of Rifampicin Resistance among Tuberculosis Patients in a Tertiary Care Centre of Koppal District. **Materials and Methods:** This hospital-based study was conducted in teaching hospital NTEP centre from January 2021 to December 2021 in Koppal District. Ethical clearance was obtained from the institutional ethical committee for the present study. **Result:** The incidence of tuberculosis in the study population is 8.85per 100000 population and incidence of Rif resistant tuberculosis in the study population is 1.58per 100000 population. **Conclusion:** Even though effective control programme of tuberculosis is present in our country still the incidence as of tubercusosis as well as incidence of drug resistant TB proposes a major challenge therefore still effective awareness as well as control programmes are essential to combat tuberculosis.

INTRODUCTION

Tuberculosis (TB) kills close to half a million Indians every year.[1] Additionally, a million 'missing' undiagnosed or inadequately diagnosed cases go unnotified annually.[2] Accelerated tuberculosis (TB) control efforts have been threatened by the emergence of Mycobacterium tuberculosis strains that are resistant to potent first-line drugs (drug resistant tuberculosis or DR-TB).[3,4,5] With an estimated 79,000 MDR-TB cases, India along with the Russian Federation and South Africa accounted for 45% of the total notified combined MDR-TB and rifampicin-resistant (RR-TB) cases in 2015.[6] Additionally, a million 'missing' undiagnosed or inadequately diagnosed cases go unnotified annually[2]. Not surprisingly, drug-resistant tuberculosis (DR-TB) is a significant problem, and India now has the most number of cases of multidrug-resistant tuberculosis (MDR)-TB in the world, contributing one-fourth of the global burden.[1] The treatment of MDR-TB requires the use of toxic drugs, is long and expensive and has substantially lower success rates than for drug-sensitive TB.[1] Despite the brief decline in TB notifications observed around the months corresponding to India's two major COVID-19 waves, the National Tuberculosis Elimination Programme (NTEP) reclaimed these numbers. Accordingly, 2021 witnessed a 19% increase from the previous year in TB patients' notification—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.As per the Global TB Report 2021, the estimated incidence of all forms of TB in India for the year 2020 was 188 per 100,000 population (129-257 per 100,000 population). The total number of incident TB patients (new & relapse) notified during 2021 was 19,33,381 which was 19% higher than that of 2020 (16,28,161). The programme had been able to catch-up with the dip in TB notifications that was observed around the months when the two major covid waves happened in India. Though factors such as changes in the health seeking behaviour of patients with chest symptoms (patientrelated) as well as diversion of the human. The estimated number of MDR and XDR-TB cases to have been put on treatment as per the global TB report 2021 was 4 per 100,000 and 1 per 100,000 population, respectively. During the pandemic, a significant reduction was observed in the total number of DR-TB patients started on treatment as compared to 2019. In 2020 and 2021, there was a reduction of 14% and 9% in the number MDR patients put on treatment as compared to the estimated numbers. Similarly, higher reductions were also seen in the number of XDR-TB patients being started on treatment in 2020 and 2021 as compared to the previous years, and also against the estimated

numbers.[7] District teaching hospital koppal being a tertiary care centre serving a population of 1,389,920 majority of who belong to rural areas receives a large number of tuberculosis patients. In this study we made an attempt to find the incidence of rif resistance TB among CBNAAT positive TB patients.

MATERIALS AND METHODS

This was a health facility based retrospective cross-sectional study conducted from january 2021 to december 2021 in koppal district teaching hospital NTEP centre. The study population were all TB presumptive (patients with clinical signs and symptoms suggestive of TB) patients who visited the study area during the study period. A single sputum sample per patient for age greater than 6 years and a gastric aspirate sample in case of children less than this age group were used in all study facilities for the diagnosis of all presumptive TB patients using Xpert MTB/RIF assay. Samples were collected before the patients started anti-TB treatment. Samples were processed by GeneXpert MTB/ RIF assay. These were diluted and decontaminated, and the GeneXpert MTB/RIF assay was performed according to the manufacturer's manual. Other laboratory diagnostic methods such as culture and acid fast bacilli (AFB) smear microscopy were not done for patients with M. tuberclosis negative result by Xpert MTB/RIF. Patients' records that had incomplete data, e.g., age, gender, Xpert MTB/RIF results, HIV status, sample type, and TB treatment history were excluded from the study. The data was entered in to EPI info version 7 and then exported to SPSS version 20 for analysis. Descriptive statistics was done for the calculation of frequencies of each variable. All the variables (Age, sex, previous TB treatment history, HIV) included in this study are traditional/known risk factors of drug resistance TB and included in the regression model irrespective of their value. The study was approved by institutional ethical committee (IEC) Koppal institute of medical sciences Koppal. Informed consent was not sought from the study participants as it used secondary data. Confidentiality of the information collected was maintained by omitting their name and other personal identifiers from extraction sheet.

RESULTS

Among the at-risk population (1,389,920), samples of 934 patients were sent for CBNAAT analysis among which 123 samples were found to have tuberculosis i.e 13.32% of total samples tested were positive for tuberculosis. Out of 123 total new TB cases, 75 were male and 48 were female. Among 123 CBNAAT positive samples 22 samples detected to have Rif resistance i.e. 2.35% of total samples tested. The incidence of tuberculosis in the study population is 8.85per 100000 population and incidence of rif resistant tuberculosis in the study population is 1.58per 100000 population.

Table 1: Numerical Data of Sex Distrubution

	Males	Females
Total New TB Cases-123	75	48
Total Rif Resistant TB cases-22	14	8

Table 2: Numeical data of tuberculosis in our tertiary care hospital.

At risk population	1389920
Total number of samples tested	934
Total new TB cases in 2021	123
Total new Rif resistant TB cases in 2021	22

Table 3: Incidence of tuberculosis and rif resistant tuberculosis in our tertiary care hospital

Incidence of tuberculosis	8.85 per 100,000 population
Incidence of Rif resistant TB	1.58 per 100,000 population

DISCUSSION

In the present study incidence of tuberculosis was found to be 8.85 per 100000 population and incidence rif resistance was 1.58 per 100000 population. According to the RNTCP-TB Status report 2015, 2016, and 2017 an increasing order 29,057 <36,000 <53,460 of MDR-TB was found in India.[8,9,10] According to RNTCP, the burden of TB has been studied in six zones (North, West, and East, South 1 and South 2, and North East) in India. Punjab, Haryana, Chandigarh, Delhi, Himachal Pradesh, UP, and Uttarakhand states come under the North zone of India as per the RNTCP program. North zone of India is the second highest MDR-TB prevalent zone after the West zone of India, As per the RNTCP status report, a total of 25652 MDR-TB cases were detected in 2014, of which 6184 were reported in North India. In 2013, significantly increasing MDR-TB cases were found in North India, especially Delhi (11%), Haryana (14%), and UP (35%) reported a high burden of MDR-TB in North zone[8].According to a research article based on 4 years retrospective study conducted in Lucknow, UP, a continuous increasing trend of MDR-TB was observed from 2007 to 2010. A total cases of 16 (36.4%), 18 (36.7%), 25 (39.1%), and 38 (40.8%) were identified as MDR-TB cases in 2007, 2008, 2009, and 2010, respectively. Overall MDR-TB gradually increased from 2007 to 2010 in both new and previously treated cases. They found a total of 97 (38.8%) MDR-TB strains from 250 MTB culture isolates tested for first-line anti-tubercular drugs. Of which 97 MDR-TB strains, 80 (82.5%) were from PTB, and 17 (17.5%) were from EPTB cases. Among these, 23 (22%) were new MDR-TB cases, and 74 (77.3%) previously treated cases. They reported a high prevalence (38.8%) of MDR-TB at a tertiary care referral center both in new cases (29.1%) and previously treated cases (43.3%). The prevalence was the most common in the PTB (32%) cases as compared to EPTB (6.8%) cases.[11,12] Some other studies which were conducted in Delhi also showed a high prevalence of MDR-TB, i.e. 53% MDR-TB

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combined (new and previously treated cases and 67% in previously treated cases, represents a high burden of MDR-TB in North India.[13,14] In a combined study from Himachal Pradesh and Chandigarh, out of 910 PTB cases, only 52 cases were enrolled as MDR-TB as per definition. Fifty-two (5.7%) cases of MDR-TB were identified, among which 8 (15.3%) were diagnosed with XDR-TB on the basis of drug susceptibility testing (DST). According to a multicentered study conducted in different part of North India from Chandigarh, Himachal Pradesh, Punjab, Jammu and Kashmir, and Haryana reported the prevalence of MDR-TB was found to be 9% in newly diagnosed cases, which is higher than 3%–5% global prevalence rate. A new case of TB was defined as a patient who has never had treatment for TB or who has taken anti-TB drugs for less than a month. There were 121 newly diagnosed and 98 previously treated MDR-TB patients, of which MDR-TB was found to be associated with 9.9% and 27.6% of cases, respectively. This was an Indian Council of Medical Research-funded-study for over 3 years, a revealed high prevalence of DR-TB among PTB isolates from north India as compared to the WHO estimates in India in 2010.[15]

CONCLUSION

Even though effective control programme of tuberculosis is present in our country still the incidence as of tubercusosis as well as incidence of drug resistant Tb proposes a major challenge therefore still effective awareness as well as control programmes are essential to combat tuberculosis.

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