

EVALUATION OF MULTI DRUG RESISTANCE TUBERCULOSIS IN JABALPUR DISTRICT OF MADHYA PRADESH PROVINCE OF INDIAJitendra Bhargava¹, Rahul Rai², Atul Setiya³**HOW TO CITE THIS ARTICLE:**

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ABSTRACT: BACKGROUND AND OBJECTIVES: The disease of Tuberculosis (TB) is considered as old as history of mankind. Its eradication has remained an elusive dream for all governments and health care agencies. The emergence of the problem of Multi Drug Resistance strains of TB bacilli has compounded the misery, especially in developing countries. India has the highest burden of TB in the world, an estimated 2 million cases annually, and accounting for approximately one fifth of the global incidence. It is estimated that about 40% of the Indian population is infected with TB bacteria, the vast majority of whom have latent rather than active TB disease. It is also estimated by the World Health Organization (WHO) that 300, 000 people die from TB each year in India. Drug resistant TB has frequently been encountered in India and its presence has been known virtually from the time anti TB drugs were introduced for the treatment of TB. The prevalence of multi drug resistant (MDR) TB has though been believed to be at a low level in most regions of the country. Various studies have found MDR TB levels of about 3% in new cases and around 12-17% in retreatment cases. However even if there is such a small percentage of cases it still translates in India into large absolute numbers. The present study was thus taken to evaluate the MDR Tuberculosis in and around Jabalpur District of Madhya Pradesh Province of India.

KEYWORDS: Multi drug resistant (MDR) TB, Acquired MDR TB, Primary MDR TB, DOTS Plus.

INTRODUCTION: Tuberculosis or TB is a very common infectious disease of the developing world and caused by various strains of Mycobacteria, usually Mycobacterium Tuberculosis in humans. Tuberculosis most commonly attacks the lungs but can also affect other parts of the body. Its spread through the air, when people who have the disease cough, sneeze, or spit. Most infections in humans remain as an asymptomatic, latent infection, and about one in ten latent infections eventually progresses to active disease, which, if left untreated, kills more than 50% of its victims.¹

Tuberculosis is as old as the mankind. TB is the most common cause of death due to a single infectious agent worldwide in history of adults. According to the recent estimates, one third of the human population is infected with Mycobacterium tuberculosis worldwide.²

Mortality of those with pulmonary TB was about 50%. The introduction of anti-tuberculosis drugs in the 1950s and the development of the various drug regimens meant that by the 1980s there was a 98% chance of cure. However, treatment had to be continued with good quality drugs for as long six months to ensure cure.

The difficulties to ensure full recovery especially in countries with poor resource like India has resulted in an increasing incidence of tubercular bacterial infection which is resistant to the commonly effective drugs, known as multi-drug resistant tuberculosis.³

Multi-drug resistant tuberculosis (MDR-TB) is defined as TB that is resistant at least to isoniazid (INH) and Rifampicin (RMP), the two most powerful first line anti tubercular drugs.⁴

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Isolates that are multiple-resistant to any other combination of anti-TB drugs but not to INH and RMP are not classified as MDR-TB. MDR-TB develops during treatment of fully sensitive TB when the course of anti TB Drug is interrupted and the levels of drug in the body are insufficient to kill 100% of bacteria.⁵

There are two types of MDR TB. Firstly, people get “Acquired” drug resistant TB when their TB treatment is inadequate. This can be for a number of reasons, including the fact that patients fail to keep to proper TB treatment regimes, the wrong TB drugs are prescribed, or sub-standard TB drugs are used for treatment. Secondly, transmitted or “Primary” drug resistant TB results from the direct transmission of drug resistant TB from one person (who is infected with MDR strain) to another.⁶

There are 27 "high burden" countries. These are countries where there are at least 4, 000 cases of MDR TB each year and/or at least 10% of newly registered TB cases are of MDR TB.⁵ The problems of MDR TB is mostly that of developing countries. The scenario is no different in India. Though there have been studies conducted in various parts of our country the true figures of prevalence and incidence of MDR TB are lacking or are far from reality. The emergence of MDR strains of Mycobacterium Tuberculosis has rendered current antitubercular chemotherapeutic agents ineffective.⁷

In India, the National Tuberculosis Program was started in 1962 to reduce the problem of tuberculosis in the community. It was reviewed and in 1992, the Revised National Tuberculosis Control Program (RNTCP) was introduced. The program aims a case detection of 70% and a cure rate of 85%.⁸ In the year 2006 WHO launched “Stop TB strategy” which is to be implemented between 2006-2015.⁹

This study was carried out to find out the prevalence of MDR TB in and around Jabalpur District of Madhya Pradesh province of India and to find out any other information that may help to devise more effective strategy to treat MDR tuberculosis.

AIMS & OBJECTIVES:

1. To find out the prevalence of MDR TB in patients attending TB Chest department OPD of NSCB Medical College, Jabalpur.
2. Any other finding that may help to devise more effective strategy to treat MDR tuberculosis.

MATERIAL & METHODS: The cases were selected from amongst the patients attending the TB chest out door patients (OPD) of Medical College, Jabalpur. The present study comprised of 150 patients of suspected pulmonary multi drug resistant tuberculosis.

SELECTION CRITERIA:

Group I: Proven Case of MDR TB who were tested positive on AFB culture & sensitivity test.

Group II: Comprise of suspected case of MDR TB like those who have received CAT II treatment for five months and still culture positive and family members of MDR TB proven case irrespective of duration of treatment whose culture report is positive.

Age above 16 years were included in the study.

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OBSERVATIONS:

Number of patients who attended TB Chest OPD (June 2009- July 2010)	3280
Total Number of sputum smears examined	2055
Total number of AFB positive smears	482
Total No. of pt. who were advised AFB culture (who remained sputum positive after treatment)	218
Total No. of patients whose culture for AFB turned out to be positive	150
Total No. of patients who were resistant to Rifampicin & Isoniazid (MDR TB)	06

TABLE 1

In the present study among the 150 culture positive cases, 6 patients (4%) showed resistance to Rifampicin and Isoniazid.

Age group (in years)	Male	Female
16-25	17	16
26-35	32	13
36-45	24	10
46-55	14	8
56-65	10	4
Total	97	53

TABLE 2: Age & Sex distribution of Cases

In the present study a total of 97 men (64.67%) and 53 women (35.33%) were included. Maximum number of men and women were found in the age group of 26-35 years and 16-25 years respectively.

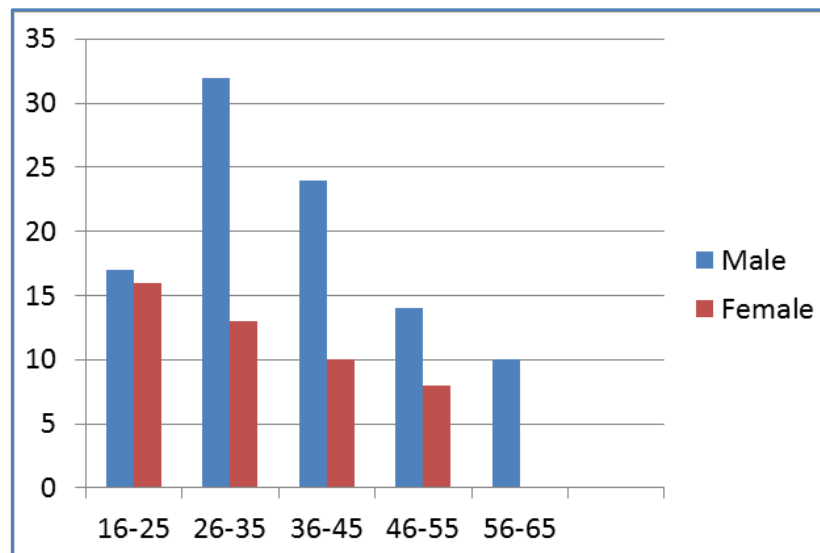


Figure 1: (AGE & SEX DISTRIBUTION)

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Drugs	No. of pt- Resistant	Percentage
Isoniazid + Rifampicin	6	4.4
Rifampicin	10	6.6
Isoniazid	8	5.3
Ethambutol	3	2.2
Pyrazinamide	5	3.2
Streptomycin	9	6

Table 3: Distribution of 1st Line drug resistance

In the present study maximum number of patients showed resistance to Rifampicin (10) followed by Streptomycin (9) Resistance to both Isoniazid and Rifampicin (MDR) was seen in 6 patients.

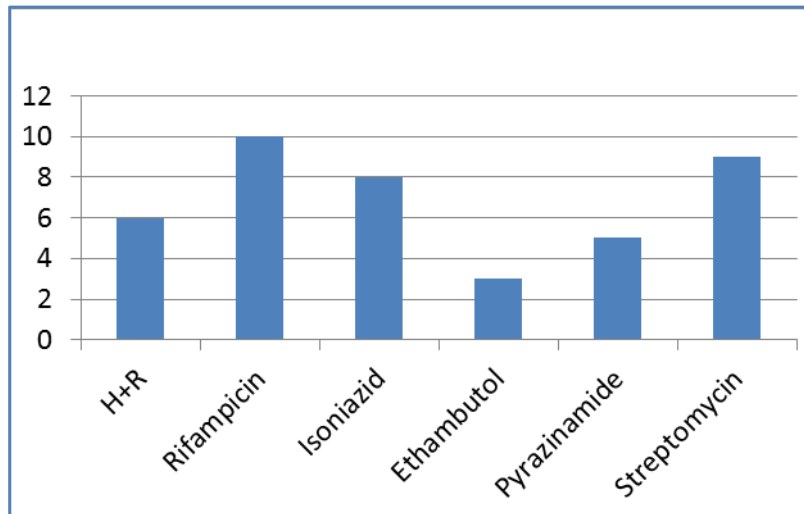


Figure 2

Drugs	Male	Female
Isoniazid + Rifampicin	4	2
Rifampicin	6	4
Isoniazid	7	1
Ethambutol	2	1
Pyrazinamide	3	2
Streptomycin	3	6

TABLE 4: Gender wise distribution of 1st Line drug resistance

In the present study maximum number of male patients showed resistance to Isoniazid (7) and among women it was towards Streptomycin. Resistance to both Isoniazid and Rifampicin was seen in 4 men and 2 women.

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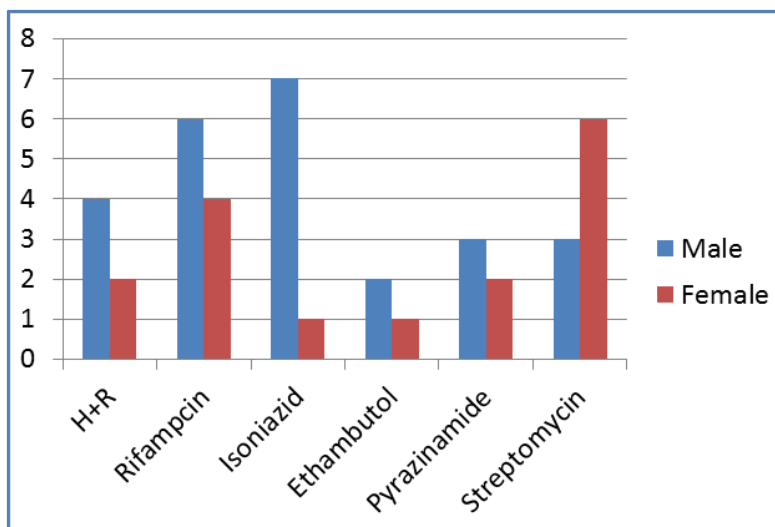


Figure 3

DISCUSSION: The present study was a prospective discretionary study conducted in 150 patients of MDR TB detected by sputum culture & sensitivity in the Department of General Medicine, NSCB Medical College, Jabalpur (M.P.) during the period of July 2009 to July 2010. A sputum culture & sensitivity was obtained and studied for resistance to first line ATT drugs. In order to reduce the sampling errors, patients who had extra pulmonary tuberculosis and those who were taking ATT under DOTS category I & III were excluded from the study.

Demographic Profile: In the present study, there were 97 (64.67%) males and 53 (35.33%) females. Majority of cases were observed in the age range of 26-35 years among men (32.98%) and among women it was 16-25 age group (30.18%). Mean age of male patients was found to be 32.85 (\pm 5.67) and among women it was found to be 26.53 (\pm 6.11).

While males predominate among TB cases in the World, an association between genders with MDR-TB has been controversial. Studies in South Africa, Australia, the Netherlands and the United State of America have reported slightly higher odds ratios among females than male, while other studies fail to find such associations¹⁶. Such studies are lacking in India. In general, it appears that the overall risk of harboring MDR-TB strains is not influenced by gender.

In the present study maximum number of patients showed resistance to Rifampicin (10) followed by Streptomycin (9) Resistance to both Isoniazid and Rifampicin (MDR) was seen in 6 patients. The trend is comparable with those of Rocky Mary et al and Azeer et al.

In the study conducted by Rocky Mary et al resistance to Rifampicin, to Isoniazid and to both (H&R) was found in 6.7%, 5.6% and 3.1% of patients respectively. In the study conducted by Azeer et al of resistance to Rifampicin, to Isoniazid and to both (H&R) was found in 7.2%, 6.9% and 4.0% of patients respectively.

In the present study maximum number of male patients showed resistance to Isoniazid 7 (7%) and among women it was towards Streptomycin 6 (12%). Resistance to both Isoniazid and Rifampicin was seen in 4 men and 2 women. Though the trend is comparable with Azeer et al but the numbers (%) are not (probably due to a larger study population of the later).

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According to MDR-TB project- Report no. 2 the MDR-TB database is characterized by a high proportion of men (68%).

SUMMARY: The present study was a prospective description study conducted in 150 patients of MDR TB detected by sputum culture & sensitivity in the Department of General Medicine, NSCB Medical College, Jabalpur (M.P.) during the period of July 2009 to July 2010. A sputum culture & sensitivity was obtained and studied for resistance to first and second line ATT drugs. In order to reduce the sampling errors, patients of extra pulmonary tuberculosis and those who were taking ATT under DOTS category I & III were excluded from the study.

The following results were obtained.

- The present study included a total of 97 males (64.67%) and 53 females (35.33%).
- Majority of cases were in the age group of 26-35 years (45 cases (30%).
- Majority of males were found in the age group of 26-35 years (n=32) (32.9%) and females in the age group of 16-25 years (n=16) (30.18%).
- Mean age of male patients was found to be 32.85 (± 5.67) and among women it was found to be 26.53 (± 6.11).
- Following was the resistance pattern to 1st line drug among the studied cases in their descending order of frequency. Rifampicin (6.6%), Streptomycin (6.0%), isoniazid (5.3%), Pyrazinamide (3.2%), Ethambutol (2.2%).

CONCLUSION: After a systematic analysis of the patients and their AFB% sputum culture sensitivity reports the following conclusions were made:

- The prevalence of MDR TB in patients attending TB Chest OPD of N.S.C.B. Medical College, Jabalpur was 4%.
- Among the cases studied maximum percentage of resistant cases were for Rifampicin. Patients who were resistant to Rifampicin(10) or Isoniazid (8) may become multidrug resistant (MDR TB) in future.
- Overall resistance to any of the ATT drugs (single or multi drug resistant) was 41 (27.33%).

Following are the recommendations to reduce the incidence of MDR-TB:

1. Prevention of drug resistance through sustained high quality DOTS implementation.
2. Promote rational use of anti-TB drugs in the country.
3. Improve laboratory capacity: Diagnosing MDR-TB.
4. Effective treatment of MDR-TB patients through implementation of RNTCP DOTS Plus (Category IV services).
5. Evaluate the extent of the threat of second-line anti-TB drug resistance and management of XDR-TB.

BIBLIOGRAPHY:

1. Hart CA, Beeching NJ, Duerden BI. Tuberculosis into the next century. J Med Microbiol 1996; 44: 1-34.
2. World Health Organization. The World Health Report Making a Difference: 1999 p.110.
3. Sharma SK, Mohan A. Multi-drug resistant tuberculosis. Indian J Med Res 2004; 120: 354-76.
4. "Multidrug and extensively drug-resistant TB (M/XDR-TB) 2010 Global Report on Surveillance and Response", WHO, Geneva, 2010, www.who.int/tb/publications
5. Narain JP, Lo YR. Epidemiology of HIV-TB in Asia. Indian J Med Res 2004; 120: 277-89.
6. <http://www.tbfacts.org/drug-resistant-tb.html>
7. Wayne Sramek. Potentially pathogenic environmental mycobacteria. Clin Microbiol Rev 1992; 5: 1-18.
8. Park K. Park's Textbook of Preventive and Social Medicine. 19th edition. 2007. p149-66.
9. World Health Organization. Global Tuberculosis Control, Surveillance, Planning, Financing, WHO Report: 2006.

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