

Susceptibility Pattern of Mycobacterium Tuberculosis to 1st Line Anti Tuberculosis Therapy

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ABSTRACT

Objective: To determine the susceptibility pattern of Mycobacterium Tuberculosis (MTB) to 1st line Anti tuberculosis therapy. **Study design:** Cross sectional study. **Study Setting:** Department of Biochemistry, Allied Hospital, Faisalabad. **Study Duration:** July 2017 to March 2018. **Methodology:** This was a cross sectional study carried out at Department of Biochemistry, Allied Hospital, Faisalabad during July 2017 to March 2018. In this study the cases of both gender with age more than 15 years were included. The cases that have already taken ATT were excluded. Sputum samples were obtained and then processed at solid Lowenstein Jensen (LJ) media for at least 6 weeks, MTB isolated from these sample were then tested for their susceptibility to the 1st line ATT drugs. The MIC of the studied drugs per ml of LJ medium for susceptibility testing were 0.2 mcg for isoniazid, 02 mcg for streptomycin, 05 mcg for Ethambutol, 100 mcg for pyrazinamide and 01 mcg for rifampicin. **Results:** In this study there were total 115 cases; out of which 72 (62.60%) were males and the mean age of the participants was 35.19±10.67 years. Drug resistance was seen in 36 (32.17%) of cases and few of the cases had more than 1 drug involvement. The most common drug to which was resistance was streptomycin affecting 19 (16.52%) of the cases. it was followed by Isoniazid where it was seen in 17 (14.78%) of the cases. Single drug resistance was seen in 30 (26.08%) of the cases. three and four drug resistance were seen in 2 (1.73%) of cases each. **Conclusion:** Drug resistance is seen in almost every 3rd case and the most common drug to show resistance is streptomycin.

Keywords: MTB, ATT, LJ media

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INTRODUCTION

Tuberculosis is a formidable disease and is found from the ancient times and seems to have never gone from the face of earth. Its number was decreasing in the developed world; though still high in the developing ones/. But due to emergence of the HIV their number is again rising in the developed countries as well.¹⁻³

TB can be pulmonary or extra pulmonary depending upon the site of involvement. Sputum examination supported by radiological investigations are the primary source of diagnosis in pulmonary TB and the EPTB diagnose relies upon the site of involvement.⁴⁻⁷ There are multiple tests to diagnose it accurately an among them Gene xpert is considered as the most useful and cheaper one as compared to cultures.⁸⁻¹⁰ Standard Anti tuberculosis therapy is started initially comprising Isoniazid, Rifampicin, Ethambutol and pyrazinamide. Streptomycin is the only injectable drug considered in the 1st line ATT. There are different categories which are designed regarding drug resistant organisms.¹¹⁻¹²

The length of ATT is long and also has wide range of side effect profiles that led to emergence of drug resistance which not only direct to lesser efficacious drugs but also has more pronounced side effect profile and duration of treatment been also an issue with this.¹³⁻¹⁶

OBJECTIVE:

To determine the susceptibility pattern of Mycobacterium Tuberculosis (MTB) to 1st line Anti tuberculosis therapy.

METHODOLOGY

Study design: Cross sectional study

Study Setting: Department of Biochemistry, Allied Hospital, Faisalabad

Study Duration: July 2017 to March 2018

Sampling techniques: Non-probability consecutive sampling

Methods:

In this study the cases of both gender with age more than 15 years were included. The cases that have already taken ATT were excluded. Sputum samples were obtained and then processed at solid Lowenstein Jensen (LJ) media for at least 6 weeks, MTB isolated from these sample were then tested for their susceptibility to the 1st line ATT drugs. The MIC of the studied drugs per ml of LJ medium for susceptibility testing were 0.2 mcg for isoniazid, 02 mcg for streptomycin, 05 mcg for Ethambutol, 100 mcg for pyrazinamide and 01 mcg for rifampicin.

Statistical Analysis:

The Data was entered and analyzed by using SPSS-version 23. Frequency and percentages were calculated for categorical data and mean and standard deviation for quantitative data.

RESULTS

In this study there were total 115 cases; out of which 72 (62.60%) were males and the mean age of the participants was 35.19±10.67 years as shown in table I. Drug resistance was seen in 36 (32.17%) of cases and few of the cases had more than 1 drug involvement. The most common drug to which was resistance was seen was streptomycin where it was seen in 19 (16.52%) of the cases. it was followed by Isoniazid where it was seen in 17 (14.78%) of the cases as shown in table II. Single drug resistance was seen in 30 (26.08%) of the cases. three and four drug resistance were seen in 2 (1.73%) of cases each as shown in table III.

Table 1: Study variables (n= 115)

Variable	Number	Percentage
Male	72	62.60%
Female	43	37.40%
Variable	Mean ± SD	Range
Age (years)	35.19±10.67	15-71
BMI (Kg/m ²)	24.33±4.19	15-31
Duration of symptoms (months)	3.78±0.67	1-6

Table 2: Resistance to drugs (n= 115)

Drugs	Number	Percentage
Streptomycin	19	16.52%
Isoniazid	17	14.78%
Pyrazinamide	5	4.35%
Rifampicin	3	2.60%
Ethambutol	3	2.60%

Table 3: Number of drugs with resistance (n= 115)

Drugs	Number	Percentage
1 drug	30	26.08%
2 drug	07	6.08%
3 drug	02	1.73%
4 drug	02	1.73%
None	68	59.13%

DISCUSSION

Tuberculosis can be a fatal entity and effective anti-tuberculosis therapy for a definitive period of time in a fixed appropriated dosage and time is the ultimate solution to this resilient infection. But due to noncompliance, interrupted supply, side effect profile and social factors, drug resistance is a burning issue.¹⁷⁻²⁰

In the present study the drug resistance was seen in 36 (32.17%) of cases and few of the cases had more than 1 drug involvement. This was similar to the studies done in the past. According to a study done by Haq M et al they found nearly similar percentages and it was seen that the greatest number of cases were resistant to streptomycin which was set in 19.05% of cases. this was followed by Isoniazid, where it was seen in 14.9%, then Ethambutol seen in 3.4%, Pyrazinamide in 2.3% and least was seen in terms of Rifampicin affecting 2.3% of cases.⁶ The data was variable worldwide but it was seen that the Streptomycin was the most resistant drug seen in all these studies. The reason can be explained by the factor that this was among the very first drugs that were made to treat TB and in effective regimen at that time and also a high degree of exposure led to emergence of drug resistance against this.¹⁸

In the present study the resistance to one drug was seen in 30 (26.08%) of the cases. Three and four drug resistance were seen in 2 (1.73%) of cases each. This was also revealed by World Health Organization where they estimated that 4.8% (95% CI 4.6-6.0) of all TB cases are resistant to one or more drugs. The highest burden of these is seen in India and china where it was seen in around 50% of the whole resistant bug and 7% of these drug resistant cases are found in Russian Federation. Pakistan is the fourth highest among high-burden drug-resistant-TB countries.²¹⁻²² The high number in the present study is due to high degree of resistance to Streptomycin which is used enormously for simple infections irrationally in the peripheries and led to increased resistance to this.

CONCLUSION

Drug resistance is seen in almost every 3rd case and the most common drug to show resistance is streptomycin.

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