CONCLUSION

- Out of 392 clinical suspected cases of *Mycobacterium tuberculosis*, Mycobacteria was grown in 206 samples thus the detection rate was 52.5%. Culture detected 28 more samples as compared to microscopy.

- *Mycobacterium tuberculosis* was found to be 175 (84.9%).

- Maximum number of patients belonged to the age-group of ≤24 years (43/175), followed by ≥55 years (39/175) and 25-34 years (38/175).

- The male: female ratio was 2.7.

- The percentage of new patients was 39.5% and previous treated was 64.4%.

- The resistance rates of *M. tuberculosis* to tested first-line agents were as follows: isoniazid, 36.6%, rifampicin, 22.9%, ethambutol, 14.9% and streptomycin, 24.6%.

- The frequency of single-drug resistance 49 (28%) with multidrug resistance being 36 (20.5%).

- 26 of the isolates (37.7%) showed primary drug resistance whereas 66 (62.3%) of the isolates were of acquired drug resistance type.

- Among the isolates from primary drug resistant cases, the resistance to INH was detected in 20%; to RIF in 4.4%; EMB in 8.7%; STR in 11.6% and to both INH and RIF (MDR) together in 2.9%.

- Acquired drug resistance was detected in 47.2% in INH; to RIF in 34.9%; EMB in 22.5%; STR in 39.3% and to MDR in 32.1%.
Antimycobacterial drug resistance was significantly higher in treated patients compared to new cases.

Monoresistance of RIF in primary and acquired drug resistance was 1.4% and 2.8% respectively.

MDR-TB prevalence is lower among new cases of culture positive samples than acquired cases.

It may therefore be concluded that tuberculosis is now a days a serious problem in view of its high occurrence in the world wide population. The present study has given us a clear insight into the study also highlights the pattern of drug resistance in Mycobacterium tuberculosis prevalent in our city.

The LPA for rapid detection of anti-mycobacterial resistance detected only 81.3% of INH-resistant strains. The detection rate of RIF and MDR resistance was 97.5% and 97.2%.

With high sensitivity for detection of RIF resistance and 100% specificity for MDR, we conclude that this test strongly facilitates adequate treatment of MDR-TB patients, long before the results of conventional are available.

With a turnaround time of approximately 6h, these techniques save several weeks of time, which is required for primary isolation and conventional DST.

Short turnaround time & potential for rapid screening of large no. of specimens make it switch as a first line screening assay for TB drug resistance. Thus, LPA is rapid & easy to perform for simultaneous detection of RIF &
low or high level INH resistance in *M. tuberculosis* isolates & clinical aspects obtained from patient suspected of having TB.

- In the present study, we encountered a major discrepancy in detecting INH resistance by genotypic method. The LPA failed to detect INH resistant strains in 17 specimens suggesting presence of unidentified mutations in other genomic regions (like ahpC, kas A, fur A) were not targeted by the assay used in the present study.

- Because discordance still exists between the conventional and molecular approach of DST and susceptibility of bacteria to drugs is defined as inhibition of growth, we recommend that the Genotype® MTBDRplus test should serve as an early guidance of therapy, which should be followed by a phenotypic DST confirmation for all suspected MDR-TB patients. Incorporation of the molecular test in the National Tuberculosis Program is an important step forward in the rapid diagnosis of MDR-TB among suspected patients in the PMDT program. The application of the molecular test directly to clinical material with sufficient bacteria will further speed up the turn-around time of the rapid diagnosis of MDR-TB and will be the next step of implementation.

- In general, molecular methods offer several advantages over conventional techniques for the rapid detection and identification of *M. tuberculosis*, such as the turnaround time for results, reliability, reproducibility and possibility to improve patient management.

- Present study demonstrated the feasibility of the MTBDRplus assay as an effective and rapid tool for MDR-TB screening in a high TB, and high MDR-
TB incidence, region and results found to be in good concordance with the LJ proportion method, which is time-consuming.

- For this reason this test can be successfully applied in a clinical laboratory setting when a rapid sensitivity testing is required for the correct management of patients or the contacts of resistant cases. However, because only some of the mutations are targeted, this molecular test cannot be considered, at the present time, as a full alternative to conventional susceptibility testing for RIF and INH, and the results obtained by molecular methods must be confirmed by phenotypic tests.

- Apart from the impact on morbidity, mortality & transmission of MDR-TB, introduction of these assays in screening & diagnostic algorithms could significantly reduce the need for sophisticated and costly conventional laboratory infrastructure still vastly inadequate in most high burden countries.

- Rifampicin, a potent drug, whose monoresistance is rare is considered to be a surrogate marker for MDR-TB, also treatment of rifampicin resistant patients is very difficult so accurate & early diagnosis of MDR-TB is highly desirable as it interrupts further transmission of disease & avoids empirical addition of life saving & thus amplification of drug resistance & creation of XDR-TB, thus enhancing the importance of our study.

- It also avoids unnecessary cost of administration & occurrence of serious side effects of second line anti-tubercular drugs in case one is dealing with drug sensitive *M. tuberculosis* strain.

- It is envisaged that molecular techniques may be an important adjuncts to traditional culture based procedures to rapidly screen drug resistance.
Prospective analysis and intervention to prevent transmission may be particularly helpful in areas with ongoing transmission of drug resistant strains as recent mathematical modeling indicate that the burden of MDR-TB cannot be contained in the absence of specific efforts to limit transmission.

- In conclusion, our findings showed a high prevalence of drug resistant *M. tuberculosis* isolates, especially MDR-TB, in the study area. Transmission of MDR-TB within community is an emergent situation which has to be tackled. There is an urgent need to further study the risk factors for development of transmission and MDR-TB in these settings.

- Considering the high rate of resistant & MDR isolates in several parts of world, especially in Eastern Europe and also as seen in our study, such a test has the potential to complement & accelerate the variety of different measures in laboratory diagnostics that are necessary for improved tuberculosis control in future.