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# To Assess Knowledge, Attitude and Practice Regarding Tolerance/ Resistance of Tuberculosis (Tb) In Health Care Professionals (HCPS) In Public and Private Hospital of Lahore: A Systematic Review

**Roop Fatima[2#], Hafsa Aslam[2#]**

Department of Pharmacy practice, faculty of pharmaceutical sciences, Lahore, Pakistan
The University of Lahore, Lahore, Pakistan
Faculty of Pharmacy practice, faculty of pharmaceutical sciences, Lahore, Pakistan
The University of Lahore, Lahore, Pakistan



**Author's Contribution**

This work was carried out by collaboration among the authors. The research project was carried out with collaborative contribution of both the authors. Both of the authors have read and approved the final manuscript

# To Assess Knowledge, Attitude and Practice Regarding Tolerance/ Resistance of Tuberculosis (Tb) In Health Care Professionals (HCPS) In Public and Private Hospital of Lahore: A Systematic Review.

**ABSTRACT:**

**Background:** Multidrug-resistant tuberculosis (MDR-TB) is an increasing global problem, with most cases of patient non-compliance during treatment of susceptible TB. The extent of MDR-TB varies significantly from country to country. Early diagnosis is important. The conventional regimen takes up to 24 months but recently shorter regimen of up to 12-18 months was introduced in a specific subset of MDR-TB patients. Knowledge about tuberculosis and correct infection control measures are therefore highly relevant in healthcare settings**.**

**Methodology:** A KAP-based cross-sectional study was conducted between 31st April 2022 and 18th May 2022 for eighteen days. A total of 185 responses were received. An online survey and questionnaire-based study were conducted on both males (N=101) and females (N=84) belonging to healthcare professionals with ages above 20.

**Results:** All respondents' knowledge, attitude, and practice aspects of MDR-TB were assessed. For each purpose, a varied amount of statistical analysis was performed on SPSS version 2.0.

**Conclusion:** Overall knowledge and practices of HCPs on TB MDR-TB control were satisfactory. Effective infection control measures including regular skill-based training and orientation for all categories of HCWs can improve infection control practices in health facilities Effective educational programs should be implemented to overcome the problem.

**Keywords: Tuberculosis resistance, KAP study, World Health Organization, Cross sectional studies, Patient education**

## 1.1. INTRODUCTION

Tuberculosis, a major reason of morbidity and mortality rate throughout the globe.[1] Tuberculosis (TB) is categorized into two types. Latent and Active TB. TB is caused by a bacterium called Mycobacterium tuberculosis. Symptoms can vary from person to person depending on the severity of disease. Individuals often experience weight loss, fever, fatigue, chills, excessive coughing, and chest pain.[2]

Drug-resistant TB (DR TB) spreads the same way as drug-susceptible TB. TB is spread through the air from one person to another. The TB bacteria enter into the air when a person with TB disease of the lungs or throat coughs, sneezes. People nearby may inhale these bacteria and become infected.[3] Incomplete and inadequate treatment is the most important factor that leads to the development of MDR-TB. [4]

### 1.1.1. Definition of Tuberculosis according to CDC (Centre for disease control and prevention):

Multidrug-resistant TB (MDR TB) is caused by TB bacteria that are resistant to at least isoniazid and rifampin, the two most potent TB drugs. These drugs are used to treat all persons with TB disease.

#### *1.1.1.a. Pre-Extensively Drug-resistant TB (pre-XDR TB):*

Pre-Extensively Drug-resistant TB (pre-XDR TB) is a type of MDR TB caused by TB bacteria that are resistant to isoniazid, rifampin, and a fluoroquinolone OR by TB bacteria that are resistant to isoniazid, rifampin, and a second-line injectable (amikacin, capreomycin, and kanamycin).

#### *1.1.1.b. Extensively Drug-resistant TB (XDR TB):*

Extensively drug-resistant TB (XDR TB) is a rare type of MDR TB caused by TB bacteria that are resistant to isoniazid and rifampin, a fluoroquinolone, and a second-line injectable (amikacin, capreomycin, and kanamycin) or by TB bacteria that are resistant to isoniazid, rifampin, a fluoroquinolone, and bedaquiline or linezolid. [3]

### 1.1.2. Epidemiology:

The World Health Organization (WHO) declared TB as a global emergency in 1993 (Grange and Zumla). Instead of all considerable medical and social interventions, TB widely affects populations around the world and continues a leading global public health problem. [5] In 2006, the term extensively drug-resistant TB (XDR-TB) was coined to describe strains of MDR-TB resistant to fluoroquinolones and second-line injectable drugs. It is estimated that 9.6% of MDR-TB cases worldwide have XDR-TB. In 2012, there were approximately 450,000 new cases of MDR-TB and 170,000 deaths. Globally, MDR-TB is present in 3.8% of new TB patients and 20% of patients who have a history of previous treatment. The highest MDR rates are found in countries of Eastern Europe and central Asia, where MDR strains threaten to become as common as pan-susceptible strains. In some countries, MDR strains account for up to 20% of new TB cases and well over 50% of patients with a history of previous TB treatment. In 2011, Minsk, Belarus reported that 35% of new patients had MDR-TB, as did 75% of those who had been treated previously for TB. In 2012, the China Centers for Disease Control and

Prevention reported that 10% of China's 1.4 million TB patients had MDR-TB, and the great majority of MDR-TB patients.[6] In 2015, 10.4 million people developed tuberculosis (TB) and 580,000 amongst them suffered from multidrug-resistant TB (MDR-TB). From those 580,000 cases of MDR-TB, only 125,000 were detected and reported. A total of 111,000 people began to receive MDR-TB treatment in 2014 while 190,000 MDR-TB patients were estimated to have died, largely due to lack of access to effective treatment. [7]

Pakistan has been ranked 5th position in terms of a high burden of MDR-TB in the world. Pakistan is a high TB endemic country, standing at 5th position in the list of 30 high burden countries (HBC) with an estimated 518,000 TB cases including 15,000 MDR-TB. The estimated proportion of MDR-TB is 4.2% in new patients and 16% in the previously treated patients (WHO 2019). According to the drug resistance survey conducted in 2012,

the prevalence of MDR-TB was 3.7% in newly diagnosed TB cases and 18.1% among previously treated TB cases.[5]

### 1.1.3. Pathogenicity:

The evolution of tuberculosis causing agent Mycobacterium tuberculosis has been long and selective toward human infection and remains one of the most widely spread pathogens because of its efficient aerosol mediated human to human transmission. As more and more genome sequences are available the evolutionary trajectory of this pathogen becomes visible, which provides us with new insights into the molecular events governing evolution of the bacterium and its ability to accumulate drug-resistance mutations. [8]

### 1.1.4. Risk Factors:

Poor compliance with the treatment is also an important factor in the development of acquired drug resistance. Diabetes mellitus and HIV infection has been well-known risk factor for TB in the past. [7]

Other Factors that lead to the development of acquired drug resistance includes inadequate chemotherapy, poor drug quality, poor adherence to treatment, treatment failure, cavity pulmonary TB.

Previous history of treatment of TB is the most powerful predictor for the presence of MDRTB. Many new cases of MDR-TB develop because of the error in management of the disease which includes the use of a single drug to treat TB, the addition of a single drug to a failing regimen, the failure to identify pre-existing resistance, the initiation of an inadequate regimen using first line anti-TB drugs. One of the predisposition factors for the development of MDRTB is variations in bioavailability of anti-TB drugs. [9]

Health care workers and the indigenous population are at a high risk of TB infection and disease. [10]

## 2. CHAPTER 2

### 2.1. LITERATURE REVIEW

To access the importance and prevalence of tuberculosis around the globe, a systematic review of the literature was carried out on online databases such as PubMed and Google scholar published during 2004-2019.TB drugs are administered in different combinations of four firstline drugs (rifampicin, isoniazid) which form the treatment regimens in the initial treatment phase of 6-9 months.

In this literature review, we access the significance and prevalence of resistance, of tuberculosis.

The overall significance of multi-drug resistant tuberculosis in different regions of the world found during the literature review has been summarized in the table given below:

| Author(s) | Year | Country Of Origin | Study Design | Sample Size | Study Duration | Focus of Study | Major Finding/ Conclusion | Incidence | Limitation |
|---|---|---|---|---|---|---|---|---|---|
| **Jihee Jung[11]** | 2017 | Sanatoria North Korea | Retrospective Study | 667 | 2007 - 2009 | Analyze the drug resistance pattern | The isoniazid and rifampicin resistance rates were high as compared to the resistance rates for fluoroquinolones | 442/100000 | **1)**Study cannot be generalized to estimate the exact drug resistance pattern **2)**Little clinical information was available |
| **Michael Abouyannis [12]** | 2014 | Malawi | Prospective, Cross-Sectional Study | 2120 | 2010 - 2011 | Document the prevalence of MDR in newly diagnosed and retreated | The prevalence of resistance observed in previously treated patients were high as compared to newly diagnosed patients with tuberculosis | **Newly diagnosed:** 260 **Retreated:** 770 | **1)**The observation that resistance patterns probably do not vary between smear-positive and smear-negative cases of tuberculosis |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Tb patients | | | |
| **Mingguan Lin [13]** | 2019 | China | Retrospective Study | 994 | 2014 - 2017 | To assess the proportion of drug resistant TB cases | The high incidence of drug resistance, specially isoniazid and rifampicin emphasis on the prevention of drug resistant TB | NA | **1)**Limited data collection<br>**2)**Lack of follow up |
| **Xiaocui Wu[14]** | 2019 | China | Retrospective Study | 1950<br>**Initially treated:** 1644<br>**Retreated:** 306 | January To December 2018 | Investigation of drug resistant characteristics of MTB | The resistance in retreated patients were high as compared to Initially treated patients with tuberculosis | NA | **1)**Data was collected from only one hospital<br>**2)**Does not include all anti-tb drugs<br>**3)**All the data was not recorded |
| **Dihadenys Lemus [15]** | 2017 | Cuba | Observational Study | 997 | 2012 - 2014 | Anti-tb drug resistance in | Some new cases and previously treated patients were sensitive | NA | The need for continuous improvement of |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | recovered patients with pulmonary tuberculosis | to isoniazid and rifampicin | | anti-tb drug resistance in Cuba |
| **Mi Zhou [16]** | 2018 | Sichuan China | Retrospective Study | 7470 | 2014 - 2017 | Drug-resistant characteristics tuberculosis | The different resistance profiles for TB without HIV patients and TB-HIV patients indicate the need of personalized treatment plan. | NA | Due to the large population in Sichuan, detailed investigations of the DR-TB burden in Sichuan are needed |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Ting Wang[17]** | 2018 | Northern China | Case Control Studies | 132 | 2010 – 2016 | To evaluate the clinical features of drug resistance | The rate of Mycobacterium tuberculosis drug resistance in new pediatric TB cases was as high as in the new adult patients | **Mycobacterium tuberculosis:** 33 cases **Multidrugresistant TB:** 8 | No significant difference was observed in clinical features between patients infected with drug-resistant |
| | | | | | | in newly diagnosed pediatric TB patients | | | and drug-susceptible strains |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Jeong Ha Mok [18]** | 2017 | Korea | Retrospective Study | 5599 | 2010 - 2014 | Additional Drug Resistance Patterns among Multidrug -Resistant Tuberculosis | The proportion of new patients and levels of additional drug resistance to core drugs were high in MDR-TB patients | NA | Considering the high levels of drug resistance, the MDR-TB treatment regimen may not be feasible |
| **C.N.Paramsivan [19]** | 2004 | India | Case Control Study | Varies Accordingly | 1874 - 2003 | MDR-TB | A strong TB control programmed surveillance studies will serve as useful parameters for management of multidrug resistant (MDR) TB cases. | 3500 over the last 3 decades | No clear evidence of an increase in the prevalence of initial drug resistance. |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **C. Ruesen [20]** | 2014 | Netherland | Retrospective Study | 18294 | 1993 - 2011 | Extent and origin of resistance to anti-tb drugs | The problem highlights the importance of early detection of TB, resistance screening and treatment programs. | 1000/100000 | **1)**14% of all patients with drugresistant TB could not be classified as ADR or PDR because their treatment history was unknown. |

# 3. CHAPTER 3

## 3.1. METHODOLOGY

### 3.1.1. Study Design:

Cross-sectional study design was used to fulfill the aim of study.

Knowledge, Attitude, Practice based study was conducted through online based survey and questionnaire. Survey/Questionnaire was designed in four sections. First section was related to demographics. Other three sections were related to knowledge, attitude, and practice respectively.

All inclusion and exclusion criteria will be followed throughout this study.

### 3.1.2. Study Setting:

The KAP based study cross sectional study was conducted in various hospitals of Lahore like the university of Lahore Teaching hospital, Ganga Ram hospital, General hospital, Mayo hospital, social security hospital, Services hospital, and Jinnah hospital.

### 3.1.3. Study Duration:

5 months

### 3.1.4. Sampling Size:

Sample size of the study was 185.

Throughout analysis, we collected 185 samples to fulfill our objective. By sample size, we understood a group of HCPs that were selected from the population and was considered as a representative of the real population for that specific study. Data was collected through online survey and questionnaire.

### 3.1.5. Subject recruitment:

The population involved in this study is health care professionals. The consent in written will be taken from the subjects of study. All the pros and cons will be explained to the subject (if necessary), and they can withdraw anytime from the study whenever they don't want to be the part of study.

### 3.1.6. Data collection method:

The subject data will be taken from the health care professionals. The data will be taken through questionnaire and online survey. Hospitals and online platform will be used for data collection. The study will be based on KAP (Knowledge, Attitude and Practice) regarding MDR Tb. The demographics will only be used for study purposes. Knowledge, Attitude and Practice of the healthcare professional will be observed.

### 3.1.7. Research instrument:

The data will be collected through online survey and questionnaire from healthcare professionals.

#### *3.1.7.a. Inclusion Criteria:*

- Subjects will be both male and female.
- The age of subjects will vary in the range of 21 to 80.

***3.1.7.b. Exclusion Criteria:***

- People who are not in medical field.

### 3.1.8. Data analysis procedure:

After the completion of data collection, data analysis was done. Initially all data had been saved in excel file. Then codes were given to each question in a separate file. After that, IBM SPSS 20 was used for analysis. Data was arranged and data variables were established.

### 3.1.9. Statistical analysis:

The analysis of the data will be carried out using SPSS 20.0 version and Microsoft excel will be used to record/save/collect the data in tabulated form. All data will be tabulated and presented graphically. Descriptive statistic will be used to summarize the demographic characteristics and predictor's data.

In descriptive analysis, data was divided into two categories. One was continuous data and other one was categorical data. For categorical data, percent was applied and for continuous data, mean and medium was applied along with standard deviation and range respectively. Descriptive analysis was carried out initially on demographic variables. From statistical analysis, frequencies were chosen to be applied on demographics that includes age, gender, residence, institution, professional, job, experience. Then separate frequency table was generated by SPSS.

Descriptive analysis was also applied to gender distribution of overall population based on demographics. Para metrical and non-parametrical tests are applied on continuous and categorical data based on normal and non-normal data. For continuous data, Maan Whitney test was applied to generate output. Mean along with standard deviation and p-value was recorded accordingly. For categorical data, Chi-square test was implemented. Output was expressed in both number and percentage.

For knowledge scale, add different variables for each question and then analyzed, codes were assigned for correct and incorrect answer. Correct answer code was given '1' and incorrect answer was given '0'. After that knowledge score was extended to 0-12. So, by recoding in knowledge categorical, '0-5' was assigned as least score that was referred to low knowledge and 6-12 was assigned as 'good score' that was referred to good knowledge score. Furthermore, knowledge score was observed among different variables of demographics.

Throughout the descriptive analysis, p-vale less than 0.05 was considered significant and recorded accordingly.

In next section, responses collected were strongly disagree, disagree, neutral, agree and strongly agree. And that were given code as '1', '2', '3', '4', '5' respectively. Further statistical analysis was implemented on this data.

In the last section. Different check marks were added and then analyzed them according to respondents' perception regarding MDR-TB study.

The statistical tools were used like Chi-square test, Maan Whitney test and logistic regression.

### 3.1.10. Ethical Approval:

Permission to conduct this study was obtained by the consent of health care professionals.

### 3.1.11. Conflict of interest:

There is no conflict-of-interest present between contributors of this research project.

## 4. CHAPTER 4

### 4.1. RESULTS

A KAP based survey/questionnaire was distributed among healthcare professionals between 31st April 2022 and 18th May 2022 for the duration of eighteen days. Total 185 responses received.

### 4.1.1. Demographics:

By analyzing the characteristics of study population, we estimated that majority of populations were males 101(54.6) as compared to females 84(45.4). Half of the participants were doctors, and the rest were other healthcare professionals.

**Table 1: Demographical characteristics of study population (N=185)**

| Variables | Number (%) | Mean ±S. D | Median (range) |
|---|---|---|---|
| Age (years) | | 28.9±5.9 | 28 (21-65) |
| **Gender** | | | |
| Male | 101 (54.6) | | |
| Female | 84 (45.4) | | |
| **Residence** | | | |
| Rural | 27 (14.6) | | |
| Urban | 158 (85.4) | | |
| **Institution** | | | |
| Government | 99 (53.5) | | |
| Private | 86 (46.5) | | |
| **Profession** | | | |
| Doctor | 82 (44.3) | | |
| Nurse | 24 (13.0) | | |
| Pharmacist | 58 (31.4) | | |
| Other | 21 (11.4) | | |
| **Job** | | | |
| Government | 87 (47.0) | | |
| Private | 98 (53.0) | | |
| **Experience (yrs.)** | | | |
| <1 year | 78(42.2) | | |
| 1-5 years | 64 (34.6) | | |
| 5-10 years | 37 (20.0) | | |
| >10 years | 6 (3.2) | | |

S.D: Standard Deviation

**Table 2: Gender distribution of overall population based on socio-demographics**

| Variables | Total Number N = 185 | Male (%) N = 101 | Female (%) N = 84 | P value* |
|---|---|---|---|---|
| **Age (years)** | 28.9±5.9 | 30 (21-65) | 25 (21-38) | <0.0001[&] |
| **Residence** | | | | |
| Rural | | 116 (15.8) | 11 (13.1) | 0.001 |
| Urban | | 85 (53.8) | 73 (86.9) | |
| **Institution** | | | | |
| Government | | 50 (49.5) | 49(58.3) | 0.240 |
| Private | | 51 (50.5) | 35 (41.7) | |
| **Profession** | | | | |
| Doctor | | 57(56.4) | 25 (30.5) | 0.001 |
| Nurse | | 7 (6.9) | 17 (20.2) | |
| Pharmacist | | 25 (24.8) | 33 (39.3) | |
| Other | | 12 (11.9) | 9 (10.7) | |
| **Job** | | | | |
| Government | | 51 (50.5) | 36 (42.5) | 0.306 |
| Private | | 50 (49.5) | 48 (57.1) | |
| **Experience (yrs.)** | | | | |
| <1 year | | | | |
| 1-5 years | | 27 (26.7) | 51 (60.7) | <0.0001 |
| 5-10 years | | 40 (39.6) | 24 (28.6) | |
| >10 years | | 31 (30.7) | 6 (7.1) | |
| | | 3 (1.6) | 3 (3.6) | |

*Chi square test

[&]Mann Whitney U test

### 4.1.2. Knowledge score:

Each question was analyzed separately, and correct and incorrect ratio was extracted out on the basis of valuable answers. This correct and incorrect ratio was helped to identify the knowledge in population of this study.

**Table 3: Responses based on knowledge score**

| Variables | Correct (%) | Incorrect (%) |
|---|---|---|
| Multi Drug Resistance Tuberculosis (MDR-TB) is defined by resistance to at least? | 99 (53.5) | 86 (46.5) |
| Drug-resistant tuberculosis is an infectious disease. | 165 (89.2) | 20 (10.8) |
| Which of the following tests can be used to confirm a diagnosis of MDR-TB? | 12 (6.5) | 173 (93.5) |
| What is the minimum duration of treatment required for individuals diagnosed with MDR-TB? | 27(14.6) | 158 (85.4) |
| What are the major signs and symptoms of MDR-TB? | 130 (70.3) | 55 (29.7) |
| Who is at a major high risk of MDR-TB? | 143 (77.3) | 42 (22.7) |
| What are the common side effects of MDR TB? | 69 (37.3) | 116 (62.7) |
| What are the effects of MDR TB treatment? | 142 (76.8) | 43 (23.2) |
| Do TB and MDR TB spread in the same way? | 147 (79.5) | 38 (20.5) |
| Can MDR TB cause death? | 162 (87.6) | 23 (12.4) |
| How long does it take to detect MDR TB? | 90 (48.6) | 95 (51.4) |
| Is MDR TB transmissible? | 163 (88.1) | 22 (11.9) |
| Which are the most frequently recommended agents to manage MDR TB? | 116 (62.7) | 69 (37.3) |

**Overall knowledge score = 7.918±1.820**

**Table 4:Analysis of knowledge score among demographics**

| Demographics | Knowledgeable | Non- knowledgeable | p-value* |
|---|---|---|---|
| **Gender** | | | |
| Male | 94 | 7 | 0.213 |
| Female | 73 | 11 | |

| | | | |
|---|---|---|---|
| **Residence** | | | |
| Rural | 26 | 1 | 0.479 |
| Urban | 141 | 17 | |
| **Institution** | | | |
| Government | 94 | 5 | 0.026 |
| Private | 73 | 13 | |
| **Profession** | | | |
| Doctor | 77 | 5 | 0.315[#] |
| Nurse | 21 | 3 | |
| Pharmacist | 52 | 6 | |
| Other | 17 | 4 | |
| **Job** | | | |
| Government | 80 | 7 | 0.620 |
| Private | 87 | 11 | |
| **Experience (yrs.)** | | | |
| <1 year | 70 | 8 | 0.240[#] |
| 1-5 years | 59 | 5 | |
| 5-10 years | 34 | 3 | |
| >10 years | 4 | 2 | |

*Fischer test

[#]Chi square test



### 4.1.3. Attitude among MDR-TB:

Almost more than half of participants strongly believed than MDR-TB was a major public problem. According to evaluation, majority had high perceptions of MDR-TB while few had a low perception of MDR-TB.

**Table 5: Overall population 's attitude towards MDR TB**

| Variables | Strongly agree (%) | Agree (%) | Neutral (%) | Disagree (%) | Strongly disagree (%) | Mean±S.D |
|---|---|---|---|---|---|---|
| **MDR TB is a major public health problem.** | 108 (58.4) | 64 (34.6) | 10 (5.4) | 2 (1.1) | 1 (0.5) | 1.51 ±0.70 |
| **New cases of MDR TB are major challenges for TB control.** | 86(46.5) | 81 (43.8) | 11 (5.9) | 4 (2.2) | 3 (1.6) | 1.69± 0.81 |
| **Are you worried that you may contract drug-resistant tuberculosis?** | 43 (23.2) | 91 (49.2) | 34 (18.4) | 8 (4.3) | 9 (4.9) | 2.18± 0.99 |
| **Healthcare workers have already been infected with MDR TB, so taking infection control measures will not help.** | 23 (12.4) | 27 (14.6) | 45 (24.4) | 66 (35.7) | 24 (13) | 3.22± 1.21 |
| **The healthcare professionals taking care of the patients with drug-resistant tuberculosis must wear N95 masks.** | 87 (47.0) | 63 (34.1) | 19 (10.3) | 10 (5.4) | 6 (3.2) | 1.84±1.03 |
| **My workplace is concerned about the risk of drug-resistant tuberculosis transmission to its staff.** | 45 (24.3) | 75 (40.5) | 44 (23.8) | 15 (8.1) | 6 (3.2) | 2.25±1.01 |
| **Standard guidelines on tb infection control help minimize healthcare-based transmission of MDR TB?** | 87 (47) | 70 (37.8) | 18(9.7) | 7 (3.8) | 3 (1.6) | 1.75±0.89 |
| **Educating the patient about MDR TB is important?** | 119 (64.3) | 51 (27.6) | 9 (4.9) | 3 (1.6) | 3 (1.6) | 1.49±0.80 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Most HCPs have adequate training for TB control activities.** | 30 (16.2) | 80 (43.2) | 41 (22.2) | 27 (14.6) | 7 (3.8) | 2.46±1.04 |

### 4.1.4. Practice:

Common practice responses were evaluated on the basis of prevention, management, and treatment of MDR-TB. Mostly, Healthcare Professionals have a best understanding for management of MDR-TB.

**Table 6:Responses regarding checkpoints of MDR-TB**

| Variables | Yes (%) | No (%) |
|---|---|---|
| **What precaution you should use while treating MDR TB patient?** | | |
| Airborne isolation precaution | 114(61.6) | 71 (38.4) |
| Total isolation | 71 (38.4) | 114 (61.6) |
| Mask | 88 (47.6) | 97 (54.2) |
| Gloves | 125 (67.6) | 60 (32.4) |
| Hand sanitizers | 100 (54.1) | 85 (45.9) |
| Powered air-purifying respirator (PAPR) | 52 (28.1) | 133 (71.9) |
| **How do u handle MDR TB patients?** | | |
| Advise him/her to take prescribed medicines on time | 141 (76.2) | 44 (23.8) |
| Advise him/her to always cover your mouth after coughing and sneezing | 147 (79.5) | 38 (20.5) |
| Advise him/her to wash your hands after coughing and sneezing | 121 (65.4) | 64 (34.6) |
| Advise him/her to don't visit other people and don't allow anyone to visit you | 66 (35.7) | 119 (64.3) |
| **Which tests you perform on MDR TB patient?** | | |
| Tuberculin skin test | 74 (40) | 111 (60) |
| Drug susceptibility test | 105 (56.8) | 80 (43.2) |
| Blood test | 62 (33.5) | 123 (66.5) |
| Chest X-ray | 85 (45.9) | 100 (54.1) |
| CT scan | 27 (14.6) | 158 (85.4) |
| **What signs and symptoms you will include in your education?** | | |
| Cough for a minimum of 6 weeks | 159 (85.9) | 26 (14.1) |
| Night sweats | 104 (56.2) | 81 (43.8) |
| Weight gain | 16 (8.6) | 169 (91.4) |

| | | |
|---|---|---|
| | 93 (50.3) | 92 (49.7) |
| | | |
| Hemoptysis | 95 (51.4) | 90 (48.6) |
| Chills | 119 (64.3) | 66 (35.7) |
| Fever | 90 (48.6) | 95 (51.4) |
| Chest pain | | |
| **How do you control increase in MDR TB infection?** | | |
| My workplace has a tuberculosis infection control committee. | 90 (48.6) | 95 (51.4) |
| I use an N95 mask most of the time | 134 (72.4) | 51 (27.6) |
| There is a tuberculosis infection control program implemented in my workplace. | 114 (61.6) | 71 (38.4) |
| A separate and open area has been designated as a sputum collection area in my workplace. | 61 (33.0) | 124 (67.0) |
| **How do you encourage your patient to show adherence to the therapy?** | | |
| Explain the treatment/ procedure | 125 (67.6) | 60 (32.4) |
| Explain the side effects | 104 (56.2) | 81 (43.8) |
| Reduce complexity for the patient | 107 (57.8) | 78 (42.2) |
| Educating patients to understand the treatment regimen and its benefits | 139 (75.1) | 46 (24.9) |
| Explain severity of the disease | 111 (60.0) | 74 (40.0) |
| Follow up with the patient | 116 (62.7) | 69 (37.3) |
| Give the reference of beloved ones | 67 (36.2) | 118 (63.8) |
| Explain seriousness of the disease | 93 (50.3) | 92 (49.7) |

| | | |
|---|---|---|
| **The major goals for treatment of MDR TB includes** | | |
| Cure the individual patient | 105 (56.8) | 80 (43.2) |
| Minimize the risk of death | 88 (47.6) | 97 (52.4) |
| Minimize the progression of disease | 124 (67.0) | 61 (33.0) |
| Reduce the transmission to other individual | 128 (69.2) | 56 (30.3) |
| Minimize the risk of disability | 83 (44.9) | 102 (55.1) |
| **What are the treatment options for MDR TB?** | | |
| Use of high dose isoniazid | 51 (27.6) | 134 (72.4) |
| Substitution of rifabutin in small portion of rifabutin cases | 79 (42.7) | 106 (57.3) |
| Linezolid | 70 (37.8) | 115 (62.2) |
| Fluoroquinolones | 114 (61.6) | 71 (38.4) |
| Phenothiazine | 25 (13.5) | 160 (86.5) |
| **A best practice for controlling MDR TB should be** | | |
| Relevant | 78 (42.2) | 107 (57.8) |
| Efficient | 85 (45.9) | 100 (54.1) |
| Effective | 128 (69.2) | 57 (30.8) |
| Ethical | 47 (2.4) | 138 (74.6) |
| **Role as healthcare professional when one of your patients is treated for MDR TB?** | | |
| To inform the patient about the ongoing treatment | 137 (74.1) | 48 (25.9) |
| When appropriate be involved in the clinical monitoring of the patient. | 118 (63.8) | 67 (36.2) |
| The responsibility lays with the specialist. | 87 (47.0) | 98 (53.0) |
| To inform about the benefits and the side effects of the treatment | 130 (70.3) | 55 (29.7) |



## 5. CHAPTER 5

## 5.1. DISCUSSION

The study included males and ad female hcp most of them were physicians (44.3%), nurses (13.0%), pharmacist (31.4%). Belonging to age group of 21-65 I case of male ad 21-38 I case of female. About (42.2%) of the participants having experience of <1 year, (34.6%) with experience 1-5 years, (20%) with experience 5-10 years and (3.2) with experience >10 years. Majority were well aware of the global as well as the nationwide problems of MDR TB.

The level of knowledge of the respondents showed that 90.27% of HCPs had good knowledge. Majority of HCP know about the transmission, causes, signs and symptoms, effects, management, and treatment of MDR-TB. But still significant amount of healthcare professionals was not agreed with those statements. This shows lack of basic knowledge and absences of proper training.

In our study, a higher score on attitude was associated with a higher score on MDR TB control practices, but a higher knowledge score was not associated with higher attitude or practice scores. These findings suggest that good knowledge, though a prerequisite, does not necessarily translate into an appropriate attitude or optimal practices of healthcare workers on DR-TB infection control. The existing training by has helped the study participants attain a good knowledge on MDR TB infection control, but it has had a little positive impact on the attitude and practices among them. Similar observations have been reported in earlier studies as well.

The result of the current study illustrates that some of the respondents have good knowledge and awareness levels, attitudes, and poor prevention practices. However, some participants lack good knowledge. Poor attitude and practice towards MDR TB. If incorrect information are held about a disease, people will not be able to recognize the signs and symptoms of the disease, and thereby delay seeking help, and that will affect negatively. An observed gap in knowledge and awareness, poor attitudes, and prevention practices among some of the research respondents in this study generally shows health risk.

Our study has some limitations. The respondents on whom we pretested the study questionnaire belonged specific population which may not have adequately captured the variation across the study population. Due to time and resource constraints, we recorded practices that were self reported by the study participants and not observed by the data collectors or the investigators.

These self-reported practices could differ from actual practices. Therefore, we recommend that for further studies practices shall be directly observed by the data collectors or investigators. We did not assess the factors that could predict the good knowledge, appropriate attitude, or optimal practices on DRTB infection control. We recommend that such factors and their impact be studied as well, which could help focus the interventions on the key issues on DR-TB infection control.

## 5.2. CONCLUSION

This research assessed knowledge, attitudes, and practices drug resistant tb among health care professionals of Lahore. The pattern of participant ‘s responses was shown using descriptive statistics. In this study, the majority of respondents had good knowledge and favorable attitudes, along with good practices of multi drug resistant tuberculosis. Some of the respondents have poor knowledge, attitude, and practice. furthermore, the results indicate gaps in knowledge about causes, transmission, prevention, treatment modes, and methods, which can make drug resistant tb infection vulnerable. drug resistant tb information and programs that are culturally sensitive should be provided to hcp using different media or methods.

## 5.3. DISCLAIMER (ARTIFICIAL INTELLIGENCE):

Author(s) hereby declare that no generative AI technologies such as Large Language Models (ChatGPT, COPILOT etc) and text to image generators have been used during writing or editing of manuscripts.

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