Original Article

Tuberculosis among Medical Students

Knowledge about Tuberculosis among Medical Students of a Private Medical College, Karachi

Muhammad Athar Khan, Sania Tabassum and Manzar Alam Shah

ABSTRACT

Objective: to assess the knowledge of TB among fourth year MBBS students at Liaquat College of Medicine & Dentistry (LCMD).

Study Design: Descriptive / cross sectional study.

Place and Duration of Study: This study was conducted at the Department of Community Medicine, Liaquat College of Medicine and Dentistry, Karachi from January 2014 to May 2017.

Materials and Methods: A cross-sectional survey was conducted among 399 fourth year MBBS students. Respondents were recruited using non-probability convenience sampling technique and informed consent sought from them. The survey was conducted through a self-administered questionnaire, and some changes were made in the previous questionnaire. Questionnaire includes 34 multiple choice questions divided by sections: knowledge of epidemiology and prevention (13 questions), diagnosis (9 questions) and treatment (12 questions). The collected information was analyzed using the SPSS 21 version. The continuous variables were summarized as mean and standard deviation (SD) and categorical variables were expressed as a percentage.

Results: The average percentage of correct answers was 44.2% in the 34 multiple choice questions that assessed the knowledge of tuberculosis amongst students. For all 34 questions about tuberculosis knowledge, "the most common pathogen of TB in immunosuppressive patients" the correct response was 4.2% and 90.2% for the "transmission of tuberculosis".

Conclusion: In general, our data show that tuberculosis knowledge is inadequate in medical students as <50% of students correctly answered the questions asked. Therefore, when these members of health care system lack knowledge of tuberculosis, the outcome of the TB treatment and prevention program may have a risk of failure.

Key Words: Tuberculosis, knowledge, medical students, undergraduate

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INTRODUCTION

Tuberculosis in Pakistan is a major public health challenge in rural as well as urban areas[1], even though it was declared a national emergency in 2001.[2] In 2015 the estimated incidence rate of Tuberculosis was 270/100,000 and 14,000 MDR/ RR Tuberculosis cases were estimated.[3]

Tuberculosis is a significant occupational risk factor for healthcare workers (HCW) in low and middle income countries.[4] In Pakistan a 23% incidence of Tuberculosis was reported in HCW in 2016 and the incidence rate was higher among HCW as compared to general population.[5]

Medical undergraduates are at a risk of being exposed to tuberculosis during their clinical rotations,[6] and it was previously discovered that among undergraduate medical students prevalence of latent and nosocomial tuberculosis infection was high.[7]

Therefore it is essential for medical students to acquire knowledge about tuberculosis control and management and the misconceptions related to Tuberculosis.[6]

It is important for medical undergraduates and future doctors to have information regarding tuberculosis because in addition to inadequate resources, poor implementation of National Tuberculosis Program and lack of government commitment, doctors are responsible, on occasion, for poor diagnosis and treatment of the disease.[8] Furthermore physicians' error and mismanagement has led to a rise in drug resistant Tuberculosis. [9] Therefore it is imperative for medical undergraduates to gain adequate knowledge regarding Tuberculosis as they are the physicians in the making in the struggle against rising Tuberculosis incidence.[6]

For effective Tuberculosis control, there is a need to properly educate undergraduates and highlight the national strategies to be adhered to, as a Pakistani survey conducted in 2005 revealed that only 22% of interns from five teaching hospitals correctly identified new cases of Tuberculosis and 82% were incapable of identifying a single component of DOTS strategy being followed in the country. Interns also have meager knowledge and don't comply with the WHO and

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National Tuberculosis Program guidelines. [10] The objective of this study was to assess the knowledge of TB among fourth year MBBS students.

MATERIALS AND METHODS

A descriptive cross-sectional survey was conducted to assess the knowledge of among four batches of fourth year MBBS students regarding tuberculosis. The study was conducted at the private medical school in Karachi, Pakistan, from January 2014 to May 2017. Respondents were recruited using non-probability convenience sampling technique. The sample size was determined using a single population proportion formula, using response distribution 60%, [11] 95% confidence level and 5% margin of error with10% no response rate, the final sample size is 399. Research variables were dependent variables (knowledge) and independent variables: social demographics (age, gender). The survey was conducted through a self-administered questionnaire, and some changes were made in the previous questionnaire.[6,11,12] Questionnaire includes 34 multiple choice questions divided by sections: knowledge of epidemiology and prevention (13 questions), diagnosis (9 questions) and treatment (12 questions). There were five possible answers to every question about knowledge, of which only one was correct. The Cronbach's of the overall questionnaire had an alpha value of 0.837. The collected information was analyzed using the SPSS 21 version. The continuous variables were summarized as mean and standard deviation (SD) and categorical variables were expressed as a percentage. After obtaining the verbal consent of the students, they were asked to fill in an anonymous questionnaire.

RESULTS

A total of 400 fourth-year medical students were enrolled between 2014 and 2017, of which 377 (94.3%) completed the questionnaire. The average age was 23.7 years $\pm$ 1.3, about 219 males (58.1%) and 158 females (41.9%). More than half of the students 197 (52.3%) attended the course to discuss tuberculosis.

Only 20 (5.3%) of the students reported that they had received a TB test. Approximately 46 patients (12.2%) had at least one TB checkup. One-third of the students (36.6%) observed at least one case of TB during medical education, and 68 (18%) observed at least one X-ray of TB. Most students 321 (85.1%) were aware of the risk of tuberculosis infection.

Table No.1: Percentage of correct answers in Epidemiology and Prevention of TB (n=377)

Questions	Correct Answer	N (%)
Tuberculosis is currently the highest in the world in the following areas:	Pakistan, India and China	155(41.1)
The incidence of TB in Pakistan is currently(2016):	250-300/100,000 (270/100,000 -WHO)	109(28.9)
Which of these microorganisms has a strong relationship with Mycobacterium tuberculosis?	HIV	238(63.1)
Is it necessary to separate active tuberculosis patients?	No	22(5.8)
The risk of active tuberculosis in life is	More than 20% of patients with latent tuberculosis and HIV infection	97(25.7)
Which groups are considered to be at risk of tuberculosis?	1. Health care workers 2. People migrate from high TB prevalence areas 3. Elderly, children, immunosuppressed patients	185(49.1)
The most common pathogen for TB in patients with immunosuppression is:	Mycobacterium Avium Complex	16(4.2)
TB pathogens are transmitted by:	Airborne	340(90.2)
Which action strategy is useful for controlling the spread of tuberculosis?	TB vaccination	97(25.7)
The current TB vaccine consists of:	Live and attenuated bacteria	237(62.9)
What is the name of the TB vaccine?	BCG	286(75.8)
The incidence and delayed diagnosis of tuberculosis in vulnerable groups may be related to the following factors:	1. Inequalities 2. Socio-economic issues 3. Low resources of native country	160(42.4)
What personal protective equipment (personal protective equipment) is required in the room where the open tuberculosis patients stays:	Masks	208(55.2)
Mean Percentage Score of correct answers for epidemiology and prevention = **43.9%**		

Table No.2: Percentage of correct answers in Diagnosis of TB (n=377)

Questions	Correct Answer	N (%)
The immune response to TB is:	Cell mediated	287(76.1)
Which organ may be affected by Mycobacterium tuberculosis?	Lung, brain and kidney	304(80.6)
Mantoux test is:	An intradermal injection	289(76.7)
The Mantoux test is positive from the induration diameter:	5 mm	92(24.4)
Which of the following diagnostics tests recommended by WHO to diagnose active tuberculosis?	Sputum smear microscopy	222(58.9)
Sputum positive TB is:	1 out of 2 sputum sample +ve	69(18.3)
The identification of B Koch bacillus is always carried out by:	Ziehl–Neelsen stain	112(29.7)
Xpert MTB/RIF test is used to detect:	Diagnosis of TB and rifampicin resistance	25(6.6)
Is it recommended to test patients and health care workers who are in contact with TB patients?	Yes, it is	185(49.1)
Mean Percentage Score of correct answers for diagnosis = **46.7%**		

Table No.3: Percentage of correct answers in Treatment of TB (n=377)

Questions	Correct Answer	N (%)
Which of these antibiotics are not useful for TB treatment?	Penicillin G	138(36.6)
DOTS is	Directly Observed Treatment-Short course strategy	188(47.8)
DOTS Plus is for:	MDR-TB	116(30.8)
If a patient taken full course of TB treatment in past and declared cured or treatment completed, now he/she is smear positive	A case of relapse	206(54.6)
Decide the Treatment Category: New and smear positive	CAT I	171(45.4)
Decide the Treatment Category: - Relapse - Rx.after failure - Rx.after default	CAT II	142(37.7)
The duration of intensive and continuation phase in CAT I of TB patients.	2 and 4 months	254(67.8)
The duration of intensive and continuation phase in CAT II of TB patients.	3 and 5 months	99(26.3)
The drugs used for intensive and continuation phase in CAT I of TB patients.	HRZE and RH	175(46.4)
Sputum smear examination is done after starting treatment at	2 months	247(65.5)
Most anti-tuberculosis drugs are safe to use during pregnancy except streptomycin	Yes	101(26.8)
Most appropriate test to check drug resistance TB is	X-pert MTB/Rif	63(16.7)
Mean Percentage Score of correct answers for diagnosis = **42%**		

The average percentage of correct answers was 44.2% in the 34 multiple choice questions that assessed the knowledge of tuberculosis students, and there was no association between gender and the average percentage of correct answers. The average percentage of correct answers was 43.9% for epidemiology and prevention, the average percentage of diagnoses was 46.7%, and the average percentage of treatments was 46.4%.

In the section of "epidemiology and prevention" (Table 1), the highest and lowest average scores were reported for correct answers: 90.2% answers for tuberculosis pathogens; and 4.2% of the most common pathogens of TB in patients with immuno-suppression. In the "Diagnostic" section (Table 2), the highest and lowest average scores for correct answers were: "organ affected by Mycobacterium tuberculosis" (80.6%); and "Xpert MTB / RIF test for testing" (6.6%). In the "treatment" section (Table 3), the questions with the highest and lowest average scores for correct answers were: "duration of intensive and continuation phase of CAT I in TB patients" (67.8%); and "most appropriate test for drug-resistant tuberculosis" (16.7%).

For all 34 questions about tuberculosis knowledge, "the most common pathogen of TB in immunosuppressive patients" correct response was 4.2% and 90.2% for the "transmission of tuberculosis". In general, there is no gender difference on the whole.

DISCUSSION

Currently TB is major global threat to health; furthermore 95% of TB cases are living in the developing countries.[12] In spite of the fact that Pakistan has a high burden of TB[13], the knowledge of healthcare professionals is poor[10], and the lack of knowledge creates a barrier against TB control and prevention. Thus the discernment of the knowledge and level of awareness of Pakistani medical students is empirical. Unlike survey of medical students in India, Uganda, Canada [14] and Italy [12] where students had adequate knowledge, this study demonstrated that the overall knowledge of TB amongst medical students was inadequate and less than 50% students were well informed about the epidemiology, prevention, diagnosis and treatment of the disease. On the other hand we established that 90% of the students were aware that TB is transmitted through airborne droplet exposure from an infected person, this finding was higher than the findings of a survey conducted in China, which revealed 1/3rd of their respondents could not correctly respond to the same question,[6] also 87% of Pakistani GPs[16]and 96% Pakistani interns [10]agreed TB is a droplet infection.80% of our participants responded that TB most likely affects the lungs, brain and the kidneys which is similar to the knowledge of medical students in Oman, 91%of whom agreed that TB is not just confined to the respiratory tract.[17]

Responding to the question "which microorganism is strongly related with TB bacillus" 63% students in our study correctly answered HIV, which was found to be similar to 58% correct response finding in a Bulgarian study[18] and investigation of Ethiopian high school students also reported that nearly 70% had the same view.[11] Irani students though had better knowledge and 86% answered the same question correctly.[19]

Primary prevention of TB comprises of immuno-prophylaxis with BCG vaccine and a study conducted in Iran reported that less than half of the students believed BCG vaccination has a role in TB prevention, interestingly; this study discovered that 76% students were aware of this measure for prevention of disease.[19] This study revealed that even though majority (85%) of the students were aware of their risk of acquiring TB infection, less than 10% were screened for the disease or offered vaccination, as compared to screening of nearly 70% Italian healthcare students[20] and vaccination of 79% Bulgarian medical students.[19]55% participants in our study agreed that masks are the personal protective equipment needed in a room with an open TB patient, as opposed to 89% medics in Oman who during a study agreed that while taking care of TB patients, wearing masks and washing hands is helpful[17]

Present study revealed that 59% medical students consider sputum smear microscopy to be the recommended test by WHO for diagnosis of TB, as compared to only 38% Pakistani interns [10] and 66 % Pakistani private practitioners [13] who consider sputum microscopy to be the best diagnostic tool for pulmonary TB. A study conducted in Bangalore amongst interns of medical colleges revealed that 71% considered sputum AFB the best diagnostic test.[21]

A study conducted in Iran reported that 95% of final year students were familiar with the standard six months treatment of TB, in contrast, this study evaluated that nearly 68% students know the duration of intensive and continuation phase in CAT I of TB patients is 2 and 4 months.[19] The participants of present study had better knowledge than the knowledge of Saudi students, 59% of whom did not know the duration of TB treatment.[22] 46.4% participants in this study correctly identified the drugs used for intensive and continuation phase in CAT I of TB patients i.e. HRZE and RH respectively, and 56.5% Pakistani interns are reported to prescribe HRZE in the initiation phase and 52% prescribe RH in the continuation phase.[10]

Pakistan ranks 4th amongst the high MDR-TB burden countries in the world and in Pakistan the multidrug resistance reported in routine is 3.0- 4.1% in new cases and 30 -35.7% in previously treated cases.[23] WHO recommends using of the Xpert MTB/RIF assay for surveillance of MDR-TB[24], alarmingly in the current study it was observed that only 16.% students are aware most appropriate test to check for drug resistance TB is X-pert MTB/Rif and only 6.6% knew that Xpert MTB/RIF test is used to detect both TB and resistance to Rifampicin. DOTs plus strategy is used for management of MDR-TB[25] and it was observed in our study that nearly 31% of the students have this knowledge. This finding is in accordance to a study conducted in Iran that the knowledge of their medical students is also not up to the mark.[26].

CONCLUSION

In general, our data show that tuberculosis knowledge is inadequate in medical students as <50% of students correctly answered the questions asked. Therefore, when these members of health care system lack knowledge of tuberculosis, the outcome of the TB treatment and prevention program may consequently have a risk of failure. Thus, it is essential to develop and implement strategies and policies to improve medical students' awareness of tuberculosis, including the ability to integrate knowledge and good practices.

Author's Contribution:

Concept & Design of Study:	Muhammad Athar Khan
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