

## Knowledge, Attitude and Practice against Tuberculosis Infection among Medical Students Medical School at Taif University, Taif city, Kingdom of Saudi Arabia

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### ABSTRACT

**Background:** TB is an infectious disease with high morbidity and mortality if not treated. It is caused by Mycobacterium Tuberculosis. Tuberculosis is a community health problem which can be prevented or at least decreasing mortality by raising the awareness and orientation of population specially TB contacts. The aim of this study was to assess the knowledge, attitude and practice of the medical students regarding tuberculosis at Taif University.

**Methods:** A cross sectional study was conducted from March, 2017 to May, 2017 among medical students at Taif university. A self-administered questionnaire that consisted of 30 different questions about demographic and knowledge statements about tuberculosis, risk factors and diagnosis. Data was analyzed using SPSS version17.

**Results:** A total of 435 medical students were included in the current study. The participants were 251 males (57.8 %) and 184 females (42.2 %). From all participants 86.6% agreed that Poor living conditions, crowdedness, and refugee camps are good environments for transmission of TB. 74.2% of students that close contact with a patient having TB is harmless; however 67.5% agreed that an AIDS patient could be infected

with TB even if Mantoux test is negative.

**Conclusions:** In countries with high TB prevalence, it is important to increase community awareness regarding the disease. More studies are needed to assess the community awareness of the community towards TB. Also campaigns to increase people awareness are needed

**Keywords:** Knowledge, Tuberculosis, TB, Mycobacterium Tuberculosis, Medical Students.

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### INTRODUCTION

Tuberculosis (TB) is a contagious disease caused by Mycobacterium tuberculosis organism.<sup>1</sup> Tuberculosis commonly affects the lungs, but also affects other organs of the body. Most of the cases of TB infections are not symptomatic; in which case it is known as latent tuberculosis. Approximately 10% of latent cases of TB infections progress to active disease, which if not managed appropriately will kill about 50% of those cases. The typical symptoms of active TB are a chronic cough with bloody sputum, fever, sweats at night, and weight loss.<sup>1</sup>

TB is transmitted from person to another through the air. When people with active lung TB cough, sneeze, speak or spit, they spread the TB microbes into the air. Only a few of these germs can cause infection if inhaled.<sup>2</sup> Patients whose have latent TB do not transmit the disease. Active infection occurs mostly in patients

with HIV/AIDS and in smokers.<sup>1</sup> Active TB is diagnosed by chest X-ray, microscopic examination and culture of body fluids. Latent TB diagnosis depends on the tuberculin skin test (TST) or blood tests.<sup>3</sup>

Inhibition of TB spread includes screening of people at high risk to get infection, early detection of carriers, treatment of infected patients, and immunization with the bacillus Calmette-Guérin vaccine (BCG).<sup>4-6</sup> Household, workplace, and social contacts of patient with active TB are at high risk to be infected.<sup>6</sup> Combination of antibiotics over a long period of time is required for treatment.<sup>1</sup> Antibiotic resistance is a critical issue with increasing prevalence of multiple drug-resistant tuberculosis (MDR-TB).<sup>1</sup> One third of the global population is believed to be infected with TB.<sup>1</sup> Around 1% of the population are newly infected every year.<sup>7</sup> In

2014, 1.5 million deaths, out of 9.6 million cases of active TB, were recorded. Most of deaths occurred in developing countries. Annually the number of new cases has reduced since 2000.<sup>1</sup> Tuberculin test was positive in approximately 80% of people in some countries in Africa while 5–10% of population were positive in the United States.<sup>8,9</sup>

Pulmonary tuberculosis is a common disease in Saudi Arabia. As most cases of tuberculosis are due to reactivation of latent infection, identification of individuals with latent tuberculosis infection (LTBI) who are at increased risk of progression to active disease, is a key element of tuberculosis control programs.<sup>10</sup>

In 2012, World Health Organization (WHO) reported that Kingdom of Saudi Arabia is still a moderate TB burden country with yearly TB incidence rate of 18/100,000 population.<sup>11</sup> Old age and male gender are remaining risk factors for higher mortality among Saudi nationals, and being female is a predisposing factor among non-Saudis. Also previous history of TB and HIV were risk factors for high mortality.<sup>12</sup> The incidence rate of TB is double or triple times in the immigrants compared to residents.<sup>13</sup> Furthermore, yearly statistical data from the Ministry of Health showed a decreasing TB incidence among non-Saudis and a stable one among Saudis. Health services in Saudi Arabia have developed enormously over the last two decades, as evidenced by the availability of health facilities throughout all parts of the vast Kingdom. The Saudi Ministry of Health (MOH) provides over 60% of these services while the rest are shared among other government agencies and the private sector. A series of development plans in Saudi Arabia have established the infra-structure for the expansion of curative services all over the country. The development of health care services in Saudi Arabia has influenced life in the Kingdom and changed the health map of the country in a very positive way. Previous health plans established most of the infrastructure for the health services with remarkable results.<sup>14</sup> Therefore, this study was conducted to evaluate the knowledge, attitude and practice of the medical students regarding tuberculosis.

**METHODS**

**Study Design and Periods**

This cross-sectional study was conducted from March, 2017 to May, 2017 among medical students at Taif University.

**Study Population, Sample and Subjects**

A total number of 435 students, male 251 (57.7%) and female 184 (42.2%), age ranging from 19-24 years participated in this study. Participants from 1st year (#62), 2nd year (#60), 3rd year (#63), 4th year (#101), 5th year (#86) and 6th (#63).

**Data Collection**

Each student filled the questionnaire after getting his/her approval under close supervision of the research team and also explained to the students the purpose of the survey. The questionnaire except students' names to guarantee their anonymity in the collected data.

**Variables and Measurements**

The questionnaire that consisted of 30 different questions about Demographic and knowledge statements about tuberculosis, risk factors and diagnostic factors. Demographic variables consists of 3 questions which are gender, age and academic year. Knowledge variable consists of 27 divided into 14 questions about TB, 5 questions about risk factors of TB and 8 questions about diagnostic factors. The respondents could respond "agree", "disagree" or "don't know".

**Inclusion Criteria**

University Medical students from 18-26 years age enrolled in various academic year.

**Exclusion Criteria**

Medical students not willing to participate in this study. Students below 18 years

**Ethical Approval and Informed Consent**

Informed consent was obtained from all the students after study details were discussed with them. Informed consent was approved by signing of informed consent. The research project received ethical approval from the Research Ethics Committee, Faculty of Medicine, Taif university.

**Statistical Analysis**

Respondents with missing information regarding various attributes were excluded from analysis. Data was analyzed using Statistical Program for Social Sciences (SPSS ver 16.0 Chicago, USA). Descriptive analysis of all the explanatory and outcome variables was done by using mean and standard deviation for quantitative variables, frequency and percentages for categorical variables. P values > 0.05 were considered statistically significant.

**Table 1: Socio-demographic characteristics of the study population (N=435)**

Socio-demographic variables	Number	%
<b>Gender</b>		
Male	251	57.7%
Female	184	42.2%
<b>Age in years</b>		
19-21years	183	42.0%
22-24 years	236	54.2%
25-27 years	16	3.6%
<b>Academic Years</b>		
1st year	62	14.2%
2nd year	60	13.7%
3rd year	63	14.4 %
4th year	101	23.2%
5th year	86	19.7 %
6th year	63	14.4 %

**Table 2: Response rates for medical students on knowledge statements about tuberculosis (Tb) (N=435)**

Knowledge Factors	Agree n (%)	Disagree n (%)	I don't know n (%)
An AIDS patient could be infected with the agent causing TB even if Mantoux test is negative.	294(67.5%)	43 (9.8%)	98 (22.5%)
Two-weeks treatment with antibiotics ensures cure of TB.	50(11.4%)	275(63.2%)	110 (25.2%)
Mycobacterium could be dormant for many years and get reactivated.	290(66.8%)	33(7.5%)	112 (25.7%)
Protection against TB can be established by Chemoprophylaxis.	92(21.1%)	169(38.8%)	174(40%)
There are > 30 million deaths/year because of TB infection worldwide.	85 (19.5%)	58(13.3%)	292(67.1%)
All immigrants to KSA should be screened for Mycobacterium.	285(65.5%)	31(7.1%)	119(27.3%)
Incidence of TB in KSA is high.	135 (31.0%)	134(30.8%)	166 (38.1%)
KSA is a country which is free of TB.	22 (5.0%)	325(74.7%)	88(20.2%)
BCG vaccine ensures 100% protection against TB.	100 (22.9%)	201(46.2%)	134(30.8%)
Close contact with a patient having TB is Harmless.	40 (9.2%)	323(74.2%)	72(16.5%)
Simple precautions like wearing mask, washing hands and good ventilation are helpful while taking care of a TB patient.	370 (85.0%)	32 (7.3%)	33 (7.5%)
I feel uncomfortable while talking to a patient with TB.	221 (50.8%)	133(30.5%)	81(18.6%)
A patient with TB must not share kitchen tools (plates, spoons, glasses, etc.) with others.	321 (73.7%)	51(11.7%)	63(14.4%)
Keeping a patient with TB at home carries the risk of infecting others.	274(62.9%)	81(18.6%)	80(18.3%)

**Table 3: Response rates on knowledge statements about risk factors or factors precipitating contracting TB (N=435)**

Risk factors	Agree N (%)	Disagree N (%)	I don't know N (%)
TB is caused by a virus	102(23.4)	292(67.1)	41(9.4)
Poor living conditions, crowdedness, and refugee camps are good environments for transmission of TB	378(86.6)	19(4.3)	38(8.7)
HIV epidemic is the main reason behind the new outbreaks of TB worldwide	203(46.6)	99(22.7)	133(30.5)
You can get TB by drinking raw milk from an infected animal	207(47.5)	87(20)	141(32.4)
The commonest mode of transmission of TB is through inhalation of M. tuberculosis in aerosols and dust	288(66.2)	51(11.7)	96(22.1)

**RESULTS**

A total of 435 medical students were included in the current study. Their demographic characteristics are shown in the table (1). The participants were 251 males (57.8 %) and 184 females (42.2 %) with the age ranging from 19 to 27 years from the 1<sup>st</sup> to the 6<sup>th</sup> years. Table 2 displays the knowledge of students about the tuberculosis (Tb), above (60%) of students agreed that an AIDS patient could be infected with the agent causing TB even if

Mantoux test is negative, Mycobacterium could be dormant for many years and get reactivated, all immigrants to KSA should be screened for Mycobacterium, simple precautions like wearing mask, washing hands and good ventilation are helpful while taking care of a TB patient, a patient with TB must not share kitchen tools (plates, spoons, glasses, etc.) with others and keeping a patient with TB at home carries the risk of infecting others. While below (60%) of students agreed that two-weeks treatment with

antibiotics ensures cure of TB, protection against TB can be established by Chemoprophylaxis, there are > 30 million deaths/year because of TB infection worldwide, incidence of TB in KSA is high, KSA is a country which is free of TB, BCG vaccine ensures 100% protection against TB, close contact with a patient having TB is Harmless and I feel uncomfortable while talking to a patient with TB.

Table 3 displays the knowledge of students about the risk factors or factors precipitating contracting TB, below (60%) of students agreed that TB is caused by a virus, HIV epidemic is the main reason behind the new outbreaks of TB worldwide and you can get TB by drinking raw milk from an infected animal. While above (60%) of students agreed that Poor living conditions,

crowdedness, and refugee camps are good environments for transmission of TB and The commonest mode of transmission of TB is through inhalation of M. tuberculosis in aerosols and dust.

Table 4 displays the knowledge of students about the diagnosis of TB, above (60%) of students agreed that Night fever and sweating are symptoms of patients with TB and A tuberculin test is essential to diagnose suspected cases of TB. While below (60%) of students agreed that every patient with TB coughs out bloody sputum. A person could be infected with TB but show no clinical symptoms throughout life, Disseminated TB does not involve meninges and bones. TB is only confined to the respiratory tract, TB is diagnosed using blood smears and A positive Mantoux test means a definite TB infection.

**Table 4: Response rates for medical students on knowledge statements about diagnosis of TB (N=435)**

<b>Diagnosis factors</b>	<b>Agree N (%)</b>	<b>Disagree N (%)</b>	<b>I don't know N (%)</b>
<b>Every patient with TB coughs out bloody sputum</b>	138(31.7)	183(42.1)	114(26.2)
<b>A person could be infected with TB but show no clinical symptoms throughout life</b>	180(41.3)	128(29.4)	127(29.2)
<b>Disseminated TB does not involve meninges and bones</b>	52(11.9)	196(45.1)	178(40.9)
<b>TB is only confined to the respiratory tract</b>	55(12.6)	313(71.9)	67(15.4)
<b>TB is diagnosed using blood smears</b>	164(37.7)	149(34.2)	140(32.2)
<b>Night fever and sweating are symptoms of patients with</b>	297(68.2)	36(8.2)	102(23.4)
<b>A positive Mantoux test means a definite TB infection</b>	139(31.9)	208(47.8)	88(20.2)
<b>A tuberculin test is essential to diagnose suspected cases of TB</b>	321(73.7)	39(8.9)	75(17.2)

## DISCUSSION

TB is still one of the most important global public health threats. If global control of the disease does not improve, the annual global incidence is expected to increase from the current 21% to 61% by 2020.<sup>15</sup> Early detection and adequate treatment are critical control measures. Despite the fact that China carries one of the highest TB burdens in the world, lack of knowledge about the disease remains an abiding problem in the country, and thus, presents a barrier to control efforts.<sup>16</sup> Medical students are China's future health professionals and clinical leaders. In Turkey, for example, a study of 828 fourth-year medical students found that they lacked skills in interpreting radiology and smears even in their last year of medical school.<sup>17</sup> One study in Brazil found that although medical students had had good knowledge of biosafety norms, they engaged in risky behaviours in healthcare settings where patients with TB were assisted.<sup>18</sup> Similarly, a study in the USA reported that, prior to implementation of the National Tuberculosis Curriculum Consortium (NTCC) in US medical schools, about one-third of medical students did not know the method for administering tuberculin skin test or that the BCG vaccine was not a contraindication for TB skin testing.<sup>19</sup> The average knowledge base for all of the five core knowledge domains was only 2.4%, which was lower than the score (43.45%) reported in a previous study in China's Hunan province.<sup>20</sup> We also found that only 24.1% knew the classic symptoms of TB (cough and blood stained

sputum), which was similar to the report in Nanjing, China, where only 26.3% students were familiar with TB symptoms.<sup>21</sup> We found that only 30% knew the free TB treatment policy in China, which was similar to that reported in a related study.<sup>22</sup> One-third of students could not recognize a type of TB transmission. A study of final-year medical students in China's Hunan area in 2000 showed that knowledge and practical competencies toward TB among final-year medical students were generally insufficient.<sup>23</sup> Results of our current study showed that the situation has not improved in the past 13 years. TB teaching has been widely known as an useful way to support TB knowledge among students. In 2003, the U.S. National Institutes of Health (NIH) perceived a need to strengthen the teaching of TB to health-profession students, and funded the NTCC to help address this need.<sup>17</sup> Evidence shows that this has contributed to marked improvement in TB knowledge among students, nationally.<sup>15,24,25</sup> Strong recommendations to strengthen TB knowledge of medical and other health-profession students through education have also been made by other countries.<sup>26</sup> Although the National Guideline for TB Control in China emphasizes TB health education and promotion for the public, patients with TB and students, TB health education and promotion in universities remain suboptimal.<sup>27</sup> Accessing TB health education was significantly associated with core knowledge of TB.

## CONCLUSION

In countries with high TB prevalence, it is significant that all opportunities to increase people awareness regarding the disease are used to the optimal. In line with the WHO settings approach to health promotion,<sup>26</sup> schools must be seen as significant way for TB health teaching given the multiplier outcome such intervention is likely to have on the students, their families, communities and others in their community networks.<sup>20</sup> Coordination of TB health promotion in schools with local TB control departments and district-level Centers for Disease Control and Prevention must be strengthened on an constant basis.

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## REFERENCES

1. Tuberculosis (TB) [Internet]. WHO. 2017 [cited 8 April 2017]; <http://www.who.int/mediacentre/factsheets/fs104/en/>
2. CDC; TB; Basic TB Facts. Cdc.gov. 2017 [cited 9 April 2017]. Available from: <https://www.cdc.gov/tb/topic/basics/default.htm>
3. Konstantinos A (2010). Testing for tuberculosis. Australian Prescriber. 33 (1): 12–18.
4. Hawn, TR; Day, TA; Scriba, TJ; Hatherill, M; Hanekom, WA; Evans, TG; Churchyard, GJ; Kublin, JG; Bekker, LG; Self, SG (December 2014). Tuberculosis vaccines and prevention of infection. Microbiology and molecular biology reviews: MMBR. 78 (4): 650–71. doi:10.1128/MMBR.00021-14. PMC 4248657. PMID 25428938.
5. Harris, Randall E. (2013). Epidemiology of chronic disease: global perspectives. Burlington, MA: Jones & Bartlett Learning. p. 682. ISBN 9780763780470.
6. Organization, World Health (2008). Implementing the WHO Stop TB Strategy: a handbook for national TB control programmes. Geneva: World Health Organization. p. 179. ISBN 9789241546676.
7. 10 facts on tuberculosis. World Health Organization. 2017 [cited 7 April 2017]. <http://www.who.int/features/factfiles/tuberculosis/en/>
8. Kumar V, Abbas AK, Fausto N, Mitchell RN (2007). Robbins Basic Pathology (8th ed.). Saunders Elsevier. pp. 516–522. ISBN 978-1-4160-2973-1.
9. Lawn, SD; Zumla, AI (2 July 2011). "Tuberculosis". Lancet. 378 (9785): 57–72. doi:10.1016/S0140-6736(10)62173-3.
10. Saudi guidelines for testing and treatment of latent tuberculosis infection Hamdan H. Al Jahdali, a Salim Baharoon, a Abdullah A. Abba, b Ziad A. Memish, a Abdulrahman A. et al.
11. World Health Organization (2014) Global Tuberculosis Report 2014 [Internet]. 2017 [cited 8 April 2017]. Available from: [apps.who.int/iris/bitstream/10665/91355/1/9789241564656\\_eng.pdf](apps.who.int/iris/bitstream/10665/91355/1/9789241564656_eng.pdf)
12. Abouzeid MS, Al RF, Memish ZA (2013) Mortality among tuberculosis patients in Saudi Arabia (2001-2010). Ann Saudi Med 33: 247-52.

13. Abouzeid MS, Zumla AI et al. (2012). Tuberculosis trends in Saudis and nonSaudis in the Kingdom of Saudi Arabia—a 10 year retrospective study (2000-2009). PloS one 7: e39478.
14. Zohair A. Sebai et al. Health Care Services In Saudi Arabia: Past, Present and Future. J Family Community Med. 2001; 8(3): 19–23.
15. Dye C, Garnett GP, Sleeman K, et al. Prospects for worldwide tuberculosis control under the WHODOTS strategy. Lancet 1998;352:1886–91.
16. Wang Y. Report of the fifth national sampling survey of TB epidemiology. Beijing: Military Medical Science Press, 2011:1–7.
17. Kilicaslan Z, Kiyan E, Erkan F, et al. Evaluation of undergraduate training on tuberculosis at Istanbul Medical School. Int J Tuberc Lung Dis 2003;7:159–64.
18. Teixeira EG, Menzies D, Cunha AJ, et al. Knowledge and practices of medical students to prevent tuberculosis transmission in Rio de Janeiro, Brazil. Rev Panam Salud Publica 2008; 24: 265–70.
19. Jackson M, Harrity S, Hoffman H, et al. A survey of health-profession students for knowledge, attitudes, and confidence about tuberculosis, 2005. BMC Public Health 2007;7:219.
20. Feng SD, Yang SQ, Ling HY. Investigation on knowledge, attitude and behavior regarding tuberculosis in university students in Hengyan City. Chin J Sch Doct 2011;25:815–17.
21. Zhang Z, Zhang XN, Cao SY, et al. Cognition of tuberculosis related knowledge and attitude among college students in Nanjing. Chin J Sch Health 2012;33:263–4.
22. Yan HY. Survey on the knowledge, attitude and behaviors related to TB among undergraduate students in universities. Chin J Sch Health 2009;30:639.
23. Bai LQ, Ziao SY, Xie HW, et al. Knowledge and practice regarding tuberculosis among final-year medical students in Hunan, China. Zhonghua Jie He He Hu Xi Za Zhi 2003;26:458–61.
24. Harrity S, Jackson M, Hoffman H, et al. The National Tuberculosis Curriculum Consortium: a model of multi-disciplinary educational collaboration. Int J Tuberc Lung Dis 2007;11: 270–4.
25. Jensen PA. Where should infection control programs for tuberculosis begin? Int J Tuberc Lung Dis 2005;9:825.37.
26. Fu L, Tian M, Pan R, et al. Investigation on college student knowledge, confidence and behavior about prevention and treatment for tuberculosis in chengdu. Parasitoses Infect Dis 2008;6:185–7.
27. Wei X, Walley JD, Liang X, Liu F, Zhang X, Li R. Adapting a generic tuberculosis control operational guideline and scaling it up in China: a qualitative case study. BMC Public Health. 2008;8(1):260
28. WHO. Tuberculosis control and medical schools. Report of a WHO Workshop, Rome, Italy, 29–31 October 1997. [http://whqlibdoc.who.int/hq/1998/WHO\\_TB\\_98.236.pdf](http://whqlibdoc.who.int/hq/1998/WHO_TB_98.236.pdf)

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