

The Importance of Tuberculosis Screening

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Abstracts

Tuberculosis was counted one of the deadliest ailments in the world, the process of disease is very slow and till the time comes to know about the same, generally it appears to be late, also the infection is also horrific at the same level. The reports from WHO stated that more than a million people die all over the world by Tuberculosis and really this not a small number at all. Screening, laboratory tests, X-Ray, etc. the early detection of the disease can reduce the number of cases in near future. Many of the developed countries have taken receptive measures and achieve respectable goals in this regard. This present study was conducted on King Abdulaziz University Hospital (KAUH) in Jeddah and the results were based on the data shared by the testing laboratory.

Keywords: Tuberculosis, Screening, detection, cure.

1. Introduction

In the early 80s the spread of Tuberculosis was so fierce that, at the one hand person suffering from the same becomes the victim of social boycott and on the other hand his/her friends relatives use to face a number of issues in this regard, i.e. social acceptance, post cure components and many other related components. This states that in many of the cases patient were not able to recover from the disease, ever in the long erm and generally die from the because of the above stated reasons. Since the last 200 years or more, TB has remained the most horrible disease of all times and till the final years of 20th century the mortality rate was at its peak i.e. till this time the governments of affected countries have started to take stratified measures in this regard, where distribution of free medicine, free check-up camps, free sanitoriums, all weather camps for rehabilitation and many other such arrangements/facilities for the infected or severe patients.

As stated above Tuberculosis was counted one of the deadliest ailments in the world, the process of disease is very slow and till the time comes to know about the same, generally it appears to be late, also the infection is also horrific at the same level. The reports from WHO stated that more than a million people die all over the world by Tuberculosis and really this not a small number at all. To be specific, about 7 million people died alone in 2019, also the average detection rate was around 500 people in every 1 lakh tests.

Many of the international agencies are trying to eradicate tuberculosis from the face of the earth in times to come, like WHO has set the target of 2035, IMA is working towards the decrease in detection rate i.e. somewhere between 10 to 12 cases per 1 lakh cases on annual basis. Then at the other hand, there are countries that are not much affected by the said ailment and symbolically have met the above said thresholds years back, these are the developed countries and depict the rate of detection to only 1-2 cases per 1 lakh test on annual basis. This is not true for the underdeveloped countries or the developing countries and Saudi Arabia is one of them, the situation is even poor in rural areas of the country where the primary health centers are not having proper facility of testing or medication.

In the last 20 years or so, steps taken by the medical agencies all over the world have resulted fine and the respective detection rate has also decreased, but still the developing countries are looking forward to get the 100% eradication of the disease, agencies like WHO, IMA, etc. are joining hands to look for the ways and means of 100% eradication of the disease. Actually this is not a very long term goal and generally based in the spread of awareness and understanding of people for the same. agencies are using all the mediums of promotion i.e. print media, electronic media, govt. and private websites, today social media is also used extensively for the sake of promotion.

In Saudi Arabia, a noticeable decrease was observed in the detection cases of tuberculosis from 1980 to 2010, initially the cases were around 75/lakh in 1980 have reached to 10 in 2010, in order to mention this is a huge decrease but still there are miles to be travelled in this regard.

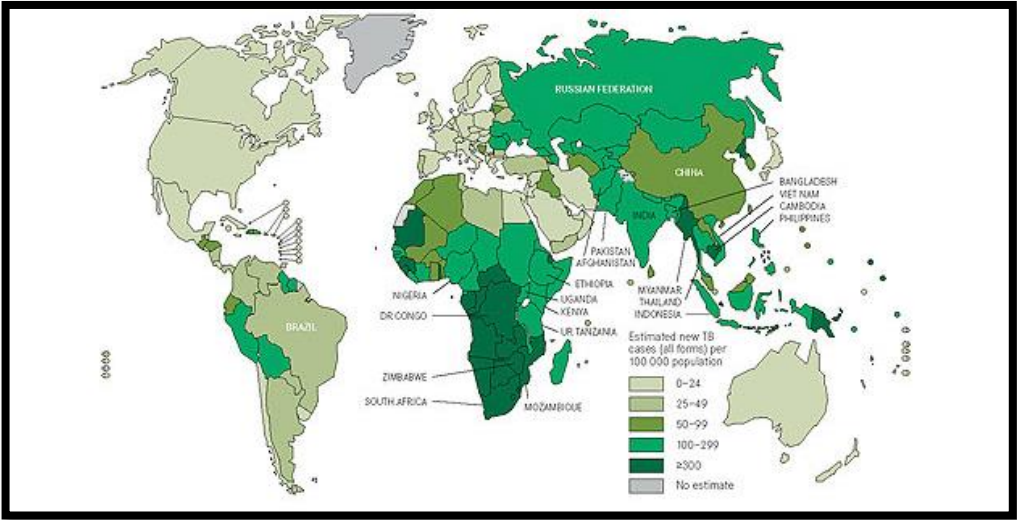


Source: <https://www.statista.com/statistics/681412/saudi-arabia-incidents-of-tbc-per-100-000-inhabitants/>

Figure 1: Reported cases of TB in KSA from 2006 to 2022

As a matter of fact, Tuberculosis is an airborne disease and extremely infectious, the respective bacteria of the disease directly affect the lungs and gradually increase the ailment in due course of time. The fierceness of the disease can be understood with the fact that a person suffering from cough expel up to 40,000 infectious aerosol droplets of the disease, where the chances of infection is only 1-2% and at the same level a TB patient can spread the infection in only 10 droplets and the infected person takes the same for life long.

The greatest risk of infection is for people who attend large gatherings, are in close contact with others, and live in areas with poor ventilation. Prevention of TB focuses on vaccinating infants and identifying, identifying, and treating cases. A simple test can determine whether a person has TB. Masks are not effective in preventing the spread of TB. Special masks called HEPA filters are required when caring for patients. Signs and symptoms of tuberculosis include cough, fever, night sweats, weight loss, fatigue, and blood in the sputum. Tuberculosis can also affect the heart, bones (although rare), and central nervous system. Tuberculosis is a global crisis. According to the World Health Organization (WHO), there are 22 countries in the world with a high prevalence of lung disease. Saudi Arabia is not classified as a country with a high rate of tuberculosis, but Afghanistan (22) and Pakistan (8) are in our region. The number of cases in the country has reached 1,257, 1 patient per 100,000 people, and South Africa has 971 people per 100,000 people. Saudi Arabia has one of the lowest rates of the disease, with only 18 cases per 100,000 people.



Source: <https://www.arabnews.com/node/409896>

Figure 2: Estimated TB Cases in KSA, 2010 to 2015

A small proportion of foreigners come from countries in the Middle East, North Africa and Southeast Asia. In the context of epidemics, these differences can have different global

consequences for host countries, migrant workers and countries of origin. While the prevalence of TB among the Omani population is decreasing, the number of people living in the country is increasing. This shows that the spread of TB among people living abroad is a problem, as reported elsewhere in the world, and requires a multifaceted response. The circumstances in which the condition is declared do not carry the full burden of under-reporting.

2. Methodology of the study:

- This study was conducted at the King Abdulaziz University Hospital (KAUH) in Jeddah, the KAUH used to be approached by the respective patients from all over the country, being one of the best hospitals in the state for testing, screening and cure of Tuberculosis.
- The hospital is having a digital radiography system which is unique and one of its kind in all of the state, also the laboratory of the hospital is the part of national TB program and liable to cater a huge number of patients all over the country. During the period of the study, a close watch was kept on the patient approaching the OPD of the tuberculosis department for the purpose of screening, the researcher has selected the respective samples from these patients only.
- Most of the patients have willingly participated in the study and were keen to know about the results.
- According to the hospital's client base, people who come for consultation first go through the outpatient department and are then directed to other services if needed, such as examination status or private consultation. Since the hospital has a separate tuberculosis clinic, patients receiving tuberculosis treatment can go directly to the tuberculosis clinic or polyclinics.
- Since the study is carried out simultaneously with normal hospital work, the center's capacity usually allows 20-25 people to participate each day; when this number is reached, approximately 25% of the hospital's outpatient patients are enrolled, so the registrations will continue until the next day.
- The goal of the this study was to invite 250 participants; this is the number we can enroll in eight months using our resources, and we estimate that 45-50% of the participants will be examined for quality and sent for testing.
- Everyone over the age of 15 is eligible. In order to reduce fetal exposure to X-rays after home study, patients currently receiving antituberculosis treatment or those who were likely or known to be pregnant were excluded.
- Patients were selected regardless of the presence of symptoms or clinical suspicion of TB. The researcher has taken written consent from all the participants before entering a common interview, the questions include the symptoms of TB, state of cough in the patient, duration of cough, symptoms of fever, sweat condition during sleep and loss of body weight.
- As the part of the investigation the patients involved in the study were liable to get a free consultation on their X-Ray by a trained radiologist along with other relevant information necessary for their diagnosis.

- Anyone with one or more symptoms and/or a chest X-ray with any abnormality was referred for TB laboratory testing on the same day.

Process:

Laboratory personnel were trained on how to prepare two samples, one in the field and one in the morning. A smear is prepared directly from the first sputum collection and examined for acid-fast bacilli by fluorescence microscopy. The second sample (usually in the morning) is made using the N-acetyl-L-cysteine-NaOH method. Concentrated smears were prepared from the resuspended pellet and examined for acid-fast bacilli by fluorescence microscopy. 0.5 mL was used for the Xpert MTB/RIF assay and 0.5 mL was inoculated into a mycobacterial growth indicator tube using the BACTEC MGIT 960 system and 0.1 mL was inoculated into Löwenstein-Jensen medium. Cultures positive for acid-fast bacilli were tested for mycobacteria. Tuberculosis complex was determined by the MPT64 antigen test (Standard Diagnostics, Korea). Isolates that tested positive and negative for AFB by the MPT64 antigen were tested using the Genotype Mycobacteria CM line probe according to the manufacturer's instructions.

Analysis:

During the study period, about 300 patients were chosen for the study and finally 250 were taken into account. Of all the enrolled patients 86% were screened for TB symptoms and even for a chest X-ray; the remaining 14% of the patients were only tested for the symptoms of TB and not for a chest X-ray, rather in some of the cases chest X-Ray was not taken due to time restraint or the delay time in the queue.

From the total of 86% of the patients gone for both i.e. symptoms or TB and for a chest X-Ray 39% were above the age of 30 and include both male and female respondents. However, the average age of the respondents was 40 years whereas the average age of all the patients together ranged from 30 to 50 years. 13% of the respondents were having the history of Tuberculosis in their respective families. 15% of the respondents were having an abnormal chest X-ray, 45% were having more than one TB symptom, of all the respondents 35% were having regular cough for about 2-3 weeks.

Of the 31 patients with TB, 10 (32%) were positive by concentrated smear microscopy, 17 (55%) were positive by Xpert MTB/RIF, and almost all of them 97% were positive by TB Positive culture. Of the TB positive patients, 57% had positive broth culture and 97% had moderately positive culture (MGIT). Of the 16 individuals with positive Xpert and positive culture, 2 had high Xpert, 5 had average, 5 had low, and 4 had very low Xpert. The specimens of two patients with positive Mycobacterium tuberculosis complex samples were resistant to rifampin; only one individual with a positive Xpert MTB/RIF test (very low grade) had a negative culture; Both participants had positive (small) sputum and negative Xpert and culture results; there were 30 specimens that were positive for M. tuberculosis complex culture, as well as 15 specimens that were negative for smear microscopy and positive for nontuberculous mycobacteria.

Just like all other studies, this present study also has certain limitation. A large proportion 20% of those who tested positive did not receive a laboratory result because they did not go to the laboratory or were unable to expectorate. Additionally, due to cost and laboratory equipment, we

did not perform laboratory tests on participants who did not have positive symptoms or who did not have a chest X-ray. This would have resulted in more accurate and specific calculations and would have led to a better estimate of the presence of TB in patients; however, most data suggest that there is little if any cause for TB in those who do not have symptoms and have a chest X-ray. While Xpert and Culture only test one sample per participant, both samples are recommended as culture samples and can be used for all results. Due to limited access to chest X-rays, we are the first 20-25 patients to come to the clinic each day, representing approximately 40% of all outpatients, and these patients may not be representative of all patients who come to the hospital. out of hospital. Also since chest x-ray readings are done by human readers, the results are subject to different readings, which is well known with the use of chest x-ray as a win screen.

3. Conclusion:

Current TB testing strategies in Saudi Arabia and similar regions may miss many TB cases due to low traveler screening rates, unclear criteria, and inadequate efficacy and/or underdiagnosis of current testing methods. Our findings suggest that strengthening TB testing in outpatient settings, such as identifying patients for TB testing by cough lasting more than 2 weeks and/or combining at least 2 symptoms, has the potential to improve TB care in this setting. Our findings also suggest that improved TB diagnosis requires improved diagnostic testing, including on-demand testing, as currently available molecular tests still miss many individuals with TB disease.

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