

Conducting Knowledge, Attitude, And Practice Towards Tuberculosis Among Healthcare and Non-Healthcare Employees in Al-Jouf Hospitals

Maha Aladham Damith¹, Reem Aladham Damith², Hind Aladham Damith³, Ohud Musleh Alruwaili⁴, Norah Mufadhi Alanazi⁵, Shuaa Satim Alruwaili⁶, Alla Johum Alruwaili⁷, Aminah Muhayl Alasmar Alruwaili⁸, Nawarah Muhayl Alasmar Alruwaili⁹, Razan Muteb Alruwaili¹⁰

1. *Nursing Specialist, Princ Muteb Bin Abdulaziz Hospital, Principal Author*
2. *Nursing Specialist, Princ Muteb Bin Abdulaziz Hospital*
3. *Nursing Specialist, King Abdulaziz Specialist Hospital*
4. *Nursing Specialist, Princ Muteb Bin Abdulaziz Hospital*
5. *Nursing Specialist, Princ Muteb Bin Abdulaziz Hospital*
6. *Nursing Specialist, Princ Muteb Bin Abdulaziz Hospital*
7. *Nursing Specialist, Princ Muteb Bin Abdulaziz Hospital*
8. *Nursing Technician, Princ Muteb Bin Abdulaziz Hospital*
9. *Nursing Specialist, Princ Muteb Bin Abdulaziz Hospital*
10. *Nursing Specialist, Princ Muteb Bin Abdulaziz Hospital*

Abstract

Aim: This study aimed to assess and compare the knowledge, attitudes, and practices regarding TB among healthcare and non-healthcare employees in hospitals located in the Al-Jouf region.

Introduction/Background: Tuberculosis (TB) is one of the oldest and most persistent infectious diseases known to humanity, caused by the bacterium *Mycobacterium tuberculosis*.

Methodology: The study employed a self-administered questionnaire as the data collection tool.

Results: The survey findings revealed that participants showed moderate attitudes towards TB management, prevention and the role of the health care system. While there is confidence in some areas, there are concerns about social support, access to treatment and cultural influences that affect TB control. The relationship between occupational groups and general knowledge about TB is strong. This association could guide training strategies by identifying occupational groups that may require more education and awareness about TB. There is a moderate to strong positive association between occupational group and TB management practices. Health care workers, due to their training and experience, follow stricter TB prevention practices, while non- health care workers show lower adherence, possibly due to less exposure and perception of risk.

Discussion: The results highlight the importance of knowledge, understanding and practice of tuberculosis among healthcare workers and non-healthcare workers.

Recommendation: Based on the study findings, it is recommended that develop targeted training programs focusing on professional groups with weaker knowledge and practices regarding TB. Implement strategies to overcome cultural barriers and strengthen social support systems that encourage TB patients to seek timely diagnosis and treatment. Focus on improving skills in contact tracing and improving diagnostic accuracy among health care workers.

Conclusion: The study provides valuable insights into current levels of knowledge, attitudes and practices, and identifies areas for improvement. By addressing these gaps through targeted education and training programs, hospitals can strengthen TB control measures, reduce the risk of transmission, and improve patient outcomes. This comprehensive approach is essential to fostering a safer and more supportive environment for both staff and patients, ultimately contributing to the broader public health goal of eliminating TB.

Keywords: Tuberculosis (TB), Knowledge, Attitude, and Practice (KAP), Healthcare Employees, Disease Control.

INTRODUCTION

Introduction

Tuberculosis (TB) is one of the oldest and most persistent infectious diseases known to humanity, caused by the bacterium *Mycobacterium tuberculosis*. Despite global efforts to control and eliminate TB, it remains a leading cause of morbidity and mortality worldwide. In particular, TB poses significant public health challenges in regions with high disease prevalence and limited healthcare resources. The Al-Jouf region of Saudi Arabia is no exception, where TB continues to be a concern for both public health authorities and healthcare providers.

Background on the Subject

TB is transmitted through the air when individuals with active pulmonary TB expel bacteria by coughing, sneezing, or talking. The disease can affect various organs, but it primarily targets the lungs. Symptoms of active TB include a persistent cough, fever, night sweats, and weight loss. While TB is curable with a course of antibiotics, the emergence of multidrug-resistant TB (MDR-TB) has complicated treatment efforts. Effective TB control requires not only medical intervention but also robust public health strategies, including surveillance, vaccination, and public education.

Current Knowledge

Previous studies have shown that healthcare workers generally possess better knowledge of TB than non-healthcare workers, due to their training and experience in handling infectious diseases. Healthcare workers are often more aware of TB transmission routes, symptoms, and preventive measures. However, gaps in knowledge, attitudes, and practices (KAP) still exist among healthcare workers, which can hinder effective TB control. Non-healthcare workers, on the other hand, may have limited exposure to TB-related information, leading to lower levels of awareness and potentially contributing to the spread of the disease within hospital settings and the broader community.

Knowledge Gaps

Despite the recognized importance of KAP in TB control, there is limited research specifically comparing the KAP towards TB among healthcare and non-healthcare employees in the Al-Jouf region. Understanding these differences is crucial for designing effective educational interventions and policies tailored to the needs of different employee groups within hospitals. This study seeks to fill this gap by providing comprehensive data on the KAP related to TB among both healthcare and non-healthcare employees in Al-Jouf hospitals.

Aims of the Study

The primary aim of this study is to assess and compare the knowledge, attitudes, and practices regarding TB among healthcare and non-healthcare employees in hospitals located in the Al-Jouf region. The specific objectives include:

1. Evaluating the level of TB knowledge among healthcare and non-healthcare employees.
2. Assessing the attitudes of these employees towards TB and its patients.
3. Analyzing the practices related to TB prevention and control in both groups.
4. Identifying significant gaps and areas for improvement in TB-related KAP.

Hypothesis and Research Question:

Hypothesis

1. Primary Hypothesis: Healthcare employees in Al-Jouf hospitals have significantly higher levels of knowledge, more positive attitudes, and better practices towards tuberculosis (TB) compared to non-healthcare employees.
2. Secondary Hypothesis: Both healthcare and non-healthcare employees exhibit specific gaps in TB-related knowledge, attitudes, and practices that require targeted educational interventions.

Research questions:

1. What is the level of knowledge about TB among healthcare employees compared to non-healthcare employees in Al-Jouf hospitals?
2. What are the attitudes of healthcare employees towards TB patients and TB control measures compared to those of non-healthcare employees?
3. What are the current practices related to TB prevention and control among healthcare employees compared to non-healthcare employees?
4. What specific educational interventions are needed to address the gaps in TB knowledge, attitudes, and practices among healthcare and non-healthcare employees in Al-Jouf hospitals?

Significance of the study

1. Public Health Impact: TB remains a major public health concern globally, including in Saudi Arabia. Understanding the KAP of healthcare and non-healthcare workers is vital for effective TB control and prevention strategies.
2. Occupational Health: Healthcare workers are at higher risk of TB infection due to their frequent exposure to infected patients. Assessing their KAP towards TB can help identify gaps in knowledge, address misconceptions, and improve infection control practices to protect both healthcare workers and patients.
3. Community Transmission: Non-healthcare employees, such as administrative staff, cleaners, and security personnel, also play a crucial role in the hospital environment. Their KAP towards TB is important as they can act as potential vectors for community transmission if not adequately informed and trained.
4. Early Detection and Treatment: Adequate knowledge about TB symptoms, transmission, and prevention can lead to early detection and prompt treatment, reducing the risk of disease transmission and improving patient outcomes.
5. Stigma Reduction: TB is often associated with stigma and discrimination, which can hinder efforts for early diagnosis and treatment. Assessing the attitudes of healthcare and non-healthcare workers towards TB can help identify and address stigmatizing beliefs, promoting a more supportive environment for TB patients.
6. Policy and Resource Allocation: Findings from the study can inform policymakers and healthcare administrators about the need for targeted educational interventions, training programs, and resource allocation to enhance TB control efforts in Al-Jouf hospitals.
7. Research Gap: While studies on TB KAP among healthcare workers exist, there may be limited research focusing on non-healthcare employees within hospital settings. This study could fill this gap and provide valuable insights into the overall TB knowledge, attitudes, and practices among all hospital staff.

Methods

This study employed a cross-sectional design, utilizing a structured questionnaire to gather data from participants. The questionnaire will cover key areas of TB knowledge, attitudes, and practices and will be validated by experts in infectious diseases. Participants will be selected through stratified random sampling to ensure diverse representation. Data analysis will involve both descriptive and inferential statistics to explore differences and correlations between the groups.

CHAPTER II: REVIEW OF EVIDENCE

The literature review

Tuberculosis (TB) remains a significant global health concern, with millions of new cases reported each year. Despite advancements in medical science, TB continues to pose challenges, particularly in regions with limited resources and poor healthcare infrastructure. In the fight against TB, understanding the knowledge, attitudes, and practices (KAP) of both healthcare and non-healthcare employees is crucial.

Healthcare workers, including doctors, nurses, and support staff, play a pivotal role in TB control and prevention. Their knowledge about the disease, its transmission, and preventive measures is essential for effective patient care and infection control within healthcare facilities. However, studies have shown that gaps in knowledge and suboptimal practices among healthcare workers can contribute to TB transmission and hinder efforts to curb the disease.

Non-healthcare employees, such as administrative staff, janitorial workers, and security personnel, also have a role in TB prevention, albeit indirectly. Their awareness of TB risks and adherence to infection control measures can help create safer environments in workplaces, schools, and community settings. Understanding their knowledge, attitudes, and practices towards TB is imperative for implementing comprehensive prevention strategies [1].

Healthcare workers (HCWs) are at the forefront of the global battle against tuberculosis (TB), providing essential services to diagnose, treat, and care for patients afflicted with this disease. Their pivotal role in combating TB is underscored by their continuous and close contact with individuals suffering from TB, which, paradoxically, places them at a significantly heightened risk of contracting the infection themselves [2]. The constant exposure to TB pathogens within healthcare settings underscores the critical need to address the occupational hazards faced by HCWs.

Tuberculosis (TB) remains a significant global health concern, with millions of new cases reported each year. Despite advancements in medical science, TB continues to pose challenges, especially in regions with limited resources and poor healthcare infrastructure. Understanding the knowledge, attitudes, and practices (KAP) of both healthcare and non-healthcare employees is crucial in the fight against TB.

A recent meta-analysis has brought to light a concerning statistic: the incidence of active TB among HCWs is approximately three times higher than that observed in the general population. This alarming disparity highlights the occupational risks that HCWs endure as they fulfill their professional duties. The elevated risk is attributable to various factors, including frequent interactions with TB patients, inadequate ventilation in healthcare facilities, and sometimes insufficient adherence to protective measures [3]. This situation necessitates urgent attention to the working conditions and safety protocols within healthcare environments to safeguard those who are indispensable to TB control efforts.

Given the heightened vulnerability of HCWs to TB, the implementation of robust occupational TB prevention and infection control (TBIC) measures within healthcare facilities is of paramount importance. Effective TBIC strategies are essential to mitigate the risk of TB transmission in these high-risk settings. These measures include the use of personal protective equipment (PPE), administrative controls such as TB screening and isolation procedures, and environmental controls like proper ventilation systems. Strengthening TBIC practices not only protects HCWs but also enhances the overall effectiveness of TB control programs by preventing nosocomial infections and maintaining a healthy workforce capable of delivering uninterrupted healthcare services.

Healthcare workers, including doctors, nurses, and support staff, play a pivotal role in TB control and prevention. Their knowledge about the disease, its transmission, and preventive measures is essential

for effective patient care and infection control within healthcare facilities. However, studies have shown that gaps in knowledge and suboptimal practices among healthcare workers can contribute to TB transmission and hinder efforts to curb the disease.

Non-healthcare employees, such as administrative staff, janitorial workers, and security personnel, also play a role in TB prevention, albeit indirectly. Their awareness of TB risks and adherence to infection control measures help create safer environments in workplaces, schools, and community settings. Understanding their knowledge, attitudes, and practices towards TB is imperative for implementing comprehensive prevention strategies.

As professionals, nurses are constantly seeking ways to make a positive impact on society. They are accountable for providing ongoing care, protecting patient lives, and assisting with daily activities. To fulfill these responsibilities effectively, it is crucial for nurses to maintain the highest level of competence in the procedures they perform for their patients.

Nursing services are delivered in various settings, such as hospitals, communities, home health, and others. The delivery of care is guided by different care models, which provide guidance on organizing and delivering care services based on values and beliefs [5]. Care delivery models in nursing outline the conceptual organization, coordination, and distribution of work among nurses and are grounded in administrative and nursing theories [6].

Nurses, as frontline healthcare suppliers, play a substantial role in enhancing the quality of patient interest and consequently influencing the economic situation of healthcare organizations [7]. Nurses' self-reports using surveys are often used to measure the recognized quality of nursing care. Nursing care delivery models can effectiveness the quality of nursing care supplied to patients. [8] reported Some nurses in the team-based delivery model reported not completing their tasks as well as nurses in units using the total patient care delivery model. Some of the nurses working in the team-based delivery model were not performing as well as those in units using the total patient care delivery model. Specifically, they reported a higher number of unfinished nursing tasks. This suggests that the team-based delivery model may not be as effective for these nurses and that further examination, and adjustments may be needed to improve their performance and ensure patient care is being delivered effectively.

In clinical nursing, qualifications relate to professional criterions in healthcare, patient safety, and quality of care [4]. Traditionally, the connotation of qualification covered knowledge and skills, but today it should be seen from a more holistic perspective as something that involves other factors, such as attitude [9]. A poor attitude can cause disregard in some nursing duties; for example, severe care is often prioritized over care of inveterate conditions, such as chronic wounds [10]. Wound care is a significant challenge in the healthcare system. Wound infection is a prevalent issue in medical treatment. However, there is limited understanding of patients' knowledge and attitude towards caring for traumatic wounds [11].

It is known that having the correct knowledge about the symptoms and transmission mode of a disease is essential for disease prevention, screening, early detection, and early treatment-seeking behaviors—thereby improving overall management of health conditions [12].

knowledge, attitude, and practice

Dealing with tuberculosis (TB) effectively necessitates healthcare workers (HCWs) to be well-versed in various aspects of the disease. Knowledge is the cornerstone, encompassing an understanding of *Mycobacterium tuberculosis*, its airborne transmission, and risk factors for infection [13]. HCWs must be adept at recognizing TB symptoms such as persistent cough, hemoptysis, night sweats, and weight loss. Proficiency in diagnostic tools like sputum smear microscopy, chest X-rays, and molecular tests such as GeneXpert is crucial [14]. Additionally, HCWs should be familiar with latent TB infection (LTBI) screening methods, including the tuberculin skin test (TST) and interferon-gamma release assays (IGRAs). Comprehensive knowledge extends to treatment protocols, including the standard regimen (isoniazid,

rifampicin, ethambutol, and pyrazinamide) and the challenges posed by drug-resistant TB, such as multi-drug-resistant TB (MDR-TB) and extensively drug-resistant TB (XDR-TB). Preventive measures, particularly vaccination with *Bacillus Calmette-Guérin* (BCG) and infection control practices, are also critical areas of knowledge [12].

Attitude plays a vital role in TB management, with empathy and compassion being essential traits for HCWs. Understanding the stigma associated with TB and providing continuous support can significantly enhance patient trust and adherence to treatment [15]. A commitment to continuous learning is necessary for staying abreast of the latest guidelines and research, reflecting a proactive attitude towards professional development. Additionally, adopting a public health perspective helps HCWs appreciate their role in breaking the transmission cycle and emphasizes the importance of TB control as a public health priority.

Effective practice involves strict adherence to infection control protocols to prevent the spread of TB within healthcare settings. This includes using proper ventilation systems, personal protective equipment (PPE) such as N95 respirators and isolating infectious patients. Regular TB screenings for HCWs are also crucial. In patient management, HCWs must ensure accurate diagnosis, prompt initiation of appropriate treatment, and diligent monitoring of patient adherence to the treatment regimen. Educating patients about TB, its transmission, and the importance of completing the full course of treatment is integral to successful outcomes.

Community engagement is another critical aspect of HCW practice. Participating in outreach programs helps raise awareness about TB, reduce stigma, and promote early diagnosis and treatment. Collaboration with public health authorities is essential for tracking and managing TB cases, especially in high-risk populations. Finally, maintaining accurate documentation and reporting of TB cases, treatment outcomes, and adverse drug reactions is crucial for effective public health surveillance and response. These practices collectively enhance the ability of HCWs to manage TB effectively and contribute to broader public health goals.

Studies have shown that awareness and knowledge about TB and access to its services in high TB burden environments is insufficient. On average, one TB patient can infect 10–15 people [14]. Timely screening and medications for TB management are essential to reduce the likelihood of infection [15]. Drug-resistant TB is a global challenge that is growing, resulting from incorrect use and mismanagement of TB drugs due to a lack of proper knowledge about this disease.[16] Each year, approximately half a million people become resistant to multiple drugs for TB, which is expensive and complicated to treat and has potentially life-threatening side effects.

Conducting a study on the knowledge, attitude, and practice (KAP) towards tuberculosis (TB) among healthcare and non-healthcare employees in Al-Jouf hospitals is crucial for several reasons. The existing literature underscores the importance of such studies in identifying gaps in TB awareness, attitudes, and practices, which are essential for effective TB control and prevention. Reviewing the literature reveals that while healthcare workers generally possess higher levels of TB-related knowledge due to their training and direct exposure, non-healthcare employees often exhibit significant knowledge deficits. These gaps can lead to misconceptions about TB transmission and prevention, potentially increasing the risk of outbreaks within hospital settings.

Attitudes towards TB, as highlighted in previous studies, play a vital role in shaping behaviors and practices. Healthcare workers, although more knowledgeable, may still harbor negative attitudes or stigma towards TB patients, which can impact patient care and adherence to treatment. Non-healthcare employees, on the other hand, might display fear or reluctance to interact with TB patients due to a lack of understanding, further exacerbating stigma and isolation of affected individuals. Understanding these attitudes is essential for designing targeted interventions that promote empathy and reduce stigma.

The literature also emphasizes the critical role of practice in TB control. Effective infection control practices, such as the use of personal protective equipment (PPE), proper ventilation, and patient isolation, are well-documented among healthcare workers. However, the adherence to these practices can vary, and lapses can occur due to factors such as workload, resource availability, and training. Non-healthcare employees often lack formal training in these practices, increasing the risk of inadvertent exposure and transmission. Ensuring that all hospital employees, regardless of their role, are adequately trained in TB prevention practices is vital.

Conclusion

The literature review highlights the necessity of assessing and addressing the KAP towards TB among both healthcare and non-healthcare employees in Al-Jouf hospitals. Such a study would provide valuable insights into current knowledge levels, attitudes, and practices, identifying areas for improvement. By addressing these gaps through targeted education and training programs, hospitals can enhance TB control measures, reduce transmission risks, and improve patient outcomes. This comprehensive approach is essential for fostering a safer and more supportive environment for both employees and patients, ultimately contributing to the broader public health goal of TB eradication.

CHAPTER III: PROJECT METHODOLOGY AND IMPLEMENTATION PLAN

Introduction

This study is classified as a descriptive study, as this study aims to assess and compare the knowledge, attitudes, and practices regarding TB among healthcare and non-healthcare employees in hospitals located in the Al-Jouf region.

Identification of Design

Based on the nature and objectives of the study, the analytical descriptive approach was used, which describes the variables of the study, which are change management and quality of work, and then analyzed these main and dependent variables to reach the desired results of the study.

Target group or aggregate

This study was applied to both healthcare (e.g., doctors, nurses, technicians) and non-healthcare (e.g., administrative staff, support staff) employees working in hospitals across the Al-Jouf region. A sample consisting of (218) people working in hospitals across the Al-Jouf region.

Setting

This study was applied to the hospitals across the Al-Jouf region.

Plan and implementation process

This research is based on quantitative and quantitative analysis of data collection using a questionnaire.

The questionnaire was relied upon as a tool to collect data from the sample individuals, and the questionnaire prepared in line with the study questions to achieve its objectives.

To assure the quality of the collected data, the questionnaire piloted before implementation to assure feasibility and clarity of the tool. The validity and reliability of the tools were tested too.

Study tool:

The study was structured as a descriptive cross-sectional investigation targeting healthcare and non-healthcare employees at Al-jouf region hospitals. It took place in Al-jouf province, Saudi Arabia, spanning from

May 2024 to August 2024. The primary objective of the study was to evaluate the knowledge, attitudes, and practices (KAP) of healthcare and non-healthcare employees concerning tuberculosis (TB).

The study employed a self-administered questionnaire as the data collection tool. The questionnaire was developed based on existing literature related to tuberculosis. It consisted of five sections. Section 1 focused on gathering socio-economic information from the participants, including gender, age, marital status, nationality, place of work, level of education, years of experience and the area where the participant is living. Section 2 comprised 20 questions aimed at assessing the participants' general knowledge about tuberculosis. Section 3 consisted of 10 questions designed to measure the participants' attitudes towards tuberculosis. Section 4 involved 8 statements to evaluate the participants' practices concerning tuberculosis. Section 5 involved 5 questions about real tuberculous cases experienced through the period of employment.

The modified statistical standard for the study tool

The classification (a five-year Likert standard) was used to assess the quality and use of the health management information system data in the primary care center in Al-Rawdah, Hail, Saudi Arabia, as table (1) shows a five-point Likert scale:

To judge the opinions of the respondents on the scale after deriving their arithmetic averages, an arithmetic equation was made for that, by finding the response range on a five-point scale and multiplying the result by the number of decisions in which the responses are separated, which are (very low quality; low quality; medium quality; high quality). Then judge the resulting value, and the judgment points (cut-off point) which is the standard as shown in Table No. (1):

Table (1)

The modified range of the study instrument

No.	Standard	The rate range it follows
1	Strongly Agree	5
2	Agree	4
3	Neutral	3
4	Disagree	2
5	Strongly Disagree	1

Data analysis

The data analysis was conducted using the SPSS software program version 26, developed by IBM Inc. in Armonk, NY, USA. Descriptive statistics, such as frequencies and percentages, were calculated to summarize the responses. The chi-squared test was employed to examine the relationship between categorical independent variables and sociodemographic data. Statistical significance was determined by p-values less than 0.05. To explore the extent of the associations between the chosen factors and accurate knowledge about tuberculosis (TB) transmission, multivariable analyses were conducted using the Generalized Estimating Equation (GEE) logistic regression.

Ethical considerations

Moral considerations can be identified as one of the most important parts of the research, and one of the most important is that the research participants should not be harmed in any way. Priority must be given to respecting the dignity of the participants in the research, and full consent must be obtained from the

participants before the study, and the protection of the privacy of the participants in Research, and an adequate level of confidentiality of the search data must be guaranteed. Ethical approval will be outlined from the Directorate of Health Affairs in Al-jouf.

Summary

In this chapter, the project methodology, implementation plan, statement of the study population, how to analyze the data that collected to achieve the research objectives, and the ethical considerations necessary to conduct the research are explained.

CHAPTER IV: STUDY OUTCOMES

Introduction

After the researcher presented in the third chapter the procedures of the study by stating the purpose and methodology of the study, defining the study population and sample, the study tool, and defining the statistical methods in the quantitative analysis of the responses of the research sample, this chapter deals with analyzing the results of this study, by presenting the responses of the sample members to the study questions, and treat them statistically using the concepts of descriptive and analytical statistics, and arrive at the results, analyze and interpret them in light of the theoretical frameworks of the study.

The analysis was conducted of the sample's responses to answer the research tool questions, as follows:

Characteristics of participants

This table shows the demographic characteristics of participants:

Table 2: Demographic characteristics

Table 2:

Frequencies and percentages of the study sample by demographic characteristics

(Sample size =218)

Classification	Frequency	Percent
Age		
From 20 to 29	125	57.3
From 30 to 39	83	38.1
From 40 to 49	10	4.6
Gender		
Male	148	67.9
Female	70	32.1
Years of experiences		
Less than 5 years	125	57.3
From 5 to 10 years	10	4.6
From 11 to 15 years	11	5.0
More than 15 years	72	33.0
Classification of appointment		
healthcare employees	173	79.4
non-healthcare employees	45	20.6
Nationality		
Saudi	179	82.1
non-Saudi	39	17.9
Education Level		

bachelor	170	78.0
Master	5	2.3
PhD	34	15.6
Others	9	4.1
Place or work		
Health Center	51	23.4
Prince Muteb Hospital	127	58.3
King Abdulaziz Hospital	37	17.0
Women and Children Hospital	3	1.4

The demographic characteristics provide valuable insights into the profile of the population being studied. It showed that:

1. Age Distribution

- Many respondents are between 20 to 29 years old (57.3%). This indicates a younger workforce or sample group.
- A significant portion falls into the 30 to 39 years category (38.1%), showing that middle-aged individuals also form a considerable part of the group.
- A smaller segment is aged 40 to 49 years (4.6%), suggesting fewer senior-aged participants.

The sample is primarily composed of younger individuals, indicating a potentially more dynamic or early-career-stage workforce.

2. Gender Distribution

- Male respondents make up a larger share (67.9%) compared to female respondents (32.1%).

The data reflects a male-dominant sample, which could impact the perspective and outcomes if the context involves gender-based analysis.

3. Years of Experience

- A majority have less than 5 years of experience (57.3%), aligning with the younger age group.
- More than 15 years of experience is the second-largest group (33.0%), indicating a strong representation of highly experienced professionals.
- Those with 5 to 10 years and 11 to 15 years of experience form much smaller groups (4.6% and 5.0%, respectively).

There is a distinct split between early-career professionals and those with extensive experience. Mid-career professionals are underrepresented.

4. Classification of Appointment

- The vast majority are healthcare employees (79.4%), while non-healthcare employees make up a smaller portion (20.6%).

This sample is primarily healthcare-oriented, which could influence findings or trends specific to this sector.

5. Nationality

- Saudi nationals constitute the bulk of the respondents (82.1%), with a smaller group being non-Saudi (17.9%).

The data is predominantly reflective of Saudi nationals, which may suggest findings are more relevant to the local context.

6. Education Level

- Most respondents hold a bachelor's degree (78.0%), while a smaller fraction have a PhD (15.6%).
- Master's degree holders are the least represented (2.3%), and Others account for 4.1%.

The population is generally well-educated, with a focus on undergraduate qualifications, but also has a notable proportion with advanced degrees (PhD).

7. Place of Work

- A majority work at Prince Muteb Hospital (58.3%), followed by Health Centers (23.4%) and King Abdulaziz Hospital (17.0%).
- Only a small number work at the Women and Children Hospital (1.4%).

There is a concentration of employees in Prince Muteb Hospital, with lesser representation in other facilities, especially the Women and Children Hospital.

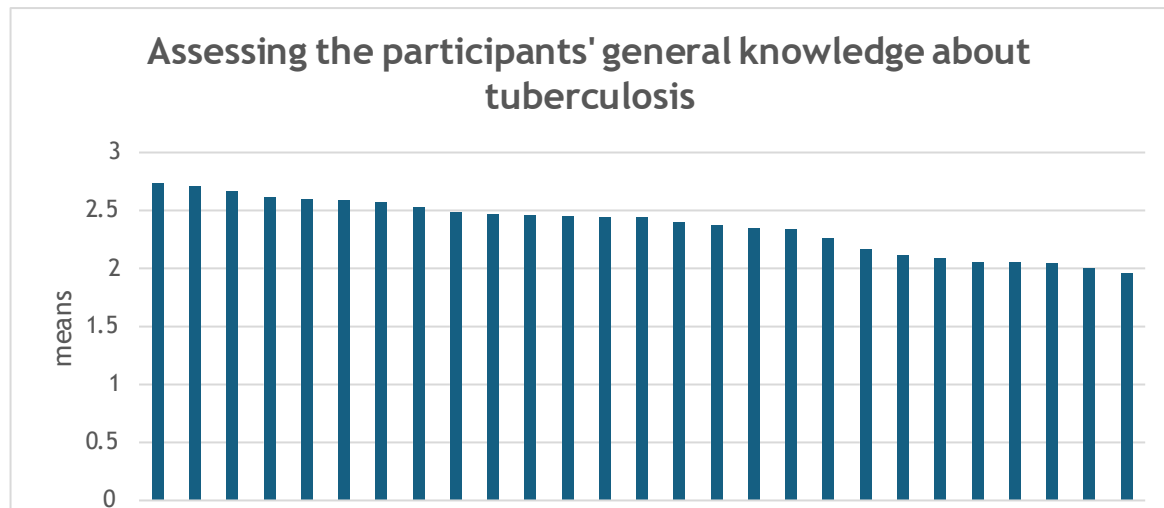
Section 2: Assessing the participants' general knowledge about tuberculosis

To answer the second section the researcher calculated Frequencies and percentages, and the table (3) shows the results

Table 3

Paragraph	Mean	Std. Deviation
I know the importance of isolating a patient with TB, which plays an important role in reducing the risk of TB transmission.	2.74	.576
Health care systems can improve access to TB preventive treatment	2.71	.563
I know if I am sick and should be quarantined	2.67	.660
I realize that tuberculosis affects the world's population, in terms of infection and mortality rates	2.62	.656
I know that TB is transmitted through droplets	2.60	.745
I have full knowledge of the infection control measures I should implement to prevent the spread of tuberculosis in health care settings	2.59	.682
I know how I can implement to control TB at the individual and population levels	2.57	.704
I know that vaccination, such as the Bacille Calmette-Guérin (BCG) vaccine, contributes to the prevention of tuberculosis.	2.53	.757
I am fully aware of the effectiveness of the BCG vaccine in preventing tuberculosis	2.49	.775
I am fully aware of the role of the BCG vaccine in preventing tuberculosis	2.47	.798

I have full knowledge of the basic modes of transmission of tuberculosis	2.46	.763
I know that TB causes lasting side effects even after recovery	2.45	.750
I can recognize the most common symptoms of active TB infection	2.44	.761
I know all infection control measures to prevent transmission of TB to others	2.44	.743
I know the important of imaging techniques to detect tuberculosis in the lungs	2.40	.751
I know exactly who is recommended to receive the BCG vaccine	2.37	.822
I know What type of microorganism causes tuberculosis	2.35	.836
Realize the importance of the Mantoux tuberculin skin test in diagnosing tuberculosis	2.34	.943
I understand the risk factors for me to develop active TB	2.26	.762
I know that spraying the air with a chemical disinfectant reduces the spread of TB	2.17	.824
I can diagnose tuberculosis in patients suspected of having the disease	2.12	.828
I am fully aware of the possible side effects of medications used to treat tuberculosis	2.09	.901
I have complete knowledge about Multidrug-resistant TB (MDR-TB)	2.06	.813
Learn how latent TB infection (LTBI) can develop into active TB disease	2.06	.742
I am very familiar with the standard treatment regimen for drug-sensitive tuberculosis	2.05	.836
I have knowledge of the populations most at risk of contracting TB	2.00	.800
I am very familiar with the challenges associated with treating MDR-TB	1.96	.842
Total (Assessment of participants' general knowledge about tuberculosis)	2.37	.476



The data presents a summary of participants' self-assessed knowledge about various aspects of tuberculosis (TB), ordered by the mean score. This provides insights into areas where participants feel more confident and areas where knowledge may be lacking. Here is an illustrated interpretation:

High Knowledge Areas (Mean Scores Above 2.5)

1. Importance of Isolating TB Patients

- Mean: 2.74, Std. Deviation: 0.576
- Highest awareness among participants about the critical role of isolating TB patients to reduce transmission risk.

2. Improving Access to Preventive Treatment

- Mean: 2.71, Std. Deviation: 0.563
- High confidence in the ability of healthcare systems to improve access to TB preventive treatment.

3. Self-Quarantine Awareness

- Mean: 2.67, Std. Deviation: 0.660
- Participants have a strong understanding of the need for self-quarantine if they are infected.

4. Global Impact of Tuberculosis

- Mean: 2.62, Std. Deviation: 0.656
- High awareness that TB significantly affects the global population in terms of infection and mortality rates.

5. Transmission of TB Through Droplets

- Mean: 2.60, Std. Deviation: 0.745

- Solid understanding that TB is transmitted through droplets, reflecting good knowledge of basic transmission routes.

6. Infection Control Measures in Healthcare Settings

- Mean: 2.59, Std. Deviation: 0.682
- Participants are aware of the infection control measures needed to prevent TB spread in healthcare settings.

7. Controlling TB at Individual and Population Levels

- Mean: 2.57, Std. Deviation: 0.704
- Good understanding of strategies to control TB on both personal and public health levels.

8. Vaccination Contribution to TB Prevention

- Mean: 2.53, Std. Deviation: 0.757
- Awareness of the role of the BCG vaccine in preventing TB is relatively high.

Moderate Knowledge Areas (Mean Scores Between 2.3 and 2.5)

9. Effectiveness of the BCG Vaccine

- Mean: 2.49, Std. Deviation: 0.775
- Participants have a moderate understanding of the effectiveness of the BCG vaccine.

10. Role of the BCG Vaccine

- Mean: 2.47, Std. Deviation: 0.798
- Knowledge about the BCG vaccine's role in TB prevention is fairly strong.

11. Modes of TB Transmission

- Mean: 2.46, Std. Deviation: 0.763
- Good awareness of how TB is transmitted, which is crucial for understanding its spread.

12. Lasting Side Effects of TB

- Mean: 2.45, Std. Deviation: 0.750
- Knowledge that TB can cause lasting effects even after recovery is reasonably well understood.

13. Recognizing Symptoms of Active TB

- Mean: 2.44, Std. Deviation: 0.761
- Participants are moderately capable of recognizing common symptoms of active TB infection.

14. Infection Control Measures to Prevent TB

- Mean: 2.44, Std. Deviation: 0.743
- Awareness of infection control measures to prevent TB transmission is fair.

15. Imaging Techniques to Detect TB

- Mean: 2.40, Std. Deviation: 0.751
- Moderate understanding of the importance of imaging techniques to detect TB in the lungs.

Lower Knowledge Areas (Mean Scores Below 2.3)

16. Who Should Receive the BCG Vaccine

- Mean: 2.37, Std. Deviation: 0.822
- Knowledge of the target groups for the BCG vaccine is somewhat limited.

17. Microorganism Causing TB

- Mean: 2.35, Std. Deviation: 0.836
- Understanding of the specific microorganism responsible for TB is moderate but could be improved.

18. Mantoux Tuberculin Skin Test

- Mean: 2.34, Std. Deviation: 0.943
- Awareness of the Mantoux test's importance in diagnosing TB is relatively low.

19. Risk Factors for Developing Active TB

- Mean: 2.26, Std. Deviation: 0.762
- Knowledge about personal risk factors for developing active TB is not very strong.

20. Chemical Disinfectants to Reduce TB Spread

- Mean: 2.17, Std. Deviation: 0.824
- Participants have limited awareness of the role of chemical disinfectants in TB control.

21. Diagnosing TB in Suspected Patients

- Mean: 2.12, Std. Deviation: 0.828
- Low confidence in diagnosing TB among patients suspected of having the disease.

22. Side Effects of TB Medications

- Mean: 2.09, Std. Deviation: 0.901
- Awareness of medication side effects is relatively weak.

23. Knowledge About Multidrug-Resistant TB (MDR-TB)

- Mean: 2.06, Std. Deviation: 0.813
- Limited knowledge about MDR-TB and its implications.

24. Latent TB Infection (LTBI) Progression

- Mean: 2.06, Std. Deviation: 0.742
- Awareness of how latent TB can develop into active TB is quite low.

25. Standard Treatment Regimen for Drug-Sensitive TB

- Mean: 2.05, Std. Deviation: 0.836
- Participants are not very familiar with the standard treatment regimens for TB.

26. Populations Most at Risk of Contracting TB

- Mean: 2.00, Std. Deviation: 0.800
- Knowledge about high-risk populations is relatively low.

27. Challenges Associated with Treating MDR-TB

- Mean: 1.96, Std. Deviation: 0.842
- This is the lowest-rated knowledge area, indicating unfamiliarity with the complexities of treating MDR-TB.

Overall Assessment

- Total Mean Knowledge Score: 2.37, Std. Deviation: 0.476
The overall knowledge of participants about TB is moderate, with room for improvement, particularly in areas concerning MDR-TB, TB diagnosis, and treatment regimens.

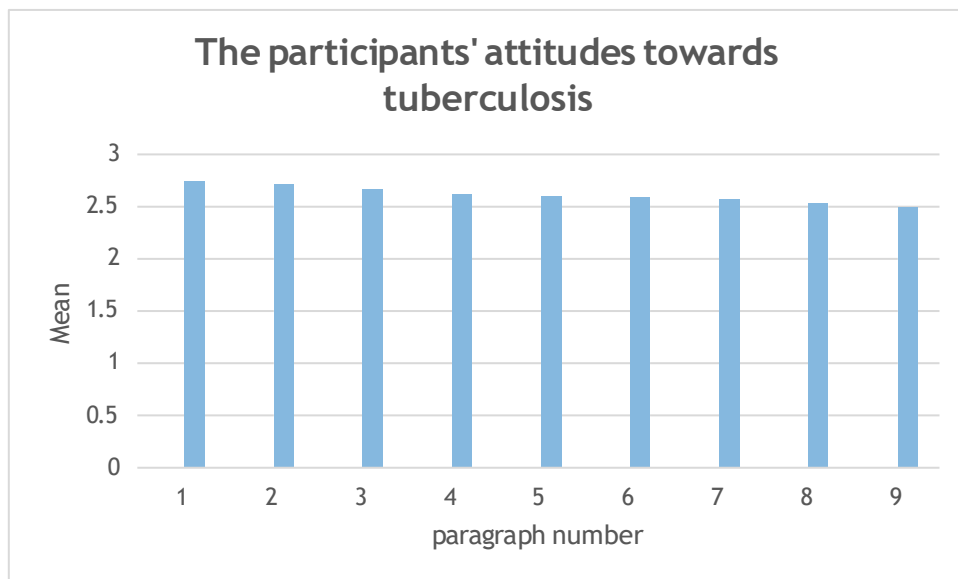
The data suggests a need for targeted education and training programs to improve knowledge in less familiar areas, especially for healthcare workers and those involved in TB prevention and control.

Section 3: The participants' attitudes towards tuberculosis.

To analyze the participants' attitudes towards tuberculosis the researcher found the mean and standard deviation for each paragraph, as it illustrated in table 4 below:

Table 4

Paragraph	Mean	Std. Deviation
I have confidence in the healthcare system's ability to diagnose and treat tuberculosis effectively	2.76	.488
I believe that tuberculosis is a preventable disease	2.73	.681
Infection prevention link nurse plays an important role in education about preventing the transmission of tuberculosis.	2.61	.791
I am concerned about the emergence of drug-resistant strains of TB.	2.40	.720
Tuberculosis is a public health problem	2.24	.868
Cultural beliefs and practices negatively influence attitudes toward tuberculosis.	2.24	.973
TB treatment is not available to everyone who needs it	1.57	.904
Hospital social support is not available for individuals with TB	1.43	.824
Total	2.25	.425



This data provides insights into participants' attitudes, beliefs, and concerns about tuberculosis (TB) and the healthcare system's ability to manage it. The mean scores range from 1.43 to 2.76, highlighting varying levels of confidence, concerns, and perceived barriers in TB management. Here is an illustrated interpretation of each point:

High Confidence Areas (Mean Scores Above 2.5)

1. Confidence in the Healthcare System's Ability to Diagnose and Treat TB Effectively

- Mean: 2.76, Std. Deviation: 0.488
- Participants have the highest confidence in the healthcare system's capacity to diagnose and treat TB effectively. The low standard deviation indicates a strong consensus among respondents.

2. Belief that Tuberculosis is Preventable

- Mean: 2.73, Std. Deviation: 0.681
- There is strong belief among participants that TB is a preventable disease, reflecting confidence in preventive measures like vaccination, public health education, and infection control.

3. Role of Infection Prevention Link Nurse in TB Education

- Mean: 2.61, Std. Deviation: 0.791
- Participants recognize the importance of infection prevention link nurses in educating people about TB prevention, indicating trust in healthcare professionals to lead public health initiatives.

Moderate Concern Areas (Mean Scores Between 2.0 and 2.5)

4. Concern About the Emergence of Drug-Resistant TB Strains

- Mean: 2.40, Std. Deviation: 0.720

- There is moderate concern about drug-resistant TB strains, reflecting awareness of the challenges posed by these forms of TB.

5. TB as a Public Health Problem

- Mean: 2.24, Std. Deviation: 0.868
- Participants moderately agree that TB remains a significant public health issue, highlighting awareness of its ongoing impact on communities.

6. Impact of Cultural Beliefs and Practices on Attitudes Toward TB

- Mean: 2.24, Std. Deviation: 0.973
- Respondents moderately acknowledge that cultural beliefs and practices can negatively influence attitudes toward TB, indicating some awareness of sociocultural barriers to TB prevention and treatment.

Low Confidence Areas (Mean Scores Below 2.0)

7. Perception of TB Treatment Availability

- Mean: 1.57, Std. Deviation: 0.904
- Participants show low confidence that TB treatment is available to everyone who needs it, suggesting perceived gaps in healthcare accessibility or equity.

8. Hospital Social Support for Individuals with TB

- Mean: 1.43, Std. Deviation: 0.824
- The lowest mean score reflects a strong perception that hospital social support for TB patients is inadequate, highlighting a critical area for improvement in holistic care.

Overall Assessment

- Total Mean Attitude Score: 2.25, Std. Deviation: 0.425
The overall attitude toward TB management, prevention, and the healthcare system's role is moderate, with notable confidence in some areas but also significant concerns about social support, treatment accessibility, and cultural influences.

The data suggests a need to address concerns about drug-resistant TB, improve access to TB treatment and support services, and overcome cultural barriers that may hinder effective TB control. Focusing on these areas could strengthen confidence and enhance TB prevention and treatment outcomes.

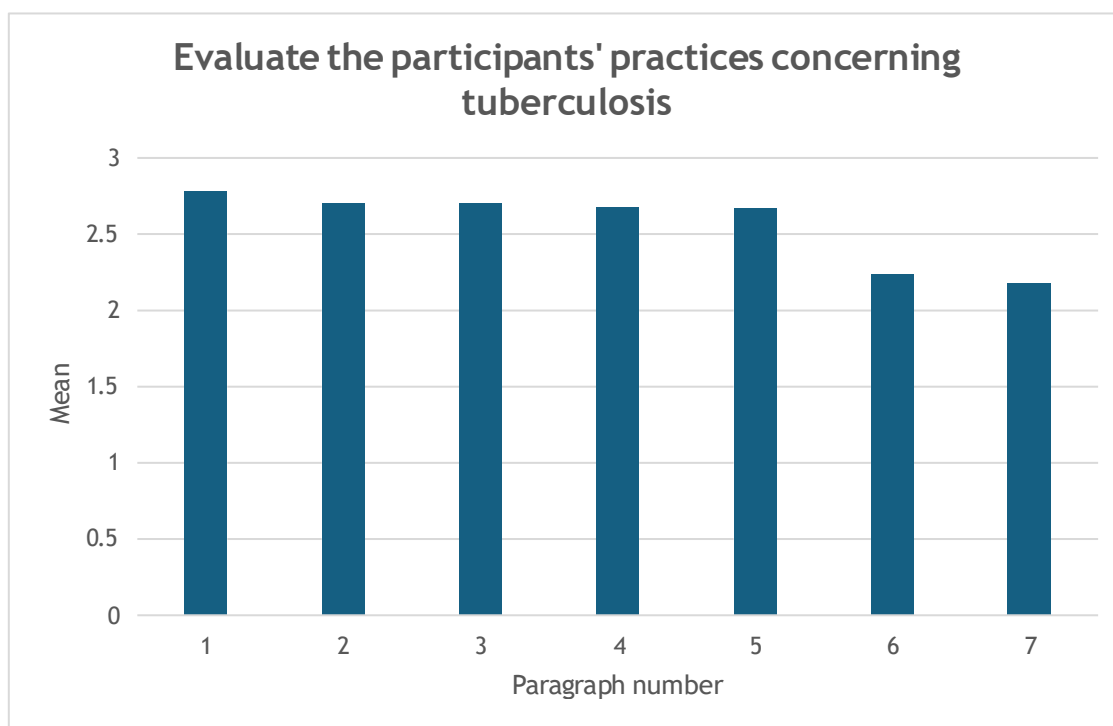
Section 4: Evaluate the participants' practices concerning tuberculosis

To analyze the participants' attitudes towards tuberculosis the researcher found the mean and standard deviation for each paragraph, as it illustrated in table 5 below:

Table 5:

Paragraph	Mean	Std. Deviation
I track best practices through wearing PPE in receiving TB patients.	2.78	.530

I seek to educate patients and their families about the prevention, transmission and treatment of tuberculosis.	2.70	.584
I follow global health strategies and protocols to promote early detection of tuberculosis cases	2.70	.488
I adhere to tuberculosis treatment regimens among patients.	2.68	.574
I maintain collaboration with other healthcare professionals to address TB within the community	2.67	.602
I conduct contact tracing and management of individuals exposed to TB	2.24	.821
I can ensure accurate and timely diagnosis of tuberculosis depending on my practices.	2.18	.768
Total	2.56	.441



This data reflects participants' self-reported practices related to tuberculosis (TB) management, particularly in terms of following guidelines, educating patients, and collaborating with other healthcare professionals. The mean scores range from 2.18 to 2.78, indicating varying degrees of adherence to best practices and protocols in TB care. Here's a breakdown of the findings:

High Adherence Areas (Mean Scores Above 2.5)

1. Tracking Best Practices Through Wearing PPE While Receiving TB Patients

- **Mean: 2.78, Std. Deviation: 0.530**
- The highest mean score reflects strong adherence to wearing personal protective equipment (PPE) when dealing with TB patients, indicating high awareness and compliance with infection prevention measures.

2. Educating Patients and Their Families About TB Prevention, Transmission, and Treatment

- **Mean: 2.70, Std. Deviation: 0.584**
- Participants actively engage in educating patients and their families, demonstrating commitment to community health education about TB.

3. Following Global Health Strategies and Protocols for Early Detection of TB Cases

- **Mean: 2.70, Std. Deviation: 0.488**
- A high mean score shows that participants are aligned with global health guidelines for TB, emphasizing the importance of early detection strategies.

4. Adhering to TB Treatment Regimens Among Patients

- **Mean: 2.68, Std. Deviation: 0.574**
- High adherence to TB treatment regimens reflects participants' diligence in ensuring patients follow prescribed treatments, crucial for effective TB management.

5. Collaboration with Other Healthcare Professionals to Address TB in the Community

- **Mean: 2.67, Std. Deviation: 0.602**
- Participants actively collaborate with other healthcare professionals, indicating a multidisciplinary approach to TB management.

Moderate Adherence Areas (Mean Scores Between 2.0 and 2.5)

6. Conducting Contact Tracing and Management of Individuals Exposed to TB

- **Mean: 2.24, Std. Deviation: 0.821**
- The lower mean score suggests that while some participants engage in contact tracing, it is not consistently practiced across all respondents, pointing to a potential area for improvement.

7. Ensuring Accurate and Timely Diagnosis of TB Based on Their Practices

- **Mean: 2.18, Std. Deviation: 0.768**
- This is the lowest-rated practice, indicating that participants feel less confident in their ability to ensure accurate and timely diagnosis of TB. This might suggest a need for further training or support in diagnostic practices.

Overall Assessment

- **Total Mean Practice Score: 2.56, Std. Deviation: 0.441**

- The overall score indicates a generally high level of adherence to best practices for TB management among participants. However, the data suggests that while participants are strong in following PPE protocols, educating patients, adhering to treatment regimens, and collaborating with others, there is room for improvement in conducting contact tracing and ensuring accurate and timely diagnoses.

To enhance TB management, targeted efforts could focus on strengthening skills in contact tracing, improving diagnostic accuracy, and ensuring consistent adherence to all recommended practices.

Evaluation of participants' general knowledge about TB by occupational category

To evaluate the participants' general knowledge about TB by occupational category, the researcher calculated the correlation between participants' general knowledge about TB by occupational category, table 6 illustrate these outcomes:

Table 6

Evaluation of participants' general knowledge about TB by occupational category

		Evaluation of participants' general knowledge about TB
Occupational category	Pearson Correlation	.547(**)
	p value	.000
	N	218

** Correlation is significant at the 0.01 level.

The value of Pearson Correlation is 0.547. This indicates that there is a moderate to strong positive relationship between general knowledge about TB and occupational category. In other words, the higher the general knowledge of the participant, the more likely he/she is to be associated with a particular occupational category.

The value of p-value is 0.000, it indicates that the result is highly statistically significant. This means that the observed relationship is not a result of chance, and there is a real relationship between the two categories.

It can be concluded that there is a strong relationship between occupational category and general knowledge about TB. This can be useful in guiding training and education strategies to identify occupational groups that may need further awareness and training about TB.

Evaluation of participants' attitudes towards TB by Occupational category

To evaluate the participants' attitudes towards TB by occupational category, the researcher calculated the correlation between participants' attitudes towards TB by occupational category, table 6 illustrate these outcomes:

Table 7 Evaluation of Participants' Attitudes Towards TB by Occupational Category

		Participants' attitudes towards TB
Occupational	Pearson	.239(**)

category	Correlation	
	p value	.000
	N	218

** Correlation is significant at the 0.01 level (2-tailed).

The data presents an analysis of participants' attitudes towards tuberculosis (TB) in relation to their occupational category, using Pearson correlation to determine the strength and significance of this relationship.

The Pearson correlation coefficient is 0.239, indicating a weak but positive correlation between participants' attitudes towards TB and their occupational category. This suggests that there is a slight tendency for attitudes towards TB to vary based on the participants' occupation. For example, healthcare workers may have different attitudes compared to non-healthcare professionals due to their exposure and experience with TB.

The p-value of .000 is highly significant ($p < 0.01$), confirming that the observed correlation is not due to random chance. This significance at the 0.01 level (2-tailed) means there is strong evidence of an actual relationship between occupational category and attitudes towards TB.

It can be concluded that there is positive correlation, although weak, suggests that the occupational category influences participants' attitudes towards TB to some extent. This could be due to differences in exposure to TB information, risk perception, or direct experience with TB patients in their respective fields. For instance, healthcare workers might have more positive or proactive attitudes toward TB prevention and control measures due to their familiarity with the disease and its impact.

In summary, while the correlation between occupational category and attitudes towards TB is not strong, it is statistically significant. This implies that targeted interventions and awareness programs could be designed according to occupational groups to address specific attitudes and misconceptions about TB, thereby improving TB prevention and control efforts.

Assessment of participants' practices regarding TB by Occupational category

To evaluate the participants' attitudes towards TB by occupational category, the researcher calculated the correlation between participants' attitudes towards TB by occupational category, table 6 illustrate these outcomes:

Table 8 Assessment of participants' practices regarding TB by occupational category

	Assessment of participants' practices regarding TB
occupational category	Pearson Correlation
	.510(**)
	p-value
	0.000
	N
	218

** Correlation is significant at the 0.01 level (2-tailed).

The data evaluates the relationship between participants' practices regarding tuberculosis (TB) and their occupational category, using Pearson correlation to measure the strength and significance of this association.

The Pearson correlation coefficient is 0.510, which indicates a moderate to strong positive correlation between participants' practices related to TB and their occupational category. This suggests that the occupational category significantly influences how participants practice TB prevention and management measures. For example, healthcare professionals may engage more in practices that prevent TB transmission compared to non-healthcare professionals.

The p-value of 0.000 shows that this correlation is highly significant ($p < 0.01$), confirming that the relationship between occupational category and TB practices is not due to random chance. This level of significance provides robust evidence that occupational differences play an essential role in determining TB-related practices.

The moderate to strong positive correlation implies that participants' practices concerning TB are substantially influenced by their occupational roles. Healthcare workers, who are more likely to be exposed to TB and are trained in handling infectious diseases, may follow more stringent TB prevention practices, such as using personal protective equipment, implementing isolation protocols, or undergoing regular screenings. On the other hand, participants from non-healthcare occupations might not have the same level of practice adherence due to less direct exposure to TB cases and potentially lower risk perception.

The findings reveal a significant association between occupational category and TB-related practices, suggesting that targeted training and educational interventions are essential, especially for non-healthcare workers, to improve TB prevention and control practices. For healthcare workers, continuous professional development and updates on best practices for TB management could further enhance their existing knowledge and compliance with preventive measures.

CHAPTER V: DISCUSSIONS AND CONCLUSIONS

Introduction

Tuberculosis (TB) is a bacterial infection. It mostly affects the lungs (pulmonary TB), but it can also affect other organs [9]. Interpreting the results from participants' responses to the study tool involves analyzing the data collected and drawing meaningful conclusions that address the research objectives. This chapter discusses and interprets the results from participants' responses to the study tool.

Discussions

The demographic characteristics of the sample population provide a comprehensive overview that can significantly influence the interpretation of findings, especially in terms of workforce dynamics, gender perspectives, and sector-specific insights.

Notably, the sample is largely composed of younger individuals, with the majority (57.3%) being between 20 to 29 years old, indicating a younger workforce or early-career stage population. The next significant age group is 30 to 39 years (38.1%), which represents middle-aged individuals, likely to bring more experience but still retaining a dynamic and adaptable approach. Only a small fraction (4.6%) falls within the 40 to 49-year-old bracket, indicating limited senior-aged participation. This distribution could suggest a workforce that is energetic, open to innovation, and more adaptable to change, which is critical in sectors requiring agility and modernization.

The gender sample is predominantly male (67.9%), with a smaller proportion of female respondents (32.1%). This gender imbalance could significantly affect any gender-based analysis or interpretation of data. A male-dominant sample might skew findings towards perspectives and experiences more prevalent among men, potentially overlooking or underrepresenting the viewpoints and challenges faced by women. If the context of the study involves exploring gender dynamics, the results may need careful consideration and possible adjustments to account for this disparity.

The number of years' experience distribution mirrors the age demographics, with a majority (57.3%) having less than 5 years of experience, indicating a strong presence of early-career professionals. Interestingly, the second largest group (33.0%) comprises individuals with more than 15 years of experience, pointing to a significant representation of highly experienced professionals. This dichotomy suggests that while there is a significant presence of young, possibly more adaptable individuals, there is also a robust group of seasoned professionals who bring stability, knowledge, and expertise to the workforce. The middle ground—those with 5 to 15 years of experience—is notably underrepresented, which could mean fewer individuals with a blend of fresh ideas and substantial experience.

In classification of appointment, we noticed that most respondents (79.4%) are healthcare employees, which indicates that the sample is heavily skewed towards this sector. This concentration could lead to findings that are more reflective of healthcare-specific challenges, trends, and dynamics. The smaller group of non-healthcare employees (20.6%) suggests that cross-sector comparisons may be limited, but it still offers a potential contrast to understand sectoral differences.

A vast majority of respondents nationality are Saudi nationals (82.1%), with only 17.9% being non-Saudi. This demographic detail suggests that the insights gathered from this study may be more relevant and applicable to the local Saudi context. It may also reflect national policies, cultural factors, or workforce regulations that are unique to Saudi Arabia, potentially limiting the generalizability of the findings to other regions or contexts.

The educational qualifications are skewed towards undergraduate degrees, with 78.0% holding a bachelor's degree. A significant proportion (15.6%) possess a PhD, while master's degree holders are the least represented (2.3%). This education distribution implies a workforce that is generally well-educated but also highlights a potential gap in individuals with master's level qualifications, who might bridge theoretical and practical applications in certain roles. The notable number of PhD holders suggests a presence of highly specialized knowledge, which could be advantageous in research, policy development, or advanced clinical settings.

Finally, there is a marked concentration of employees at Prince Muteb Hospital (58.3%), with other facilities such as Health Centers (23.4%) and King Abdulaziz Hospital (17.0%) having less representation. The Women and Children Hospital, with only 1.4% representation, is significantly underrepresented. This concentration could affect the diversity of perspectives and experiences captured in the study, as employees from different facilities may have varying experiences and challenges.

In general, the demographic characteristics of this sample provide valuable insights that can shape the interpretation and relevance of findings. The data reflects a younger, male-dominated workforce with a mix of early-career and highly experienced professionals, primarily from the healthcare sector. These factors, along with the strong representation of Saudi nationals and the skewed distribution across educational levels and workplaces, will influence the overall outcomes and applicability of the study, particularly if it involves gender, sector-specific, or cross-national analyses.

With an overall mean knowledge score of 2.37 (Std. Deviation: 0.476), the participants' knowledge about TB is moderate, indicating some understanding but also significant gaps. The data suggests the necessity for targeted education and training programs, particularly focusing on less familiar areas like MDR-TB, diagnosis techniques, and treatment regimens. Improving knowledge in these domains is crucial for healthcare workers and others involved in TB prevention and control, which is in line with previous studies such as [16].

The overall attitude toward TB management, prevention, and the healthcare system's role are moderate, with notable confidence in some areas but also significant concerns about social support, treatment accessibility, and cultural influences.

The data suggests a need to address concerns about drug-resistant TB, improve access to TB treatment and support services, and overcome cultural barriers that may hinder effective TB control. Focusing on these areas could strengthen confidence and enhance TB prevention and treatment outcomes.

The overall score indicates a generally high level of adherence to best practices for TB management among participants. However, the data suggests that while participants are strong in following PPE protocols, educating patients, adhering to treatment regimens, and collaborating with others, there is room for improvement in conducting contact tracing and ensuring accurate and timely diagnoses, which is in line with previous studies such as [5].

To enhance TB management, targeted efforts could focus on strengthening skills in contact tracing, improving diagnostic accuracy, and ensuring consistent adherence to all recommended practices.

It can be concluded that there is a strong relationship between occupational category and general knowledge about TB. This can be useful in guiding training and education strategies to identify occupational groups that may need further awareness and training about TB. The study results show that healthcare workers have greater knowledge about tuberculosis and its preventive applications compared to non-health workers, which is in line with previous studies such as [2, 6] that emphasized the role of training and experience among healthcare workers in enhancing their knowledge and awareness of the importance of tuberculosis prevention.

It can be concluded that there is positive correlation, although weak, suggests that the occupational category influences participants' attitudes towards TB to some extent. This could be due to differences in exposure to TB information, risk perception, or direct experience with TB patients in their respective fields. For instance, healthcare workers might have more positive or proactive attitudes toward TB prevention and control measures due to their familiarity with the disease and its impact.

While the correlation between occupational category and attitudes towards TB is not strong, it is statistically significant. This implies that targeted interventions and awareness programs could be designed according to occupational groups to address specific attitudes and misconceptions about TB, thereby improving TB prevention and control efforts as in [10].

The moderate to strong positive correlation implies that participants' practices concerning TB are substantially influenced by their occupational roles. Healthcare workers, who are more likely to be exposed to TB and are trained in handling infectious diseases, may follow more stringent TB prevention practices, such as using personal protective equipment, implementing isolation protocols, or undergoing regular screenings. On the other hand, participants from non-healthcare occupations might not have the same level of practice adherence due to less direct exposure to TB cases and potentially lower risk perception. Previous literature indicated the importance of following prevention protocols such as the use of personal protective equipment (PPE) and education about infection transmission, and the current study found agreement with this as it showed that healthcare workers adhere more to these protocols [12].

The findings reveal a significant association between occupational category and TB-related practices, suggesting that targeted training and educational interventions are essential, especially for non-healthcare workers, to improve TB prevention and control practices. For healthcare workers, continuous professional development and updates on best practices for TB management could further enhance their existing knowledge and compliance with preventive measures. As for attitudes, previous studies have shown that cultural factors influence attitudes towards TB, and the current study confirmed that cultural factors influence the attitudes of some workers towards TB, which reflects agreement with the literature, highlighting the importance of developing strategies that are compatible with the local cultural context to reduce barriers that may hinder TB control [10].

However, the current study also showed gaps in adherence to contact tracing procedures and timely diagnosis of the disease, which is a point of difference that requires strengthening these aspects through continuous training programs.

Findings:

1. Overall Attitude Towards TB Management and Prevention:

- Participants exhibit a moderate attitude towards TB management, prevention, and the role of the healthcare system. While there is confidence in some areas, concerns exist regarding social support, treatment accessibility, and cultural influences affecting TB control.
- There is a positive but weak correlation between occupational category and attitudes towards TB, suggesting that different occupations influence participants' attitudes. Healthcare workers tend to have more proactive attitudes due to their familiarity with the disease.

2. Knowledge and Awareness:

- The relationship between occupational category and general knowledge about TB is strong. This correlation can guide training strategies by identifying occupational groups that may require further education and awareness about TB.
- Participants showed a generally high level of adherence to TB management best practices, especially in PPE protocols, patient education, and treatment regimen adherence. However, there are gaps in conducting contact tracing and ensuring accurate and timely diagnoses.

3. TB Management Practices:

- There is a moderate to strong positive correlation between occupational category and TB management practices. Healthcare workers, due to their training and experience, follow more stringent TB prevention practices, while non-healthcare workers demonstrate lower adherence, possibly due to lower exposure and risk perception.
- Significant concerns are noted regarding drug-resistant TB, access to TB treatment, and overcoming cultural barriers that may hinder effective TB control efforts.

Recommendations:

1. Targeted Training and Educational Interventions:

- Develop targeted training programs that focus on occupational categories with weaker knowledge and practices related to TB. This should include enhancing awareness about TB symptoms, transmission, and preventive measures, particularly for non-healthcare workers who may lack exposure or training.

2. Address Cultural and Social Barriers:

- Implement strategies to overcome cultural barriers and enhance social support systems that encourage TB patients to seek timely diagnosis and treatment. Engaging community leaders and using culturally sensitive materials could help in this effort.

3. Strengthening TB Management Practices:

- Focus on improving skills in contact tracing and enhancing diagnostic accuracy among healthcare workers. Continuous professional development programs can update healthcare workers on the latest guidelines and technologies for TB management.

4. Enhance Awareness on Drug-Resistant TB:

- Increase awareness and provide specific training on the challenges associated with multidrug-resistant TB (MDR-TB), focusing on early detection, appropriate treatment regimens, and patient management to prevent the spread of resistant strains.

5. Improve Access to Treatment and Support Services:

- Address issues related to accessibility of TB treatment and support services, ensuring that all patients, regardless of their background, have equitable access to necessary care. This could involve streamlining referral systems and ensuring medications and services are readily available.

6. Promote Interdisciplinary Collaboration:

- Encourage collaborative efforts among different healthcare professionals and sectors to enhance TB prevention and control practices. Sharing knowledge and experiences across disciplines can lead to more comprehensive and effective TB management strategies.

7. Monitor and Evaluate Interventions:

- Establish a monitoring and evaluation framework to assess the impact of these interventions and adjust strategies based on feedback and evolving needs. This approach ensures continuous improvement and effectiveness in TB management efforts.

By addressing these findings with targeted recommendations, TB prevention and management outcomes can be significantly improved, ultimately reducing the burden of the disease and enhancing public health efforts.

References

1. Menzies D, Joshi R, Pai M. Risk of tuberculosis infection and disease associated with work in health care settings [State of the Art Series Occupational lung disease in high- and low-income countries, Edited by M. Chan-Yeung. Number 5 in the series]. *Int J Tuberc Lung Dis.* 2007;11(6):593–605.
2. Uden L, Barber E, Ford N, Cooke GS. Risk of Tuberculosis Infection and Disease for Health Care Workers: An Updated Meta-Analysis. *Open Forum Infect Dis.* 2017;4:ofx137.
3. Zhang Y, Wu J, Hui X, Zhang P, Xue F. Knowledge, attitude, and practice toward tuberculosis prevention and management among household contacts in Suzhou Hospital, Jiangsu province, China. *Front Public Health.* 2024 Mar 12;12:1249971. doi: 10.3389/fpubh.2024.1249971. PMID: 38532970; PMCID: PMC10963489.
4. Parreira P., Santos-Costa P., Neri M., Marques A., Queirós P., Salgueiro-Oliveira A. (2021). Work methods for nursing care delivery. *International Journal of Environmental Research and Public Health*, 18(4), 2088. <https://doi.org/10.3390/ijerph18042088>
5. Jin J., Yi Y. J. (2019). Patient safety competency and the new nursing care delivery model. *Journal of Nursing Management*, 27(6), 1167–1175. <https://doi.org/10.1111/jonm.12788>
6. Wei H., Sewell K. A., Woody G., Rose M. A. (2018). The state of the science of nurse work environments in the United States: A systematic review. *International Journal of Nursing Sciences*, 5(3), 287–300. <https://doi.org/10.1016/j.ijnss.2018.04.010>
7. Al-Orainey IO: Tuberculosis infection during Hajj pilgrimage. The risk to pilgrims and their communities. *Saudi Med J.* 2013, 34:676-80.
8. Alzeer A, Mashlah A, Fakim N, Al-Sugair N, Al-Hedaithy M, Al-Majed S, Jamjoom G: Tuberculosis is the commonest cause of pneumonia requiring hospitalization during Hajj (pilgrimage to Makkah). *J Infect.* 1998, 36:303-6. 10.1016/s0163-4453(98)94315-8

9. Kandasamy G, Almaghaslah D, Almanasef M. Knowledge, attitude and practice towards tuberculosis among healthcare and non-healthcare students at a public university in Saudi Arabia. *Front Public Health*. 2024 Feb 5;12:1348975. doi: 10.3389/fpubh.2024.1348975. PMID: 38379677; PMCID: PMC10877943.
10. Vigenschow A, Edoa JR, Adegbite BR, Agbo PA, Adegnika AA, Alabi A, Massinga-Loembe M, Grobusch MP. Knowledge, attitudes and practices regarding tuberculosis amongst healthcare workers in Moyen-Ogooué Province, Gabon. *BMC Infect Dis*. 2021 May 27;21(1):486. doi: 10.1186/s12879-021-06225-1. PMID: 34039304; PMCID: PMC8157668.
11. Alotaibi B, Yassin Y, Mushi A, Maashi F, Thomas A, Mohamed G, Hassan A, Yezli S. Tuberculosis knowledge, attitude and practice among healthcare workers during the 2016 Hajj. *PLoS One*. 2019 Jan 25;14(1):e0210913. doi: 10.1371/journal.pone.0210913. PMID: 30682065; PMCID: PMC6347151.
12. Lemon SM, Hamburg MA, Sparling PF, Choffnes ER, Mack A. (2007), Global infectious disease surveillance and detection: assessing the challenges. Workshop summary. In *Global infectious disease surveillance and detection: assessing the challenges. Workshop summary*. National Academies Press.
13. Reliefweb. Drug-resistant tuberculosis in Afghanistan: We must continue to put people at the center of treatment; 2022. Available from: <https://reliefweb.int/report/afghanistan/drug-resistant-tuberculosis-afghanistan-we-must-continue-put-people-center>.
14. WHO. Tuberculosis, Key facts. <https://www.who.int/news-room/fact-sheets/detail/tuberculosis> In: Geneva: WHO;; 2020.
15. Regassa Luba T, Tang S, Qiaoyan L, Afewerki Gebremedhin S, Kisasi MD, Feng Z. Knowledge, attitude and associated factors towards tuberculosis in Lesotho: a population-based study. *BMC Infect Dis*. 2014;19(96):1–10 doi:10.1186/s12879-019-3688-x.
16. Yasir Essar M, Jan Rezayee K, Ahmad S, et al. Knowledge attitude and practices toward tuberculosis among hospital outpatients in Kabul, Afghanistan. *Frontiers*. 2022;10(933005):1–10, 11 7 doi:10.3389/fpubh.2022.933005.

Appendix I

The questionnaire

English questionnaire

Dear participants:

This questionnaire is for the collection of basic data for research submitted to the department of Faculty of Graduate Studies at the University of Al-Jouf as part of the requirements for obtaining a master's degree entitled " Conducting knowledge, attitude and practice towards tuberculosis among healthcare and non-healthcare employees in Al-Jouf hospitals.

". Please answer all the paragraphs of the attached questionnaire by placing a reference (x) under the appropriate alternatives set at each paragraph.

Please answer all survey questions and do not leave any paragraphs unanswered as this will be lost. This questionnaire is evaluated as a tool to collect the required study data. Your answers will be used for scientific research purposes only.

All of the response in the survey will be recorded anonymously. And will be a crossed by the research team only, if you have any questions regarding the survey or this research project in general, please contact the researcher at e-mail: by completing and submitting this survey, you are indicating your consent to participate in the study

Thank you for your good cooperation

The Researcher

Section 1: General Information:

Please answer the following questions by placing an (X) in front of the appropriate answer:

- 1- Age:
 - ☐ from 20 to 29 years old
 - ☐ from 30 to 39 years old
 - ☐ from 40 to 49 years old
 - ☐ from 50 to 59 years old
- 2- Gender:
 - ☐ male
 - ☐ female
- 3- Years of experience:
 - ☐ Less than 5 years
 - ☐ 5 to 10 years
 - ☐ 11 to 15
 - ☐ More than 15 years
- 4- Classification of appointment:
 - ☐ pharmacist
 - ☐ doctor (physician)
 - ☐ nurse
 - ☐ radiologist technique
 - ☐ lab technician
 - ☐ non-healthcare employees
- 5- Nationality:
 - ☐ Saudi
 - ☐ non-Saudi
- 6- Level of education:
 - ☐ bachelor
 - ☐ master
 - ☐ PhD
 - ☐ other
- 7- place or work:
 - ☐ Al-Muwaishir Hospital
 - ☐ Prince Miteb Hospital
 - ☐ Prince Abdulaziz Specialized Hospital
 - ☐ Sawyer Clinic
 - ☐ Sawyer Hospital
 - ☐ Douma Al-Jandal Hospital

Section 2: Assessing the participants' general knowledge about tuberculosis

Paragraph	Yes	No
I know What type of microorganism causes tuberculosis		
I have full knowledge of the basic modes of transmission of tuberculosis		
I can recognize the most common symptoms of active TB infection		
I can diagnose tuberculosis in patients suspected of having the disease		
Realize the importance of the Mantoux tuberculin skin test in diagnosing tuberculosis		
I know the important of imaging techniques to detect tuberculosis in the lungs		
I am very familiar with the standard treatment regimen for drug-sensitive tuberculosis		
I am fully aware of the possible side effects of medications used to treat tuberculosis		
I have complete knowledge about Multidrug-resistant TB (MDR-TB)		
I am very familiar with the challenges associated with treating MDR-TB		
I have full knowledge of the infection control measures I should implement to prevent the spread of tuberculosis in health care settings		
I am fully aware of the role of the BCG vaccine in preventing tuberculosis		
I know exactly who is recommended to receive the BCG vaccine		
I am fully aware of the effectiveness of the BCG vaccine in preventing tuberculosis		
Learn how latent TB infection (LTBI) can develop into active TB disease		
I understand the risk factors for me to develop active TB		
I have knowledge of the populations most at risk of contracting TB		
I realize that tuberculosis affects the world's population, in terms of infection and mortality rates		
I know how I can implement to control TB at the individual and population levels		
I know that TB is transmitted through droplets		
I know if I am sick and should be quarantined		
I know that TB causes lasting side effects even after recovery		
I know that spraying the air with a chemical disinfectant reduces the spread of TB		
I know that vaccination, such as the Bacille Calmette-Guérin (BCG) vaccine, contributes to the prevention of tuberculosis.		
Health care systems can improve access to TB preventive treatment		

I know all infection control measures to prevent transmission of TB to others		
I know the importance of isolating a patient with TB, which plays an important role in reducing the risk of TB transmission.		

Section 3: The participants' attitudes towards tuberculosis.

Paragraph	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I believe that tuberculosis is a preventable disease					
Tuberculosis is a public health problem					
TB treatment is not available to everyone who needs it					
Hospital social support is not available for individuals with TB					
Infection prevention link nurse plays an important role in education about preventing the transmission of tuberculosis.					
I am concerned about the emergence of drug-resistant strains of TB.					
I have confidence in the healthcare system's ability to diagnose and treat tuberculosis effectively					
Cultural beliefs and practices negatively influence attitudes toward tuberculosis.					

Section 4: Evaluate the participants' practices concerning tuberculosis

Paragraph	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I can ensure accurate and timely diagnosis of tuberculosis depending on my practices.					
I adhere to tuberculosis treatment regimens among patients.					
I seek to educate patients and their families about the prevention, transmission and treatment of tuberculosis.					
I conduct contact tracing and management of individuals exposed to TB					
I maintain collaboration with other healthcare professionals to address TB within the community					

I follow global health strategies and protocols to promote early detection of tuberculosis cases					
I track best practices through wearing PPE in receiving TB patients.					

Thank you for participating in this survey

The researcher

الاستبيان باللغة العربية عزيزي

المشارك:

تهدف هذه الاستبانة إلى جمع البيانات الأساسية للأبحاث المقدمة إلى قسم كلية الدراسات العليا بجامعة الجوف ضمن متطلبات الحصول على المعرفة والاتجاهات والممارسة تجاه مرض المل بين العاملين في مجال الرعاية الصحية العاملين من غير الرعاية الصحية في مستشفيات الجوف. " . يرجى الإجابة على جميع فقرات الاستبيان المرفق بوضع الإشارة (x) تحت البدائل المناسبة المحددة عند كل فقرة.

يرجى الإجابة على جميع أسئلة الاستطلاع وعدم ترك أي فقرات دون إجابة لأن ذلك سوف يضيع. ويتم تقييم هذا الاستبيان كأداة لجمع بيانات الدراسة المطلوبة. سيتم استخدام إجاباتك لأغراض البحث العلمي فقط. سيتم تسجيل جميع الإجابات في الاستطلاع بشكل مجهول. وسيتم العيور من قبل فريق البحث فقط، إذا كان لديك أي أسئلة بخصوص الاستبيان أو هذا المشروع البحثي بشكل عام، يرجى الاتصال بالباحث على البريد الإلكتروني: بإكمال هذا الاستبيان وإرساله، فإنك تشير إلى موافقتك على المشاركة في الدراسة

شكرا لكم على حسن تعاونكم الباحث

القسم الأول: معلومات عامة:

يرجى الإجابة على الأسئلة التالية بوضع علامة (X) أمام الإجابة المناسبة: [من 20 1- العمر:

إلى 29 سنة]

[من 30 إلى 39 سنة]

[من 40 إلى 49 سنة]

من 50 إلى 59 سنة 2-

الجنس:

[ذكر

[أنثى

3- سنوات الخبرة:

[أقل من 5 سنوات

[من 5 إلى 10 سنوات

[من 11 إلى 15]

[أكثر من 15 عاما 4-

مصنف العين : [ميدلاني

[طبيب (طبيب)] []

ممرضة

[نقية الأسف] [في مختبر

[الموظفين غير العاملين في مجال الرعاية الصحية 5- الجنسية :

[سعودي

[غير سعودي

6- السنوى التعليمي : []

بكالوريوس

[بان

[دكتوراه] []

آخر

7- المكان أو العمل :

[مستشفى المؤنبر

[مستشفى الأمير متعب

[مستشفى الأمير عبد العزيز التخصصي] [مستوصف

صوير

[مستشفى صوير

[مستشفى دومة الجندل

القسم 2: تقييم المعرفة العامة للمشاركين حول مرض السل

الفترة	نعم	لا
أعلم نوع الكائن الدقيق الذي يسبب مرض السل		
لدي معرفة كاملة بأساليب لنقل السل الأساسية		
أستطيع التعرف على الأعراض الأكثر شيوعاً لعدوى السل النشطة		
أستطيع تشخيص السل لدى المرضى المشتبه بإصابتهم بالمرض		
أدرك أهمية اختبار الجلد التوبركولينى ملتقو في تشخيص السل		
أعلم أهمية تقنيات التصوير للكشف عن السل في الرئتين		
أنا على دراية تامة بنظام العلاج القياسي للسل الحساس للأدوية		

Conducting Knowledge, Attitude, And Practice Towards Tuberculosis Among Healthcare And Non-Healthcare Employees In Al-Jouf Hospitals

		أنا مدرك تماماً لآثار الجانبيه المحتملة للأدوية المستخدمة لعلاج السل
		لدي معرفة كاملة بالسل المقاوم للأدوية المتعددة (MDR-TB)
		أنا على دراية تامة بالتحديات المرتبطة بعلاج السل المقاوم للأدوية المتعددة
		لدي معرفة كاملة بإجراءات التحكم في العدوى التي يجب علي تنفيذها لمنع انتشار السل في مرافق الرعاية الصحية
		أنا مدرك تماماً "ما الدور لقاح BCG في الوقاية من السل
		أعلم بالضبط من يوصي له بتلقي لقاح BCG
		أنا مدرك تماماً "ما لفعالية لقاح BCG في الوقاية من السل
		أعرف كيف يمكن أن تتطور عدوى السل الكامنة (LTBI) إلى مرض السل النشط
		أفهم العوامل التي تعرضني لخطر تطوير مرض السل النشط
		لدي معرفة بالسكان الأكثر عرضة للإصابة بالسل
		أدرك أن مرض السل يؤثر على سكان العالم من حيث معدلات العدوى والوفيات
		أعلم كيف يمكنني تنفيذ تدابير السيطرة على السل على المستوى الفردي والجماعي
		أعلم أن السل ينتقل عن طريق الرذاذ
		أعلم إذا كنت مري "صا ويجب أن أكون في الحجر الصحي
		أعلم أن السل يسبب أثاراً جانبية دائمة حتى بعد الشفاء
		أعلم أن رش الهواء بمطهر كيميائي يقلل من انتشار السل
		أعلم أن التطعيم، مثل لقاح (BCG) Bacille Calmette-Guérin ، يساهم في الوقاية من السل.
		يمكن لأنظمة الرعاية الصحية تحسين الوصول إلى علاج الوقاية من السل
		أعلم جميع إجراءات التحكم في العدوى لمنع انتقال السل للأخرين
		أعلم أهمية عزل المريض المصاب بالسل، والذي يلعب دوراً "مهماً في تقليل خطر انتقال السل.

القسم الثالث: مواقف المشاركين تجاه مرض السل

القسم الرابع: تقييم ممارسات المشاركين فيما يتعلق بمرض السل

الفقرة	لا أوافق بشدة	لا أوافق	أوافق	أوافق بشدة
أستطيع ضمان التشخيص الدقيق وفي الوقت المناسب للسل بنا "ء على ممارستي				
لدي ثقة في قدرة نظام الرعاية الصحية على تشخيص وعلاج مرض السل بفعالية				
تؤثر المعتقدات والممارسات الثقافية سلباً على المواقف تجاه مرض السل				
ألتزم بأنظمة علاج السل بين المرضى				
أسعى لتثقيف المرضى وأسراهم حول الوقاية من السل وانتقله وعلاجه				
أقوم بتبني وإدارة الأفراد الذين تعرضوا للسل				

					أحافظ على التعاون مع المهنيين الصحيين الآخرين لمعالجة مرض السل في المجتمع
					تتابع استراتيجيات وبروتوكولات الصحة العالمية لتعزيز الكشف المبكر عن حالات السل
					تتابع أفضل الممارسات من خلال ارتداء معدات الوقاية الشخصية عند استقبال مرضى السل

شكرا لك على المشاركة في هذه الدراسة الباحثة