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(ACCRA)

KNOWLEDGE, ATTITUDE AND PRACTICES RELATED TO TUBERCULOSIS AMONG HEALTHCARE WORKERS AT KOMFO ANOKYE TEACHING HOSPITAL

BY

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DECLARATION

I hereby declare that this written thesis " Knowledge, Attitude and Practices related to Tuberculosis among Healthcare Workers at Komfo Anokye Teaching Hospital" is solely my work and it contains no published work accepted for the award of any other degree of the University, except where due acknowledgement has been made in this project.

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(Academic Supervisor) Signature Date
(Department of Microbiology)

DEDICATION

I dedicate this work to the Almighty God for his utmost blessings, and to my supervisor Prof Eric Sampane - Donkor as well as my family.

ACKNOWLEDGEMENT

My sincere thanksgiving goes to the Almighty God for his abundance grace and favor, seeing me through this academic work.

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ABSTRACT

Background: Tuberculosis (TB) is one of the most important infectious diseases in the world. A lot of efforts have been put in place to curb its menace since the global epidemic in the 1990s. Even though progress has been made in recent time, the incidence and mortality rates of tuberculosis leaves a lot to be desired. Good knowledge, positive attitude and good preventive practice on the part of healthcare workers (HCWs) are pivotal in the fight against TB worldwide. A deficit in the knowledge, attitude and TB preventive practice among HCWs can lead to the delivery of substandard care, ineffective use of resources and poor service delivery which would impact health outcomes negatively as well as increase the risk of TB transmission and compound the issues of antimicrobial resistance. The aim of this study was to assess the knowledge, positive attitude and preventive practice (KAP) of

HCWs as well as the determinants of KAP among HCWs in Komfo Anokye Teaching Hospital (KATH).

Method: This study was a descriptive cross – sectional survey. A structured knowledge, attitude and practice questionnaire was administered among

Doctors/Physicians, Nurses, Midwives, Pharmacists/Drug Dispensers, Biomedical Scientists.

Results: Three hundred and sixty nine (369) healthcare workers (HCWs) in Komfo Anokye Teaching Hospital (KATH) participated in this study. These included two hundred and nine (209) Nurses, Seventy-seven (77) Midwives, fifty - nine (59) Doctors/Physician Assistants, thirteen (13) Pharmacists/Pharmacy Technicians and seven (7) Biomedical Scientists. Knowledge (overall mean score = 0.74, SD=1.3), attitude (overall mean attitude score = 0.67, SD = 0.08) and TB control practice

(overall mean attitude score = 0.77, SD = 0.17) of HCWs were good. Nonetheless some gaps were identified. With regard to TB knowledge, knowledge deficit was observed on the signs and symptoms, diagnoses, treatment regimen and the mode of transmission. Again healthcare workers (70 %) were not willing to work aon TB patients as they perceived TB as threatening and stressful. Poor practice was identified with regard to adequate training of staffs on TB and timing of diagnosing TB suspected cases. Educational level of HCWs was a predictor of TB knowledge where HCWs holding a Bachelor degree were five times likely to have good knowledge on TB (AOR: 5.17, 95% CI: 1.24-21.65). Nurses were 16 % likely to demonstrate positive attitude (AOR: 0.16, 95% CI: 0.03-0.7) compared to Doctor/

Physician Assistants. HCWs with a Diploma (AOR: 17.6, 95% CI: 4.37-70.93), Bachelor‟s Degree (AOR: 0.85, 95% CI: 1.55-22.07), Masters (AOR: 14.38, 95% CI: 1.23-168.85) were also more likely to demonstrate positive attitude. Females (AOR: 2.19, 95% CI: 1.17-4.10), Nurses (AOR: 2.35, 95% CI: 1.15-4.8**)** and Midwifes were likely to practice good TB infection control.

Conclusions: The outcome of this result is encouraging since majority of respondent had good knowledge, attitude and effective practice in the control and management of TB. Even though the aforementioned were identified to be good, some gaps were undoubtedly disclosed necessitating the need for adequate education of Healthcare workers on TB disease and infection.

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ABBREVIATIONS AND ACRONYMS

ABBREVIATIONS	NAMES
AIDS	Acquired Immunodeficiency Syndrome
BCG	Bacillus Calmette – Guerin
DOT	Directly Observed Therapy
GHS	Ghana Health Service
HCWs	Healthcare Workers
HIV	Human Immunodeficiency Virus
KAPs	Knowledge, Attitude, Practices
KATH	Komfo Anokye Teaching Hospital
MDR – TB	Multi – Drug Resistance – Tuberculosis
OPD	Out – Patient Department
TB	Tuberculosis
WHO	World Health Organisation
XDT – TB	Extensive Drug Resistance - Tuberculosis

CHAPTER ONE

INTRODUCTION

1.0 BACKGROUND

Tuberculosis (TB) is one of the most common communicable diseases that affect people globally. Even though, a lot of attempts have been made in recent times in the control of tuberculosis, it remains a major public health burden. A report from World Health Organization (WHO) discloses that, tuberculosis continues to be part of the top ten (10) causes of death – in 2000, it was sixth and in 2015 ninth (Global Health Estimate, 2000; Global Health Estimate, 2015). New cases recorded globally on tuberculosis in 2015 were 10.4million with 1.8million deaths including 0.4million HIV related cases (WHO, 2016). According to the Global Tuberculosis Report 2016, out of 55% of TB cases that had HIV test, 78% were found to be positive. It was also observed that, TB cases with HIV formed 31% of the overall TB cases in the WHO Africa Region (WHO, 2016). Evidence available therefore indicates that the conditions of patients who have HIV can become worse with a higher incidence of Tuberculosis.

Tuberculosis is caused by the organism, *Mycobacterium tuberculosis.* Tuberculosis is an airborne disease; hence one becomes infected through inhalation by coming into contact with the droplet nuclei which carries the organism. The droplet nuclei become airborne as an infected person coughs, sneezes, shouts or sings. The risk of infection is dependent on the duration of exposure and concentration of the droplet– the closer the proximity and longer the duration, the higher the risk of infection (Centers for Disease Control and Prevention, 2005: Nienhaus *et al*, 2014).

The mode of transmission of tuberculosis put a lot of people at risk of getting infected, especially those in the healthcare settings (WHO, 2016).Thus healthcare workers are at a higher risk of becoming infected especially those who come into close contact with

TB patients particularly, nurses, physicians, laboratory personnel (Tudor *et al*, 2014).Several studies point out the risk level of tuberculosis to healthcare workers. In a review article by Cobelens (2007), it was observed that delayed diagnosis of TB in infected patients; ineffective treatment, poor ventilation and air circulation, inadequate infection prevention control and Multi-Drug Resistance (MDR) were contributing factors of tuberculosis risk among healthcare workers. A study in Netherland showed that, out of 67 healthcare workers whose source of TB infection could be traced, 28(42%) were found to be infected at work. It was further shown that delayed diagnosis and inadequate TB prevention control played a part in TB infection among healthcare workers (HCWs) (Vries *et al,* 2006).

In a related study in Malaysia, it was recorded that the incidence rate among healthcare workers increased from 65.71/100000 in 2007 to 97.86/100000 in 2010 (Farhanah *et al,* 2016).Nienhaus *et al* (2014) observed that HCWs who worked on TB patients who needed bronchoscopy and intubation were at higher risk of TB infection.

Despite the burden of TB globally, the risk level among HCWs could be seen to be lowered in areas where proper preventive practices are followed. To achieve this feat, effective communication between HCWs and TB patients is very paramount. This together with adequate knowledge, good attitude and preventive practice on the part of HCWs would help curb the menace and also contribute to efforts to fight TB globally (Farhanah *et al*, 2016; Lerkanokkum *et al*, 2013). In that, if HCWs have adequate information on tuberculosis, it would help them develop and exhibit positive attitude towards patients and co-workers, thereby enabling them to put into practice measures in preventing TB in and around their health facilities – also to the general population; hence strengthening the pillars and components of the End TB strategy, which fall in the domain of healthcare workers (WHO, 2016).

The incidence rate of tuberculosis per 100000 per year in Ghana from 2000 to 2015 has seen a steady decline according to WHO – 216 in 2000 and 160 in 2015 (WHO, 2016). Although, Ghana is not part of high burdened TB only countries in the world, the country forms part of the 30 countries with high burden of TB/HIV cases (WHO, 2016).

1.1 PROBLEM STATEMENT AND SIGNIFICANCE OF THE STUDY

Tuberculosis is one of the global cankers in the world. A lot of efforts have been put in place to curb its menace since the global epidemic in the 1990s. Even though progress has been made in recent time, the incidence and mortality rates leaves a lot to be desired. According to a report by WHO (2016); in 2015, it was recorded that 17.3% of new cases of tuberculosis resulted in death of the patients. Out of these fatalities, 22.2% were complicated with another common communicable disease, i.e. HIV/AIDS. As part of ways to curb the high incidence, WHO rolled out the Stop TB strategy (WHO, 2006) which helped in diverse ways and now the End TB strategy (WHO, 2016) has been brought to fore. According to the pillars on which the End TB campaign would thrive, the first pillar makes mention of "integrated, patient centered care and prevention "and the second component of the second pillar states "Engagement of communities, civil society organizations, and public and private care providers" (WHO, 2016). The activities and components of this pillar points highlight the important role of healthcare workers in controlling menace. Farnahah *et al* (2016) indicated that good knowledge, attitude and preventive practice are essential in therapeutic outcome of tuberculosis.

In as much as in Ghana we have seen steady decline of TB incidence, there are limited data and no published article on tuberculosis cases among healthcare workers (WHO, 2016). Additionally, there is hardly any information on the knowledge, attitude and practices on tuberculosis among HCWs.

It is established that Healthcare Workers play a vital role in an attempt to fight diseases, be it communicable or non-communicable. Therefore, assessing the knowledge, attitude and practice of healthcare workers (HCWs) on tuberculosis (TB) would help in the control of the disease. Results from the study provides direction for training of healthcare workers on tuberculosis. Consequently, the study therefore supports efforts of the national TB programme control in Ghana.

1.2 GENERAL OBJECTIVE

The main aim of this study is to evaluate the knowledge, attitude and practices (KAPs) related to Tuberculosis among healthcare workers in the Komfo Anokye Teaching Hospital (KATH)).

1.2.1 Specific Objectives

1. To assess the knowledge, attitude and practice (KAP) of healthcare workers (HCWs) on tuberculosis (TB) at KATH.
2. To identify determinants of knowledge, attitude and practice of tuberculosis among the healthcare workers.

1.3 OPERATIONAL DEFINITION OF TERMS

- *Healthcare worker(s)* – someone who works in a health facility.
- *Practice* – kind of service delivery by HCWs through TB infection control.

CHAPTER TWO

LITERATURE REVIEW

2.1 EPIDEMIOLOGY OF TUBERCULOSIS

Tuberculosis (TB) is a communicable disease induced by bacteria *Mycobacterium tuberculosis*, which most often affects the lungs, both curable and preventable. TB spreads through the atmosphere from individual to individual. They propel the TB

germs into the atmosphere when individuals with lung TB cough, sneeze, or spit. To get infected, a individual requires to inhale just a few of these germs (Fogel, 2015).

WHO reports that approximately one – third of the people in the world harbor the TB bacteria without exhibiting the signs and symptoms of the disease, hence cannot spread the condition. According to WHO (2016), People with TB bacteria are 10% likely to fall ill with the TB disease. However, individuals with lower immune systems, such as individuals with HIV, malnutrition or diabetes, or individuals who use tobacco, have a much greater danger of getting sick (WHO, 2016).

The signs (such as cough, fever, night sweats, or weight loss) can be normal for many months when an individual gets active TB disease. This may result in delays in pursuing care, resulting in bacteria being transmitted to others. Through close touch over the course of a year, individuals with active TB can infect 10–15 other individuals. On median, 45% of HIV-negative individuals with TB and almost all HIV-positive individuals with TB will die without adequate therapy (WHO, 2016).

In their most successful years, tuberculosis mainly affects adults. All age groups, however, are at danger. More than 95% of instances of TB and fatalities occur in emerging nations. People with HIV are 20 to 30 times more probable to create active tuberculosis. Similarly, those suffering from conditions that impair the immunes system also stand the risk of developing active TB. Children of about one million with age group between zero to fourteen (0–14 years of age) got sick with TB, and out of this, one hundred and seventy thousand children with exception of children infected with HIV) lost their live from the disease in 2015. TB is present in almost every part of the world. Among the people who use tobacco, risk of contracting the TB disease is greatly high. Generally, increasing number of people (20%) with TB cases are attributed to

smoking. In 2015, the highest incidence of TB occurred in Asia with 61%, followed by Africa with 26% (WHO, 2016).

Globally, WHO (2016) discloses that the top ten (10) sources of death includes tuberculosis. In 2015, 10.4 million individuals suffered from TB and 1.8 million died from the disease (including 400,000 among HIV-positive people). In low-and middleincome nations, over 95% of TB fatalities happen. Six countries account 60%, followed by India, Indonesia, China, Nigeria, Pakistan and South Africa, which are leading the list. An approximately 1 million kids were sick with TB in 2015 and 170,000 were killed with TB (excluding kids with HIV). TB is a leading HIV-positive individual killer: 35% of HIV deaths were due to TB in 2015. An approximately 480000 individuals worldwide created MDR-TB (MDR-TB) in 2015 (WHO, 2016). About nine million people around the world developed tuberculosis for the first time in 2004, and nearly two million died with or from the disease (WHO, 2006).

Since 2000, the average TB rate has decreased by 1.5% per year. This must speed up to 4-5% annual loss to achieve the 2020 milestones of WHO's "End of TB Strategy." An estimated TB diagnosis and treatment between 2000-2015 saved an estimated 49 million lives. Tuberculosis ending by 2030 is one of the freshly agreed Sustainable Development Goals ' health objectives (WHO 2016). About two decades ago, the problem of tuberculosis in Africa attracted little attention partly because TB incidence was low and falling in most parts of the continent (Dye *et al*, 2006). The burden of TB in Africa is far greater today, especially in the Sub Saharan. Poverty, under development and political instability in various parts of the continent has inhibited progress in implementing effective TB control measures (Dye *et al*, 2006).

South Africa is one of the countries with the highest burden of TB with an estimated incidence of 450,000 cases of active Tb in 2013. So about 1% of South Africa‟s population develops active TB, which places the country as the third highest in the world after India and China (Kanabu, 2016).

Among the healthcare workers, tuberculosis has remained an occupational hazard for since 1920s and due to several tuberculosis outbreaks in healthcare settings in the early 1990s, the concern about the transmission to both patients and healthcare workers has been raised (Farhanah *et al*, 2016). Healthcare workers have two to three folds greater the risk of active tuberculosis than the general population and this is of greater concern especially if the health setting is not well equipped with the requisite knowledge and resources to protect themselves, the healthcare workers may not be able to effectively protect the patients in their care and treat the infected populace (Farhanah *et al*, 2016).

A study done in the Netherlands to determine the conditions that place healthcare workers at risk aside the occupational exposure revealed delayed diagnosis, ineffective TB control protocol and inadequate infection-control measures as the main factors (Vries *et al*, 2006). The study also concluded that predisposing factors making healthcare workers more susceptible to the condition is difficult to determine as some of the tested TB positive workers were community acquired.

After chemotherapy was introduced in the 1950s, prevention of tuberculosis disease among medical professionals lost notice (Menzies et al, 1995). It was reactivated by the latest revival of tuberculosis and the development of HIV infection and multi-drug resistance in nations with a low incidence of TB (Menzieset al 1995). HIV infection in the HCW improves the likelihood of illness following infection, elevated therapeutic risk of multi-drug resistance Sand suicide, and their mixture, in specific, has caused

multi-drug-resistant tuberculosis nosocomial outbreaks (Cobelens, 2007). Inflation in the patient with infectious disease, bad ventilation Sand air recirculation, insufficient infection control and isolation methods, and unrecognized (numerous) medical resistance are important variables that contribute to nosocomia disease infection. (Cobelens, 2007).

A retrospective research in a hospital in South Africa revealed that some healthcare workers had contracted multidrug resistant tuberculosis with a third of the affected dying from the disease (Tudor *et al*, 2014). The level of risk was dependent on the level of exposure as most workers were working in TB wards, pediatric units and outpatient departments.

2.2 DIAGNOSIS AND TREATMENT OF TUBERCULOSIS

Cough with sputum and blood at moments, chest pain, weakening, loss of weight, fever and night sweats are common signs of active lung TB. Many nations still depend on a long-standing technique named sputum smear microscopy to diagnose TB, with qualified laboratory engineers examining sputum microscopy samples to see whether there are TB bacteria. Only half the number of TB cases are detected by microscopy and the number of medication-resistance TB bacteria cannot be detected. Since the WOHO's first recommendation for use in 2010, the use of Xpert MTB / RIF ® has expanded substantially. TB and the most significant TB medicine is concurrently detected in the experiment. The diagnosis can be carried out in 2 hours and now the evaluation of all individuals with TB indications and diseases is suggested by the WHO as the starting diagnostic test. The trial already includes over 100countries, including Ghana, and 6.2 million cartridges were procured worldwide in 2015 (WHO, 2016).

The diagering of MRTs and MRTs as well as HIV-associated TBs may be complicated and costly. Diagnosis is also very costly. WHO has recommended 4 new diagnostic tests in 2016–the fast-molecular test for detecting tuberculosis at peripheral health facilities where Xpert MTB / RIF cannot be used. The diagnosis of tuberculosis in kids is especially tough and only Xpert MTB / RIF is currently usually accessible to help diagnose pediatric TB. (WHO, 2016).

TB is a disease that can be treated and cured. The standard six months course of 4 antimicrobial medicines, which provide the user with data, monitoring and help by a health care provider or qualified volunteer, is the active, medical susceptible TB illness. Therapeutic adhesion can be hard and the disease can spread without such assistance. When drugs are correctly supplied and given, the vast bulk of instances of TB can be healed (over 84 percent). An approximately 49 million lives were rescued from TB diagnosis and therapy between 2000 and 2015. (WHO, 2016).

Anti-TB medicines were used in every country surveyed over decades and strains that are resistant to 1 or more medicines were documented. Drug resistance arises when anti-TB medications are used incorrectly by health suppliers, poorly-qualified medications, and patients who stop their therapy early. (WHO, 2016).

Multi-drug-resistant tuberculosis (MDR-TB) is the most strong, first line anti-TB drug in TB induced by bacteria that do not react to isonyzide and rifampicin. By using second-line medicinal products, MDR-TB is treatable and curable. However, secondline therapies are restricted and involve comprehensive (up to 2 years of therapy) chemotherapy with toxic and costly drugs. More serious drug resistance may grow in some instances. Extensively drug resistant TB (XDR-TB) is a more severe way to treat patients with MDR-TB due to bacteria who do not react to the most efficient second-line anti-TB drugs. Approximately 48,000 individuals created MDR-TB in 2015

globally. Additionally, approximately 100,000 individuals have created opposition to rifampicin and required MDR TB treatment. (WHO, 2016).

Only 52% of patients with MDR-TB worldwide and 28% of XDR-TB are presently being handled effectively. WHO endorsed in 2016 a brief, uniform regimen for clients with MDR-TB who have no resistant antibodies to TB drugs of the second line. This regime requires 9–12 months and is much cheaper than traditional MDR-TB therapy for up to two years. However, this scheme cannot be used by patients with XDR-TB or second-line anti-TB medicines, and it is necessary to have longer MDR-TB regimens to which 1 of the fresh (Bedquiline and Delamanide) medicines could be added (WHO, 2016).

2.3 TUBERCULOSIS IN GHANA

Ghana is not among the top TB burdened countries in Africa but we still have a good share of its presence in the world (WHO, 2016). With a population of approximately 27 million in 2015, about 44,000 people were living with the disease with about 15, 000 dying from the disease (WHO, 2016). The disease is more common among males and adults (18+years). Unfortunately, TB treatment coverage in 2015 was 33% with estimated drug resistant TB of 10% among those living with TB. This is partly because 56% of the national TB budget was left unfunded (WHO, 2016). There was a recorded success rate of about 86% among those treated and therefore Ghana could end the TB menace in the country if well supported financially (WHO, 2016).

The National Tuberculosis Control Programme is successfully recording decreasing incidence of the disease and mortality with increasing treatment success rates since 2000 (GHS, 2007). The number of the unreported cases and late reports as well as defaulter rate declined with the implementation of the Community Based DOTS

(Directly Observed Therapy Short-term) in 2007 which mandates Municipal and District Health Directorates to play a coordinating role and ensure that they form strong link between the health centers and hospitals (GHS, 2007). This ensured that cases referred from the health centers to the hospitals are given priority attention and that defaulter prevention mechanisms were effectively in place.

The Community-based DOTS is a tuberculosis care approach. The change to a fixed dose combination and injection failure in fresh instances means all tuberculosis patients are no longer required to be treated at a wellness center (GHS, 2007).). (GHS, 2007). The DOTS Community-based approach identifies and trains community volunteers and followers to help tuberculosis patients in their community. This approach had been enacted by 80 districts by the end of 2007 (GHS, 2007).

2.4 KNOWLEDGE, ATTITUDE AND PRACTICES OF TUBERCULOSIS

2.4.1 Knowledge and Attitude of the Community towards TB

People suffering from tuberculosis are treated on out-patient basis until the person is cured; however when the disease reaches its deteriorating stages or the patients develop a complication, they are admitted to the hospitals as in-patients. The community therefore hosts a good number of people with tuberculosis; diagnosed and undiagnosed. In some villages in India, the country with the highest prevalence of tuberculosis globally, the knowledge about the cause of the disease and its mode of transmission was poor (Easwaran *et al*, 2015; Pichamuthu, Putthawar &Akinola, 2014). The members in the communities had little knowledge about the condition but their attitude towards infected people with TB was good; hence supported them to seek treatment and to get better. The same could not be said for other towns in the same country as revealed in the study by Yadav *et al* (2006) where discrimination against tuberculosis

was evident. Some of the participants in the study stated they would not share food nor shelter with people with TB.

In Malaysia, the people did not only have a poor knowledge base about tuberculosis but exhibited a strong negative social attitude towards tuberculosis (Koay, 2004). Majority of the respondents in the study described TB patients as unclean and felt embarrassed to be related to a person with TB. They added that it was a disgrace to the family whilst others too stated that it was too much of a sensitive topic to be discussed. Another study in Bangladesh by Islam *et al* (2015) stated that participants would feel embarrassed if they acquired tuberculosis and some added that it was less dignifying to be associated to the disease condition.

The knowledge and attitude of the community towards tuberculosis has a positive correlation with literacy level of the people as discovered by many studies (Saranya *et al*, 2016; Easwaran *et al*, 2015; Tolossa, Medhin & Legesse, 2014). Findings from these studies support the fact that high literacy produces positive attitude and practice towards tuberculosis. In instances where there was ongoing TB education programmes, the attitude of the people became more positive as the education progressed. Rural areas with high levels of illiteracy had very negative attitudes and even false beliefs about the condition.

2.4.2 Knowledge, Attitude and Practice of Healthcare Workers towards Tuberculosis

Healthcare workers are also members of the community but the special training they have received places them in a more responsible position and hence more is expected from them with regard to their knowledge, attitude and practice. The health centers are also high TB population density areas and therefore almost always have a TB case present. The knowledge and attitude of healthcare workers towards tuberculosis is

generally below expectation for most of the researches carried out with respect to tuberculosis at the health centers. In Nigeria, a study in one of their states revealed that the bad knowledge base and attitude of healthcare workers towards TB patients was one of the major reasons that discouraged their adherence to treatment (Luka *et al*, 2011). In the Caribbean, similar level of knowledge and attitude was discovered in their studies (Zahra, 2011).

The knowledge and attitude of healthcare workers however improved with increasing duration on the job. Most of the healthcare workers who had worked for longer periods displayed high level of knowledge and positive attitude towards TB (Zahra, 2011). Increased exposure and experience produced more knowledge and positive attitude among healthcare workers. A publication in a Malaysian health journal by Farhanah *et al* (2016) backed this fact with its findings from studies conducted in India and South Africa.

Similar to the knowledge of the community which improved with high level of literacy and TB education, the level of knowledge of healthcare workers were also good among students and workers who had recent workshop on tuberculosis. A research by Vassilopoulos *et al* in 2010 recorded high level of knowledge on TB among student nurses whilst another by Bhandari & Bandein 2016 also had good level of knowledge on the condition among medical students.

Bad knowledge leads to bad practice as one cannot practice what he does not know. But there were other factors hindering the practice of healthcare workers in the delivery of care to TB patients and which even put the healthcare workers at increased risk of contracting the disease (Farhanah *et al*, 2016). A comprehensive study in Nigeria of 20 hospitals by Kuyinu *et al* (2016) revealed that most hospitals did not have a TB infection Control Plan, good ventilation system for the wards and inconsistent screening

of patients with cough even at the out-patient department and pediatric units. There were cases of poor funding to acquire logistics for TB care and weak managerial support from the hospital administration. Hashim *et al* (2003) recorded in their study that the most bad practices of healthcare workers towards TB is because the hospital has not provided any proper laid down guidelines for caring for TB.

2.5 CONCEPTUAL FRAMEWORK

A conceptual framework provides a guide for the researcher during the development of the study and enables the researcher to link the findings to the body of knowledge (Burns and Grove 2005). Knowledge changes our beliefs and education therefore is not just the acquisition of knowledge but a change in our beliefs and mind set which goes on to affect our attitude and character. Without knowledge, we act on ignorance and bad information produces bad attitude. The structure in Fig. 1 depicts that the practice behaviour of healthcare workers towards tuberculosis patients could be directly or indirectly affected by the socio-demographic characteristics (such as, gender, age, professionalism, experience and training), knowledge on TB (such as;

Eligibility criteria for Treatment of TB, Transmission of TB) and the healthcare workers attitude towards TB (such as; Provision of protective equipment, TB screening tools, Diagnosis of TB etc.). As showed using the arrows, there is a connection between socio-demographic characteristics, level of knowledge, attitude and the practice behaviour of healthcare providers towards TB and their socio – demographic characteristics, level of knowledge and attitude.

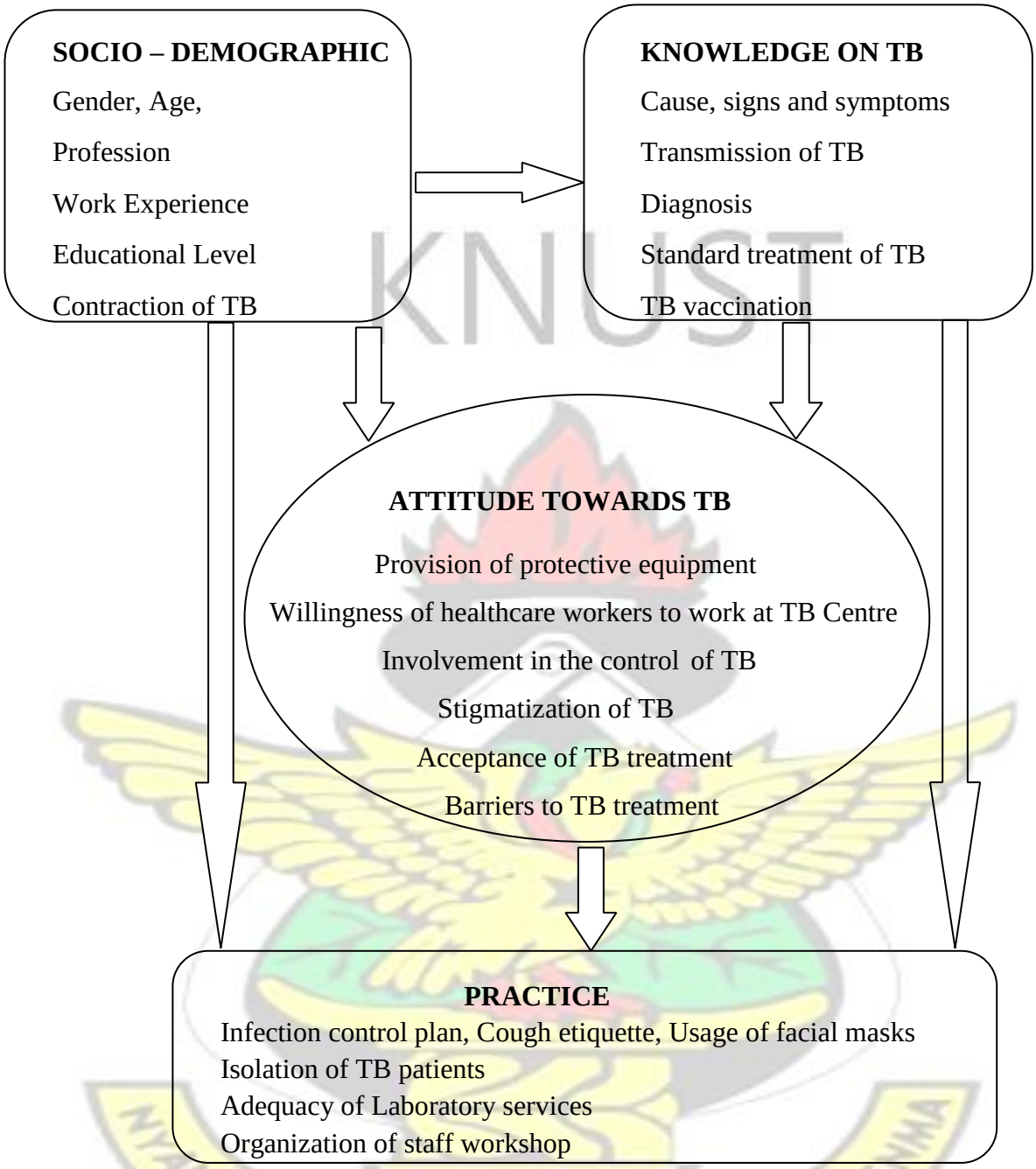

Figure 2.1: Conceptual Framework

Source: Health Belief Model

CHAPTER THREE

MATERIALS AND METHOD

3.0 INTRODUCTION 3.1 STUDY AREA AND POPULATION

The study involved healthcare professionals in the Komfo Anokye Teaching Hospital in the Kumasi Metropolis of the Ashanti Region of Ghana where the total population is 4,780,380 (GSS, 2010). By comparison the population of Kumasi is 1, 722,806 (GSS, 2010). The study focused primarily on Doctors/Physicians, Nurses, Midwives, Pharmacists/Drug Dispensers, Biomedical Scientists. The total workforce of KATH as at the time the study was done was 3671 and out of them, the population for the healthcare professionals constituted 2291 (62.4%).

3.2 STUDY DESIGN AND DATA COLLECTION TOOL

This study was a descriptive cross – sectional survey of knowledge, attitude and practices of HCWs and well-structured questionnaire was self-administered to participants. A pretest of the study instrument was also carried out to correct defective questions.

3.3 SAMPLE SIZE AND TECHNIQUE

Participants were selected from the various categories of health professionals in KATH using proportionate stratified random sampling, where the healthcare workers were divided into subgroups according to the type of care; Doctors/Physicians, Nurses, Midwives, Pharmacists and Biomedical Scientists. A Proportionate sampling was obtained from each of the stratum and a simple random sampling was employed to obtain the desired sample size from the strata. A total minimum sample size was 323, however this project employed 369 participants to represent the healthcare professionals in order to have good precision of the information. The use of a cross sectional sample size calculation was done to arrive at the minimum number with confidence level of 95% at 5% type 1 error.

3.3.1 Sample Size Calculation

Formula: Required Sample Size (Nr) $= \frac{Z_{1\ \ 2}P(1-P)}{d^2}$ $/_2$

$Z_{1/2}^2$ = Standard normal variate (at 5% type 1 error) is1.96^2

P = Average prevalence of good knowledge, attitude and TB infection control among HCWs = 0.7 (Alotaibi *et al.*, 2019). d = Absolute error of precision= 0.05^2

Required Sample Size (Nr) $=1.96^2 \times 0.7\ (1 - 0.7) / 0.05^2$

$= 3.8416 \times 0.7\ (0.3)/0.05^2$

$= 0.901254714/\ 0.05^2$

$= 322.69$

$= 323$

Table 1: Stratification of the study sample

CATEGORIES OF HEALTH PROFESSIONALS	KOMFO ANOKYE TEACHING HOSPITAL	
	Stratum Size	**PPS**
Doctors/Physicians Assistants	365	51
Nurses	1426	201
Midwives	362	51
Pharmacists/Dispensary Technicians	118	17
Laboratory Technicians	20	3
TOTAL	2291	**323**

Formula: Proportion per stratum (PPS) = Sample size / Population x stratum size (SS)

3.4 ELIGIBILITY CRITERIA

All healthcare workers at the study hospitals were eligible to participate in the study. Healthcare workers who had less than 6 months working experience and those who refused to take part in the study were excluded.

3.5 QUESTIONNAIRE AND SCORING SYSTEM

A self-administered standardized knowledge, attitude and practice questionnaire was designed for the data collection according to WHO guidelines (World Health Organization, 2008) and questionnaires available in literature (Adane *et al.*, 2017; Alotaibi *et al.*, 2019) but was tailored towards the objectives of the study. The questionnaire consisted of four main section thus socio-demographic characteristics, TB knowledge, attitude, and practices (Appendix 1). The questionnaire was piloted among 20 HCWs in KATH and validated. The Cronbach"s alpha (coefficient α) for the TB knowledge, attitude and practice sections of the questionnaire were 0.74, 0.67 and 0.71 respectively suggesting acceptable reliability of the questionnaire.

The scoring system for KAP responses was adapted from the study conducted by Alotaibi *et al* (2019). For knowledge and practice question, correct/appropriate responses were given a 1 score, whilst a score of 0 was given for incorrect/inappropriate responses. Correct answers were based on current literature and best practice. For multiple choice questions requiring one or more correct answers, a score of 1 was ascribed for choosing the correct/appropriate response and 0 for not choosing the incorrect/inappropriate responses. The score for such questions were standardized to be between 0 and 1 by summing the score and dividing it by the total number of multiple choices in the question. For attitude question where a Likert scales was used, strongly agree, agree, neutral, disagree and strongly disagree were scored 4,3,2,1 and 0. For question requiring disagreement as the

appropriate response, strongly disagree, disagree, neutral, agree and strongly agree were scored 4,3,2,1 and 0 respectively. Each attitude question score was standardized by dividing the score by 4. Scores for each section of the questionnaire (knowledge, attitude and practice) were standardized to give overall scores ranging between 0 and 1. Overall mean score greater than 0.6 (>0.6) was categorized as good while score of 0.6 and less was categorized a poor. For attitude questions score were categorized as positive or negative.

3.6 DATA ANALYSIS

Data were entered into Microsoft excel and analysed with SPSS version 22.0 (SPSS Inc., Chicago, USA). Descriptive statistics was used to report mean, median, interquartile range, frequencies and proportions. Reliability of KAP questions was assessed using Cronbach‟s α, reliability test. Mann–Whitney U or Kruskal-Wallis test as appropriate was used to determine the difference in KAP score with respect to demographics variables. Spearman correlation coefficient was used to determine the correlation between knowledge attitude and practice among healthcare workers. Association between demographics parameters and KAP of Healthcare workers was determined using Chi-square. A logistic regression (odd ratios) was employed to assess the various determinants of TB knowledge, attitude and practices among healthcare workers. For all tests of significance a p value < 0.05 was considered statistically significant.

3.7 ETHICAL CONSIDERATION

Ethical clearance from the Committee on Human Research, Publication and Ethics (CHRPE) was sought for the study. Approval from the relevant heads KATH were also sought and informed consent was obtained from the study participants. All information

collected from the study participant were treated as confidential and the participant‟s names were not used.

CHAPTER FOUR

RESULTS

4.1 DEMOGRAPHIC OF STUDY PARTICIPANTS

Three hundred and sixty nine (369) healthcare workers (HCWs) in Komfo Anokye Teaching Hospital (KATH) participated in this study. These included two hundred and nine (209) Nurses, Seventy-seven (77) Midwives, fifty - nine (59) Doctors/Physician Assistants, thirteen (13) Pharmacists/Pharmacy Technicians and seven (7) Biomedical Scientists (Table 1). HCWs were mostly in their twenties or thirties (98%) demonstrating the youthful nature of health care professionals in KATH. Majority of HCWs have obtained either a bachelor degree (53%) or diploma certificate (38%) with Nurses comprising the majority. Among the professional groups, Doctors/Physician Assistants mostly furthered their education to the Master‟s (64%) and PhD level (100%). Most HCWs (62.3%) have been practicing as health providers for less than 5 years and the remaining (38%) has been practicing more than 5 years.

Twelve (12) out of the 369 participants (3%) had been diagnosed of tuberculosis (TB) whilst 6% have had or have relatives or close associates being TB patients. With regards to control activities of TB, 11% of HCWs were directly engaged in various TB control activities (Table 2). These control activities engaged by these HCWs centered mostly on the treatment and management of TB patients.

Table 2: Demographics of Healthcare Workers in KATH

	Healthcare Workers N (%)					Total[#]
	Doctor/Physician Assistants	Nurse	Pharmacist/ Pharmacy technicians	Midwife	Biomedical scientist	
Gender*						
Male	31 (22.8)	87 (64)	12 (8.8)	1 (0.7)	5 (3.7)	**136 (38)**
Female	22 (9.9)	122 (54.7)	1 (0.4)	76 (34.1)	2(0.9)	**223 (62)**
Age (years)						
20-29	43 (21.3)	118 (58.4)	8 (4)	28 (13.9)	5 (2.5)	**202(54.7)**
30-39	12 (8.8)	84 (61.3)	5 (3.6)	35 (25.5)	1(0.7)	**137 (37.1)**
40-49	4 (14.8)	8 (29.6)	0	14 (51.9)	1(3.7)	**27(7.3)**
50-59	0	3 (100)	0	0	0	**3 (0.8)**
Educational level						
Certificate	0	10 (90.9)	0	0	1 (9.1)	**11(3.0)**
Diploma	5 (3.6)	106 (76.3)	3 (2.2)	23 (16.5)	2 (1.4)	**139 (37.7**
Bachelor Degree	38 (19.5)	94 (48.2)	9 (4.6)	50 (25.6)	4 (2.1)	**195 (52.8)**
Masters	14 (63.6)	3 (13.6)	1 (4.5)	4 (18.2	0	**22(6.0)**
PhD	2 (100)	0	0	0	0	**2 (0.5)**
Work Experience						
Median (Range)	-	-	-	-	-	**5 (0.5 - 25)**
Less 5 years	52 (22.6)	131 (57.0)	9 (3.9)	31 (13.5)	7 (3.0)	**230 (62.3)**

More than 5 years	7 (5.0)	82 (59.0)	4 (2.9)	46 (33.1)	0 (0)	**139 (37.7)**
Had TB before	2 (16.7)	8 (66.7)	0	1 (8.3)	1 (8.3)	**12 (3.3)**
Relative had TB	6 (28.6)	13 (31.9)	0	2 (9.5)	0	**21 (5.7)**
Involved TB control activities	8 (16.2)	28 (68.3)	0	5 (12.2)	0	**41(11.1)**
Total	**59 (16.0)**	**213 (57.7)**	**13 (3.5)**	**77 (20.9)**	**7 (1.9)**	**369 (100)**

* 10 participants did not provide their gender, # proportions are calculated based on total participants

4.2 KNOWLEDGE OF HEALTHCARE WORKERS ON TUBERCULOSIS

Table 3 provides the mean knowledge score of Healthcare workers in KATH on each knowledge question. From this study, the knowledge of HCWs on TB was good (overall mean score = 0.74, SD=1.3) with 87% of HCWs recording good score of knowledge greater than 0.6. Nonetheless there were some gaps in knowledge recorded among health workers. Only 54% HCWs correctly attributed coughing and sneezing as the means by which patients with active TB can transmit TB to other people. A proportion of 8 %, 31 % and 11 % of study participants attributed eating together, shouting and sharing bed linens or toilet seats respectively as the means of contracting TB from active TB patients (Table 4). A proportion of 38% had an idea that TB can affect any part of the body (mean knowledge score of 0.37, SD=0.48). In addition, 5867% of HCWs incorrectly recognized haemoptysis, persistent high fever and loss of weight as common signs and symptoms of pulmonary tuberculosis indicating poor knowledge on the symptoms of pulmonary TB (mean knowledge score < 0.6).

Knowledge deficiencies were also noticed with regards to the various tests available for TB diagnosis. Majority of the participants recognized skin test, sputum test and chest X – ray as other means of diagnosing TB representing 61%, 73% and 98% respectively. Meanwhile, only few (37%) of the participants were able to identify blood test as a TB diagnostic test. Again, poor knowledge was demonstrated by HCWs with regards to knowledge on Gene Xpert MTB/RIF (Mean knowledge score 0.39, SD = 0.49). Only 39% have heard of it or knew that it is a rapid test for detecting multidrug resistant TB. A proportion of 46% of HCWs knew that diagnosis of TB in children is very difficult compared to adult due to the difficulty in obtaining sputum samples from them (Table 4).

Regarding knowledge on TB treatment, most HCWs knew TB was curable (99%) and the duration of treatment for newly diagnosed patients was six months (mean knowledge score =7.3). Concerning directly observed therapy (DOT), 65% of respondents knew what it was. Good knowledge (mean knowledge score > 0.6) was also demonstrated by healthcare workers on Multi drug resistant, risk factors of developing MDTB, effect of incomplete treatment, time of giving Bacillus CalmetteGuerin (BCG) vaccine and the need for good ventilation as means of preventing Tuberculosis (Table 3).

Table 3: Mean knowledge scores for Healthcare workers regarding TB.

Knowledge question	N	Min	Max	Mean	SD
1. What is TB	356	0	1	1	0.05
2. Causative Organism	347	0	1	0.98	0.13
3. Transmission of TB	365	0.2	1	0.87	0.17
4. Body part affect by TB	362	0	1	0.37	0.48
5.People with higher risk TB contraction	362	0	1	0.88	0.32
6. Symptoms of Pulmonary TB	362	0.25	1	0.52	0.32
6. Diagnosis of TB	363	0.25	1	0.67	0.27
8. Knowledge on GeneXpert MTB/RIF	355	0	1	0.39	0.49
7. TB diagnosis in Children compared to adults	302	0	1	0.46	0.5
9. TB is curable	363	0	1	0.99	0.1
10. Standard Treatment for TB	361	0	1	0.73	0.44
11. Knowledge about direct observed Treatment	304	0	1	0.65	0.48
12. Multidrug resistance TB	283	0	1	0.62	0.49
13. Risk factors of developing MDTB	321	0	1	0.75	0.24
14. Effect of incomplete treatment	364	0	1	0.86	0.26
15. Bacillus Calmette-Guerin (BCG) vaccine	343	0	1	0.88	0.33
16. Good ventilation and light in doors as TB preventive method	350	0	1	0.92	0.27
Overall	**368**	**0.41**	**1**	**0.74**	**0.13**

TB; tuberculosis, MDTB; multidrug-resistant tuberculosis, Min; minimum, Max, maximum, SD; standard deviation, N; number of observations

Table 4: Summary of responses (frequency) of HCWs to knowledge questions

Questions	Response, n (%)	Total
1. TB is		
a. Hereditary disease	1 (0.3)	
b. Communicable disease	355 (99.7)	356
2. People are at higher risk of developing tuberculosis		
a. Patients with psychotic problems	6 (1.7)	
b. People living in tropical areas	16 (4.4)	
c. Patients with HIV	341 (93.9)	363 3. **Multi – drug resistant tuberculosis is**
a. Tuberculosis that is resistant to any of the tuberculosis medication	64 (22.7)	
b. Tuberculosis that is resistant to isoniazid and rifampicin	174 (62.4)	
c. Tuberculosis that is resistant to all tuberculosis medications	37 (13.1)	
d. Tuberculosis that is resistant to pyrazinamide and ethambutol.	5 (1.4)	282

	Yes	No	
4. Causative agent: Mycobacterium ulcerans	341 (98.3)	6 (1.7)	347 **5. Transmission of TB**
Coughing	362(99.2)	3(0.8)	365
Eating	31(8.5)	334(91.5)	365
Shouting	113(31)	252(69)	365
Sneezing	318(87.1)	47(12.9)	365
Sharing of Item	41(11.2)	324(88.8)	365
6. Tb affect all part of the body	136(37.7)	226(62.3)	362 **7. Common symptom of pulmonary tuberculosis**

Haemoptysis 212(58.4) 151(41.6) 363 persistent high fever 217(59.8) 146(40.2) 363 Loss of weight 244(67.2) 119(32.8) 363 Persistent cough 343(94.5) 20(5.5) 363 **Table 4 cont'd**

Questions	Response, n (%)	Total

	Yes	No	
8. TB diagnosis test			
Skin test	132 (35.8)	231 (63.6)	363
Blood test	132 (36.4)	231 (63.6)	363
Sputum test	356 (98.1)	7 (1.9)	363
Chest X-ray	263 (72.5)	100 (27.1)	363
9. TB diagnosis in children is more difficult than in adults	138 (45.7)	164 (54.3)	302
10. Heard of Xpert MTB/RIF	139 (39.2)	216 (60.8)	355
11. TB is curable	359 (98.9)	4 (1.1)	363
12. standard TB treatment for newly diagnosed TB patient			
One month	11 (3)		
Two - Four months	24 (6.6)		
Six months	264 (73.1)		361
13. Do you what direct observed treatment during the initial phase of treatment	198 (65.1)	106 (34.9)	304
14. Multi – drug resistant tuberculosis likely to occur			
a. People with HIV	157 (48.5)	164 (50.6)	324
b. People exposed to tuberculosis patients	65 (20.1)	258 (79.6)	324
c. People who have never been exposed tuberculosis	23 (7.1)	301 (92.9)	324
d. People who have been treated for tuberculosis before	242 (73.8)	86 (26.2)	324
15. The consequences of incomplete treatment are…….			
Failure to fully cure the disease	310 (85.2)	54 (14.8)	364
development of resistance to TB drugs	339 (93.1)	25 (6.9)	364
further transmission of the disease	287 (78.8)	77 (21.2)	364
16. To prevent TB, one should receive BCG vaccine in one's adulthood	42 (12.2)	301 (87.8)	343
17. To prevent TB, one should keep good air circulation and sufficient sunshine indoor	322 (92.0)	28 (8.0)	350

TB; tuberculosis, MDTB; multidrug-resistant tuberculosis, HIV: Human immune virus, Bacillus Calmette-Gue´rin (BCG) N; number of observations

4.3 ATTITUDE OF HEALTHCARE WORKERS IN KATH TOWARDS TUBERCULOSIS

The attitude of Health care workers (HCWs) towards Tuberculosis was seen to be positive (overall mean attitude score = 0.67, SD = 0.08) with 85% of HCWs recording positive attitude score > 0.6 for each attitude question answered (Table 5). Most HCWs (88%) either strongly agreed or agreed that TB is of public health importance in Ghana, and 72% respondents stated that there is stigma associated with TB patients in Ghana., Again, majority of the participants responded that community engagement is essential in TB control (95%) whereas patients normally accepted first line therapies for tuberculosis (92%). A proportion of 76% of HCWs strongly disagreed to the statement that, teaching TB patient cough hygiene is not important. Meanwhile many of the HCWs (90%) wanted to know their HIV status. A proportion of 68% of HCWs agreed /strongly agreed that Multi-drug resistant tuberculosis is a public concern in Ghana; however 30% were indifferent. 60% of HCWs agreed that infection control is important for preventing TB menace whereas 35% disagreed (Table 6). A proportion of 45% of respondents strongly believed that spending money on TB public education was important; 42% were neutral whilst 13% disagreed in this regard.

Despite the good attitude demonstrated by the HCWs, there were some negative attitudes that were noticed (mean attitude score < 0.6). A few HCWs agreed to working with TB patients throughout their professional career (30%). When asked how they saw working on TB patient or at TB center, 78%, 44%, 5.8%, 2.2%, 1.9%, 1.4% said working on TB patients or at TB clinic was threatening, stressful, desirable, comfortable, rewarding and safe respectively (Figure 2). Only 36% of HCWs agreed that public awareness creation of TB is adequate.

Table 5: Mean Attitude scores for Healthcare workers towards TB.

Attitude questions	N	Min	Max	Mean	SD
1. Is TB of public health importance in Ghana?	343	0	1	0.87	0.2
2. Is there stigma regarding TB patients in Ghana?	355	0	1	0.72	0.2
3. Community engagement is essential in TB control	352	0.5	1	0.93	0.14
4. Money spent on educating the general public is important	353	0	1	0.62	0.24
5. Public awareness creation of TB is adequate	350	0	1	0.5	0.31
6. Multi-drug resistant tuberculosis is a problem in Ghana	331	0.25	1	0.7	0.17
7. First Line therapies for tuberculosis are accepted by patients	312	0	1	0.69	0.16
8. In Ghana there are many barriers to tuberculosis treatment	348	0	1	0.32	0.24
9. Teaching TB patient cough hygiene is not important	353	0	1	0.64	0.36
10. Infection control is important for preventing TB contraction	353	0	1	0.65	0.36
11. I should know my HIV status	350	0	1	0.79	0.23
12. Working with TB patients for all your life	349	0	1	0.4	0.42
Overall	**355**	**0.46**	**0.87**	**0.67**	**0.08**

TB; tuberculosis, Min; minimum, Max, maximum, SD; standard deviation, N; number of observations

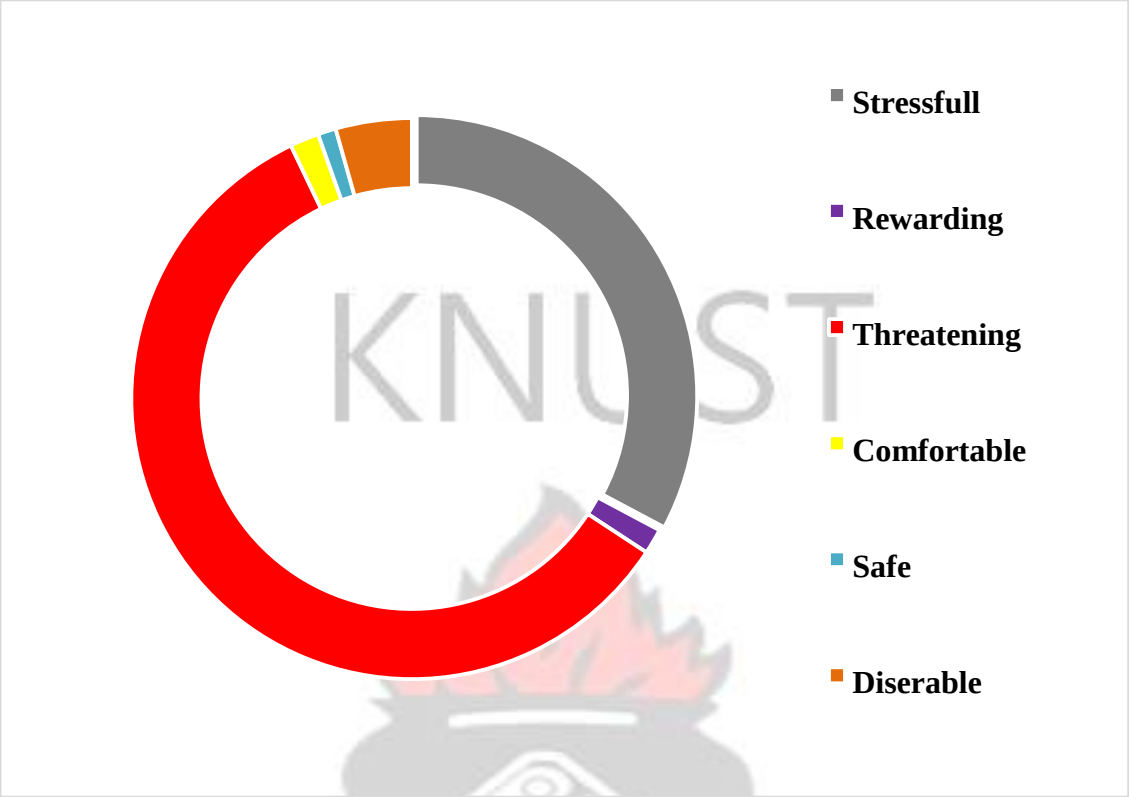

Figure 2: Perspective of Healthcare worker with regards to working on TB patient or at TB center.

Table 6: Summary of responses of HCWs to attitude questions

Attitude questions	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	N
is TB of public health importance in Ghana?	214(62.4)	88 (25.7)	34(9.9)	4(1.2)	3(0.9)	343
Is there stigma regarding TB patients in Ghana?	76(21.5)	177(50.0)	90(25.4)	7(2.0)	4(1.1)	355
Community engagement is essential in TB control	273(77.6)	60(17.0)	19(5.4)	0	0	352

Money spent on educating the general public is important	61(17.3)	98(27.8)	148(41.9)	37(10.5)	9(2.5)	353
Public awareness creation of TB is adequate	59(16.7)	69(19.5)	58(16.4)	147(41.6)	20(5.7)	350
Multi-drug resistant tuberculosis is a problem in Ghana	43(13.0)	183(55.3)	99(29.9)	6(1.8)	0	331
First Line therapies for tuberculosis are accepted by patients	8(2.6)	235(75.3)	53(17.0)	12(3.8)	4(1.3)	312
In Ghana there are many barriers to tuberculosis treatment	53(15.2)	212(60.9)	22(6.3)	53(15.2)	8(2.3)	348
Teaching TB patient cough hygiene is not important a	69(19.5)	17(4.8)	16(4.5)	156(44.2)	95(26.9)	353
Infection control is important for preventing TB contraction	146(41.4)	68(19.3)	15(4.2)	99(28.0)	25(7.1)	353
I should know my HIV status	127(36.3)	188(53.7)	11(3.1)	8(2.3)	16(4.6)	350
Working with TB patients for all your life	95 (27.2)	12(3.4)	57(16.3)	35(10)	150 (43)	349

TB; tuberculosis, HIV: Human immune virus, N; number of observations

4.4 TUBERCULOSIS PRACTICE AMONG HEALTHCARE WORKERS

Table 7 provides the mean TB infection control practice score among healthcare workers. Healthcare workers in KATH practice good TB infection management and control (Overall mean score =0.77, SD=0.17). Most HCWs (>89%) reported the separation of TB patients from other patients and the use of nose mask by patients, hospital visitors and healthcare professionals. In addition, HCWs alluded to the fact that

they have a display of TB infection control plan at their work station (85%), teaching of cough etiquette at their work station (84%) and the laboratory services for TB diagnosis was adequate (90%). The existence of some level of confidentiality when a staff contracts TB (70%) was also positive. Poor practice was identified with regard to adequate training of staffs on Tuberculosis and timing of diagnosing TB suspected cases. Only 52% HCWs reported that diagnosing of patients was either confirmed at OPD or during consultation (mean practice score=0.51, SD = 0.50) considering the mean score.

When HCWs were asked the frequency of workshops organized in KATH with regard to Tuberculosis control, 28%, 17% and 5% of the participants said TB workshops were organized once every six months, once every year and once every two years respectively. Meanwhile 23% confirmed that no workshop had been organized in KATH whereas 27% had no idea how frequently TB workshops are organized in this facility.

Table 7: Mean TB infection control practice score of HCWs

Attitude question	N	Min	Max	Mean	SD
Display of written TB infection control plans at my work station	316	0	1	0.85	0.36
Teaching of cough etiquettes at my work station	347	0	1	0.85	0.36
When are TB patients mostly diagnosed in healthcare facility	303	0	1	0.51	0.50
Use of nose mask by TB patients, relative and health workers	339	0	1	0.88	0.32

TB patients are isolated from other patients	323	0	1	0.99	0.08
Adequate training of staffs with regards to Tuberculosis	349	0	1	0.53	0.5
Laboratory services are adequate for TB diagnosis	353	0	1	0.9	0.31
Adequate number of staffs for managing TB patients	351	0	1	0.74	0.44
Will continue to work in my full capacity if I contracts TB	353	0	1	0.69	0.46
Will maintain confidentiality when a staff contracts TB	346	0	1	0.7	0.46
Overall	**355**	**0.2**	**1**	**0.77**	**0.17**

TB; tuberculosis, Min; minimum, Max, maximum, SD; standard deviation, N; number of observations

Table 8: Summary of responses of HCWs to TB infection control questions

Attitude questions	**Responses n (%)**		**N**
	Yes	**No**	
Display of written TB infection control plans at my work station	268(84.8)	48(15.2)	316
Teaching of cough etiquettes at my work station	295(84.0)	56(16.0)	347
When are TB patients mostly diagnosed in healthcare facility			303
Use of nose mask by TB patients, relative and health workers	300(88.5)	39(11.5)	339

TB patients are isolated from other patients	321(99.4	2(0.6)	323
Adequate training of staffs with regards to Tuberculosis	184(52.7)	165(47.3)	349
Laboratory services are adequate for TB diagnosis	316(89.5)	37(10.5)	353
Adequate number of staffs for managing TB patients	258(73.5)	93(26.5)	351
Will continue to work in full capacity if a staff contracts TB	111(31.4)	242(68.6)	353
Will maintain confidentiality when a staff contracts TB	241(69.6)	105(30.4)	346

TB; tuberculosis, n; number of observations

4.5 DETERMINANT OF KNOWLEDGE, ATTITUDE AND PRACTICE OF TUBERCULOSIS AMONG THE HEALTHCARE WORKERS

There was significant difference in the mean knowledge score with regard to gender, age, various healthcare professions, educational level and whether HCWs were involved in any TB control activities or not. Females, Doctors and healthcare professionals with Master or PhDs degree as well as those involved in TB control activities had higher knowledge on TB. For attitude; Gender, age, healthcare professionals and level of education had significant means score with males, HCWs more than 30 years, doctors/pharmacists and those with a master degree had high mean attitude score. All variables (demographics) had significant difference in the mean score of TB infection control practice except having a relative with TB and also being involved in TB control activities (Table 9).

There was a weak positive correlation between mean knowledge score and mean practice score (r=0.22, p<0.0001). A weak negative correlation was observed between mean attitude score and mean knowledge score (r = -0.18, p=0.001) and mean practice score (r=0.28, p<0.0001) (Table 9).

There was a significant association between knowledge of HCWs of TB with demographic parameters such as gender (P=0.024), healthcare profession (P=0.005), work experience (P=0.023) and educational level (P=0.002) (Table 10). More females (90%) had good knowledge on TB compared to males (82%) (P=0.024). Most Nurses (82%), Pharmacists/Pharmacy technicians (92%), Midwives (97.4) and Biomedical Scientists (85.7) had good knowledge on TB. Only 55% of Doctor/Physician Assistants had good knowledge score on TB (Table 11).

With regards to the association of demographics parameters with attitude, only educational level was associated to the attitude of HCWs with regard to TB. Most individual with certificates (64%) had negative attitude whiles majority of HCWs with a diploma (91%), degree (91%), masters (95%), PhD (100%) has positive attitude. Although there was no association between attitude and other demographic parameter except in education, where most HCWs had positive attitude (Table 11).

Most females (89%) had good TB practices than males (63%). Majority of HCWs in the age group 20-29 (72%), 30-39 (85%), 40-49 (100%) and 50-59 years (100%) had good practice score. A few Doctor/Physician Assistants (59) and pharmacist/ Pharmacy technicians (50%) had good practice score. However, most nurse (79%), midwives (99%) and biomedical scientists (86%) had good TB practice score. 72%, 88%, 100%, 100% of HCWs having worked for less than 5 years, 5-10, 10-20 and more than 20 years respectively had good practice score (Table 11). In addition, more than 90% of

HCWs with certificates, diploma, degree and master and PhD degrees had good TB practice. 92% HCWs who have been diagnosed of TB before had poor TB practice score whilst other HCWs who have not had TB before had good practice score.

Gender (P=0.001), age (P=0.001), healthcare profession (P=0.001), work experience (P=0.001), educational level (P=0.001) and whether having been diagnosed with TB before (P=0.001) were associated to the practice of TB infections control activities.

Table 9: Demographics and Knowledge, attitude and Practice (KAP) score of healthcare workers

Demographics		Knowledge				Attitude				Practice			
		N	Mean	SD	P-value*	N	Mean	SD	P-value*	N	Mean	SD	P-value*
Gender	Male	115	0.72	0.13	**<0.0001**	115	0.69	0.08	**0.009**	115	0.71	0.19	**<0.0001**
	Female	215	0.76	1.12		215	0.67	0.07		215	0.79	0.14	
Age	Less than 30	191	0.75	0.13	0.295	191	0.66	0.08	**<0.017**	191	0.74	0.17	**<0.021**
	More than 30	164	0.73	0.12		164	0.69	0.08		164	0.79	0.16	
Healthcare profession	Doctor/Physician Assistants	49	0.82	0.12	**<0.0001**	49	0.72	0.07	**<0.0001**	49	0.69	0.19	**<0.0001**
	Nurse	194	0.72	0.13		194	0.67	0.08		194	0.75	0.17	
	Pharmacist/ Pharmacy technicians	7	0.65	0.02		7	0.72	0.03		7	0.70	0.15	
	Midwife	73	0.76	0.09		73	0.65	0.06		73	0.73	0.07	
	Biomedical scientist	7	0.61	9		7	0.68	0.06		7	0.88	0.16	
Work experience	Less than 5 years	220	0.73	0.13	0.193	220	0.68	0.08	0.206	220	0.72	0.18	**<0.0001**
	More than 5 years	135	0.76	0.12		135	0.67	0.07		135	0.83	0.11	

N; number of observations, SD; standard deviation, TB; tuberculosis, *p-value for the Mann–Whitney U or Kruskal-Wallis test,

Table 10: Correlation between Knowledge, Attitude and Practice of TB Infection Control among HCWs in KATH

		Knowledge	Attitude	Practice
Knowledge	Correlation Coefficient	1.000	-	-
	P-value		-	-
	N	368		
Attitude	Correlation Coefficient	**-0.180****	1.000	-
	P-value	**.001**		
	N	355	355	
Practice	Correlation Coefficient	**.216****	**-.279****	1.000
	P-value	**<0.0001**	**<0.0001**	
	N	355	355	355

** Correlation is significant at the 0.05

Table 11: Association between demographics, knowledge, attitude and Tb control practice of HCWs

Demographics		Knowledge			Attitude			Practice		
		Poor	**Good**	**P-value**	**Negative**	**Positive**	**P-value**	**Poor**	**Good**	**P-value**
Gender*	Male	25 (18.4)	111 (81.6)	**0.024**	19(15)	108 (85)	0.762	47 (37)	80 (63)	**<0.001**
	Female	22 (9.9)	200 (90.1)		36 (16.5)	182 (83.5)		23 (10.6)	195 (89.4)	
Age	Less than 30 years	25 (12.5)	175 (87.5)	0.736	31 (16.2)	160 (83.8)	0.932	54 (28.2)	137 (71.8)	**<0.0001**
	More than 30 years	23 (13.7)	145 (86.3)		26 (15.9)	138 (84.1)		21 (12.8)	143 (87.2)	
Healthcare profession	Doctor/ Physician Assistants	4 (44.4)	5 (55.6)		2 (3.6)	53 (93.6)		21 (40.4)	31 (58.6)	
	Nurse	39(18.3)	174 (81.7)		40 (19.1)	169(80.9)		44 (21.1)	165 (78.9)	
	Pharmacist/ Pharmacy technicians	1 (7.7)	12 (92.3)	**0.005**	1 (12.5)	7 (88.5)	0.05	4 (50)	4 (50)	**0.001**
	Midwife	2 (2.6)	74 (97.4		12 (15.8)	64 (84.2)		1 (1.3)	75 (98.7)	
	Biomedical scientist	1 (14.3)	6 (85.7)		1 (14.3)	6 (85.7)		1 (14.3)	6 (85.7)	

Table 11 cont'd

Demographics		Knowledge			Attitude			Practice		
		Poor	Good	P-value	Negative	Positive	P-value	Poor	Good	P-value
Work experience (Years)	Less than 5 years	38 (16.6)	191 (83.4)	**0.05**	33 (15)	187 (85)	0.683	62 (23.2)	158 (71.7)	**<0.001**
	More than 5 years	9 (6.5)	130 (93.5)		22 (16.3)	113 (83.7)		12 (8.9)	123 (91.1)	
Educational level	Certificate	4 (36.4)	7(63.6)	**0.002**	7 (63.6)	4 (36.4)	**0.001**	1 (9.1)	10 (90.9)	**0.001**
	Diploma	27 (19.6)	111 (80.4)		12 (9)	122 (91)		36 (26.9)	98 (73.1)	
	Degree	15 (7.7)	180 (92.3)		35 (18.7)	152(91.3)		27 (14.4)	160 (85.6)	
	Masters	1(4.5)	21 (65.5)		1 (4.8)	20 (95.2)		10 (47.6)	11(52.4)	
	PhD	1(50)	1(50)		1(50)	1(50)		1 (50)	1 (50)	
Had TB before	No	46 (12.9)	310 (87.1)	0.64	55 (16)	288 (84)	0.226	63 (18.4)	280 (81.6)	**<0.001**
	Yes	1 (8.3)	11(91.7)		0	12 (100)		11 (91.7)	1 (8.3)	
Relative had TB	N o	38 (11.4)	294 (85.6)	0.295	51 (15.7)	273 (84.3)	0.049	67 (20.7)	257 (79.3)	0.176
	Yes	4 (19.0)	17 (81)		0	12 (100)		7 (33.3)	14 (66.7)	
Involved TB control activities	No	41 (12.7)	281 (87.3)	0.804	50 (16.2)	259 (83.18)	0.65	65 (21.0)	244 (79)	0.231
	Yes	6 (14.6)	35 (85.4)		5 (12.2)	36 (87.8)		6 (14.6)	35 (85.4)	

In the logistic regression analysis, only education level of HCWs was predicator of TB knowledge. HCWs with a Bachelor degree were five times more likely to have good knowledge on TB when compared with HCWs with only a certificate (AOR: 5.17, 95% CI: 1.24-21.65) [Table 12]. Healthcare profession and Educational level were the predictors of good attitude of HCWs toward TB disease. Nurses were 16 % likely to demonstrate positive attitude (AOR: 0.16, 95% CI: 0.03-0.7) compared to Doctor/ Physician Assistants. HCWs with a Diploma (AOR: 17.6, 95% CI: 4.3770.93), Bachelor"s Degree (AOR: 0.85, 95% CI: 1.55-22.07), Masters (AOR: 14.38, 95% CI: 1.23-168.85) were more likely to demonstrate positive attitude (Table 13). Females were 2.19 times more likely to practice good TB infection control and management compared to their male counterparts (AOR: 2.19, 95% CI: 1.17-4.10). Nurses (AOR: 2.35, 95% CI: 1.15-4.8**)** and Midwives were 2.35 and 44.86 times likely to practice good TB infection control (Table 14). Surprisingly, HCWs who were diagnosed of TB were 99% less likely to establish good TB infection control practices (AOR: 0.01, 95% CI: 0.001 – 0.19) compared to those who have not been diagnosed of TB before.

12 Logistic regression analysis of TB knowledge among HCWs

Demographics		Knowledge		P-value
		COR (95% CI)	AOR (95% CI)	
Gender	Male	1	1	
	Female	2.1 (1.1 - 3.8)*	1.71 (0.85 - 0.44)	0.13
Age (Years)	Less than 30	1		
	More than 30	0.9 (0.5 - 1.8)		

Table :

Healthcare profession	Doctor/ Physician Assistants	1	1	
	Nurse	0.3 (0.1-0.95)*	0.4 (0.12 - 1.46)	0.17
	Pharmacist/ Pharmacy technicians	0.9 (0.1 – 8.5)	1.2 (0.12 - 12.39)	0.88
	Midwife	2.9 (0.5 – 15.2)	1.92 (0.29-12.65)	0.50
	Biomedical scientist	0.4 (0.04 – 4.6)	0.9 (0.07-10.99)	0.93
Work experience (Years)	Less than 5 years	1	1	
	More than 5 years	2.9 (1.3 – 6.2)*	2.15(0.93 - 4.95)	0.073
Educational level	Certificate	1	1	
	Diploma	2.3 (0.6 – 8.6)	2.92 (0.73-11.67)	0.13
	Bachelor Degree	6.9 (1.7-26.1)*	**5.17 (1.24-21.65)**	**0.02**
	Masters	12 (1.1-126.1)*	4.77 (0.35-64.58)	0.24
	PhD	0.6 (0.02-11.8)	0.25 (0.01-7.73)	0.43
Had TB before	No	1		
	Yes	1.7 (0.2 - 13.6)		
Relative had TB	No	1		
	Yes	0.6 (0.2 - 1.8)		
Involved TB control activities	No	1		
	Yes	0.9 (0.3 – 2.2)		

*Significance at 0.05, COR: Crude Odds Ratio AOR: Adjusted Odds Ratio **13 Logistic regression analysis of attitude of HCWs towards TB**

Demographics		**Attitude**		P-value
		COR (95% CI)	**AOR (95% CI)**	
Gender	Male	1		

Table :

	Female	0.94 (0.52 – 1.72)		
Age	Less than 30	1		
	More than 30	0.99 (0.56 – 1.75)		
Healthcare profession	Doctor/ Physician Assistants	1	1	
	Nurse	0.24 (0.07- 0.82)*	**0.16 (0.03-0.7)**	**0.015**
	Pharmacist/ Pharmacy technicians	0.40 (0.04 – 4.44)	0.26 (0.02-3.38)	0.30
	Midwife	0.31 (0.08 – 1.14)	0.2 (0.04-0.97)	0.05
	Biomedical scientist	0.35 (0.03 – 3.88)	0.38 (0.03-5.75)	0.48
Work experience (Years)	Less than 5 years	1		
	More than 5 years	0.9 (0.50 - 1.6)		
Educational level	Certificate	1	1	
	Diploma	17.79 (4.55-69.6)*	**17.6 (4.37-70.93)**	**<0.0001**
	Bachelor"s Degree	7.34 (2.03-368.57)*	**5.85 (1.55-22.07)**	**0.009**
	Masters	35 (3.3 - 36.29)*	**14.38 (1.23-168.85)**	**0.034**
	PhD	1.75 (0.08-36.29)	0.3 (0.01-8.79)	0.48
Had TB before	No	NA		
	Yes	NA		
Relative had TB	N o	NA		
	Yes	NA		
Involved TB control activities	No	1		
	Yes	1.46 (0.55-3.89)		

*Significance at 0.05, NA: Not applicable, COR: Crude Odds Ratio AOR: Adjusted Odds Ratio

Table :

14 Logistic regression analysis of TB control practice among HCWs

Demographics		TB control practice		P-value
		COR (95% CI)	AOR (95% CI)	
Gender*	Male	1	1	
	Female	5.15 (2.94 - 9.03)*	**2.19 (1.17-4.10)**	**0.014**
Age	Less than 30	1	1	
	More than 30	0.37 (0.21 - 0.65)*	1.16 (0.57-2.35)	0.68
Healthcare profession	Doctor/ Physician Assistants	1	1	
	Nurse	3.13 (1.67 - 5.85)*	**2.35 (1.15-4.8)**	**0.019**
	Pharmacist/ Pharmacy technicians	0.83 (0.19 - 3.68)	0.90 (0.19-4.14)	0.89
	Midwife	62.5 (8.1 - 482.17)*	**44.86 (3.79-534.40)**	**0.003**
	Biomedical scientist	5 (0.56 - 44.34)	22.59 (0.64 – 795.29)	0.086
Work experience (Years)	Less than 5 years	1	1	
	More than 5 years	3.68 (1.94 – 7.00)*	1.49 (0.67 – 3.31)	0.33
Educational level	Certificate	1		
	Diploma	0.27 (0.03 – 2.20)		
	Degree	0.59 (0.07 – 4.82)		
	Masters	0.11 (0.01 – 1.02)		
	PhD	NA		
Had TB before	No	1	1	
	Yes	0.02 (0.003 – 0.16)*	**0.01 (0.001 – 0.19)**	**0.002**
Relative had TB	N o	1		
	Yes	0.53 (0.21 – 1.37)		
	No	1		

Table :

Involved TB control activities	Yes	1.58 (0.64 – 3.93)		

*Significance at 0.05, NA: Not applicable, COR: Crude Odds Ratio AOR: Adjusted Odds Ratio

CHAPTER FIVE

5.0 DISCUSSION

Infectious diseases such as tuberculosis and HIV/AIDS have become a major health concern which have attracted lots of attention in both developed and developing countries. The prevention of such diseases especially among healthcare workers is key to the provision of safe and quality healthcare (Geberemariyam *et al.*, 2018). With regards to TB disease control and prevention; good knowledge, positive attitude and good preventive practice on the part of HCWs would help reduce the impact of TB disease as well as contribute immensely in the fight against TB worldwide (Farhanah *et al*, 2016; Lerkanokkum *et al*, 2013). A deficit in the knowledge, attitude and TB preventive practice among HCWs can lead to the delivery of substandard care, ineffective use of resources and poor service delivery which would impact health outcomes negatively as well as increase the risk of TB transmission and compound the issues of antimicrobial resistance (Dodor *et al.*, 2009; Chang and Cataldo, 2014). Hence, the aim of this study was to assess the knowledge, positive attitude and preventive practice (KAP) of HCWs as well as the determinants of KAP among HCWs in KATH.

5.1 KNOWLEDGE OF HEALTHCARE WORKERS ON TUBERCULOSIS

In this study, the knowledge of HCWs on what TB is, its causative organism and its transmission mode were good albeit some gaps that were identified, similar to other studies conducted in South Africa (Engelbrecht *et al.*, 2016; van Rensburg *et al.*, 2018), Russia (Woith *et al.*, 2010), Ethiopia (Temesgen and Demissie, 2014), Peru (García *et al.*, 2018) and Saudi Arabia (Alotaibi *et al.*, 2019). This study recorded some misconception about the transmission mode of TB as recorded similarly in the study conducted by Alotaibi *et al.* (2019). Few respondents attributed eating together,

shouting and sharing bed linens or toilet seats as a means of contracting TB from active TB patients (Table 4). Again, the study also recorded a poor knowledge of HCWs on the signs and symptoms of pulmonary TB as HCWs incorrectly recognized haemoptysis (58%), persistent high fever (59%) and loss of weight (67%) as common signs and symptoms of pulmonary tuberculosis. This is in contrast to other studies where majority (76-98%) of HCWs correctly identified the signs and symptoms of TB (Temesgen and Demissie, 2014; Engelbrecht *et al.*, 2016; van Rensburg *et al.*, 2018; Alotaibi *et al.*, 2019). With regards to TB immunization, 88% - 92% of HCWs at KATH were clear on the importance of BCG vaccination as well as good ventilation and light in doors as TB preventive method in contrary to other studies where only 36% -49% of HCWs knew the importance of these preventive measures (Bhebhe *et al.*, 2014; Alotaibi *et al.*, 2019). Again the knowledge level on TB diagnosis generally was good however, the knowledge regarding rapid diagnostic test for discovering TB and resistance to rifampicin (Gene Xpert MTB/RIF) was poor amongst HCWs. This study therefore affirms that the knowledge level on this new diagnostic tool is low among most HCWs as seen in a study conducted by Noé *et al* (2017) and Alotaibi *et al* (2019), although this diagnostic test has been massively endorsed by WHO and integrated into most laboratories for routine TB diagnosis. (World Health Organisation, 2014).

Antimicrobial resistance among TB patients is a growing concern and many studies have observed a deficit knowledge on MDR – TB mostly among healthcare givers (*Woith et al*., 2010; Isara and Akpodiete, 2015; Alotaibi *et al.*, 2019). This study is no difference from other works done as it was observed that HCWs had little knowledge on MDR-TB, although they had good knowledge on TB treatment, effect of incomplete treatment and risk factors for developing MDTB. These results strongly point out that HCWs must be educated of TB, signs and symptoms, transmission, diagnosis and

Treatment of TB especially MDR-TB so as to communicate correctly to patients. This is because TB knowledge among HCWs determines the quality of health care information being relay to patient and as such an inadequate information passed from HCWs to patients can lead to the creation of negative perception about the disease among patients (Dodor *et al.*, 2009; Chang and Cataldo, 2014; Alotaibi *et al.*, 2019). This can also pose a greater hindrance to the fight against TB globally (Dodor *et al.*, 2009; Chang and Cataldo, 2014).

5.2 ATTITUDE OF HEALTHCARE WORKERS IN KATH TOWARDS TUBERCULOSIS

Attitude of Healthcare workers toward TB disease as well as TB patients are very crucial in improving the health seeking behaviors of patients, compliance to treatment and outcomes of treatment so as to prevent the development of drug resistance (Chang and Cataldo, 2014; Isara and Akpodiete, 2015). In this study, positive attitude of HCWs towards TB (overall mean attitude score of 0.67) was observed although some negative attitudes were recorded in some studies (Woith *et al.*, 2010; Temesgen and Demissie, 2014; Engelbrecht *et al.*, 2016; van Rensburg *et al.*, 2018; Alotaibi *et al.*, 2019). Most HCWs regarded TB or MTDR-TB as public health importance and noticed the importance of community engagement and public education in TB control. Negative attitude was recorded with the HCWs willingness to work at TB clinic throughout their professional career (only 30% of HCWs at KATH agreed to working at TB clinic or on TB patients) as observed in other studies conducted by Tenna *et al* (2013) and Alotaibi *et al* (2019). This is because majority (over 50%) of HCWs perceived working on TB patients or at TB clinic as threatening and stressful. The explanation to this effect could be seen in studies conducted elsewhere, where deficit in knowledge on TB,

transmission, treatment, stigma with the disease were attributed to affect HCWs attitude (Dodor *et al.,* 2009; Kanjee *et al.,* 2011; Chang and Cataldo, 2014).

5.3 TUBERCULOSIS CONTROL PRACTICE AMONG HEALTHCARE WORKERS

In this study, HCWs had a good TB infection control practice and management. The overall TB control practice mean score in this study (means score = 0.77) was higher than that for attitude (means score = 0.67) or knowledge (means score = 0.74). This means score was higher than that recorded in studies conducted in Southern Mozambique (means score = 0.36) (Noé *et al.*, 2017) and Addis Ababa, Ethiopia (means score = 0.52) (Demissie Gizaw *et al.*, 2015) but was lower than mean score (means score = 0.81) reported in data from Saudi Arabia (Alotaibi *et al.*, 2019). Most healthcare workers were reported to have been teaching cough etiquettes (85%), using of nose mask by TB patients, relative and health workers (88%) and isolating TB from other patients (99%). Although this a good practice by HCWs there is still the need to address the 1% -15% poor healthcare practices. KATH as an institution practices some good TB management by ensuring the display of TB control infection plan at work station of HCWs, laboratory services are adequate for TB diagnosis, adequate number of staff for managing TB cases, not allowing HCWs who contracts TB to continue working in full capacity till recovery as well as maintaining confidentially of staffs who contracts TB to minimize stigma. Although this managerial practice are good, the result disclosed that there are inadequacy of training of staffs on TB and most patients are diagnosed with TB some days after admission. This practice therefore can be attributed to poor knowledge of staffs on the signs and symptoms which can lead to TB transmission in the healthcare facility. This situation calls for the education of staff on

the signs and symptoms of TB to enhance early diagnosis (World Health Organization, 2014).

The results of this study suggests the need for an interventions to improve KAP of HCWs regarding TB. Health care workers need to be encouraged to be abreast with current scientific literature and made aware of national and international TB control guidelines and best practices as well as advances in tuberculosis control and management (Alotaibi *et al.,* 2019).

5.4 DETERMINANT OF KNOWLEDGE, ATTITUDE, PRACTICE AMONG HEALTHCARE WORKERS

Gender, healthcare profession and educational level were associated to good knowledge of TB among HCWs with educational level being the main predicator of good knowledge. This confirms findings of other studies reported elsewhere (Demissie Gizaw *et al.,* 2015; Minnery *et al.,* 2013; Buregyeya *et al.,* 2016; Woith et al., 2017; Shrestha et al., 2017; Alotaibi et al 2019). Meanwhile, duration of work experience and being involved in TB control activities were not associated with good TB knowledge and this is in contrast to studies conducted by Woith *et al* (2010),

Demissie Gizaw *et al* (2019), Buregyeya *et al* (2016). Noé *et al* (2017), Shrestha *et al* (2017) and Alotaibi *et al* (2019). With regards to Attitude, health care profession and educational level were also associated with positive attitude even though total attitude score differed among gender, age categories, healthcare profession and Level of education. In a study conducted in Peru, attitude score among HCWs differed based on the employment groups (Minnery *et al.,* 2013) whilst in Saudi Arabia, age and healthcare profession were associated with HCWs attitude score (Alotaibi *et al.,* 2019). Again, gender, healthcare profession, education level, having had TB or not and duration of work experience were strongly associated with good TB control practice

score similar to a study conducted by Alotaibi et al (2019). In a similar work in Mozambique, good TB control practice was also dependent on HCWs level of education, healthcare profession and working experience on TB patients Noé *et al* (2017). Demissie Gizaw et al (2015) in Ethiopia, also in their findings highlighted that the level of education and TB work experience of HCWs were associated with good TB infection control practice among HCWs.

In this study, a weak significant positive correlation was observed between knowledge and TB control practice, supporting other studies (Temesgen and Demissie, 2014; Van Rensburg *et al.,* 2018). The correlation between attitude and knowledge or attitude and practice was negative which contradicts with the study by Alotaibi *et al*. (Alotaibi *et al.*, 2019). It is reported in literature that there exist no simple or single relation between Knowledge, attitude and TB control practice among HCWs (Demissie Gizaw *et al.*, 2015; Engelbrecht *et al.,* 2016).

CHAPTER SIX

6.0 CONCLUSION

The healthcare professionals are the first point of contact for TB patients that seek medical attention and the adequacy of controlling the spread of pulmonary tuberculosis and its management are dependent on these health professionals. The outcome of this result is encouraging since majority of respondent had good knowledge, attitude and effective practice in the control and management of TB. Even though the aforementioned were identified to be good, some gaps were undoubtedly disclosed, necessitating the need for adequate information on TB signs and symptoms, diagnoses, treatment regimen and the mode of transmission. This will dispel any misconception related to TB disease in order to rule out TB stigmatization particularly in health

services. In relation to HCWs attitude on the need to working at TB centers, majority of the respondents were not yearning to work at the centers as they recognized it as being stressful and life threatening. Isolation of patients, teaching of cough etiquette, use of nose mask among others were some of the good practices portrayed by the HCWs. Although, HCWs demonstrated good practices, there was inadequate training of staff on TB infection control.

Again, the HCWs‟ knowledge level on TB according to this study was determined by gender, age, professionalism, educational level and their encounter with TB patients in the management and control of TB. Educational level was the main predicator for good TB knowledge. Similarly, the good practice exhibited by the HCWs was also attributed to gender, educational and professional levels. However, HCWs with higher level of education had good attitude towards TB whereas the other demographic features portrayed in this study had no influence on HCWs attitude. In summary, the good practices showed by HCWs were associated to the level of their knowledge while there was no relation between knowledge and practices with regards to HCWs attitude in the control of TB infection.

6.1 RECOMMENDATION

1. Organizing frequent workshops to create awareness on Signs and symptoms of TB, Mode of transmission, TB diagnostic tool (Gene Xpert) and End TB Strategy for TB infection.
2. The management of KATH can set up monitoring and evaluation team to address emerging problems that can hinder TB infection control.
3. Other research can be conducted to ascertain the factors contributing to HCWs unwillingness to work at TB centers.

4. Other research can be done in other health facilities in Ghana to ascertain the level of knowledge, attitude and practices towards TB control since this work was limited to only Komfo Anokye Teaching Hospital (KATH).

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APPENDICES

Appendix 1: Questionnaire

Dear Respondents,

I am a postgraduate student conducting a study on **"Knowledge, Attitude and Practice related to Tuberculosis among Healthcare Workers at Komfo Anokye Teaching Hospital (KATH).** I wish to seek your views regarding the above mentioned topic. Any information provided in this questionnaire would be kept confidential and would be used for my research work only. Your honest answers to this study would be greatly appreciated and would help in addressing issues related to the topic.

Number: ……. Date: ……/……/…….

Please circle [O] where appropriate.

SECTION A: DEMOGRAPHIC DATA

1. **Gender;** **a.** Male b. Female

2. **Age** _____

3. **Profession**
   a. Doctor/Physicians Assistants b. Nurse c. Pharmacists/Pharmacy technicians

   d. Midwife e. Biomedical Scientist

4. **Work Experience (Duration)** _____ year/years

5. **Educational Level**
   a. Certificate b. Diploma c. Degree d. Masters c. PhD

6. **Have you ever had Tuberculosis?** **a.** Yes b. No

7. **Has any of your close contacts been sick with tuberculosis? For example; a friend, spouse, etc.**

   a. Yes b. No

8. Are you directly involved in tuberculosis control activities? a. Yes b. No

If yes, please specify……

SECTION B: KNOWLEDGE ON TUBERCULOSIS

1. **Tuberculosis is**…..;
   a. Hereditary disease b. Communicable disease

2. **Is tuberculosis caused by mycobacterium tuberculosis invading into human body?**
   a. Yes b. No

3. **Patients with active TB can infect other people through*(Circle all that apply)***
a. Coughing
b. Eating together
c. Shouting
d. Sneezing
e. Sharing bed linens or toilet seats

4. **Any part of the body can be affected by TB.**
a. Yes
b. No

5. **Which group of people is at higher risk of developing tuberculosis?**

a. Patients with psychotic problems
b. People living in tropical areas
c. Patients with HIV
d. Males
e. Females

6. **What is the most common symptom of pulmonary tuberculosis?** ***(Circle all that apply);***

a. Haemoptysis
b. persistent high fever
c. Loss of weight
d. Persistent cough

7. **TB can be diagnosed through** ***(circle all that apply)***;

a. Skin test
b. Blood test
c. Sputum test
d. Chest X-ray
e. Don"t Know

8. **TB diagnosis in children is more difficult than in adults?**

a. Yes
b. No

If yes briefly explain……

9. **Have you heard of Xpert MTB/RIF?**
   a. Yes
   b. No

If Yes, what is it used for?.....

10. **TB is curable;** a. Yes
    b.No

11. **The standard TB treatment for newly diagnosed TB patient takes;**
    a. One month
    b. Two - Four months
    c. Six months
    d. Don"t Know

12. **Do you know what direct observed treatment during the initial phase of treatment is?**

a. Yes
b. No

13. **Multi – drug resistant tuberculosis is…….**

a. Tuberculosis that is resistant to any of the tuberculosis medication
b. Tuberculosis that is resistant to isoniazid and rifampicin
c. Tuberculosis that is resistant to all tuberculosis medications
d. Tuberculosis that is resistant to pyrazinamide and ethambutol.

14. **Which of this group of people is multi – drug resistant tuberculosis likely to occur?*(Circle all that apply)***

a. People with HIV
b. People exposed to tuberculosis patients
c. People who have never been exposed tuberculosis
d. People who have been treated for tuberculosis before

15. **The consequences of incomplete treatment are…….*(Circle all that apply)***

a. Failure to fully cure the disease
b. development of resistance to TB drugs
c. further transmission of the disease
d. none of them

16. **To prevent TB, one should receive BCG vaccine in one's adulthood;** a. Yes
b. No

If No, when should it be given…….

17. To prevent TB, one should keep good air circulation and sufficient sunshine indoor;

a. Yes
b. No

SECTION C: ATTITUDE

Please circle [O] the most that applies to you regarding your attitude to the statement. If the statement does not apply to you, do not circle.

1. **Is TB of public health importance in Ghana;**

a. Strongly agree
b. Agree
c. Neutral
d. Disagree
e. Strongly disagree

2. **How do you see working on a TB patient or at a TB center;*(Circle all that apply)***

a. Stressful
b. Rewarding
c. Threatening
d. Comfortable
e. Safe
f. Desirable

3. **Would you accept working on TB patients for the rest of your service as a health worker?**
   a. Yes
   b. No
4. **Is there a stigma regarding TB patients in Ghana?**
   a. Strongly agree
   b. Agree
   c. Neutral
   d. Disagree
   e. Strongly disagree
5. **Community engagement is essential for the control of the disease**
   a. Strongly agree
   b. Agree
   c. Neutral
   d. Disagree
   e. Strongly disagree

6. **Money spent on educating the general public is better than money spent on direct observed treatment.** a. Strongly agree
   b. Agree
   c. Neutral
   d. Disagree
   e. Strongly disagree
7. **Public awareness creation of TB is adequate**
   a. Strongly agree
   b. Agree
   c. Neutral
   d. Disagree
   e. Strongly disagree

8. **Multi – drug resistant tuberculosis is a problem in Ghana**
   a. Strongly agree
   b. Agree
   c. Neutral
   d. Disagree
   e. Strongly disagree

9. **First line therapies for tuberculosis are accepted by patients**
   a. Strongly agree
   b. Agree
   c. Neutral
   d. Disagree
   e. Strongly disagree

10. **In Ghana, there are many barriers to tuberculosis treatment**
    a. Strongly agree
    b. Agree
    c. Neutral
    d. Disagree
    e. Strongly disagree

11. **Teaching TB patients cough hygiene is not important**
    a. Strongly agree
    b. Agree
    c. Neutral
    d. Disagree
    e. Strongly disagree

12. **Infection control is an important means to prevent contracting TB**
    a. Strongly agree
    b. Agree
    c. Neutral
    d. Disagree
    e. Strongly disagree

13. **I should know my own HIV status**
    a. Strongly agree
    b. Agree
    c. Neutral
    d. Disagree
    e. Strongly disagree

SECTION D: PRACTICE ON TB

1. **Is there availability of a written TB infection control plan at my work station?**
    a. Yes No

2. **I teach patient and other work colleagues cough etiquette at my work station?**
    a. Yes
    b. No

3. **When are patients mostly diagnosed of TB at your facility?**
    a. During OPD/consultation
    b. Some days after admission
    c. After some weeks on admission
    d. After some months

4. **TB patients, relative and healthcare workers use face mask?**

   a. Yes
   b. No

5. **Are TB patients isolated from other patients in your health facility?**
   a. Yes
   b. No

6. **The laboratory service that your health facility uses is adequate for the diagnosis of tuberculosis.**
   a. Yes
   b. No
7. **In your health facility, there is sufficient number of people required to treat the tuberculosis patients seen.**
   a. Yes
   b. No
8. **The majority of staff in your health center have adequate training regarding tuberculosis**
   a. Yes
   b. No
14. **If I get TB, I would be allowed to continue working in my current capacity** a. Yes
   b. No

15. **My employer would maintain confidentiality if I were to contract tuberculosis**
   a. Yes
   b. No

9. **What is the frequency of training or workshops for staff in the facility on TB and TB infection control?**
   a. Once every six months
   b. Once every year
   c. Once every two years
   d. Never

10. **What is /would have been your best practice in caring for TB patient?**

……
…

Appendix Two: Certificate of Registration (KATH)

KOMFO ANOKYE TEACHING HOSPITAL

RESEARCH AND DEVELOPMENT UNIT (R & D)

CERTIFICATE OF REGISTRATION

REG. NO: RD/CR18/226

This is to certify that

Prof/Dr/Mrs/Mr/Ms Aboagye Christiana Safoa

has registered his/her proposed study titled A Cross-Sectional Study on Knowledge, Attitude and Practice of Tuberculosis Infection Control among Healthcare Workers in the Kumasi Metropolis

..... with the Research and Development Unit.

Date: 17-August-2018

Name of issuing officer

Mr. Isaac Boakye

Signature

K/17/0427270

*Receipt number must tally with pay-in slip from the bank

Note

This certificate does not constitute ethical clearance for the conduct of the study but proof of registration of study with KATH. Ethical clearance from the Committee of Human Research, Publications and Ethics (CHRPE) is required to conduct the study in KATH. Copies of all relevant regulatory approvals including CHRPE must be submitted to the R&D Unit prior to commencement of the study.

Version RD/REG-01 1ST JUNE, 2018

Please note: All previous versions of the certificate of registration becomes obsolete

Form expires 30TH JUNE, 2019

Appendix 3: Letter of Approval (CHRPE/AP/076/19)

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY
COLLEGE OF HEALTH SCIENCES
SCHOOL OF MEDICAL SCIENCES / KOMFO ANOKYE TEACHING HOSPITAL
COMMITTEE ON HUMAN RESEARCH, PUBLICATION AND ETHICS

Our Ref: CHRPE/AP/076/19 — 26th February, 2019.

Miss Christiana Safoa Aboagye
KNUST – Africa Institute of
Sanitation and Waste Management
School of Public Health
KNUST-KUMASI.

Dear Madam,

LETTER OF APPROVAL

Protocol Title: ***"A Cross Sectional Study on Knowledge, Attitude and Practices of Tuberculosis Infection Control among Healthcare Workers in the Komfo Anokye Teaching Hospital."***

Proposed Site: ***Komfo Anokye Teaching Hospital.***

Sponsor: ***Principal Investigator.***

Your submission to the Committee on Human Research, Publications and Ethics on the above-named protocol refers.

The Committee reviewed the following documents:

- A notification letter of 17th August, 2018 from the Komfo Anokye Teaching Hospital (study site) indicating approval for the conduct of the study at the Hospital.
- A Completed CHRPE Application Form.
- Participant Information Leaflet and Consent Form.
- Research Protocol.
- Questionnaire.

The Committee has considered the ethical merit of your submission and approved the protocol. The approval is for a fixed period of one year, beginning 26th February, 2019 to 25th February, 2020 renewable thereafter. The Committee may however, suspend or withdraw ethical approval at any time if your study is found to contravene the approved protocol.

Data gathered for the study should be used for the approved purposes only. Permission should be sought from the Committee if any amendment to the protocol or use, other than submitted, is made of your research data.

The Committee should be notified of the actual start date of the project and would expect a report on your study, annually or at the close of the project, whichever one comes first. It should also be informed of any publication arising from the study.

Yours faithfully,

Rev. Prof. John Appiah-Poku.
Honorary Secretary
FOR: CHAIRMAN

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