Assessment of Knowledge, Attitude andBehavioural Practices towards TB Prevention and Control among Healthcare Workers at the Thika Level 5 Hospital

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DECLARATION

This proposal is my own original work and has never been presented for a degree to any other university.

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DEDICATION

Firstly, I dedicate this work to the almighty Allah, for his blessings and generosity in my life.

Secondly, I would like to Dedicate to my family, for their prayers, moral, financial support and patience during my studies. May the Blessings of Allah be upon them forever.

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LIST OF ABBREVIATIONS AND ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
ART	Anti-Retroviral Therapy
CPT	Cotrimoxazole Preventive Therapy
DOTS	Directly Observed Therapy- Short-Course
GTB	Global Tuberculosis Programme
HIV	Human Immunodeficiency Virus
MDR-TB	Multi-Drug Resistant TB
NLTP	National Leprosy and Tuberculosis Program
TB	Tuberculosis
W.H.O	World Health Organization

ABSTRACT

Background: Tuberculosis (TB) is a major health concern globally. Ranked among the foremost cause of death amongst infectious diseases in the World, TB affects millions of people each year and remains to be a main universal health problem. TB is a curable with a timely diagnosis and correct treatment. To reduce the health problem caused by TB, countries have fully integrated national TB programme in the primary health-care system. In Kenya, the Government has come up with ways of providing care to TB patients through government hospitals (NASCOP, 2013). Healthcare workers are responsible for educating and promoting behavioural practices that can help reduce transmission of TB.

Objective: To assess the knowledge, attitudes and behavioural practices towards TB prevention and control among healthcare workers at the Thika Level 5 Hospital.

Methods:This was a cross-sectional study carried out at the Thika Level 5 Hospital. The population of health care workers was stratified by cadre. In each stratum (cadre), health care workers were selected conveniently considering their working schedule.A self-administered structured questionnaire was used to collect data from 201 healthcare workers. Descriptive analysis was done to summarize data. Bivariate analysis was done using Chi-square/ Fishers exact test to evaluate the association between the participants' knowledge, attitude and practices (KAPs) towards TB infection, transmission, prevention and control; and their demographic characteristics, cadre, work experience, history of service and training in TB prevention and control. Multivariate analysis was performed using Poisson regression model to evaluate the factors associated withKAPs of health workers towards prevention and control of TB.

Results: Two hundred and one healthcare workers participated in the study (a response rate of 96.6 %). A majority (69.6%) of the respondents were female and more than half (55.7%) were nurses. Median age of HCWs in the study was 30 years (Inter-quartile range (IQR): 25-40). Less than half (46.8%) had at least one-year experience dealing with TB patients while 12.95% had no experience in TB care. Almost all respondents (99.5%) had good knowledge regarding TB, 58.7% had positive attitude towards TB care and 71.6% had good TB care practices. The median (IQR) score of basic TB knowledge was 83.3% (66.7-83.3), that of attitudes towards TB disease and care was 53.6% (42.1-63.2) and that of TB care practices was 60.0% (40.0-80.0). Those with more than five years in service at the facility were more likely to have positive attitudes compared to those with five or less years in service (Prevalence ratio (PR)=1.57; CI: 1.19-2.07). Those who had served less than tenTB patients in the past six months were more likely to have poor TB care practices compared to those who had served tenor more TB patients (PR=0.82; CI: 0.67-0.99).

Conclusion: Health Care Workers at Thika Level 5 Hospital have goodknowledge on TB care. However, this contrasts with the level of attitudes towards the same where a considerable proportion had negative attitude and the level of TB care practices. Notably, over one-tenth of HCWs in TL5H do not know of existence of TB vaccine, despite treating TB patients. Duration of service was significantly associated with HCWs' attitudes towards TB care.

1.0 CHAPTER ONE: BACKGROUNDOF THE STUDY

TB is a highly infectious disease that is caused *Mycobacterium tuberculosis*(Kumar, 2007). The disease frequently attacks the lungs leading to Pulmonary TB and, some-times, other parts of the body such as the circulatory system, the central nervous system, the lymphatic, the genitourinary and the gastrointestinal systems, as well as bones, joints and the skin leading to extra pulmonary TB. TB is increasingly becoming one of the leading health concerns and is the leading causes of death among communicable diseases (Dave *et al.*, 2013). The 2016 World Health Organization report recorded 1 million Four Hundred Thousand TB deaths in 2015 globally('Global Tuberculosis Control', 2006). In total, 10% children were children while 90% were adults.

The load of TB has increased in Africa mainly because of HIV infection over the last two decades. Over 4 million people worldwide are infected by TB and 740,000 deaths occur every year in Africa(WHO, 2016). In the south of the Sahara, the disease contributes to 25% of preventable deaths in adults with its impact on illness and death increasing in HIV+ persons and MDR TBdrug resistant TB. Tuberculosis has made Kenya one of the highest TB burden countries globally as a one of the main causes of mortality and morbidity. Tuberculosis is reported to have compromised the already strained health services due to the associated morbidity. The implication is severe in areas with understaffed health care personnel coupled with inadequate health facilities.

TB spreads through the air with over 30% of the world's current population having been infected with *M.tuberculosis*,(WHO, 2016). However, most of these cases don't develop into the full-blown disease. In fact, only 10% of latent infections eventually progress to active disease that kills over 50% the victims if left untreated. The contraction of TB is high in developed countries where the population's immune system has been compromised by immunosuppressive drugs,

substance abuse, or AIDS(Shea *et al.*, 2014). TB distribution across the world varies with most of the population that test positive in tuberculin tests being in Asian and African countries.The undiagnosed TB patient is the primary risk to the general population especially health-care workers (HCW). Close contact to infected persons prior to diagnosis ranks among the major risks for TB infection. The transmission risk of TB to HCWs from patients and colleagues is a neglected problem in many countries (Demissie Gizaw, et al, 2015).

TB prevention, diagnosis, treatment and control strategies around the world started getting attention in 1991 when the disease was recognized as a major public health issue(Mcgee, 2005). This was followed by establishment of 2 targets for TB control namely, increasing detection rates to 70% and cure rate to 85% by 2000. The targets were entrenched within the Directly Observed Therapy – short course (DOTS) strategy that was launched by WHO in 1994 and endorsed by the WHO STOP TB Strategy in 2006('Global Tuberculosis Control', 2006). To realize the targets, TB spread prevention in health care settings was promoted by utilization of infection control and environmental measures(Porter, 2015). Infection control measures required the promotion of earlydiagnosis/case detection, observance of treatment and TB infection control measures. HCWs must educate their co-workers, TB patients and the society at large about sufficient ventilation (Zhang *et al.*, 2013).

Despite the knowledge of HCWs about TB, TB illness control practices in hospitals remains poor(Mmutle, 2011); and (Hashim, 2003). According to WHO Report of 2016, Kenya is ranked 10th among the world's 22 countries with a high rate of TB. (The report further shows that Kenya had an incidence rate of 123 new sputum smear-positive (SS+) cases per 100,000 people and more than 200,000 new TB cases in 2014, and in 2015, 108,401 cases were recorded.

In Kenya, the efforts towards tuberculosis control were boosted with the development of NLTP in 1980. This led to the establishment of DOTS in 1993 and by 2001, about 100% DOTS coveragewas reported (NLTLD, 2014). Kenya is considered as one of the countries in the World that advocates for TB and leprosy control. In Africa, Kenya was the first country to achieve WHO targets for case detection and treatment success of new smear-positive pulmonary TB cases. Successful TB treatment remains to be NTLD Program's trademark with rates among new smear-positive cases averaging over 88% among HIV-negative patients, 82% among PLHIV, and approximately 68% among those being treated for MDR-TB(NLTLD, 2014). Kenya continues to lead in rolling out TB/HIV collaborative activities (Mauch *et al.*, 2011).

A public health threat over the years, TB remains one highest-ranked killer worldwide despite the discovery of drugs that can cure this infectious illness. Control and prevention of TB therefore remains a global endeavour but also a national responsibility and Global Tuberculosis Programme (GTB) under WHO co-ordinates the global effort, formulate strategies and provide guidelines to National Tuberculosis Programmes (NTP) worldwide. Control can be achieved through early active case detection and complete treatment, and detection and preventively treating persons with latent TB infection. The present global strategies to control TB have three diverse but have common characteristics, such as, humanitarian, public health and economic. The major humanitarian concern is reducing illness, suffering and death. The public health aspect is appropriate diagnosis and treatment to reduce transmission within communities, while decreasing costs, promotion of development and fighting against poverty makes the economic dimensions. It's against this background that this study soughtto explore the healthcare workers' knowledge, attitude and behavioural practices about TB prevention and control in Kenya using a case of the Thika Level 5 Hospital.

1.1 Statement of the problem

Tuberculosis (TB) is a key worldwide health challenge that causes ill-health in millions of people each year. In 2015, the disease ranked among the top 10 cause of mortality worldwide (WHO, 2015). This is even though the disease is curable with timely diagnosis and adherence to proper treatment. To reduce the health problem caused by TB, the National TBprogramme was incorporated in the principal health-care system where TB case suspects are recognized, diagnosed and treated by peripheral health-care workers (WHO, 2016).

The Kenyan Government is implementing a program to provide reasonable and impartial access to high quality of care for diseases of public health magnitude such as TB through government hospitals (Health, 2014). Healthcare workers are responsible for educating and promotingbehavioural practices that can help reduce transmission of TB. Raising knowledge and positive attitude of TB Patients can reduce onward transmission and improve health and save lives (Jaramillo, 2001). They are therefore expected to possess current and accurate knowledge to promote good behavioural practices about TB prevention and control due to their key roles as educators in disease prevention and health promotion.

Despite the current preventive, treatment and control measures, it is imperative to evaluate behavioural practices among HCWs for proper planning practices. Healthcare workers combine their knowledge to educate patients about TB prevention and control, encouraging and informing roles to influence their colleagues as well as their patients to prevent and control TB transmission. Demissie et al, (2015) noted that HCWs need to conduct important health education awareness, encouraging and informing roles to influence their colleagues and patients about TB transmission, control and prevention.

Using a case of the Thika Level 5 Hospital in Kiambu County, this study soughtto explore the healthcare workers' knowledge, attitude and behavioural practices about TB prevention and control.

1.2 Research questions

i. What level of knowledge, attitude and behavioural practices is put towards TB control and preventive measures among healthcare workers at the Thika Level 5 Hospital?

ii. What are the socio-demographic factors associated with knowledge, attitudes and behavioural practices about TB control and preventive measures amongst healthcare workers at the Thika Level 5 Hospital?

1.3 Research objectives

1.4 The Main Objective

To assess knowledge, attitudes and behavioural practices towards TB prevention among Health Care Workers at the Thika Level 5 Hospital.

1.4.1 Specific Objectives

1. To assess the level of knowledge, attitude and behavioural practices towards TB control and preventive measures among healthcare workers at the Thika Level 5 Hospital.
2. To identify and characterize the socio-economic demographic factors associated with knowledge, attitudes and behavioural practices about TB control and preventive measures amongst healthcare workers at the Thika Level 5 Hospital.

1.5 Justification of the study

The results of this study are expected to improve the knowledge, attitude and practice of healthcare providers towards TB prevention and control among their co-workers, patients and the community at large. The study highlights areas for further research by scholars and researchers.

2.0 CHAPTER TWO: LITERATURE REVIEW

2.1 Background Information on Tuberculosis

Tuberculosis has been present in human history since antiquity. According to Aisu, Raviglione and Al, (1995), the WHO declared TB a global emergency in the year 1993and it is estimated that between the year 2009 to 2025, a total of about one billion people will be newly infected by the bacteria, 200 million people will get TB and 40 million will die from it if control programs do not improve (WHO, 2010). Anderson *et al.*, (2007) noted that TB is a disease of the under privileged people in the Society. As such, with better socio-economic environments and access to appropriate medication, TB infection has been effectively controlled across the globe.

In industrialized countries, TB is commonly linked to known high risk groups like the elderly,(WHO, 2010). The risk of contracting TB increases with duration of exposure to infected persons who are not on treatment (WHO, 2012). In addition, children under five and the old and those who are immune-suppressed are at higher risk of TB infection. Globally, the African region contributes slightly over 25% of the TB burden making the region the second after Asia which contributes 59% of the Global case load (WHO, 2012).

TB epidemiology is explained by the changes in the trends of the burden of TB disease over time indicated by incidence, prevalence and mortality (WHO, 2013). Kenya is ranked 10^{th} on the list of 22 high burden tuberculosis nations globally and 5^{th} in Africa (WHO, 2014). HIV/AIDS has significantly changed the epidemiology of TB such that many persons with Mycobacterium TB and HIV have a 5-10% annual risk of developing active TB. The double impact of TB and HIV co-infection is keeping a large population trapped in poverty with an estimated 170 million working days are lost each year because of TB (Anderson *et al.*, 2007). In addition, the health sector is overwhelmed by the cost of drugs and treatment.

Kenya undertakes a TB national prevalence survey regularly even though no nationally representative vital registration system with standard ICD-10 coding is in place. Data on TB prevalence and mortality are hardly available due to low coverage of the civil registration systems in the country. Less than 50 per cent of deaths are documented and about 10 per cent of deaths receive any ICD code (CRS, 2014). Results from an occurrence survey and vital registration systems is used to evaluate the contemporary levels of TB disease and mortality and could also provide imperative data about the efficacy of current TB programmatic efforts and measures needed to develop TB care and control (Sitienei *et al.*, 2013).

2.2 The Kenyan Situation

The fight against TB in Kenya has progressed and its health sector continues to experience massive scale up of both treatment and diagnostic facilities. In 2013, case detection rate (CDR) and treatment success rate were at 79% and 89% respectively. By the end of 2014, 95% of TB patients were tested for HIV against a national target of 95% (NLTLD, 2014). In 2013, diagnosis and treatment of TB was done by general HCWs in 1,900 TB diagnostic centres and over 4,300 TB treatment centers in Kenya(NLTLD, 2014). This translates to 1 diagnostic centre per 37,634 populations. The report further indicates that diagnosis of TB can be done through sputum smear microscopy for new smear positive cases (DLTLD, 2013). Negative cases are diagnosed through a diagnostic algorithm. The diagnosis of extra pulmonary TB is based on clinical suspicion and the collection of appropriate specimens for TB bacteriology where this is feasible (DLTLD, 2013). The Country developed a medium-term TB control strategic plan to cover 2011-2015 which is modeled along the WHO Stop TB approach. The global targets of TB control are to attain at least 70% TB case revealing rate and 85% treatment hit rate (WHO, 2014).

Despite this progress, major problems remain as close to 21% of all incident TB cases are not detected, the important delays in TB diagnosis facilitates TB transmission and is linked to a higher frequency of the poor sequel of TB and the rising problem of drug resistant TB(DLTLD, 2013). It has been reported that insufficient infection control actions in hospital settings may be easing the TB transmission to HCWs and patients. This has substantial penalty for vulnerable groups such as HIV infected persons (DLTLD, 2013). The emergence of multidrug-resistant *Mycobacterium tuberculosis* (MDR-TB) worldwide poses a serious problem to the treatment of tuberculosis. These MDR strains are at least resistant to two most important primary chemotherapeutic agents' rifampicin and isoniazid,they require treatment with more expensive and more toxic second-line drugs.

The prevention, control and treatment of TB in Kenya has and continues to receive national attention. The government created and placed the NLTP under the Ministry of Health (MOH) to help in addressing the disease (Health, 2014). In 2007, the government upgraded the then-NLTP to a division within the MOH (DLTLD) and increased funding for TB control. A larger proportion of TB patients benefited from improved DOTS services implemented by the government in collaboration with donor support. The DLTLD executes services including TB treatment, community-based DOTS (C-DOTS), and public-private mix (PPM) DOTS, as well as activities to deal with Multi-Drug-Resistant-TB. Faced with epidemiological evidence, Kenya's Ministry of Health restructured NLTP by developing the National Strategic Plan for controlling TB. It included most of the global recommendations for TB control emphasizing areas on promotion, communication and social mobilization (ACSM) strategies (Health, 2014). Within this plan, HCWs are among the groups that Kenya considered the most important target for their ACSM activities.

2.3 Role of Health care Workers

Studies have strongly supported the need to specifically target HCWs and increase their acquaintance and capability in the prevention, control and management of TB cases (Espinal *et al.*, 2000)(Yonge and Otieno, 2016). Other studies have noted that beyond professional guidance, there are limited structured ways to constantly enhance the skills of HCWs regarding national guidelines for TB management.

According to(Gizaw, Alemu and Kibret, 2015)on the knowledge and practice of health professionals towards TB infection control and its associated factors in Ethiopia's health facilities, the study indicated that only 36.1% had poor knowledge and 51.7% unsatisfactory practice score towards TB infection control. More than six years of experience and working in health facility and TB related training were importantly associated with knowledge on TB infection control. In addition, having experience in TB clinic and TB related training were significantly associated with practice on tuberculosis infection control.

The use of primary health care facilities in South Africa's Free State Province, in a study carried out byEngelbrecht *et al.*, (2016) assessed the factors associated with healthcare workers' good TB infection control practices by using a cross-sectional self-administered survey with a sample of 202 nurses and 34 facility-based community healthcare workers. Observations in various facilities were done in 41 primary health care facilities in selected areas. The study findings showed good levels of knowledge about TB. Over 80% of the studied population had affirmative attitudes towards TB infection control practices. Further analysis indicated that for every unit increase in attitudes, good practices increased 1.090 times. Thus, respondents with good levels of knowledge were more likely to have good quality practices compared to respondents with poor levels of knowledge.

(Bhandari and Bande, 2016)analysed the level of knowledge and awareness among medical students and nursing staff about TB infection control. A total of 88 medical students and 48 nursing staff were involved in the study. The study established that medical students had more knowledge, attitude and practice regarding TB compared to nursing staff and the difference was found to be statistically significant. It was concluded that nursing staff need regular seminars, symposiums or meetings to improve their knowledge about tuberculosis.

(Charisis *et al.*, 2013) carried out an assessment of the knowledge and practices of hospital employees on TB in Northwestern Greece. The study used a structured questionnaire which was administered to 789 employees in Ioannina University Hospital consisting of physicians, nurses, technicians, assistants and administrators. Most employees recognized respiratory droplets as transmission route and pulmonary TB as infectious. However, very few employees acknowledged that TB is an airborne disease and that laryngeal TB is infectious. Further analysis revealed that most of the employees who had managed a suspected case used regular masks, with very few employees using high protection masks or none. For newly diagnosed patients, most of the employees supported care in special infectious disease units. In conclusion, hospital employees may lack specific knowledge on less common routes of transmission of TB and often fail to practice certain guidelines for suspected TB cases.

(Hashim, et al (2003) undertook a cross-sectional study using 500 patients and 500 HCWs randomly selected from 250 primary health care facilities all over Iraq to assess knowledge, attitudes and practices towards TB. Research findings showed that 95.5% of the HCWs were aware of TB due to their age and job duration. However, their practice was poor compared to patients with only 38.2% reported to have managed suspected TB cases perfectly. In Iraq, the national TB programme had a positive impact on knowledge of TB patients.

(White, (2011) sought to set up a baseline of TB-related understanding, attitude and practice among health care workers in Kingston and St. Andrew (KSA). Data were collected using close-ended questionnaires and analysed using descriptive and chi-squared analysis. The study results showed less than optimal performance on TB-related knowledge, attitudes and practices among the survey participants; less than 40% had good knowledge of TB.

Noé *et al.*, (2017) studied the knowledge level, identified attitudes and evaluated practices regarding TB care and control among 170 health care workers of the district of Manhiça, which is a high TB and HIV burden rural area in Southern Mozambique. Over 70% of the population approved there was stigma associated with TB and less than 30% of respondents had heard of Xpert MTB/RIF® testing. The study concluded that HCWs' knowledge gaps recognized may lead to lower quality patient care. Thus, HCW should be provided with tailored TB education to reduce the high TB burden in the rural areas in Southern Mozambique.

3.0 CHAPTER THREE: METHODOLOGY

3.1 Research Design:

The study was a cross-sectional conducted between January 2018 and August 2018.

3.2 Research Area and Site Description:

The study was carried out at the Thika Level 5 Hospital with bed capacity of 265; it serves as a teaching and referral hospital and serves a rural and urban population as well as in-patient and out-patient population. This Hospital is located in Central Kenya (Thika District Annual Report, 2014). This Hospital also serves as a referral hospital for the Government of Kenya, FBO, NGOs and private health facilities around that area. The hospital is conveniently identified as the target site of this study because it provides among other services TB diagnosis and treatment. This characteristic makes the hospital suitable for the study.

3.3 Study Population

The study population was drawn from health workers at Thika Level 5 Hospital. The hospital has about 450 Medical healthcare workers according to the Thika District Annual Report (2014).

3.4 Inclusion Criteria:

Medical Healthcare workers at the Thika Hospital

3.5 Exclusion Criteria:

Medical Healthcare workers who refuse to give consent

3.6 Sampling Technique and Sample Size:

The population of health care workers was stratified by cadre as shown in the conceptual frame work 3.8.1. In each stratum (cadre), health care workers were selected conveniently considering their working schedule. The number of health care workers to be selected in each stratum was allocated using proportional size allocation.

The total sample size of health care providers required for this study was calculated using Daniel's formula for estimation of population prevalence. (Daniel WW (1999). Biostatistics: A Foundation for Analysis in the Health Sciences. 7th edition. New York: John Wiley & Sons, 2009)

$$n \geq \frac{NZ^2_{\alpha/2}P(1-P)}{d^2(N-1)+Z^2_{\alpha/2}P(1-P)}$$

Where:

n= minimum sample size required

N=Total estimated population of health workers (N=450)

$Z_{\alpha/2}$ = Critical value for standard normal distribution at α-level of significance (α=0.05, $Z_{\alpha/2}$=1.96)

P=Estimatedproportion of health care providers with good knowledge of TB prevention and controlat Thika Level 5 hospital (P was set at 0.5 because there's no available information from literature)

d=Margin of error (d=0.05)

The minimum sample size required is; n=208 health care providers

3.7 Recruitment and Consenting Procedures:

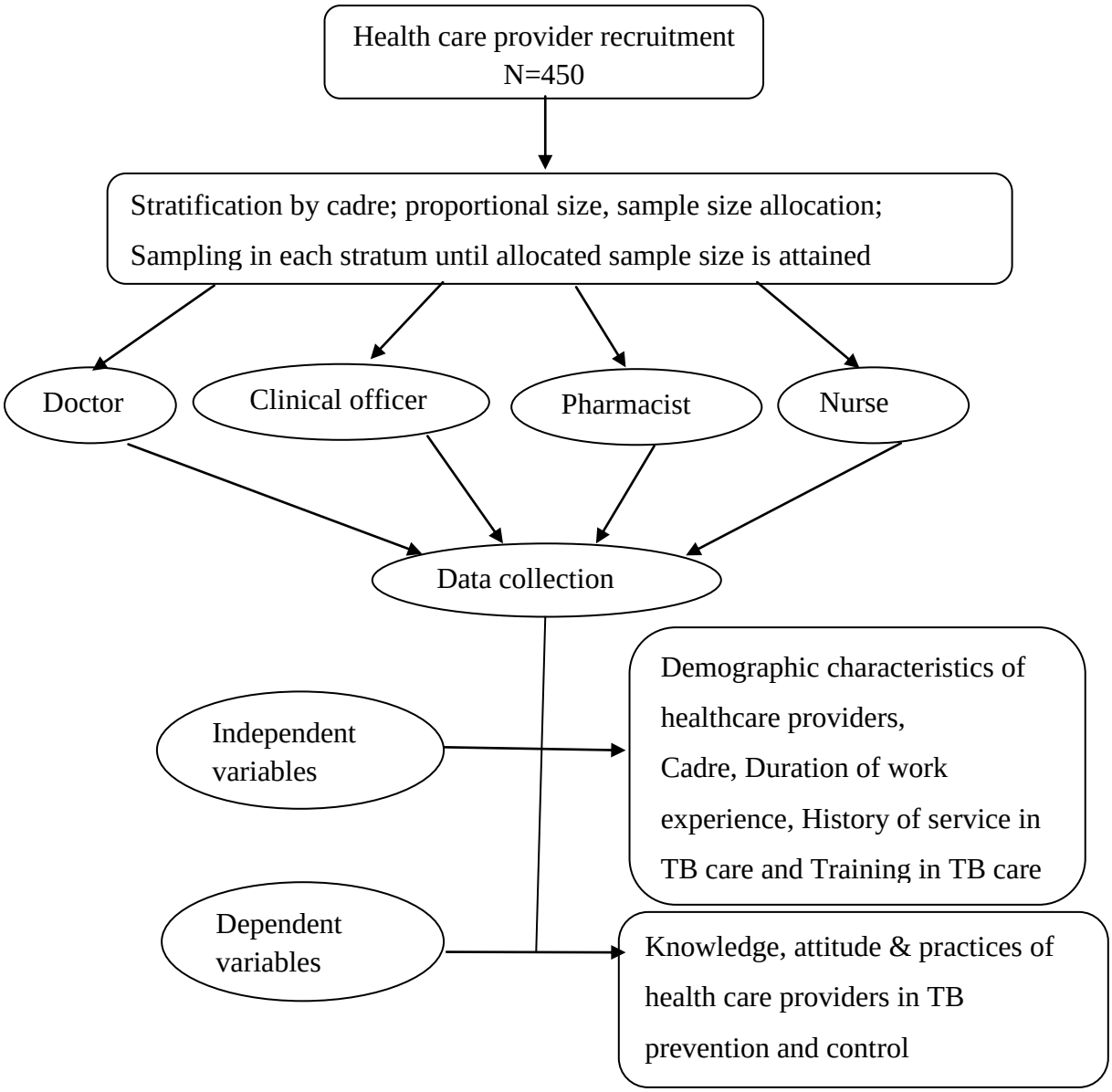
The Principal investigator was responsible for enrolment which includes getting informed consent from the respondents. Enrolment of participants involved screening to identify the ones who met the eligibility criteria. The Participants weretaken through agreeable procedure. The respondents were given all-purpose information for the study, the risks and merits of the study as no risk associated with this study, and the secrecy andliberty to say no to the study. The eligible

respondents who provided consent to participate in the study were recruited after signing a consent form.

3.8 Variables

The study focused on KAP variables. Knowledge was measured by the signs and symptoms, transmission, treatment, prevention and control of TB. Attitude focused on the ability to consider tuberculosis as a very serious or some-what serious disease and problem, acknowledging that TB can occur in any person, positive perception towards the TB patients and; sympathy and desire to assist TB patients. Lastly, practice was measured by consultation to other health care professionals about their sickness if they had tuberculosis, preference and confidence on the available method of TB treatment, promptness in seeking medical help immediately they recognized they have signs and symptoms of TB and; support and help towards TB patients.

3.8.1 Conceptual framework



3.9 Data collection procedure

This study mainly used primary data. Self-administered structured questionnaires with open and closed-ended questions were used to collect the data. Data were collectedover 2 weeks in the month of May 2018. To improve the response rate, the researchercontacted the health facility to find out the most suitable time to collect data. The study recruited two highly trained graduate students as research assistants to assist with the collection exercise.

3.10 Pilot Test

After developing the questionnaires, the researcher conducted a pilot test for in ascertaining the level of reliability and the validity of the instrument to be used in the study. The questionnaire was pretested using 10 healthcare workers at Kiambu District Hospital to determine clarity to the population. Kiambu District Hospital was used to avoid bias in the main study.

3.11 Ethical Considerations and Approval

The researcher obtained an introductory letter from the university before embarking on a data collection exercise. Permission from the top management of the health facility was also sort before data collection commences. The studywas submitted to the KNH- UON Scientific and Ethical Review Committee for review and approval. Only respondents who gave informed consent were eligible and recruited for the study. Confidentiality was also be maintained.

3.12 Data Management

The questionnaire was pre-coded for entry into the IBM SPSS Statistics 20. Data werecleaned andanalyzed using IBM SPSS Statistics 20. Descriptive analysis was done to summarize the data; frequencies and percentages were reported for categorical data and measures of central tendency (mean/median) and dispersion (Standard deviation/Interquartile range) for quantitative data. Summary statistics were presented using tables and graphed in charts. This is followed by

bivariate analysis using chi-square/ Fishers exact test to evaluate the association between the participants' responses based on their knowledge; attitude and practices towards TB infection, transmission, prevention and control and their demographic characteristics, cadre, work experience and history of service and training in TB prevention and control. Chi-square statistics and corresponding p-values were reported.

Lastly, multivariate analysis using Poison regression model was used to evaluate the effect of the independent variables (demographic characteristics,education level, cadre, work experience and history of service in TB care) on the knowledge, attitude and practice of health workers towards prevention and control of Tuberculosis. Adjusted odds ratios, confidence intervals and p-values were reported.

3.13 Study Results Dissemination Plan

The research findings will be disseminated through conferences, seminars and workshops and medical journals and also through publication in a peer-reviewed journal.

4.0 CHAPTER FOUR: RESULTS

4.1 Characteristics of the HCWs

A total of 201 HCW responded to the questionnaireas shown a Table 1. The response rate was 96.6% (201/208). The participants' age ranged between 20 and 59 years with a median of 30 years (IQR=25-40 years).Majority of the HCW in this study were female (69.6%);and more than half were nurses (55.7%). The other professions included; clinical officers (10.0%), medical doctors (7.0%), laboratory technologists (8.0%), pharmacists (4.0%) among otherssuch as occupational therapist, nutritionist, counsellors, and records. Less than half of the HCW had attained at least a Bachelor's degree (42.8%).

Whereas a significant proportion (45.8%) had worked at the hospital for less than 1 year, about a-fifth (19.9%) had worked there for more than 10 years. Less than half (46.8%) of them had at least one-year experience taking care of TB patients. Notably, there was a number of HCW (12.9%) who had no experience handling TB patients. In the six months preceding the study period, majority (68.2%) of the HCW had interacted with less than ten TB patients. On average, TB cases present at the hospital every week. A few of the HCW in this study had either been diagnosed with TB (2.0%) or had a close contact with someone diagnosed with the TB disease (14.0%).

Table 1: Characteristic of study participants

Characteristic	Category	Count(prop)
Gender (n=201)	Male	61 (30.4%)
	Female	140 (69.6%)
Highest education level (n=201)	Certificate	7 (3.5%)
	Diploma	87 (43.3%)
	Higher diploma	21 (10.5%)
	Bachelor's degree	78 (38.8%)
	Master's degree	8 (4.0%)
Profession (n=201)	Medical doctor	14 (7.0%)
	Nurse	112 (55.7%)
	Lab technologist	16 (8.0%)
	Clinical officer	20 (10.0%)
	Pharmacist	8 (4.0%)
	Others	31 (15.4%)
Duration of service at Thika level 5 hospital (n=201)	<1 year	92 (45.8%)
	1-5 years	34 (16.9%)
	6-10 years	35 (17.4%)
	>10 years	40 (19.9%)
Duration of experience Caring for TB patients (n=201)	<1 year	81 (40.3%)
	1-5 years	59 (29.4%)
	6-10 years	12 (6.0%)
	>10 years	23 (11.4%)
	Never	26 (12.9%)
TB Patients cared for in the past 6 months (n=176)	<10 patients	120 (68.2%)
	10-39 patients	36 (20.5%)
	≤ 40 patients	20 (11.4%)
Frequency of interaction with TB Patients (n=201)	Never	12 (5.5%)
	Rarely	69 (34.5%)
	Once a month	23 (11.5%)
	Once every 2 weeks	4 (2.0%)
	Weekly	29 (14.5%)
	Daily	64 (32.0%)
Ever been diagnosed with TB? (n=201)	Yes	4 (2.0%)
	No	197 (98.0%)
Ever had a close contact diagnosed With TB? (n=201)	Yes	28 (14.0%)
	No	172 (86.0%)

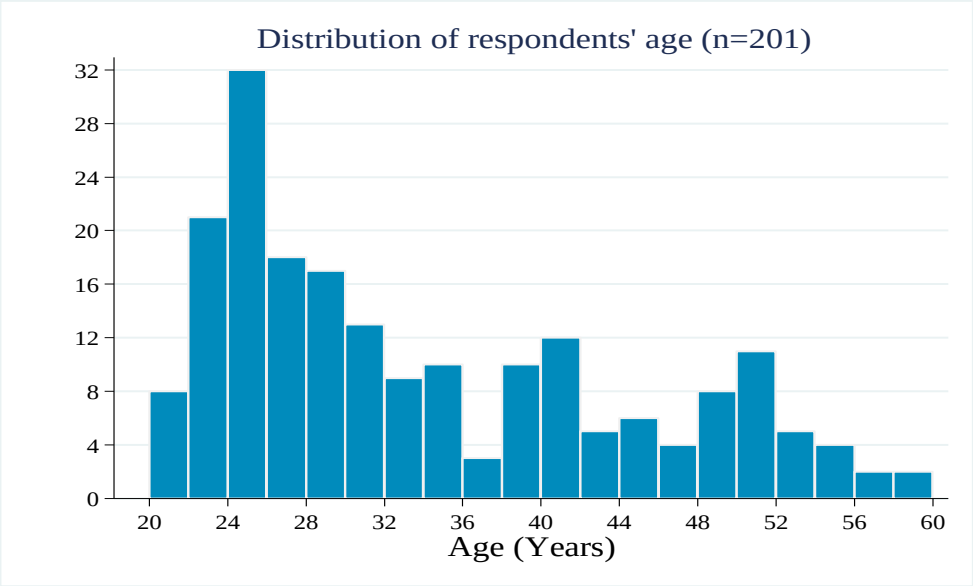


Figure 1: HCW age distribution

The age distribution was right skewed, as shown in Figure 1 with a peak at 25 years.

4.2 Health Care Workers' knowledge on TB care

4.2.1 Tuberculosis basics

HCW were asked to respond to a set of questions to assess their general knowledge of TB as a disease. These included identifying the causative agent of TB, knowledge about TB transmission, populations at risk, prevention and level of training in handling TB patients. Majority (85.6%) of the HCW were able to correctly state the causative agent of TB, *Mycobacterium tuberculosis* bacterium; asked about whether TB is transmissible, all said yes. In describing how TB is spread most (97.0%) gave correct responses and correctly listed (83.6%) the populations at risk of contracting the disease. When asked to grade the likelihood of developing active TB upon getting exposed at least half (57.3%) said moderate to very high

extent. With regards to prevention measures that can be taken as HCW when handling a TB case, more than half (53.2%) gave correct responses such as having adequate/proper ventilation at the facility, use of protective wear when handling patient samples etc. Approximately two-thirds of the HCWs reported having received at least2 to moderate training on TB patient care. These results are described in detail in table 2.

Table 2: Health care workers' general knowledge about TB

General knowledge about TB	Category	Count(prop)
Causative agent of TB?	Mycobacterium TB	172 (85.6%)
	Don't know	29 (14.4%)
Is TB transmissible?	Yes	201(100.0%)
Knowledge of how TB is spread	Correct response	195 (97.0%)
	Incorrect response	6 (3.0%)
Which people are at higher risk of Contracting TB infection?	Correct response	168 (83.6%)
	Incorrect response	33 (16.4%)
Likelihood of developing active TB immediately after contracting TB	Not at all	10 (5.1%)
	Least extent	74 (37.6%)
	Moderate extent	70 (35.5%)
	Great extent	32 (16.2%)
	Very great extent	11 (5.6%)
What preventive measures can be taken as a health care worker when dealing with a TB case?	Correct response	107 (53.2%)
	Incorrect response	94 (46.8%)
To what extent would you say you have received training on TB prevention?	Not at all	38 (18.9%)
	Least extent	56 (27.9%)
	Moderate extent	79 (39.3%)
	Great extent	19 (9.5%)
	Very great extent	9 (4.5%)

4.2.2 TB diagnosis

The study sought to assess the HCWs knowledge of TB diagnosis pointers such as symptoms, challenges in diagnosing paediatric patients, sample collection and management as well as the diagnostic tests used. Most (94.0%) of the HCWs knew the pulmonary TB symptoms to look out for in patients. Afew HCWs (11.0%) were not able to correctly name the best diagnostic tool to use for screening TB. Among the diagnostic tests mentioned includedGeneXpert (77.6%), Microscopy (10.0%), Chest X-ray (0.5%), Mantoux test (0.5%) and culture (0.5%). Approximately two-thirds (68.7%) of the HCWs, agreed that TB diagnosis was more difficult

inchildren than adults andwhen asked to cite the reasons, about half gave correct responses (57.3%). Asked about the number of sputum samples to be collected for TB diagnosis, the number ranged between 0 and 5, with majority stating between 2 and 3 (69.6%). Approximately one-third (36.3%) did not know the right time to collect the initial sputum sample for TB screening and only about half correctly described how sputum samples should be stored before laboratory analysis. About one-third (32.8%) of the HCWs did not know what Gen Xpert is. Table 3 gives more details.

Table 3: Healthcare workers' knowledge of TB diagnosis

TB Diagnosis	Category	Count(prop)
What are the most common symptoms Of pulmonary TB?	Correct response	189 (94.0%)
	Incorrect response	12 (6.0%)
What is the best diagnostic tool for TB?	Gene Xpert	156 (77.6%)
	Microscopy	20 (10.0%)
	Culture	1 (0.5%)
	Chest X-ray	1 (0.5%)
	Mantoux test	1(0.5%)
	Incorrect response	22 (11.0%)
Is TB diagnosis more difficult in children than adults? (n=201)	Yes	138 (68.7%)
	No	63 (31.3%)
If yes, why is it difficult? (n=138)	Correct response	59 (42.8%)
	Incorrect response	79 (57.3%)
How many sputum samples are necessary for diagnosis?	No response	17 (8.5%)
	0	1 (0.5%)
	1	42 (20.9%)
	2	76 (37.8%)
	3	64 (31.8%)
	5	1 (0.5%)
When should the initial sample be taken?	Correct response	128 (62.7%)
	Incorrect response	73 (36.3%)
How should sputum samples be store before laboratory analysis?	Correct response	103 (51.2%)
	Incorrect response	98 (48.8%)
Do you know what GeneXpert is?	Yes	135 (67.2%)
	No	66 (32.8%)
What is GeneXpert? Explain	Correct response	133 (98.5%)
	Incorrect response	2 (1.5%)

4.2.3 TB treatment

Most of the HCWs (98.0%) knew that TB is curable. Asked about the duration of first line pulmonary TB treatment one-third (32.5%) of the HCW gave incorrect responses. About the number of drugs prescribed in the first line TB treatment, slightly less than half (47.2%) of the

HCWs said less than 4 drugs. When asked about the timing of the first follow-up sputum sample following initiation of treatment for a TB case, less than half (43.1%) of the participants said 2 months. Approximately half (54.6%) of the participants identified at least three consequences of incomplete TB treatment including development of resistant TB, failure to fully cure the disease and further transmission of the disease. Majority (85.0%) of the participants were aware about the TB vaccine (BCG) and when it is given (95.0%). More details are given in table 4.

Table 4: Health Care Workers' knowledge on TB treatment

TB treatment	Category	Count(prop)
Is TB a curable disease	Yes	197 (98.0%)
	No	4 (2.0%)
How long is the first line treatment of Pulmonary TB?	2 months	60 (30.0%)
	6 months	135 (67.5%)
	9 months	4 (2.0%)
	12 months	1 (0.5%)
How many drugs are prescribed in the firstLine treatment of TB?	One	6 (3.0%)
	Two	42 (21.1%)
	Three	46 (23.1%)
	Four	105 (52.8%)
Do you know what DOT means in the initial phase of TB treatment?	Yes	122 (61.0%)
	No	79 (39.0%)
If yes, explain	Correct response	121 (99.2%)
	Incorrect response	1 (0.8%)
When should the first follow-up sputum sample be taken following the start of Treatment of a TB case?	After 1month	64 (34.0%)
	After 2months	81 (43.1%)
	After 3months	28 (14.9%)
	After 7months	15 (8.0%)
What are the consequences of incomplete treatment?	Development of resistant TB	80 (40.4%)
	Failure to fully cure the disease	8 (4.0%)
	Further transmission of the disease	2 (1.0%)
	All of the above	108 (54.6%)
Is there a vaccine for TB?	Yes	173 (87.8%)
	No	24 (12.2%)
If yes, name the TB vaccine	Correct response (BCG)	147 (85.0%)
	Incorrect response	26 (15.0%)
When is the best time to give the BCG vaccination?	At birth	192 (95.0%)
	At 2 months	6 (3.0%)
	At 6 months	2 (1.0%)
	Other	1 (0.5%)

4.3 HCWs' attitudes towards TB care

A Likert scale was used to evaluate the HCWs' attitudes towards TB as a disease and care for TB patients. They were asked to indicate how strongly they agreed or disagreed with certain statements on five-point Likert scaleas shown Table 5.

Table 5: HCWs attitudes towards TB disease and TB care

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Finding every new case of TB is essential for control of the disease.	5 (2.5%)	3 (1.5%)	7 (3.5%)	40 (20.1%)	144 (72.4%)
Community engagement is essential for the control of the disease	5 (2.5%)	3 (1.5%)	3 (1.5%)	33 (16.4%)	157 (78.1%)
There is a substantial increase in treatment completion rates if direct observed treatment is used.	4 (2.0%)	2 (1.0%)	20 (10.1%)	69 (34.9%)	103 (52.0%)
There is stigma associated with tuberculosis in Kiambu County	24 (12.1%)	33 (16.7%)	52 (26.3%)	68 (34.3%)	21 (10.6%)
The way you interact with TB patients/regard tuberculosis contributes to any possible stigma there is	9 (4.6%)	25 (12.8%)	39 (19.9%)	81 (41.3%)	42 (21.4%)
Tuberculosis as a disease has more stigma associated with it than HIV	34 (17.0%)	70 (35.0%)	38 (19.0%)	39 (19.5%)	19 (9.5%)
Money spent on educating Kiambu County general population is better than money spent on direct observed treatment	21 (10.6%)	31 (15.7%)	56 (28.3%)	51 (25.8%)	39 (19.7%)
In Kiambu County, the general population is aware of the tuberculosis services that are available	15 (7.5%)	34 (17.0%)	57 (28.5%)	74 (37.0%)	20 (10.0%)
Public awareness regarding TB as a health problem in Thika Level 5 hospital is adequate	17 (8.6%)	40 (20.1%)	46 (23.1%)	74 (37.2%)	22 (11.1%)
First line therapies for tuberculosis are accepted by patients	5 (2.6%)	19 (9.8%)	55 (28.5%)	92 (47.7%)	22 (11.4%)

At Thika Level 5 hospital, there are many barriers to tuberculosis treatment	28 (14.2%)	78 (39.6%)	40 (20.3%)	39 (19.8%)	12 (6.1%)
Most staff in TL5H have adequate training regarding tuberculosis	25 (12.8%)	45 (23.0%)	61 (31.1%)	54 (27.6%)	11 (5.6%)
The laboratory service atTL5His adequate for the diagnosis of TB.	11 (5.6%)	15 (7.6%)	40 (20.3%)	89 (45.2%)	42 (21.3%)
In TL5H, there is enough staff required to treat the TB patients seen	22 (11.5%)	43 (22.5%)	55 (28.8%)	49 (25.7%)	22 (11.5%)
Making people with suspected/confirmed pulmonary tuberculosis wear masks in the hospital is acceptable.	14 (9.3%)	21 (14.0%)	36 (24.0%)	56 (37.3%)	23 (15.3%)
Teaching TB patients cough hygiene is not important	131 (66.8%)	26 (13.3%)	6 (3.1%)	9 (4.6%)	24 (12.2%)
Infection control is an important means to prevent contracting TB.	14 (7.0%)	30 (15.1%)	46 (23.1%)	54 (27.1%)	47 (23.6%)
If I contracted TB, I would be allowed to continue working in my current capacity.	22 (11.1%)	30 (15.1%)	46 (23.1%)	54 (27.1%)	47 (23.6%)
My employer would maintain confidentiality if I were to contract TB	14 (7.0%)	19 (9.6%)	62 (31.2%)	61 (30.7%)	43 (21.6%)

4.4 HCWs practices in TB care

More than three-quarters of the HCWs had previouslycared for or managed a TB patient. The respondents reported taking various precautions when handling Patientssuch as wearinga regular mask (61.7%) and use of gloves (1.7%). Asked about where a newly diagnosed multidrug resistant TB case should be treated, half (50.3%) chose in-hospital (in-patient) and another42.3%preferred out-patient. Most (70.2%) of the respondents were aware of the course of action to take in case a patient has a positive sputum sample after four months of treatment and about half (51.2%) understood the course of action in handling a patient presenting with yellowish skin after three weeks of treatment. These results are presented in detail in table 6.

Table 6: Healthcare workers' practices

TB care practices	Category	Count(prop)
Ever managed a TB-suspected patient or Material	Yes	170 (85.0%)
	No	30 (15.0%)
If yes, what precautions do you take	Regular mask	111 (61.7%)
	High protection mask	28 (15.6%)
	No precautions were taken	23 (12.8%)
	Gloves	15 (8.3%)
	Whole body uniform	3 (1.7%)
Where should a newly diagnosed patient with Multidrug resistant TB be treated?	Hospitalization	101 (50.3%)
	Ambulatory out-patient	85 (42.3%)
	None of the above	15 (7.5%)
What would you do with a patient with a positive sputum sample after four months of treatment?	Follow up sputum	33 (16.4%)
	Resolution of signs and symptoms	12 (6.0%)
	Weight gain	15 (7.5%)
	All of the above are correct	141 (70.2%)
What should you do if your patient has yellowish skin after three weeks of treatment?	Evaluate level of liver enzymes if possible	54 (26.9%)
	Consider this as a potential side effect of drug therapy	37 (18.4%)
	Stop treatment	7 (3.5%)
	All the above	103 (51.2%)

4.5 Overall TB care knowledge, attitude and practices score

The knowledge level, attitudes and HCWs practices in TB care were graded by assigning one score for each correct response. Total score for each respondent was calculated by dividing the sum of the correct response scores by the total score for correct responses in a given set of questions; this was expressed as percentage. The table below summarizes the distribution of the respondents' scores per set of questions. See table 7.

Table 7: Overall knowledge, attitude and practices score

KAPS	No of questions	Median score (%)	IQR	Minimum score (%)	Maximum score (%)
Basic knowledge of TB disease	7	83.3	66.7-83.3	33.3	100
TB diagnosis	7	71.4	57.1-85.7	28.6	100
TB treatment	8	71.4	71.4-85.7	28.6	100
Attitudes towards TB disease and care	19	53.6	42.1-63.2	21.1	89.5
TB care practices	5	60.0	40.0	20.0	100

At least three quarters of the HCWs in this study scored more than 50% in terms of knowledge (Figure 4). A significant proportion scored less than 50% in terms of attitude and practices. This finding is illustrated in figure 4.

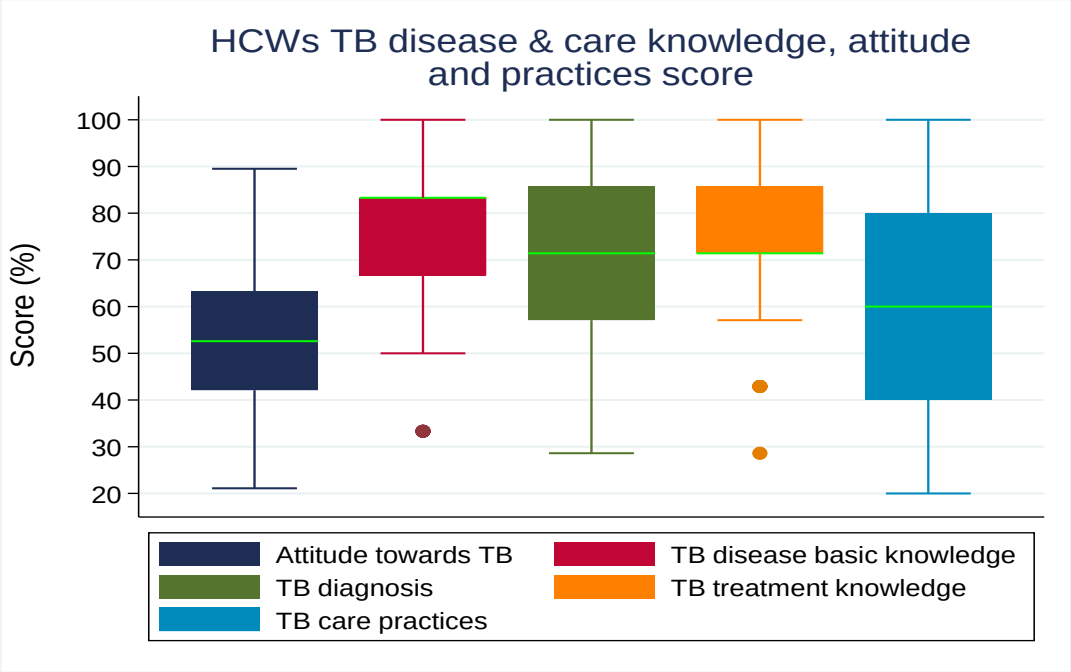


Figure 2: Graph showing the distribution of the HCWs knowledge, attitude and practices scores

A HCW was graded as having good knowledge, good attitude and good practices with regards to TB care if he/she scored at least 50% for a given section. The table 8 shows the summary of the KAPs classification. As shown in the table, despite almost all the respondents having good knowledge of TB disease and care, more than half had poor attitudes and poor practices. See table 8 and figure 5.

Table 8: Knowledge, attitudes and practices grading

KAPS	Level	Count (Percent)
Overall knowledge about TB	Good	200 (99.5%)
	Poor	1 (0.5%)
Attitudes towards TB disease and care	Positive	118 (58.7%)
	Negative	83 (41.3%)
TB care practices	Good	144 (71.6%)
	Poor	57 (28.4%)

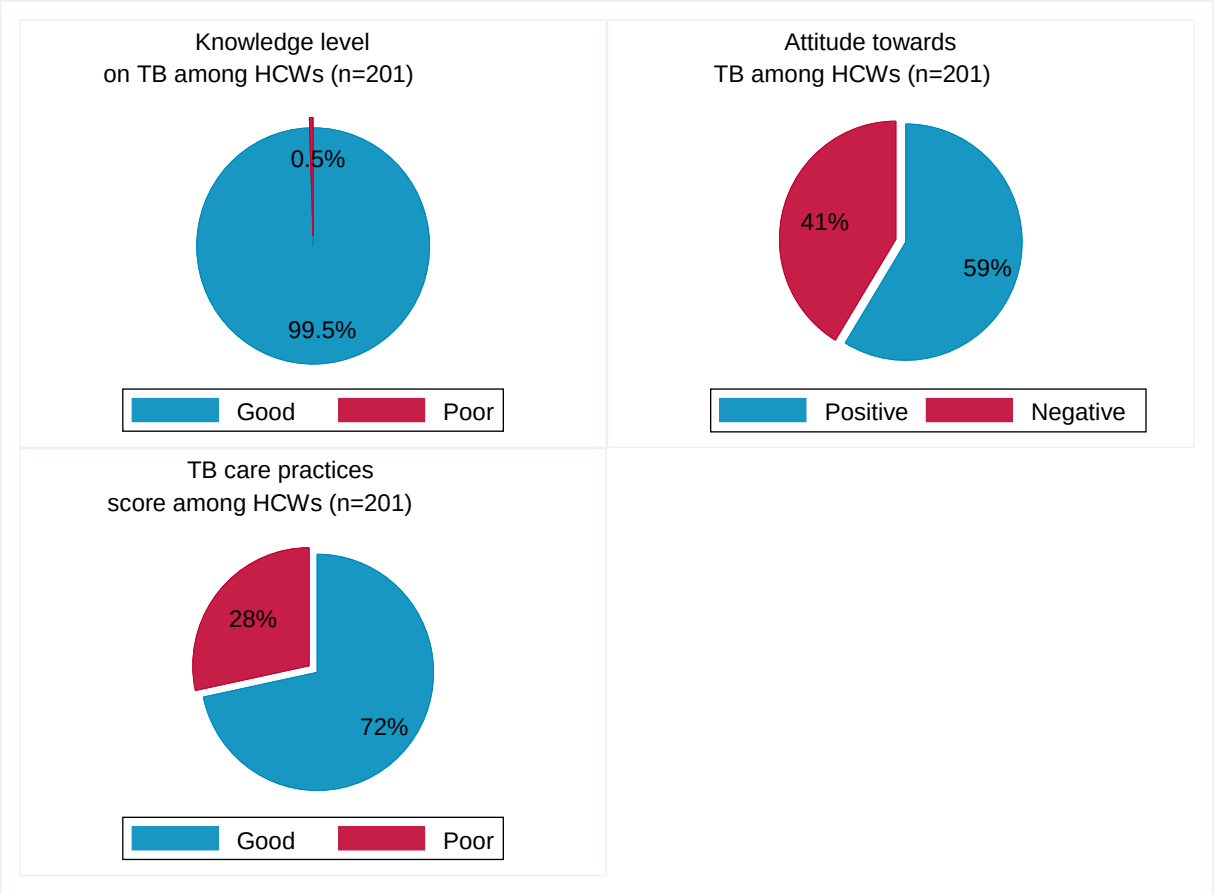


Figure 3: Graphical presentation of HCWs knowledge, attitudes and practices as graded

4.6 Association between HCWs socio-demographic characteristics and their knowledge, attitudes and practices

4.6.1 Crude associations

In the bivariate analysis, chi-square tests were done to test association between the HCWs' socio-demographic characteristics and their attitude towards TB disease and care. All tests were done at 0.05 level of significant. As shown in table 9, highest level of education (p=0.014), history of TB diagnosis (p=0.028) and the duration of service at Thika Level 5 Hospital (p<0.001) were significantly associated with the HCWs' attitudes towards TB disease. See table 9 below.

Table 9: Bivariate analysis- socio-demographic characteristics and attitudes

Characteristic	Category	Positive attitude	Negative attitude	χ	P-value
Gender (n=201)	Male	89	52	3.797	0.051
	Female	29	31		
Highest education level (n=201)	Higher diploma and below	76	39	6.040	**0.014**
	Bachelor's degree and above	42	44		
Profession (n=201)	Nurses and others	95	64	0.341	0.559
	Doctors and clinical officers	23	19		
Duration of service atThika level 5 hospital(n=201)	≤5 years	62	64	12.572	**<0.001**
	≥6 years	56	19		
Duration of experience Caring for TB patients (n=201)	Never	11	14	4.585	0.101
	≤5 years	82	59		
	≥6 years	35	10		
Patients cared for in the past 6 months (n=176)	<10 patients	75	45	1.126	0.570
	10-39 patients	22	14		
	≤ 40 patients	10	10		
Frequency of interaction with TB patients (n=201)	Once fortnightly or less	63	44	0.159	0.924
	Weekly	16	13		
	Daily	38	26		
Ever been diagnosed with TB? (n=201)	Yes	0	4	5.802	**0.028**
	No	118	79		
Ever had a close contact diagnosed with TB?	Yes	21	7	3.562	0.059
	No	97	76		

Chi-square tests of association were done, to evaluate the relationship between the HCWs characteristics and their practices in TB care. As shown in table 10, only the frequency of TB

patients' interaction (p-value=0.015) was found to be significantly associated with the HCWs practices. More results are shown in table 10.

Table 10: Bivariate analysis- Socio-demographic characteristics and practices

Characteristic	Category	Good practices	Poor practices	χ	P-value
Gender (n=201)	Male	42	18	0.114	0.736
	Female	102	39		
Highest education level (n=201)	Higher diploma and below	81	34	0.193	0.661
	Bachelor's degree and above	63	23		
Profession (n=201)	Nurses and others	110	49	2.266	0.132
	Doctors and clinical officers	34	8		
Duration of service atThika level 5 hospital(n=201)	≤5 years	88	38	0.539	0.463
	≥6 years	56	19		
Duration of experienceCaring for TB patients (n=201)	Never	12	13	8.393	**0.015**
	≤5 years	104	37		
	≥6 years	28	7		
Patients cared for in the past 6 months (n=176)	<10 patients	86	34	4.682	0.096
	10-39 patients	32	4		
	≤ 40 patients	14	6		
Frequency of interaction with TB patients (n=201)	Once fortnightly or less	73	34	1.219	0.544
	Weekly	22	7		
	Daily	48	16		
Ever been diagnosed with TB? (n=201)	Yes	2	2	0.941	0.332
	No	142	55		
Had a close contact diagnosed with TB?	Yes	19	9	0.229	0.632
	No	125	48		
Attitude	Good	87	31	0.613	0.434
	Poor	57	26		

4.6.2 Adjusted associations

Poisson regression with robust standard errors was fit to estimate the adjusted prevalence ratio of positive attitude with respect to the HCWs' characteristics. The response variable was the HCWs' attitude (1=Positive; 0= Negative) with negative attitude being the reference group. Except for the HCWs' duration of service at TL5H, all other factors had no significant effect on the adjusted prevalence ratio of positive attitude. With regards to duration of service, the prevalence of positive attitude towards TB disease and care was 57% (PR=1.57, C.I:1.19-2.07) higher among HCWs with more than 5years' experience relative to those with at most 5 years of service, after adjusting for the effect of other factors in the model. Details of regression output are presented in table 11 below.

Table 11: Multivariate analysis-HCWs characteristics and attitudes

Factor	Prevalence Ratio	P-value	[95% Conf.	Interval]
Gender				
Female	1.00			
Male	0.98	0.893	0.72	1.34
Education				
Higher diploma and below	1.00			
Bachelors and above	0.77	0.057	0.59	1.01
Profession				
Nurses and others	1.00			
Doctors and Clinical officers	1.06	0.733	0.76	1.46
Duration caring for TB Patients				
Five years and below	1.00			
More than five years	0.96	0.762	0.73	1.27
No of TB patient treated				
10-39 patients	1.00			
< 10 patients	1.09	0.611	0.77	1.54
Atleast40patients	0.63	0.097	0.37	1.09
Duration working at TL5H				
Five years and below	1.00			
More than five years	1.57	**0.001**	1.19	2.07
Frequency of TB patient interaction				
Once fortnightly or less	1.00			
Weekly	0.84	0.367	0.59	1.22
Daily	1.17	0.334	0.85	1.59
Close contact diagnosed with TB				
No	1.00			
Yes	1.22	0.186	0.91	1.62
Training on TB				
No	1.00			
Yes	1.41	0.095	0.94	2.10

In the second model, the response variable was the HCWs' practices (1=good, 0=poor). The hypothesis being tested was that the HCWs' characteristic had no effect on the TB care practices at 5% level of significance. As shown in table 12, the prevalence of good practices was 18% (PR=0.82, C.I:0.67-0.99) lower among HCWs who treated less than 10 TB patients in the past six months, relative to those who cared for between 10 and 39 TB patients after adjusting for the

effect of other predictors in the model. The rest of the factors in the model had no significant effect of the prevalence of good TB care practices. Details of results are given in table 12.

Table 12: Poisson regression model-HCWs characteristics and practices

Factor	Prevalence ratio	P-value	[95% Conf. Interval]	
Gender				
Female	1.00			
Male	0.94	0.531	0.76	1.15
Education				
Higher diploma and below	1.00			
Bachelors and above	1.02	0.831	0.85	1.23
Profession				
Nurses and others	1.00			
Doctors and Clinical officers	1.16	0.130	0.96	1.41
Duration caring for TB patients				
Five years and below	1.00			
More than five years	1.09	0.463	0.86	1.38
No TB patients treated past 6 months				
10-39 patients	1.00			
< 10 patients	0.82	**0.047**	0.67	0.99
Atleast 40patients	0.76	0.097	0.55	1.05
Duration of work experience at TL5H				
Five years and below	1.00			
More than five years	1.04	0.728	0.84	1.28
Frequency of interaction with TB patients				
Once fortnightly or less	1.00			
Weekly	0.94	0.602	0.73	1.20
Daily	0.96	0.745	0.76	1.21
Close contact diagnosed with TB				
No	1.00			
Yes	0.98	0.913	0.74	1.31
Training				
No	1.00			
Yes	1.14	0.301	0.89	1.48

5.0 CHAPTER FIVE: DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Discussion

5.1.1 Characteristics of healthcare workers

More than two-thirds (69.6%) of the respondents were female and a majority (55.7%) were nurses. The respondents' age ranged between 20 and 59 years with a median age was 30 years (IQR: 25-40) and slightly over one-third (37.3%) had served at TL5H for more than five years. These characteristics mirrored those of a study done in Nepal, where 63.2% of the participants were female, had a mean age of 36 years (SD=9.7). However, there was a contrast in terms of duration in service, where about two-thirds (63.2%) had been in service for more than five years (Shrestha et al., 2017). Additionally, the characteristics of respondents in this study were quite different from those of an similar study in Lesotho where more than three-quarters (88.4%) of the respondents were female, had a median age of 27 years and the median duration of service in the hospital of 3 years (Bhebhe et al., 2014). The disparity could be attributed to the fact that the Lesotho study included student nurses.

5.1.2 Level of knowledge, attitude and behavioural practices towards TB control and preventive measures among healthcare workers

Most respondents correctly stated the causative agent (85.6%) and mode of transmission of TB (100%). In addition, approximately half of were conversant with correct preventive measures that should be observed when handling a TB patient for instance working in an adequately ventilated room and use of protective wear while handling a patient. Thiswas similar to the finding of a study in Lesotho where 90.7% of the HCWs recognized the right transmission mode (airborne) of the disease (Bhebhe et al., 2014). These findings were close to those of another study in Nigeria aimed at assessing the KAPS of infection control among Health Care workers

inDirectly Observed Treatment (DOTS) centres in Lagos, where 97.8% of the respondents correctly named the transmission pathways of TB i.e. person to person through air.

In this study, a majority of respondents had knowledge of pulmonary TB symptoms to look for when diagnosing a suspected case. Diagnostic tests for TB named by respondents included Gene Xpert, Microscopy, Chest X-ray, Mantoux test and culture. Notably, about one-tenth could not correctly name the best diagnostic screening tool for TB, pointing to the need to hold refresher courses for HCWs regularly. As regards treatment, 98.0% of the respondents knew that TB is curable and 85.0% were aware about TB vaccine (BCG). These findings on knowledge of TB treatment mirrored those of a study ina Southern African country, which established that almost all (97.7%) of HCWs knew that TB is curable. In the same study however, more than half (58.6%) of HCWs said that BCG vaccine is not preventive of pulmonary TB (Bhebhe et al., 2014).

As regards practices, 85% of respondents had ever managed a TB suspected patient out of which 81.7% used protection mask as a safety precaution while 8.3% used gloves. It is worth noting that more than one-tenth (13.5%) of HCWs did not report using any form of safety precaution despite knowing the disease is highly contagious. However, this may notonly be due to ignorance on the part of HCWs, but also there could be a result of shortage of safety supplies in the facility.

Overall, an overwhelming 99.5% of HCWs in this study had good knowledge on TB. This finding was however different from that of a study on Ethiopia where only 63.9% of the HCWs had good knowledge of the same (Demissie et al., 2015). Another study in Kingston and St. Andrew (KSA) revealed that less than 40% of HCWs had good knowledge of TB (White, 2011). The variation could be attributed to either true differences in the populations regarding level of knowledge or the choice of indicators of good knowledge between the studies. Either way, the result in this study of level of knowledge of TB is commendable. Regarding attitude towards TB

care, just over half (59.0%) of respondents had a positive attitude. This points to a disconnect between knowledge and attitudes towards TB care of HCWs. This result slightly disagreed with that of a study in South Africa, where more than 80% of HCWs had positive attitudes towards TB care (Bhebhe et al., 2014). However, the study used slightly different indicators of attitude and we could witness different results had it used the same indicators as those of this study. Finally, regarding practices, almost three quarters (72%) had good TB care practices.

5.1.3 Association between socio-economic demographic factors with knowledge, attitudes and behavioural practices on TB control and preventive measures

In multivariate analysis, HCWs' duration of service at TL5H was significantly associated with one's attitude towards TB control and care. Those with more than five years of service were more likely to have positive attitude relative to those with five years or less. This points to the need to conduct regular seminars and symposia especially to the young HCWs in service (five or less years of service) so as to improve their attitude towards prevention and control of TB. A study in South Africa revealed a positive association between attitude and practices among HCWs regarding TB care (Engelbrecht et al., 2016). It is therefore advisable to initiate measures to improve HCWS' attitude as this will likely improve their practices in the long run. As regards practices, results from multivariate analysis revealed that prevalence of good practices among those who had treated less than 10 patients in the last six months was lower compared to those who had taken care of more than 10 patients. This was expected since one gains experience as they treat more patients. It indicates the need to pay special attention to those with limited experience handling TB patients during trainings and seminars on TB.

5.2 Conclusion

This study established that Health Care Workers at Thika Level 5 Hospital have good knowledge on TB care. However, this contrasts with the level of attitudes towards TB where a considerable

proportion had negative attitude and the level of TB care practices. It is notable that over one-tenth of HCWs in TL5H do not know of existence of TB vaccine, despite treating TB patients. There was also poor knowledge on the number of first line prescription drugs for TB, where almost half of respondents gave less than the required number (four). Duration of service was significantly associated with HCWs' attitudes towards TB care. Number of TB patients treated in the past six months was significantly associated with HCWs' practices on TB care.

5.3 Recommendations

i. Hold refresher courses on TB care to all HCWs dealing with TB patients especially those with limited experience dealing with TB patients

ii. Initiate/enhance ways to improve HCWs' attitudes and consequently practices e.g. provide adequate protective safety gear, provide well ventilated rooms for treatment of TB patients.

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APPENDIX I: INFORMED CONSENT

Study Title:Assessment of Knowledge, Attitude and Behavioural Practices towards TB Prevention and Control among Healthcare Workers at the Thika Level 5 Hospital.

University of Nairobi, Institute of Tropical and Infectious Diseases (UNITID)

Principal Investigator: Dr. ABDIKADIR ADEN MOHAMUD

Introduction:

I would like to tell you about a study being conducted by the above mentioned researcher. The purpose of this consent form is to give you the information you will need to help you decide whether or not to be a participant in the study. Feel free to ask any questions about the purpose of the research, what happens if you participate in the study, the possible risks and benefits, your rights as a volunteer, and anything else about the research or this form that is not clear. When we have answered all your questions to your satisfaction, you may decide to be in the study or not. This process is called 'informed consent'. Once you understand and agree to be in the study, I will request you to sign your name on this form. You should understand the general principles which apply to all participants in a medical research:

i) Your decision to participate is entirely voluntary

ii) You may withdraw from the study at any time without necessarily giving a reason for your withdrawal

iii) Refusal to participate in the research will not affect the services you are entitled to in this health facility or other facilities. We will give you a copy of this form for your records.

May I continue? YES ( ) NO ( )

What Is This Study About?

The purpose of this study is to Assess the Knowledge, Attitude and Behavioural Practices towards TB Prevention and Control among Health workers at the Thika Level 5 Hospital. Participants in this research study will be asked to fill questionnaire which will take

approximately 30 minutes to fill, participants in this study randomly chosen. We are asking for your consent to consider participating in this study.

Confidentiality: The information you provide will remain confidential as possible. We will keep all of our paper records in a locked file cabinet. You are not writing your name or identification information on the questionnaire, so that, no one will know your answers to the questions. However, no system of protecting your confidentiality can be absolutely secure, so it is still possible that someone could find out you were in this study, but cannot know your answers to the questions as you did not write your name on the questionnaire.

Benefits and Risks: although there is no direct benefit to you as an individual, but the result of this research is expected to further improve the knowledge, attitude and practice of healthcare providers towards TB prevention and control among their co-workers, patients and the community at large. There are no anticipated risks associated with this study as the study uses questionnaires to fill, no sample will be carried out

What If You Have Questions In Future?

If you have further questions or concerns about participating in this study, please call or send a text message to the study staff at the number provided at the bottom of this page.

For more information about your rights as a research participant you may contact the Secretary/Chairperson, Kenyatta National Hospital-University of Nairobi Ethics and Research Committee Telephone No. 2726300 Ext. 44102 email uonknh_erc@uonbi.ac.ke.

What Are Your Other Choices?

Your decision to participate in research is voluntary. You are free to decline participation in the study and you can withdraw from the study at any time without injustice or loss of any benefits.

CONSENT FORM (STATEMENT OF CONSENT)

Participant's statement

I have read this consent form or had the information read to me. I have had the chance to discuss this research study with a study counselor. I have had my questions answered in a language that I understand. The risks and benefits have been explained to me. I understand that my participation in this study is voluntary and that I may choose to withdraw any time. I freely agree to participate in this research study.

I understand that all efforts will be made to keep information regarding my personal identity confidential.

By signing this consent form, I have not given up any of the legal rights that I have as a participant in a research study.

I agree to participate in this research study: Yes ( ) No ( )

Participant printed name:_____

Participant signature _____ **Date** _____

Researcher's statement

I, the undersigned, have fully explained the relevant details of this research study to the participant named above and believe that the participant has understood and has willingly and freely given his/her consent.

Researcher's Name: _____ **Date**: _____

Signature_____

Role in the study: _____[i.e. study staff who explained informed consent form.]

For more information contact the principle researcher: Email: abdikadirstar@gmail.com

Tell: 0722 967051

APPENDIX II: RESEARCH QUESTIONNAIRE

ASSESSMENT OF KNOWLEDGE, ATTITUDE AND BEHAVIOURAL PRACTICES TOWARDS TB PREVENTION AND CONTROL AMONG HEALTHCARE WORKERS AT THE THIKA LEVEL 5 HOSPITAL

Please tick (√) the box that matches your answer to the questions and give the answers in the spaces provided as appropriate.

SECTION A: DEMOGRAPHIC INFORMATION

What is your gender?

Male [ ]

Female [ ]

What is your age in years? _____

What is your highest level of educational attainment?

Certificate [ ]

Diploma [ ]

Higher Diploma [ ]

Bachelors' Degree [ ]

Masters' Degree [ ]

PhD [ ]

g) Other (Specify) [ ]

What is your profession within Thika level 5hospital?

Medical Doctor [ ]

Nurse [ ]

Laboratory scientist [ ]

Clinical Officer [ ]

Pharmacist [ ]

Dentist [ ]

Other (Nutritionist, Counsellor, Records)

(Specify) _____

How long have you been workingat Thika Level 5 hospital?

Less than one year [ ]

One to five years [ ]

Five to ten years [ ]

More than ten years [ ]

How long have you cared for patients with tuberculosis or presumptive cases of tuberculosis?

< 1 year [ ]

1 to 5 years [ ]

5 to 10 years [ ]

More than ten years [ ]

Never [ ]

How many patients treated for tuberculosis have you cared for in the last 6 months?

0 – <10 [ ]

10 - <40 [ ]

≥40 [ ]

How often do you interact with patients who have TB?

Daily [ ]

Weekly [ ]

Once every 2 weeks [ ]

Once a month [ ]

Rarely [ ]

Never [ ]

In the past 6 months have you received any tuberculosis-specific training?

Yes [ ]

No [ ]

Have you ever been diagnosed with tuberculosis?

Yes [ ]

No [ ]

Has someone you are in close contact with ever been sick with tuberculosis (for example: family members, spouse, etc.)?

Yes [ ]

No [ ]

SECTION B: KNOWLEDGE

Tuberculosis Basics

What is the causative agent of tuberculosis?

Is tuberculosis a transmissible disease?

Yes [ ]

No [ ]

How TB is spread?

Which group of people is at higher risk of contracting tuberculosis infection?

If a person contracts tuberculosis, to what extent are they likely to develop active tuberculosis within the immediate time frame?

Not at All [ ]

Least Extent [ ]

Moderate Extent [ ]

Great Extent [ ]

Very Great Extent [ ]

What type of preventive measures can you take as health care professional if you are dealing with a TB patient or a suspect of tuberculosis:

Please briefly explain: _____

_____

To what extent would you say you have received training on TB prevention and control?

Not at All	[ ]
Least Extent	[ ]
Moderate Extent	[ ]
Great Extent	[ ]
Very Great Extent	[ ]

Tuberculosis Diagnosis

What are some of the most common symptoms of pulmonary tuberculosis?

What is the best diagnostic tool for tuberculosis? Example, Microscope or gene Expert?

Is TB diagnosis in children more difficult than in adults?

Yes	[ ]
No	[ ]

If yes, briefly explain_____

How many sputum samples are necessary for diagnosis? _____

When should the initial sputum sample be taken?_____

How should a sputum sample be stored before laboratory analysis? _____

_____

Do you know what Gene Xpert is?

Yes [ ]

No [ ]

If yes: What is it? _____

Tuberculosis Treatment

Is tuberculosis a curable disease?

Yes [ ]

No [ ]

How long is the first line treatment of pulmonary tuberculosis?

2 months [ ]

6 months [ ]

9 months [ ]

12 months [ ]

How many drugs are used in the first line treatment of tuberculosis?

One [ ]

Two [ ]

Three [ ]

Four [ ]

Do you know what does DOTs mean during the initial phase of treatment?

Yes [ ]

No [ ]

If yes, explain briefly: _____

When should the first follow up sputum sample be carried out following the commencement of treatment of a confirmed case of tuberculosis?

1 month after the beginning of treatment [ ]

2 month after the beginning of treatment [ ]

3 month after the beginning of treatment [ ]

7 month after the beginning of treatment [ ]

What are the consequences of incomplete treatment?

Development of resistant tuberculosis [ ]

Failure to fully cure the disease [ ]

Further transmission of the disease [ ]

All of the above [ ]

Is there a vaccine for TB?

Yes [ ]

No [ ]

If yes, name it:_____

When is the best time for BCG vaccination?

At birth [ ]

At 2 months [ ]

At 6 months [ ]

Other. Specify _____

SECTION C: ATTITUDES

Please mark which most applies regarding your attitude to the statement

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Finding every new case of TB is essential for control of the disease.					
Community engagement is essential for the control of the disease					
There is a substantial increase in treatment completion rates if direct observed treatment is used.					
There is a stigma associated with tuberculosis in Kiambu County					
The way you interact with TB patients/regard tuberculosis contributes any possible stigma there is					
Tuberculosis as a disease has more stigma associated with it than HIV.					
Money spent on educating Kiambu County general population is better than money spent on direct observed treatment					
In Kiambu County, the general population is aware of the tuberculosis services that are available					
Public awareness regarding TB as a health problem in Thika Level 5 hospital is adequate					
First line therapies for tuberculosis are accepted by patients					
At Thika Level 5 hospital, there are many barriers to tuberculosis treatment					

Most staff in TL5H have adequate training regarding tuberculosis					
The laboratory service used atTL5His adequate for the diagnosis of TB.					
In TL5, there is enough people required to treat the TB patients seen					
Making people with suspected/confirmed pulmonary tuberculosis wear masks in the hospital is acceptable.					
Teaching TB patients cough hygiene is not important					
Infection control is an important means to prevent contracting TB.					
If I contracted TB, I would be allowed to continue working in my current capacity.					
My employer would maintain confidentiality if I were to contract TB					

SECTION D: PRACTICES

Have you ever managed a TB suspected patient or material?

Yes [ ]

No [ ]

If yes, what precautions did you take?

Regular mask [ ]

Whole body uniform [ ]

Gloves [ ]

High protection mask [ ]

No precautions were taken [ ]

People with Multi- Drug Resistant TB can be effectively treated as?

Ambulatory Out-Patient [ ]

Hospitalization [ ]

None of the above [ ]

What are the methods used in monitoring success of Tb treatment in TB patient?

Weight gain [ ]

Resolution of signs and symptoms [ ]

Follow up sputum [ ]

All the above are correct [ ]

What should you do if your patient has yellowish skin after three weeks of treatment?

Consider this as a potential side effect of drug therapy [ ]

Stop treatment [ ]

Evaluate level of liver enzymes if possible [ ]

All the above are correct [ ]

Thank you very much

APPENDIX III: RESEARCH BUDGET

Item	Cost
Research Materials	17,000
KNH-UoN Ethics Research Committee	2000
Data collection	
Two Research assistants	2x10,000
Transport and lunch	6,000
Printing	4,000
Subtotal for data collection	30,000
Data analysis	20,000
Internet	18,000
Compilation	3,000
Sub Total	90,000
Contingency (10%)	9,000
Total	**99,000**

APPENDIX IV: TIME FRAME

TASK	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
Proposal Development								
Submission to Ethics								
Study commencement								
Data collection and analysis								
Dissemination of the Findings								