SURVEY ON THE KNOWLEDGE, ATTITUDES AND PRACTICES ON TUBERCULOSIS (TB) AMONG HEALTH CARE WORKERS IN KINGSTON & ST. ANDREW, JAMAICA

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Dissertation submitted in partial fulfilment of the requirement for the degree of Master of Public Health, The University of Liverpool

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Declaration

No portion of this work has been submitted in support of an application for degree or qualification to this or any other University or institution of learning.

Zahra Nailah White
Abstract

Objectives: To establish a baseline of TB-related knowledge, attitudes and practices among health care workers in Kingston and St. Andrew; and to determine if an association existed between recent training in TB and knowledge level, perception of the public health threat TB poses locally and the diagnostic test requested to confirm TB.

Study Design: Quantitative cross-sectional survey assessing TB-related knowledge, attitudes and practices among health care workers in KSA.

Participants: Health care workers employed to the selected public health facilities in KSA with formal clinical and/or public health training.

Methods: Data was collected through self-administration of close-ended questionnaires by participants that were conveniently recruited on the day. Descriptive analysis and chi-squared analysis were primarily used to analyze the data.

Results: Suboptimal performance on TB-related knowledge, attitudes and practices was found among the survey participants. Less than 40% of respondents had good knowledge of TB. Significant associations with good knowledge were only found with highest educational level obtained and the number of years employed to a public health facility.

Conclusion: Health care workers should be included as a target group for ACSM activities to increase competence in TB management and compliance with national guidelines. Interventions should address a combination of the varying influences on behaviour, focussing on specific gaps identified to improve their impact.

Keywords: Knowledge, Attitudes and Practices (KAP); Tuberculosis (TB); Advocacy, Communication and Social Mobilization (ACSM); Cross-sectional; Jamaica

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<td>ACSM</td>
<td>Advocacy, Communication and Social Mobilization</td>
</tr>
<tr>
<td>AIDS</td>
<td>Acquired Immune Deficiency Syndrome</td>
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<td>ANOVA</td>
<td>Analysis of Variance</td>
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<td>DOTS</td>
<td>Directly Observed Treatment Short Course</td>
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<td>GDP</td>
<td>Gross Domestic Product</td>
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<td>HBM</td>
<td>Health Belief Model</td>
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<td>HCW</td>
<td>Health Care Worker</td>
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<td>HIV</td>
<td>Human Immunodeficiency Virus</td>
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<td>KAP</td>
<td>Knowledge, Attitudes and Practices</td>
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<tr>
<td>KSA</td>
<td>Kingston &amp; St. Andrew</td>
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<td>MDGs</td>
<td>Millennium Development Goals</td>
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<td>MDR-TB</td>
<td>Multidrug Resistant Tuberculosis</td>
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<td>NTP</td>
<td>National TB Programme</td>
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<td>PAHO</td>
<td>Pan American Health Organization</td>
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<td>TB</td>
<td>Tuberculosis</td>
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<td>WHO</td>
<td>World Health Organization</td>
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1. Introduction, Background and Literature Review

1.1 Jamaica

Jamaica is the third largest Caribbean island, situated north-westerly within the Caribbean Sea. The total area covers 10,991 km$^2$ and the climate is considered to be tropical marine with relatively consistent temperatures averaging around 30°C throughout the year, and the heaviest period of rainfall between the months of May and October (Meteorological Service of Jamaica, 2002).

Jamaica is classified as an upper middle income country (World Bank, 2010) and its economy is primarily supported by service industries; namely tourism, and financial and insurance services in addition to agriculture, mining and manufacturing (Witter, 2005).

The island is divided into fourteen parishes. The city of Kingston is the capital and is located within the parish of the same name on the South-eastern coast of the island. However, the parish of Kingston covers a limited area of only 25 km$^2$, and as such, is considered along with the bordering parish of Saint Andrew as a single administrative unit (Kingston and St. Andrew) for management purposes and delivery of services.
1.2 Population

At the end of 2009, Jamaica had an estimated population of just under 2.7 million persons (STATIN, 2010). Within the island, KSA has the highest population with 667,778 inhabitants, accounting for 25% of the entire population (STATIN, 2010).

The sex breakdown of the population is approximately equal with a 50/50 balance between males and females. However, breakdown of the population by age groups reveal a predominantly young population with approximately 27.4% (739,668) under the age of 15 years, and 54.0% (1,458,034) between the ages 15-49 years (STATIN, 2009).
1.3 Health Structure

Under the National Health Services Act of 1997, health services are administered and managed through four regional health authorities that have direct responsibility for service delivery within their constituent parishes. Each parish also has a public health department that is headed by a Medical Officer of Health and Parish Manager.

Table 1.1 Constituent Parishes of the Regional Health Authorities in Jamaica

<table>
<thead>
<tr>
<th>Regional Health Authorities</th>
<th>Parishes</th>
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<td>South East</td>
<td>Kingston &amp; St. Andrew, St. Catherine, St. Thomas</td>
</tr>
<tr>
<td>North East</td>
<td>Portland, St. Mary, St. Ann</td>
</tr>
<tr>
<td>Western</td>
<td>Trelawny, St. James, Hanover, Westmoreland</td>
</tr>
<tr>
<td>Southern</td>
<td>Clarendon, Manchester, St. Elizabeth</td>
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</table>
In 2008, the political administration implemented a *Removal of User Fees* policy within the public sector as a strategy to enhance equitable access to health care. With the implementation of this policy, several services were made available to the public without charge, including but not limited to doctor’s examination, hospital stay, diagnostic services (x-rays and lab tests of various kinds) as well as high cost diagnostic services such as magnetic resonance imaging. However, even prior to this policy, TB treatment was free of cost to patients (except at the University Hospital of the West Indies, a teaching hospital that operates as a private institution but treats a small minority of TB cases each year).

1.4 *Tuberculosis (TB)*

1.4.1 Introduction to the Disease

Tuberculosis (TB) is a communicable disease caused by the bacteria *Mycobacterium tuberculosis* in humans, and may affect several organs within the body. However, the primary site for active TB infection is the lungs. TB is spread through droplet nuclei that become aerosolized when an infected person coughs, speaks, sings or talks. Although latent infection is possible, the bacteria are inactive in this form and the person is not contagious. It is therefore the active disease that is referred to as TB within this document.

1.4.2 Global Epidemiology of Tuberculosis

In 2009, it was estimated that there were over 9 million new cases of TB across the world resulting in an estimated prevalence of over 14 million cases (WHO, 2010, pp. 5-7). There were also an estimated 1.3 million deaths among HIV-negative cases and an additional 0.4 million deaths among co-infected patients with TB and HIV in 2009 (WHO, 2010a, pp.
5-7). Due to its vast public health implications, it is one of the three communicable diseases specifically mentioned under the Millennium Development Goals (MDGs). This has contributed to structured efforts on a global scale with notable improvements in National TB Programmes (NTPs) worldwide. In spite of this though, TB remains a public health challenge globally.

1.4.3 Epidemiology of Tuberculosis in Jamaica

In the initial years of TB control in Jamaica, the disease burden was much heavier than it is presently and TB was one of the leading causes of death (MoH, 2010). Current statistics depict a much lower burden with an estimated incidence rate of 6.5/100,000 population and prevalence of 9/100,000 population (WHO, 2010, p. 100). However, although classified as a low-burden country (PAHO, 2005; WHO, 2009), Jamaica performs poorly on several of the indicator targets established by WHO. Jamaica’s case detection rates (of all forms of TB) have consistently worsened over time, declining from 79% in 1990 to 59% in 2008, even though an improvement was noted in 2009 (WHO, 2010, p. 103). Furthermore, during the period 1995 - 2008, among new smear positive cases, Jamaica noted particularly low cure rates between 2 and 14%, and treatment completed rates between 33 – 65%, (WHO, 2010, p. 109), for which the WHO indicator target for treatment success is 87% (WHO, 2010, p. 12). Defaulter rates also varied widely between 8% to as high as 39% with no consistent directional trend observed over the years (WHO, 2010, p. 109). Among the retreatment cases, there is even more cause for concern as over the period 1995 – 2008, a cure rate of 0% has been documented and default rates between 17 – 33% (WHO, 2010, p. 112). Finally, the potential impact of TB in Jamaica is compounded by the HIV epidemic and high levels of TB/ HIV co-infection. TB/HIV co-
infection rates have ranged from 16% to 33%, and averaged 24% (from 2002 – 2009), compared to global average of 15% (MoH, 2010; WHO, 2010a).

1.4.4 Jamaica's National Tuberculosis Programme (NTP)

Previously, confirmed cases were institutionalized for years in a dedicated sanatorium which was later converted to the National Chest Hospital. Today, this institution (located within KSA) is still the primary health facility for the management of patients with TB. The only other sites that have the capacity to treat TB in Jamaica are the University Hospital of the West Indies (also located in KSA), and the Cornwall Regional Hospital located in St. James (Western Regional Health Authority). Sputum samples from suspected cases in Jamaica's health facilities are primarily sent to the National Public Health Laboratory within KSA for examination so the focus of diagnosis and treatment of TB in Jamaica is still highly centralized.

Presently, under the current NTP, confirmed cases are hospitalized throughout the entire 8 week initiation phase of treatment, even though the patient is considered non-infectious after 2 weeks of treatment. The rationale behind this practice was largely to lower the risk for the development of multi-drug resistant forms of TB. Internationally though, this extended hospitalization is considered outdated as it presents challenges to the patient (e.g. productive days lost) and also the health system, including heavy costs associated with extensive admissions.
The data presented under the epidemiology of TB in Jamaica (Section 1.4.3) highlight the weaknesses in case detection and follow-up throughout the continuation phase to ensure treatment completion and cure, which in combination with a growing HIV epidemic, makes Jamaica more vulnerable to experiencing an increased burden and development of drug-resistant TB in the short to medium term.

1.4.5 National Strategic Plan for Tuberculosis Control (Jamaica)

Faced with undeniable epidemiological and programmatic evidence, Jamaica’s Ministry of Health has committed to restructuring its NTP. This led to the development of the National Strategic Plan for TB Control which was completed through a process of consultation with various stakeholders in 2010. This plan incorporates several of the international recommendations for TB control, including a strong emphasis on advocacy, communication and social mobilization (ACSM) strategies (WHO, 2006a; WHO, 2006b; MoH, 2010).

Within this plan, health care workers (HCWs) are one of the subgroups that Jamaica’s Ministry of Health prioritized as a primary target for their ACSM activities (MoH, 2010). Even though there will be a thrust to move TB treatment and care towards a more community-based programme, HCWs will continue to play a key role in TB control, particularly as it relates to enhanced case detection, patient education and supervision of DOTS partners.
1.5 Public Health Implications

Public health focuses on facilitating the wellness of whole populations through preventing diseases, injury, disabilities and death while promoting a healthy environment and conditions for future generations (Tulchinsky & Varavikava, 2008, p. 33). Today, this goes beyond environmental measures (such as sanitation) and clinical concepts (e.g. vaccination, treatment etc.) and also includes attention to health policy, resource allocation, as well as the organization, management and provision of medical care and of health systems (Tulchinsky & Varavikava, 2008, p. 33). Another important facet of modern public health is the concept of "Health for All," which actively recognizes that health is a basic human right and governments have a responsibility to secure and protect this right for all of their citizens.

TB is an air-borne communicable disease that affects millions of persons, which despite being curable, is responsible for widespread morbidity and mortality globally. If left untreated, each person with active TB can infect on average between 10 to 15 other persons in a year ... (and 2/3 persons who don’t get treatment will die) (WHO, 2010b). Effective identification and treatment of all cases is thus the cornerstone of TB control, but the success of these strategies is dependent on several other supporting factors among the population as well as caregivers.

Although Jamaica has developed a National Strategic Plan for TB Control with a strong focus on ACSM, the activities outlined in this plan are very general. This research will enhance this policy by contributing to its further development and strategies for implementation. Importantly, a KAP survey, a tool often used to guide ACSM activities can
help identify key barriers to timely diagnosis of cases and/or possible contributory factors that may influence treatment adherence (WHO, 2008, p. 6). The ultimate objective of this research is to help ensure that ACSM strategies are evidence-based, developed from meticulous assessment of the obstacles to engaging in desirable behaviours as well as on a strategic analysis of motivating factors that can be used in the interventions (PAHO, 2006, p. 50) for maximum impact on the target population. As such, the findings of this research will relate directly to the operationalization of a national policy for improved TB control which will also directly affect resource allocation for training and health promotion under the national TB programme.

1.6 Literature Review

1.6.1 Summary of Articles

ACSM strategies have been recognized as an integral component in the efforts to stop TB (PAHO, 2005; WHO, 2006a; WHO, 2006b). One key instrument that has been accepted as a useful tool in the development of an ACSM plan is a knowledge, attitudes and practices (KAP) survey. A KAP survey is a representative study of a specific population on what is known, believed and done in relation to a specific topic (WHO, 2008, p. 6). A detailed, evidence-based ACSM plan is dependent on the availability of baseline data of these indicators (WHO, 2008) which has not as yet been established for Jamaica.

A review of KAP surveys for TB conducted in other countries, and international guidelines established to assist TB control efforts, strongly support the need to specifically target HCWs to increase their knowledge and competence in the management of TB cases (Al-Maniri et al, 2008; Berger & Bratu, 2006; Dato and Imaz, 2009, Hashim & Al Dulayme,
2003; Jackson et al, 2007; LoBue, Moser & Catanzaro, 2001; Teixeira et al, 2008; Nshuti et al, 2001; WHO, 2006; WHO, 2008). While measuring and addressing patient factors affecting health-seeking behaviour has been readily acknowledged as important features in effective TB-control, the importance of conducting ACSM activities with HCWs as well is increasingly being acknowledged too.

In Jamaica, beyond professional training in school, there are no organized mechanisms to continually provide HCWs with TB information related to the disease and national guidelines for management. Furthermore, it is assumed that in a low burden country, emphasis and exposure to TB from either training and/or professional experience may be minimal, which likely negatively impacts understanding of diagnosis and management of TB. However, previous KAP surveys of TB among practitioners in various settings do not necessarily provide enough evidence to definitively support or oppose this assumption as findings are somewhat conflicting. In Oman, a low incidence setting, (Al-Maniri et al, 2008) poor levels of knowledge was found among general practitioners, whereas in Argentina (another low incidence setting), a study found that almost 100% of their physicians correctly recognized the main symptoms associated with TB (Dato & Imaz, 2009). Inconsistent findings were also noted among countries with comparatively high burdens. In Iraq, (Hashim, Al Kubaisy & Al Dulayme, 2003) almost 100% of physicians were reported as having good TB knowledge whereas among Brazil and Nairobi, (Kenya), knowledge levels were found to be suboptimal (Teixeira et al, 2008; Chakaya et al, 2005). A comparative study (Emili et al, 2001) explored this idea further by assessing the knowledge and practices of medical students with variable levels of exposure to TB in endemic (India and Uganda) and non-endemic areas (Canada). Although this comparative
study found that the basic level of knowledge was similar at each of the sites ... (and the Canadian students) performed well ... despite both limited curricular time and patient exposure, this is likely to have been biased by the fact that the Canadian students were attending review lectures (which included TB) and actively preparing for licensing exams at the time of the survey administration. All the same, even with adequate results among the Canadian sample, the students from the endemic areas had stronger performance levels generally, and an association between higher levels of exposure and good practices was found. Comparisons between these studies should be interpreted cautiously though as each study had different objectives, target groups and criteria to measure level of knowledge, and also used varying types of statistical analyses to arrive at their conclusions.

Interestingly though, one consistent finding was that even where ‘good’ knowledge was found, this was often not a good predictor of behaviour. One research actually revealed that good knowledge was inversely associated with a favorable practice (Teixeira et al, 2008). This finding was consistent across other studies where despite high levels of knowledge, desirable practices among physicians was noted to have been considerably lower (Hashim, Al Kubaisy & Al Dulayme, 2003; Dato & Imaz, 2009). It is fairly evident then that even though knowledge is critical, knowledge may not be the most influential factor on behaviour (WHO, 2006b; Teixeira et al, 2008; Hashim, Al Kubaisy & Al Dulayme, 2003). In light of this realization, a limitation among several studies (Al-Maniri et al, 2008; Jackson et al, 2007; Cirit, Orman and Ünlü, 2003; Dato & Imaz, 2009; Emili et al, 2001) was that only one facet of behavioural influences was assessed which may have limited
understanding of other contributing factors that also directly affect TB control activities among health staff (CDC, 2005).

It can be concluded then that there is no single indicator that can be reliably used across contexts to understand the factors influencing the level of knowledge or compliance with management guidelines for TB diagnosis and treatment among HCWs. It is therefore necessary to determine this information within a local context in order to identify country-specific weaknesses in TB knowledge, cultural beliefs and clinical practices affecting prompt diagnosis and appropriate care of TB patients (WHO, 2008; Orette and Shurland, 2001; Soltan et al, 2008; Swamy, 2003). As such, this study applied the Health Belief Model (Fig. 1.3) that takes into consideration 6 factors believed to determine behaviour, namely perception of severity, perception of susceptibility, perception of benefits, perception of barriers, cues to action and one’s self efficacy (Glanz, Rimer & Lewis; 2002; Hayden, 2009; Hausmann-Muela, Ribera & Nyamongo, 2003). The completion of this survey prior to full-scale implementation of programmatic reform will facilitate the development of more targetted approaches and also stronger levels of evaluation as it will “provide a baseline for comparison with subsequent, post-intervention KAP surveys” (WHO, 2008, p. 7).
1.6.2 Literature Review Strategy

A literature search was conducted for documents available in English written since 2000. Initially, local and international reports on Tuberculosis control were reviewed to obtain statistical data to support the rationale and public health importance of the topic. Internal reports were obtained directly from the Ministry of Health from the Health Promotion and Protection Division in addition to publications from the Pan American Health Organization and World Health Organization that are published electronically on their websites.

A general internet search using Google as the search engine was also performed to identify relatively recent programme and policy guidelines written in English since 2000 related to “Advocacy, Communication and Social Mobilization” activities for Tuberculosis Control. Due to the questionable validity of information and unmanageable volume of
information generated from a general internet search, only documents from internationally recognized NGOs and international health partners were included in the literature review.

Subsequently, a more detailed search was conducted among the Academic Health databases EBSCO, EBSCO Discovery Science, Scopus, PubMed and ScienceDirect in the University of Liverpool’s online library using the terms “Tuberculosis AND knowledge attitudes practices” as keywords. The reference lists of the relevant research articles produced were also reviewed. Criteria for inclusion in the literature review was based on scholarly full text e-journal articles that were related to the implementation and findings of KAP surveys among HCWs on the diagnosis, spread and/or treatment of TB. In the interest of being very thorough though, a wider definition of HCW than will be used in the current research was applied in the literature review. Therefore, the literature review incorporated articles where assessments were done among students in a clinical field, allopathic trained clinicians (including private physicians) as well as village doctors/ traditional healers. Studies that were entirely qualitative or did not survey HCWs at all within the sample population were excluded. Laboratory, genetic studies or clinical trials were also excluded.

This strategy produced 1,188 results of which 22 articles, 7 policy documents and 4 national and international reports met the inclusion criteria for review.
2. Aim, Objectives and Epistemological Approach

2.1 Research Question and Epistemological Approach

This research was intended to define the extent of TB-related knowledge, attitudes and practices, as it relates to symptoms, diagnosis, transmission, and treatment of TB among health care workers (HCWs) employed to public health facilities in Kingston & St. Andrew (KSA).

The research hypothesis was that among HCWs, low levels of TB-related knowledge (regarding common symptoms, case definitions and treatment guidelines as outlined in the TB Prevention and Control Procedure Manual, [2007]), the perception that TB does not present a public health challenge and the infrequent practice of requesting sputum microscopy/culture to confirm cases are related to infrequent exposure to formal TB training activities for HCWs. As such, the null hypothesis was that infrequent exposure to TB training is not associated with low levels of TB-related knowledge, low appreciation for the public health challenge locally and incorrect diagnostic practices.

A positivist epistemological approach was utilized as it was assumed that the knowledge, attitudes and practices of HCWs would be relatively stable and thus could be objectively ascertained. As such, repeated assessments among HCWs across different health facilities would provide the same type of information and results would thus be comparable.
2.2 **Aim**

To measure TB-related knowledge, attitudes and practices with regards to diagnosis, transmission and treatment among HCWs employed to public health facilities in Kingston and St. Andrew (KSA); and to determine if there was any association between participation in recent training in TB and good knowledge, perception of seriousness of this disease within a local context and appropriate diagnostic test requested (i.e. sputum smear microscopy/ culture).

2.3 **Objectives:**

The specific objectives of this research were as follows:-

1. To review and critically analyze available literature related to the implementation of ACSM activities on TB for health care workers, specifically the conducting of a knowledge, attitudes and practices survey.

2. To establish a baseline level of knowledge, attitudes and practices among health care workers in KSA.

3. To determine if recent training in TB impacts the level of TB-related knowledge, awareness of the public health threat that TB presents or practice of requesting sputum samples to confirm a diagnosis of TB. The sociodemographic factors of highest educational level attained and the number of years employed to a public health facility were also tested to see if an independent association existed with these variables and good knowledge that may confound the interpretation of results.
4. To utilize information gleaned to guide the development and delivery of communication messages and strategies to health care workers in KSA, Jamaica.

2.4 Research Outcomes

These research findings are expected to contribute to the development of targeted communication messages and evidence-based strategies for HCWs to provide support for the restructured national TB programme in Jamaica. It will also provide a baseline level of TB-related knowledge, attitudes and practices for HCWs in KSA.
3. METHODOLOGY

3.1 Study Design
The research was a quantitative cross-sectional survey assessing TB-related knowledge, attitudes and practices (KAP) among health care workers (HCWs) in Kingston & St. Andrew (KSA), Jamaica.

3.2 Sample Size, Frame and Population
The parish of KSA was selected to conduct this research as it reports the majority of all new TB cases (~36%) annually and most of the TB services are concentrated there. Out of a comprehensive list of public health organizations (7 public hospitals, 49 health centres and 1 public health department), the sample frame was narrowed down to eleven institutions (20% of the total public health facilities in KSA) which were randomly selected. The 11 selected sites represented health facilities with a wide range of health services offered: (1) type 8 Health Centre, (2) type 5 Health centre, (4) type 3 health centres, (1) type 2 Health centres, (1) type A Hospital and (2) specialist hospitals.

Using the statistical software, StatsDirect, the sample size of 427 participants was calculated using an estimated health staff population in KSA of 3,000 persons, a 95% confidence level, 5% margin of error, and a non-response rate of 20%. A 50% estimated population proportion of correct knowledge was utilized to give the most conservative sample size as an estimate was unavailable as this was the first time Jamaica (or any other English-speaking Caribbean country) was conducting a KAP survey on TB among
HCWs. Respondents were conveniently recruited for participation on the same day as data collection.

3.3 Ethical Considerations and Approval
In addition to approval which was received from the University of Liverpool, ethical approval was granted locally by the South East Regional Health Authority, the administrative body that has responsibility for the delivery of health services in KSA.

All persons were informed that their participation was voluntary and written informed consent was sought from all participants prior to their participation. Confidentiality of participants was maintained as no personal identifying information was collected on the questionnaire.

3.4 Participants
The inclusion criteria for participation were HCWs currently employed to one of the selected public health facilities within KSA with formal clinical and/or public health training (i.e. tertiary level education including institutions that provide technical training in health services).

Employees of the University Hospital of the West Indies were excluded from the sample frame. Although this institution is a regional teaching hospital in KSA and treats a small minority of TB cases each year, it operates as a quasi-private treatment facility. It therefore
differs significantly from the public health facilities which may have reduced the generalizability of results.

3.5 Procedures

The data collection tool, adapted from the WHO template (WHO, 2008), was pretested on 20 HCWs outside of KSA, and slight adjustments made accordingly prior to data collection.

Data collection occurred over 6 weeks from May 9 to June 19, 2011. To enhance the response rate, the health facilities were sensitized in writing beforehand and contacted by phone by the Student Investigator to ascertain the most convenient time to do data collection. Three graduate students were recruited as research assistants in April 2011 to assist with data collection. These assistants were trained with regards to the background, rationale, research protocol and data collection tools (participant information sheet, informed consent, and questionnaire).

Figure 3.1 below outlines the procedures for data collection at the selected study sites. The data collectors spoke to persons in charge at the facilities, identified the relevant areas to be visited and approached the HCWs (identified by their uniform and/or their work identification). Persons were invited to participate and the participant information sheet reviewed. Eligibility was determined by clarifying the various categories of workers and explaining the inclusion criteria to staff. After reviewing the participant information sheet with the HCW and verifying eligibility, the participant was asked to provide written informed
consent and complete the short self-administered questionnaire in the data collector’s presence. When the participant was finished, both the consent form and questionnaire were collected but stored in separate folders to further reassure participants that their responses would not be able to be traced back to them. Persons who refused to participate or provide written informed consent were simply thanked for their time without any further pressure to change their mind or explain their refusal.

3.5 Minimization of Bias

Selection Bias

Even though participants were conveniently selected at the health facilities, selection bias was first minimized by randomly selecting the health facilities that would be targeted for participation from a comprehensive list of all public health facilities within KSA. In addition, workers in all the departments (excluding Records and other administrative Departments) at the selected health facilities were approached on the days of data collection. These strategies would have facilitated the inclusion of a wide range of health facilities, in terms of size and services offered, and also of categories of workers and hence minimize the preferential selection of a specific group of HCWs or type of health facility.
Fig. 3.1 Flow Chart Outlining Data Collection Procedures at Study Sites
Information Bias

The questionnaire was pretested on 20 HCWs outside of KSA for refinement of the questions in order to minimize leading or confusing questions. Categorized values for age, time employed in current position and time employed in a public health facility were asked instead of specific values to enhance the anonymity of respondents.

Social desirability of participants, sometimes referred to as response bias, was another potential form of information bias that could have occurred. This happens when respondents give responses in keeping with what they consider was expected of them. This was minimized by collecting the data through anonymous self-administration of the questionnaire so that the data collector would not be able to associate individual responses to the particular individual (i.e. no personal identifying information was collected on the questionnaire) at any time.

3.7 Potential Confounders

Some potential confounders that could have been independently associated with either exposure to training and/or the measured knowledge, attitudes and practices were number of years employed to a public health facility and highest educational level. These variables were assessed in the questionnaire and univariate analysis conducted by cross-tabulating them with knowledge level to see if they were independently associated with good knowledge.

However, Jamaica’s cadre of health staff is very diverse and includes HCWs from varying backgrounds and nationalities. As such, staff members who were foreign nationals may
have had professional experience and/or training that may differ significantly to that of locally trained staff. As such, this may also be another potential confounder influencing their level of knowledge, attitudes or practices of TB. However, this was not assessed in the questionnaire and hence was not able to be accounted for.

3.8 Data Cleaning and Analysis

The questionnaire was pre-coded for entry into the software Epi Info and data analyzed using both Epi Info and the SPSS Statistics software (Version 17). To minimize data entry errors, check codes were incorporated into the database and the data cleaned to ensure consistency of responses. For questions that were omitted on the questionnaire, these responses were left blank during data entry and treated as missing data in the analysis. Similarly, if more than one answer was selected when participants were specifically instructed to select only one response, this also would have been left blank during data entry and treated as missing data in the analysis.

An outline summarizing the amount of missing data for each question asked was presented in the results (Table 4.3). Missing data were excluded from analysis except for presentation of the general and sociodemographic characteristics of the study sample.

TB-Related Knowledge

The National Tuberculosis Prevention and Procedure Manual (MoH, 2007) was used as the reference for determining the correct responses. There were 6 knowledge-related questions that assessed information on the main symptoms associated with active,
pulmonary TB, the possibility of re-infection, the standard length of time of treatment, if and how TB may be cured and case definitions for TB classifications. Frequencies were used to describe the level of knowledge for each component being measured to determine where specific weaknesses in knowledge existed in comparison to the guidelines noted in the National guidelines.

Furthermore, answers corresponding to TB-related knowledge and awareness were scored out of a total of 11. Each correct answer was scored as 1 except for "cough ≥ 3 weeks" which was scored as two as this corresponds to the case definition for active pulmonary TB in the national guidelines. Incorrect answers were scored as zero. The total correct answers were summed and reported as the overall knowledge score out of 11 for that participant. The median score of 6 was used as the cut off for defining good or poor levels of knowledge. Persons that received scores higher than the median were classified as having good knowledge; whereas those receiving a score less than or equal to the median were classified as having poor knowledge. Chi-squared analysis (with significance considered at a p value less than 0.05) was done to compare the proportions that had good knowledge with those that had recently received training as well as with the sociodemographic variables of highest level of educational qualification attained and years employed in a public health facility.

An analysis of variance test was also conducted to determine if there was a significant difference between the mean scores of those that had recently been trained and those that had not. This was used as an additional test to determine if training had an impact on mean knowledge scores, even if it wasn’t necessarily associated with a “good” score.
TB-Related Attitudes and Practices

There were 8 questions that gauged TB-related attitudes and practices. The components measured under this section were related to the participants' perception of severity of TB as a public health challenge locally, vulnerability of different subpopulations, prevention strategies, skill level required to conduct DOT, the health outcome they considered to pose the main risk to patients whose treatment was interrupted, health education conducted with patients, and diagnosis of suspected and confirmed cases. Descriptive statistics were determined for all questions and chi-squared analysis used to test an association between recent training in TB and the select parameters of opinion on the public health challenge that TB presents to Jamaica, and requesting sputum samples as the primary diagnostic test. Due to relatively small numbers, the responses about the extent of agreement with TB as a public health challenge to Jamaica and also diagnostic test requested were each condensed into two categories (sputum microscopy/ other tests requested and agrees it is a threat/ disagrees it is a threat) for the chi-squared analysis.
4. Results

4.1 General and Demographic Variables

Fifty seven percent (245/427) of questionnaires were completed by health care workers (HCWs) across 11 public health facilities in Kingston & St. Andrew. The sociodemographic profile of the survey participants were highlighted in Tables 4.1 and 4.2 below. Females accounted for almost 90% of the sample. Most of the respondents (36.7%; 90/245) fell in the 31 – 40 years age group followed by the “Under 31 years” age group of which 33.5% (82/245) of participants belonged to. Eleven percent of respondents (27/245) were over 50 years.

The majority of the HCWs surveyed were college/university-educated with less than 20% (42/245) either not indicating their highest educational qualification or noting “Other” for this question. A wide range of categories were included in the survey, but by far, the best represented group was “Registered Nurses”, accounting for 40% (99/245) of responses, followed by Medical Doctors that comprised 9% (22/245) of surveys.

Additionally, “1 - 4 years” was the most common period indicated for both the number of years employed in current post noted by 103 (42%) of respondents and also number of years employed to a public health facility noted by 75 (30.6%) of respondents. Health care workers from the hospital were responsible for approximately 71% of respondents, with employees from Type 5 Health Centres forming the second largest group, comprising 13.1% (32/245) of participants.
Table 4.1 Sex, Age, Highest Educational Level Obtained and Current Job Title of Study Sample of Health Care Workers in KSA, Jamaica 2011

<table>
<thead>
<tr>
<th>Characteristic (n=245)</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>29</td>
<td>11.8</td>
</tr>
<tr>
<td>Female</td>
<td>214</td>
<td>87.3</td>
</tr>
<tr>
<td>Did not indicate</td>
<td>2</td>
<td>0.8</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under 31 years</td>
<td>82</td>
<td>33.5</td>
</tr>
<tr>
<td>31 – 40 years</td>
<td>90</td>
<td>36.7</td>
</tr>
<tr>
<td>41 – 50 years</td>
<td>44</td>
<td>18.0</td>
</tr>
<tr>
<td>&gt;50 years</td>
<td>27</td>
<td>11.0</td>
</tr>
<tr>
<td>Did not indicate</td>
<td>2</td>
<td>0.8</td>
</tr>
<tr>
<td><strong>Highest Education Level</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University/ College Diploma</td>
<td>75</td>
<td>30.6</td>
</tr>
<tr>
<td>Associate’s Degree</td>
<td>3</td>
<td>1.2</td>
</tr>
<tr>
<td>Bachelor’s Degree</td>
<td>97</td>
<td>39.6</td>
</tr>
<tr>
<td>Specialized/ Professional Graduate or Post-Graduate Degree</td>
<td>28</td>
<td>11.4</td>
</tr>
<tr>
<td>Other</td>
<td>32</td>
<td>13.1</td>
</tr>
<tr>
<td>Did not indicate</td>
<td>10</td>
<td>4.08</td>
</tr>
<tr>
<td><strong>Current Job Title</strong></td>
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<td></td>
</tr>
<tr>
<td>Dental Nurse</td>
<td>15</td>
<td>6.1</td>
</tr>
<tr>
<td>Dietitian</td>
<td>1</td>
<td>0.4</td>
</tr>
<tr>
<td>Enrolled Nurse</td>
<td>10</td>
<td>4.1</td>
</tr>
<tr>
<td>Family Nurse Practitioner</td>
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<td>0.4</td>
</tr>
<tr>
<td>Health Education Officer</td>
<td>3</td>
<td>1.2</td>
</tr>
<tr>
<td>Laboratory Technician</td>
<td>1</td>
<td>0.4</td>
</tr>
<tr>
<td>Medical Doctor</td>
<td>22</td>
<td>9.0</td>
</tr>
<tr>
<td>Medical Technologist</td>
<td>4</td>
<td>1.6</td>
</tr>
<tr>
<td>Mental Health Officer</td>
<td>3</td>
<td>1.2</td>
</tr>
<tr>
<td>Nurse (Unspecified)</td>
<td>16</td>
<td>6.5</td>
</tr>
<tr>
<td>Nutritionist</td>
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<td>0.4</td>
</tr>
<tr>
<td>Pharmacist</td>
<td>4</td>
<td>1.6</td>
</tr>
<tr>
<td>Pharmacy Technician</td>
<td>9</td>
<td>3.7</td>
</tr>
<tr>
<td>Phlebotomist</td>
<td>1</td>
<td>0.4</td>
</tr>
<tr>
<td>Physiotherapist</td>
<td>2</td>
<td>0.8</td>
</tr>
<tr>
<td>Psychiatric Nurse</td>
<td>9</td>
<td>3.7</td>
</tr>
<tr>
<td>Public Health Nurse</td>
<td>8</td>
<td>3.3</td>
</tr>
<tr>
<td>Registered Midwife</td>
<td>5</td>
<td>2.0</td>
</tr>
<tr>
<td>Registered Nurse</td>
<td>99</td>
<td>40.4</td>
</tr>
<tr>
<td>Registered Nurse/ Midwife</td>
<td>15</td>
<td>6.1</td>
</tr>
<tr>
<td>Social Worker</td>
<td>1</td>
<td>0.4</td>
</tr>
<tr>
<td>Specialist Nurse</td>
<td>3</td>
<td>1.2</td>
</tr>
<tr>
<td>Did not indicate</td>
<td>12</td>
<td>4.9</td>
</tr>
</tbody>
</table>

*Medical Doctors included the category Senior House Officers and also Medical Interns. Registered Nurse/ Midwife included the Ward Managers and Nurse Supervisors. Finally, Specialist Nurse included the category Nurse Tutor.
Table 4.2 Years of Service in Current Position, Years of Service in a Public Health Facility and Type of Facility Currently Employed To

<table>
<thead>
<tr>
<th>Characteristic (n=245)</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Years of Service in Current Position</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;1 year</td>
<td>37</td>
<td>15.1</td>
</tr>
<tr>
<td>1- 4 years</td>
<td>103</td>
<td>42.0</td>
</tr>
<tr>
<td>5 – 9 years</td>
<td>41</td>
<td>16.7</td>
</tr>
<tr>
<td>10 – 14 years</td>
<td>32</td>
<td>13.1</td>
</tr>
<tr>
<td>≥ 15 years</td>
<td>30</td>
<td>12.2</td>
</tr>
<tr>
<td>Did not indicate</td>
<td>2</td>
<td>0.8</td>
</tr>
<tr>
<td><strong>Years of Service in Public Health Facility</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;1 year</td>
<td>23</td>
<td>9.4</td>
</tr>
<tr>
<td>1- 4 years</td>
<td>75</td>
<td>30.6</td>
</tr>
<tr>
<td>5 – 9 years</td>
<td>50</td>
<td>20.4</td>
</tr>
<tr>
<td>10 – 14 years</td>
<td>42</td>
<td>17.1</td>
</tr>
<tr>
<td>≥ 15 years</td>
<td>52</td>
<td>21.2</td>
</tr>
<tr>
<td>Did not indicate</td>
<td>3</td>
<td>1.2</td>
</tr>
<tr>
<td><strong>Type of Facility Employed To</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type 1 Health Centre</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Type 2 Health Centre</td>
<td>10</td>
<td>4.1</td>
</tr>
<tr>
<td>Type 3 Health Centre</td>
<td>24</td>
<td>9.8</td>
</tr>
<tr>
<td>Type 4 Health Centre</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Type 5 Health Centre</td>
<td>32</td>
<td>13.1</td>
</tr>
<tr>
<td>Type 8 Health Centre/ Dental</td>
<td>4</td>
<td>1.6</td>
</tr>
<tr>
<td>Type A Hospital (Non-specialist)</td>
<td>75</td>
<td>30.6</td>
</tr>
<tr>
<td>Type A Hospital (Specialist)</td>
<td>100</td>
<td>40.8</td>
</tr>
</tbody>
</table>

*There are no type 6 Health centres or Type B or C Hospitals in KSA. There is only 1 type 7 Health Centre (Family Planning) in KSA but this site was not among the randomly selected sites for data collection.

4.2 Missing Data

Table 4.3 summarizes the missing data from the questionnaires. These represent questions that were either omitted totally or those that had more than one option incorrectly selected. The only variable that did not have any missing data was the attitude-related question on whether the participant considered TB to present a major public health challenge. Under TB-related knowledge, the questions on the case definitions had the largest proportion of missing data while under the TB-related attitudes and practices section, the diagnostic test usually requested, the minimum level required to conduct DOT
and main risk for incomplete or interrupted treatment had the largest proportions of missing data.

### Table 4.3 Summary Analysis of the Amount of Missing Data from Questionnaires

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Missing Data</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Count</td>
<td>Percentage (%)</td>
</tr>
<tr>
<td><strong>TB-Related Knowledge</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Symptoms</td>
<td>242</td>
<td>3</td>
<td>1.2</td>
</tr>
<tr>
<td>Duration of Treatment</td>
<td>242</td>
<td>3</td>
<td>1.2</td>
</tr>
<tr>
<td>Cure Strategies</td>
<td>244</td>
<td>1</td>
<td>0.4</td>
</tr>
<tr>
<td>Reinfection</td>
<td>242</td>
<td>3</td>
<td>1.2</td>
</tr>
<tr>
<td>Relapse Case Definition</td>
<td>229</td>
<td>16</td>
<td>6.5</td>
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<tr>
<td>Defaulter Case Definition</td>
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<td>12</td>
<td>4.9</td>
</tr>
<tr>
<td><strong>TB-Related Attitudes and Practices</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Major Public Health Threat</td>
<td>245</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Most Vulnerable Subpopulations</td>
<td>244</td>
<td>1</td>
<td>0.4</td>
</tr>
<tr>
<td>Health Education on TB with Patients</td>
<td>241</td>
<td>4</td>
<td>1.6</td>
</tr>
<tr>
<td>Diagnostic Test Usually Requested</td>
<td>221</td>
<td>24</td>
<td>9.8</td>
</tr>
<tr>
<td>Referral of Confirmed Cases for Management</td>
<td>238</td>
<td>7</td>
<td>2.9</td>
</tr>
<tr>
<td>Prevention Strategies</td>
<td>243</td>
<td>2</td>
<td>0.8</td>
</tr>
<tr>
<td>Minimum Skill Level for DOT</td>
<td>227</td>
<td>18</td>
<td>7.3</td>
</tr>
<tr>
<td>Main Risk for Incomplete/ Interrupted Treatment</td>
<td>224</td>
<td>21</td>
<td>8.6</td>
</tr>
</tbody>
</table>

### 4.3 Baseline Level of TB-Related Knowledge, Attitudes and Practices

#### 4.3.1 Recent TB Training

Figure 4.1 below highlights that only 16% (39/244) of participants surveyed had attended a lecture, seminar or workshop on TB within the past 12 months.
4.3.2 Good Knowledge

Figure 4.2 shows that 40% of respondents were classified as having good knowledge of TB based on their overall score achieved on the TB-related knowledge questions.

4.3.3 Symptoms

As is displayed in Fig. 4.3, a chronic cough lasting for more than 3 weeks, as well as haemoptysis (i.e. cough with blood), were the most frequently identified symptoms of active infectious TB (i.e. pulmonary TB), indicated by 65% (160/242) of participants each. Fever, weight loss and night sweats were each noted by approximately half of the
respondents. Less than 10% of participants (13/242) incorrectly indicated diarrhoea as a main symptom of TB and less than 10% (16/242) indicated that they did not know the main symptoms for TB.

Additionally, Table 4.4 highlights that only 17% of participants correctly identified all the symptoms noted in the national guidelines. Twenty-two percent correctly identified both 3 and 4 symptoms respectively. Less than 15% recognized at least 2 symptoms, 19% recognized at least 1 correct symptom and 5.8% of participants did not correctly identify any correct symptoms of TB (including those who admitted to not knowing the symptoms).
Table 4.4 Number of Correct Symptoms Identified by Participants, KSA 2011

<table>
<thead>
<tr>
<th>Number of Correct Symptoms Identified</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid 0</td>
<td>14</td>
<td>5.8</td>
<td>5.8</td>
<td>5.8</td>
</tr>
<tr>
<td>1.00</td>
<td>46</td>
<td>19.0</td>
<td>19.0</td>
<td>24.8</td>
</tr>
<tr>
<td>2.00</td>
<td>33</td>
<td>13.6</td>
<td>13.6</td>
<td>38.4</td>
</tr>
<tr>
<td>3.00</td>
<td>54</td>
<td>22.3</td>
<td>22.3</td>
<td>60.7</td>
</tr>
<tr>
<td>4.00</td>
<td>54</td>
<td>22.3</td>
<td>22.3</td>
<td>83.0</td>
</tr>
<tr>
<td>5.00</td>
<td>41</td>
<td>17.0</td>
<td>17.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>242</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

4.3.4 TB Cure Strategies

Almost three quarters of the respondents (71.7%; 175/244) were aware that TB could be cured by following a specific anti-TB regimen. However, 16% of participants (39/244) believed that TB could not be cured and 10% (24/244) did not know for certain whether or not it could be cured. Less than 10% of participants considered either general antibiotics (22/244) and/or bed rest (8/244) to be a cure strategy for TB, and no one considered herbal remedies to be a cure strategy for TB (See Fig. 4.4).
4.3.5 Standard Duration of Treatment (Newly Diagnosed Case)

Figure 4.5 below shows that only 25% of participants (61/242) correctly identified the standard length of treatment of 5 – 6 months for a newly diagnosed case of TB. Treatment lasting more than 6 months was the most frequently identified duration (31%; 76/242) while 21% of participants (51/242) indicated that they did not know for certain what the standard treatment length was.

![Fig. 4.5 Relative Frequency of Time Believed to Be the Standard Length of Treatment for a Newly Diagnosed Case of TB, KSA 2011](image)

4.3.6 Possibility of Reinfection and Case Definitions for Patient Classification

Table 4.3 demonstrates that approximately 65% of survey participants (156/242) knew that reinfection with TB was possible. Twelve per cent (29/242) did not think that reinfection was possible though; and over 20% (57/242) were not certain. Of the case definitions for classifying relapse and defaulter TB cases, almost half of the respondents in each case (48% and 44% respectively) indicated that they did not know what the criteria for each of these classifications were. Only ~28% (65/229) knew that the correct definition for a
relapse was one who had been previously treated and cured but once again became smear positive. A slightly higher proportion of persons (37%; 86/233) correctly recognized the criteria for a defaulter case as one whose treatment had been interrupted for more than 2 months and returned to treatment with bacteriologically confirmed TB.

Table 4.5 Other Variables for TB-related knowledge among health care workers in KSA, Jamaica, 2011

<table>
<thead>
<tr>
<th>Definition of TB relapse (n=229)</th>
<th>Yes</th>
<th>No</th>
<th>Did not know for certain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Became smear +ve again near end of treatment</td>
<td>25</td>
<td>10.9</td>
<td></td>
</tr>
<tr>
<td>Treatment interrupted for ≥2 months and returned to treatment with bacteriologically confirmed TB</td>
<td>28</td>
<td>12.2</td>
<td></td>
</tr>
<tr>
<td>Previously treated and cured, but once again became smear positive</td>
<td>65</td>
<td>28.4</td>
<td></td>
</tr>
<tr>
<td>Do not know for certain</td>
<td>110</td>
<td>48.0</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Definition of TB defaulter (n=233)</th>
<th>Yes</th>
<th>No</th>
<th>Did not know for certain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Became smear +ve again near end of treatment</td>
<td>27</td>
<td>11.6</td>
<td></td>
</tr>
<tr>
<td>Treatment interrupted for ≥2 months and returned to treatment with bacteriologically confirmed TB</td>
<td>86</td>
<td>36.9</td>
<td></td>
</tr>
<tr>
<td>Previously treated and cured, but once again became smear positive</td>
<td>16</td>
<td>6.9</td>
<td></td>
</tr>
<tr>
<td>Do not know for certain</td>
<td>103</td>
<td>44.2</td>
<td></td>
</tr>
</tbody>
</table>

4.3.7 Most Vulnerable Subpopulations in Jamaica

With regards to the perceived susceptibility of subpopulations to become infected with TB, Figure 4.6 demonstrates that people living with HIV/ AIDS were considered to be a particularly vulnerable subpopulation in Jamaica by over 90% (221/244) of the survey participants, followed by family members of a confirmed case (72.5%; 177/244) and HCWs (57.4%; 140/244). Children less than 5 years were only considered to be one of the most vulnerable subpopulations by 26% (64/244) of survey participants.
Table 4.6 outlines the responses to the questions on the extent to which respondents agreed that TB is a public health threat locally and the seriousness of defaulting from treatment. The majority of participants (142/245; 60%) agreed that TB is a major public health threat to Jamaica while thirty two percent (78/245) did not consider it to be a particular challenge at this time. Nine percent of participants (22/245) were undecided on whether or not they considered it to be a public health threat to Jamaica.

Almost half of respondents (46.4%; 104/224) felt that the development of drug resistance was the most serious outcome for a confirmed TB patient who had interrupted their
treatment. The remainder of respondents were split almost equally between considering death and the worsening of symptoms with prolonged treatment course as the most serious outcome among these patients, comprising 26.8% (60/224) and 26.3% (59/224) respectively. Only one person did not consider there to be any serious risk associated with interrupted or incomplete treatment of a confirmed TB case.

Table 4.6 Responses Outlining Perceived Severity of TB among Health Care Workers, KSA 2011

<table>
<thead>
<tr>
<th>Attitude/ Practice Variable</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is TB a major public health threat to Jamaica (n=245)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes. Already more than just a major threat</td>
<td>20</td>
<td>8.2</td>
</tr>
<tr>
<td>Yes. It poses a serious threat to Jamaica</td>
<td>125</td>
<td>51.0</td>
</tr>
<tr>
<td>No. Cases are controlled so there is no major concern</td>
<td>76</td>
<td>31.0</td>
</tr>
<tr>
<td>No. It is not even a small threat at this time</td>
<td>2</td>
<td>0.8</td>
</tr>
<tr>
<td>Do not know for certain</td>
<td>22</td>
<td>9.0</td>
</tr>
<tr>
<td>Outcome considered to be the main risk for incomplete or interrupted treatment (n=224)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Worsening of symptoms and prolonged treatment course</td>
<td>59</td>
<td>26.3</td>
</tr>
<tr>
<td>Development of drug-resistance</td>
<td>104</td>
<td>46.4</td>
</tr>
<tr>
<td>Death</td>
<td>60</td>
<td>26.8</td>
</tr>
<tr>
<td>There is no serious risk</td>
<td>1</td>
<td>0.4</td>
</tr>
</tbody>
</table>

4.3.9 Prevention Strategies

Cough/sneeze etiquette (i.e. covering mouth and/or nose when coughing and/or sneezing) and immunization with the BCG vaccine were considered by over 80% (≥ 198/243) of survey participants to be useful prevention strategies against infectious TB, followed by proper hand washing which was indicated by 70% (169/243) of participants. Increased ventilation (through opening windows), good nutrition and the use of personal protective equipment were indicated by 34 – 47% of participants. All other strategies though accounted for less than 10% of responses each (See Fig. 4.7 below).
4.3.10 Minimum Skill Level Required to Conduct DOTS

The vast majority of respondents (80%; 181/227) felt that only either highly qualified or HCWs with clinical training could effectively carry out Directly Observed Treatment Short Course with confirmed TB patients (Fig. 4.8). Fourteen percent (32/227) thought that any HCW, regardless of clinical training, would be able to do this, while only 6% (14/227) did not consider this to be a technical activity that required professional training in health care.
4.3.11 Health Education with Patients

The circumstances when health education on TB was done with patients are displayed in Fig. 4.9 below. General health promotion in clinical settings was the most frequent circumstance noted for when health education on TB is done with patients, indicated by over 60% of participants (150/241). World TB day was the second most common circumstance, indicated by ~ 40% (95/241) of participants; and 34% (81/241) of participants indicated that education was done with confirmed patients and their families in either a clinical or a community setting. These results are depicted below in Figure 4.7.
4.3.12 Diagnostic Test Usually Requested

A little more than half (60%) of respondents indicated that the Mantoux test was the primary test requested to rule out active TB, followed by sputum smear analysis/culture (25.7%) and then chest X-rays (12%). Nasopharyngeal swabs and blood cultures accounted for 2% and 1% of responses respectively (Fig. 4.10).
4.4 Associations between Recent Training in TB and Knowledge Level, Highest Educational Level Obtained and Number of Years of Service in a Public Health Facility

4.4.1 Recent Training in TB and Knowledge

As shown in Table 4.7 below, chi-squared analysis between recent training in TB with knowledge level (i.e. either good or poor) did not reveal a significant association (p=0.104).

Table 4.7 Cross-tabulation and Chi-Squared Analysis between “Recent Training in TB” and “Knowledge Level” among Health Care Workers in KSA, 2011

<table>
<thead>
<tr>
<th>Attended TB training in past 12 months</th>
<th>Knowledge</th>
<th></th>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Poor</td>
<td>Good</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attended TB training in past 12 months</td>
<td>No</td>
<td>126</td>
<td>79</td>
<td>205</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>18</td>
<td>20</td>
<td>38</td>
</tr>
<tr>
<td>Total</td>
<td>144</td>
<td>99</td>
<td></td>
<td>243</td>
</tr>
</tbody>
</table>

4.7b Chi-squared test between Recent Training in TB and Knowledge Level

<table>
<thead>
<tr>
<th>Value</th>
<th>Degree of Freedom</th>
<th>Asymp. Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>2.638a</td>
<td>1</td>
</tr>
</tbody>
</table>
Based on the Analysis of Variance (ANOVA) test shown in Table 4.8 below, there was also no significant difference between the mean knowledge score obtained for participants that had recently received training in TB and those that had not attended a training recently \( (p=0.183) \).
Table 4.8 Analysis of Variance (ANOVA) between Mean Knowledge Scores among Those that Recently Received Training in TB and Those that Had Not

Analysis of Variance to test the Difference in Mean Scores between Participants that had recently received training in TB and those that had not.

<table>
<thead>
<tr>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>11.200</td>
<td>1</td>
<td>11.200</td>
<td>1.784</td>
</tr>
<tr>
<td>Within Groups</td>
<td>1174.239</td>
<td>187</td>
<td>6.279</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1185.439</td>
<td>188</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.4.2 Highest Educational Level Obtained and Knowledge Level

A significant association was found when chi-squared analysis between highest educational level and knowledge level was conducted (p=0.004) (See Table 4.9).

Table 4.9 Cross-tabulation and Chi-Squared Analysis between “Highest Educational Level Obtained” and “Knowledge Level” among Health Care Workers in KSA, 2011

4.9a Cross-tabulations comparing the Highest Educational Level Obtained by Participants and Number of Persons that had Good or Poor Knowledge

<table>
<thead>
<tr>
<th>Highest Educational Level of Participant</th>
<th>University/ College Diploma</th>
<th>Associate's Degree</th>
<th>Bachelor's Degree</th>
<th>Specialized Graduate Degree</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge Poor</td>
<td>41</td>
<td>3</td>
<td>59</td>
<td>9</td>
<td>24</td>
<td>136</td>
</tr>
<tr>
<td>Knowledge Good</td>
<td>34</td>
<td>0</td>
<td>38</td>
<td>19</td>
<td>7</td>
<td>98</td>
</tr>
<tr>
<td>Total</td>
<td>75</td>
<td>3</td>
<td>97</td>
<td>28</td>
<td>31</td>
<td>234</td>
</tr>
</tbody>
</table>

4.9b Chi-squared test between Highest Educational Level Obtained and Knowledge Level

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Degrees of Freedom</th>
<th>Asymp. Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>15.327a</td>
<td>4</td>
<td>0.004</td>
</tr>
</tbody>
</table>

a. 2 cells (20.0%) have expected count less than 5. The minimum expected count is 1.26.
4.4.3 Number of Years of Service in a Public Health Facility and Knowledge Level

Chi-squared analysis between the number of years employed in a public health facility with knowledge level (i.e. either good or poor) also revealed a significant association (p=0.003) (Table 4.10).

Table 4.10 Cross-tabulation and Chi-Squared Analysis between "Number of Years Employed in a Public Health Facility" and "Knowledge Level" among Health Care Workers in KSA, 2011

<table>
<thead>
<tr>
<th>No of Yrs Employed in a Public Health Facility</th>
<th>Knowledge</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Poor</td>
<td>Good</td>
</tr>
<tr>
<td>&lt;1 yr</td>
<td>8</td>
<td>15</td>
</tr>
<tr>
<td>1-4 yrs</td>
<td>50</td>
<td>25</td>
</tr>
<tr>
<td>5-9 yrs</td>
<td>26</td>
<td>24</td>
</tr>
<tr>
<td>10-14 yrs</td>
<td>20</td>
<td>21</td>
</tr>
<tr>
<td>&gt;=15 yrs</td>
<td>39</td>
<td>13</td>
</tr>
<tr>
<td>Total</td>
<td>143</td>
<td>98</td>
</tr>
</tbody>
</table>

4.10b Chi-squared test between Number of Years Employed in a Public Health Facility and Knowledge Level

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Degrees of Freedom</th>
<th>Asymp. Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>15.714&quot;</td>
<td>4</td>
<td>0.003</td>
</tr>
</tbody>
</table>

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 9.35.

4.4.4 Recent Training in TB and Opinion on the Public Health Threat that TB Presents to Jamaica

Table 4.11 below shows that no significant association was found with the perception of TB as a public health threat to Jamaica with recent training in TB (p=0.086).
Table 4.11 Cross-tabulation and Chi-Squared Analysis between “Recent Training in TB” and “Perception of Public Health Threat” among Health Care Workers in KSA, 2011

4.11a Cross-tabulations comparing the Number of Participants that had Recently Received Training in TB and the Number of Persons that Perceived TB to Pose a Threat to Jamaica

<table>
<thead>
<tr>
<th>Perception of Public Health Threat</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is not a threat</td>
<td></td>
</tr>
<tr>
<td>Attended TB training in past 12 months</td>
<td>205</td>
</tr>
<tr>
<td>No</td>
<td>88</td>
</tr>
<tr>
<td>Yes</td>
<td>11</td>
</tr>
<tr>
<td>Total</td>
<td>99</td>
</tr>
<tr>
<td>Is a threat</td>
<td></td>
</tr>
<tr>
<td>Attended TB training in past 12 months</td>
<td>39</td>
</tr>
<tr>
<td>No</td>
<td>11</td>
</tr>
<tr>
<td>Yes</td>
<td>28</td>
</tr>
<tr>
<td>Total</td>
<td>39</td>
</tr>
</tbody>
</table>

4.11b Chi-squared test between Recent Training in TB and Perception of Public Health Threat to Jamaica

<table>
<thead>
<tr>
<th>Value</th>
<th>Degrees of Freedom</th>
<th>Asymp. Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>2.945a</td>
<td>1</td>
</tr>
</tbody>
</table>

4.4.5 Recent Training in TB and Appropriate Diagnostic Test Requested to Confirm Diagnosis

No significant association was found between the appropriate diagnostic test requested to confirm a diagnosis of TB with recent training in TB (p=0.442) (Table 4.11).
Table 4.12 Cross-tabulation and Chi-Squared Analysis between “Recent Training in TB” and “Appropriate Diagnostic Test Requested” among Health Care Workers in KSA, 2011

4.12a Cross-tabulations comparing the Number of Participants that had Recently Received Training in TB and the Persons that Indicated the Appropriate Diagnostic Test (i.e. Sputum Smear Microscopy) for Confirmation of TB

<table>
<thead>
<tr>
<th>Attended TB training in past 12 months</th>
<th>Inappropriate Test Requested</th>
<th>Appropriate Test Requested</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>139</td>
<td>45</td>
<td>184</td>
</tr>
<tr>
<td>Yes</td>
<td>25</td>
<td>11</td>
<td>36</td>
</tr>
<tr>
<td>Total</td>
<td>164</td>
<td>56</td>
<td>220</td>
</tr>
</tbody>
</table>

4.12b Chi-squared test between Recent Training in TB and Perception of Public Health Threat to Jamaica

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Degrees of Freedom</th>
<th>Asymp. Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>.590</td>
<td>1</td>
<td>0.442</td>
</tr>
</tbody>
</table>

4.5 Overall Summary of Results

Low levels of good knowledge was found among the survey participants and individual review of responses in all sections revealed areas for concern, particularly misconceptions and potentially stigmatizing attitudes and non-compliance with national guidelines among the HCWs surveyed.

Significant associations were found with the sociodemographic variables of highest educational level obtained and number of years employed in a public health facility. However, recent training in TB was not significantly associated with knowledge level.
Furthermore, there was no significant difference in the means of the knowledge scores between participants who had recently attended a training session and those that had not.

No significant associations between recent training and the attitude-related variable of perception of public health challenge to Jamaica, or the practice-related variable of the appropriate diagnostic test requested were found.

Therefore, there was not enough evidence to reject the null hypothesis that low levels of knowledge, inappropriate diagnostic practices and low perception of TB posing a public health challenge were not associated with infrequent exposure to TB training.
5. Discussion

5.1 Strengths/ limitations/ theoretical assumptions of the methods highlighted and choices/ alternative approaches/ ethical issues explored

Tuberculosis (TB) is an infectious disease that despite the availability of a cure remains a public health challenge globally. Even though the incidence in Jamaica is relatively low, inferior performance of the national TB programme (NTP) on international indicators coupled with a growing HIV epidemic puts the country at risk for experiencing an increase in cases and also the development of multidrug resistant forms.

Appreciative of the international commitment under the MDGs to fight and control this disease, and cognizant of the worsening performance on annual indicators, Jamaica’s Ministry of Health developed a national strategic plan that outlined measures to revamp its NTP. A key component of this plan was advocacy, communication and social mobilization (ACSM) interventions for select target groups, including health care workers (HCWs).

Adequate knowledge of TB and attitudes that are congruous with national guidelines are important to facilitate timely case finding and appropriate case management – the foundation of TB prevention and control. National and international guidelines on the diagnosis and treatment of TB are primarily based on its clinical manifestations which forms the basis for training of HCWs. It is hence taken for granted that what HCWs
know about this condition, how they feel about it and what they do in relation to managing this disease will be based on their training and this biomedical concept of health.

The KAP (Knowledge, Attitudes and Practices) methodology utilized embodies the principles of the Health Belief Model (HBM), a psychological model that endeavors to explain and predict health behaviours using the constructs of perceived severity, perceived susceptibility, perceived benefits and perceived barriers that are often also influenced by modifying factors such as knowledge and education, cues to action and self efficacy (Hayden, 2009; Glanz, Rimer & Lewis, 2002). Under this model, "factors (influencing behaviour) are considered to be transformable through health education..." (Hausmann-Muela, Ribera & Nyamongo, 2003). The ultimate objective of this research was to generate evidence to guide the development of ACSM activities for HCWs for improved TB management.

KAP surveys have been widely used in health and social science research over the past few decades (Hausmann-Muela, Ribera & Nyamongo, 2003; Launiala, 2009). Some reasons for its popularity as a research methodology are that it provides a relatively low-cost mechanism to gather information on a fairly large target population in a relatively short time. KAP surveys can be particularly useful "as a tool for problem identification and intervention planning" (Vandamme, 2009). Furthermore, when conducted prior to and then repeated after an intervention, it also helps "establish a baseline for comparison with subsequent, post-intervention KAP surveys (WHO, 2008)".
and serves as a useful tool for evaluation (Vandamme, 2009). These surveys are also fairly flexible and can be readily modified for implementation within a local context.

Despite the usefulness of this type of research methodology though, a few limitations need to be taken into consideration. Generally, close-ended questions offered in a multiple choice format may encourage guessing which may result in a misrepresentation of the knowledge and practices of respondents (Vandamme, 2009). Furthermore, it is also argued that KAP surveys (and quantitative data in general) are inadequate to fully understand behaviour which is often not as straightforward as quantitative analysis implies. Although quantitative research yields highly descriptive data, it is often unable to provide an explanation for why people do what they do” (Hausmann-Muela, Ribera & Nyamongo, 2003; Launiala, 2009).

Admittedly, it is also difficult to accurately assess practices in a low incidence setting as it is likely that several HCWs do not come into direct or frequent contact with a suspected or confirmed TB patient especially as the majority of HCWs were relatively young with a limited number of years experience in a public health facility (Table 4.2). The questions on practice would thus probably have been answered based on what they may have observed other persons do or were based on a hypothetical basis. Even among staff that had direct experience with TB, these encounters may not have occurred recently which increases the potential for recall bias. Moreover, regardless of limited exposure to treating a TB case, it has been argued that the reliability of the data on practices may be questionable as behaviour is a very complex phenomenon. In addition to knowledge and attitudes, an array of external factors may also determine
behaviour such as available resources (e.g. personnel; equipment), work load, and faith in local diagnostic and/or treatment capacity etc.; which were not assessed (Launiala, 2009).

5.2 Strengths and limitations of the results highlighted, and alternative interpretations explored, in the context of the theoretical assumptions made

5.2.1 Sociodemographic Profile of Participants
Females comprised the vast majority of respondents in this survey (Table 4.1). This is consistent with what is typically observed in the basic health framework where employees, particularly nurses, (which formed the largest represented group of participants), are more often than not females. It was also not surprising that the hospitals and larger health centres provided the largest proportion of survey respondents (Table 4.2). The number of HCWs assigned to each facility is dependent on the level of services offered and the size population served, which are understandably more extensive in the larger health centres and hospitals that offer surgical as well as 24 hour emergency services.

5.2.2 Limitations
Only 57% (245) of the calculated minimum sample size of 427 questionnaires was completed. Several challenges during data collection may contributed to this low response rate. Firstly, time constraints limited the number of repeat visits to a site that were possible. Additionally, there was a higher-than-anticipated number of refusals to
participate. The specific reasons for refusal were not ascertained from participants as this may have been felt to be adding pressure to participate but as HCWs are often targetted for inclusion in research, particularly academic research among other health students, it was assumed that research fatigue may have contributed to the high levels of refusal. There was also reluctance to provide written informed consent despite the fact that the reasons for requesting consent were explained verbally and on the participant information sheet, and means of ensuring anonymity clarified. The grounds for this discomfort with written consent were unclear but suggest distrust of the mechanisms put in place to protect their anonymity, and also of the lack of consequence for them if anonymity was not assured.

Extensive rainfall and flooding throughout one week in June also affected the ability to access some of the sites and also affected the staff turnout in some of these facilities. Consequently, the results were not necessarily generalizable beyond the survey participants to the wider population of HCWs in Kingston and St. Andrew. Finally, although interviewer bias was minimized through training and self-administration of questionnaires, personality differences may have affected how assertive the data collectors were which also may have influenced the response rate.

5.2.3 TB-Related Knowledge and Awareness

In addition to recent exposure to a TB training seminar, the "knowledge and awareness" section assessed familiarity with the common symptoms associated with active TB, the possibility of reinfection, duration of treatment, the recommended cure
strategy for TB and criteria that distinguishes between various classifications of TB cases on treatment. Under the Health Belief Model (HBM), knowledge, education and sociodemographic factors are considered modifying variables of behaviour, individual characteristics that influence personal perceptions; and training and educational material are considered to be cues to action, external factors that promote the intended behaviour.

Only a small minority of survey participants had recently attended a training session on TB (Fig. 4.1). This confirms that exposure to TB training among the respondents was extremely low. It is important to note though that a couple weeks prior to data collection; there had been a series of sensitizations for health staff at one of the selected sites in response to a small cluster of TB cases that had been associated with that institution. Therefore, the survey findings for recent participation in TB training may actually be somewhat exaggerated in comparison to what you would expect under more routine circumstances.

A TB knowledge score was determined from the number of correct answers given to the 6 knowledge questions. The maximum score was 11 points and respondents scoring above the median value of 6 were considered to have good knowledge. Using this criterion, less than half of the respondents were classified as having good knowledge of TB (Fig. 4.2). This low level of knowledge was consistent with expectations based on Jamaica’s performance on international programmatic indicators and low incidence. This was also similar to a study that assessed physician knowledge on TB in Oman (another low incidence setting) where it was also concluded
that physician knowledge was insufficient for adequate case detection (Al-Maniri et al, 2008).

In comparison to high-incidence countries that utilized a similar methodology to assess the knowledge, attitudes and/or practices of health workers (including health students), results obtained were again similar in some of the cases. The proportion of respondents that had good knowledge in this study was analogous to results found in a KAP study on TB in some settings (Teixeira et al, 2008; Vandamme et al, 2009) but were notably different from others (Hashim, Al Kubaisy & Al Dulayme, 2003; Hoa, Diwan & Thorson, 2005). Direct comparisons of reported knowledge levels of TB across these settings present serious challenges in interpretation though as the studies utilized different measures as the criteria for good knowledge, the countries had notably different epidemiological profiles of TB (i.e. high burden of TB), and also different levels of ACSM activities for health staff and the general public (Vandamme et al, 2009; Hoa, Diwan & Thorson, 2005) all of which perplexes their true comparability.

In the absence of a standardized definition for "good knowledge of TB", and as a result of the fact that different studies assessed different components of TB-related knowledge, each question was also evaluated separately to further define the extent of the knowledge gaps and better understand how these gaps may specifically affect behaviour.

Recognition of common symptoms associated with active TB infection was one of the strongest areas of TB-related knowledge among HCWs surveyed. The national
guidelines for TB prevention and control specifically list chronic cough, haemoptysis, fever, weight loss and night sweats as common symptoms of TB. In addition, the case definition for a suspected case of TB is noted as “any person who presents with symptoms ... suggestive of TB, in particular, cough of long duration (>2 weeks)” (Ministry of Health, 2007). Only 17% of respondents correctly identified all five symptoms noted in the national guidelines but 61.5% correctly identified at least 3/5 of the symptoms (Table 4.4); and cough > 3 weeks, the basis for the case definition, was the most frequently recognized symptom, indicated by 65% of participants (Fig. 4.3). However, although an awareness of symptoms associated with TB was among the strongest components of knowledge revealed, the symptoms of TB can be considered to be the most basic of information essential to improved case detection and thus needs to be more universally known.

Adherence to a specific anti-TB regimen as a cure strategy for TB (72%), and an awareness of the possibility of reinfection (65%), were the other two strongest aspects of TB-related knowledge among HCWs surveyed (Fig. 4.4; Table 4.5). Nevertheless, similarly to knowledge of symptoms, the level of performance on these two questions can still be considered suboptimal. The understanding that TB can be cured through adherence to the anti-TB drugs as prescribed may serve as a motivating factor to HCWs to maintain adequate monitoring of the patient to a cure, and also to be used as encouragement to patients when educating them about the disease. These are directly related to perception of benefits which is considered to be one of the determinants of behaviour (Hayden, 2009). Health care workers have to be convinced that closely monitoring the patient throughout their treatment will be in the best interest of the
patient and will be worth the additional effort. An understanding of perceived benefits of cure therefore has to be supported by an equal appreciation for the necessary time it will take to attain a cure but also the consequences of incomplete or interrupted treatment to enable an appreciation for the seriousness of the disease, another factor that impacts behaviour.

In direct contrast to the previous questions, the duration of treatment and the case definitions for patient classifications of relapse and defaulter cases were found to be the weakest components of knowledge. Less than 40% of participants identified the correct answers for each of these questions, and these questions also had the largest proportion of missing data in this section (Table 4.3). The treatment of TB typically lasts 6 months (Ministry of Health, 2007) but most persons thought that treatment for a newly diagnosed case of pulmonary TB was longer than 6 months (Fig. 4.5). In other locations with moderate TB-burdens, this was also identified as a knowledge gap for TB (Savicevic, 2009; Akin et al, 2010) but potential reasons for this were not explored. Although TB treatment does last several months, believing that a patient would have to be monitored for a longer period than necessary may augment the perceived barrier of extensive monitoring lasting several months.

Also, the case definitions for patient classifications seemed to be points of confusion as several persons indicated the same answer for both relapse and defaulter cases. In addition to uncertainty as to the qualifying criteria for each classification, it is also likely that the participants may not realize that there is a difference between a relapse and defaulter case and may incorrectly use these terms interchangeably. In light of the high
defaulter rate in Jamaica, the low documented cure rate and the unique combination of other factors that increase the country’s susceptibility to developing multi-drug resistant TB (WHO, 2010), greater emphasis needs to be placed in training on clarifying treatment duration and the distinctions between treatment failure, relapse and defaulter cases; and the implications of each classification to the patient and their wider social community.

Good knowledge was only found to be significantly associated with the sociodemographic characteristics of highest educational qualification obtained and number of years employed to a public health facility. The significant associations that were found with good knowledge were consistent with expectations and with findings in other settings (Hashim, Al Kubaisy & Al Dulayme, 2003).

It is interesting though that good knowledge was not found to be significantly associated with recent training in TB. Furthermore, there was no significant difference between the mean scores of those participants who had received training in TB recently and those that had not which further insinuates that training did not significantly impact knowledge. Similar observations were observed in another study (Hoa, Diwan & Thorson, 2005) where it was noted that “staff members who had attended TB training courses (still) had inadequate knowledge.” Therefore, although the lack of a significant association in the current survey may be due to a type II error whereby the sample was too small to detect a significant association, it may also suggest that the training that was available did not adequately address knowledge gaps. Additionally, a period of 12 months may be too long a time span for information
learnt at a training session to be retained, particularly in a low incidence setting as Jamaica.

5.2.4 TB-Related Attitudes and Practices

This section assessed attitudes related to perceived severity of TB as a public health challenge to Jamaica, perceived susceptibility of various subpopulations, beliefs about the best prevention strategies and skill level required to monitor the patient’s treatment course; as well as practices related to the diagnosis and education of suspected cases.

The construct of perceived susceptibility works on the premise that the higher the perception of risk will also be the greater the motivation to address this risk (Hayden, 2009; Glanz, Rimer & Lewis, 2002). As applied to HCW compliance with guidelines for TB control, perceived vulnerability of subpopulations to become infected with TB likely affects the index of suspicion that a HCW will have when a patient belonging to one of these groups presents with symptoms, and by extension, have an effect on whether or not diagnostic tests for TB are requested. The increased risk of contracting TB among people living with HIV/AIDS (PLWHA) seems to be well-recognized as almost all respondents indicated PLWHA as one of the subpopulations that were most likely to become infected (Fig. 4.6). This is particularly true for Jamaica where levels of co-infection are consistently higher than the global average reported by WHO annually (Ministry of Health, 2010; WHO, 2010a). However, the relatively low number of respondents that indicated increased vulnerability among other key subpopulations suggests that there may be limited understanding of other risk factors for contracting active TB such as poor nutritional status and low socioeconomic status.
Moreover, although family members of a confirmed case were the second most commonly selected vulnerable group, they were not indicated as a vulnerable subpopulation by over a quarter of respondents (Fig. 4.6). Prolonged exposure to an infectious case is one of the most likely risk factors for developing active TB though regardless of your immunocompetence so this further supports the need to strengthen the understanding of risk factors beyond HIV status and emphasis for capturing appropriate history on potential sources of exposure.

Health care workers were the third most commonly identified group considered to be among the most vulnerable for becoming infected. Interestingly, even though almost 60% of the participants indicated that they thought HCWs were a high risk group (Fig. 4.6), less than 40% indicated that the use of personal protective equipment was a useful prevention strategy (Fig. 4.7). This apparent discrepancy between perception of susceptibility and the behaviour itself is not an unusual finding (Teixeira et al, 2008; Hashim, Al Kubaisy & Al Dulayme, 2003) and in this case highlights the fact that "perception of susceptibility explains behaviour in some cases, but not all" (Glanz, Rimer & Lewis, 2002).

Over half of survey participants agreed that TB was a major public health threat to Jamaica. This attitude contributes to the perceived seriousness of this disease locally, another factor considered to impact behaviour under the HBM. If HCWs do not consider TB to be a challenge within their setting, they will likely not be encouraged to do anything about it. Symptoms and signs of TB can be systemic in nature and very
non-specific (Ministry of Health, 2007) which makes timely diagnosis somewhat dependent on the HCW including it as a diagnosis.

An additional layer to the perceived seriousness of the disease (and also perceived benefits of adherence to treatment regimen) is the consequences believed to result from incomplete or interrupted treatment. The development of drug resistance was the most commonly noted health outcome of concern among HCWs surveyed for cases that had incomplete or interrupted treatment, with notable proportions also indicating death and the worsening of symptoms with prolonged treatment course. This shows a general appreciation for the fact that defaulting from treatment does have serious implications. It is absolutely essential that HCWs are convinced that the benefits of a particular behaviour (consistent follow-up of patients) outweigh the consequences of continuing the old behaviour. The recognition among HCWs that there are serious risks associated with defaulting from treatment, and also more specifically with the development of drug resistance, can be built on to support activities to strengthen the community monitoring component of the TB programme, making it more inclusive and participatory for wider realization of success.

Beliefs about the best prevention strategies are also related to perceived benefits which help shape health action towards prevention. However, some of the attitudes towards prevention strategies also highlighted misinformation among the respondents, specifically as it related to transmission of infection. Proper handwashing was the third most common strategy identified as a prevention strategy for TB noted by almost 70% of participants whereas the opening of windows, a more effective strategy, was noted
by less than half of the respondents. Handwashing, generally a good practice for infection control, may have limited relevance to TB prevention. TB is an airborne infection whereby infected particles are aerosolized when an infectious case coughs or talks or sings and the infected particles are inhaled by the susceptible contact (Ministry of Health, 2007). This question also highlighted attitudes among respondents that may be potentially stigmatizing. Almost 10% of respondents thought that avoiding shaking hands was a useful strategy to prevent TB, and around 5% of respondents indicated that avoiding sharing dishes was a useful strategy. Thankfully, these attitudes existed among a small minority of HCWs but points to the fact that stigmatizing attitudes do exist and need to be specifically addressed.

The minimum skill level required to conduct DOTS with confirmed patients corresponds to that of self-efficacy, the confidence in one’s ability to perform a specific function (Glanz, Rimer & Lewis, 2002; Hayden, 2009). A vast majority of respondents believed that the minimum level of expertise necessary to conduct DOTS was a HCW with clinical training, such as a registered nurse; followed by highly qualified/ trained HCWs being the second most commonly noted skill level required (Fig. 4.8). The structure for follow-up of patients under the NTP supports this perspective as it was usually a public health nurse that was assigned that responsibility. By stark contrast, in several countries, the DOTS partners are community members instead of HCWs, much less health staff with clinical and/or public health training. Nevertheless, despite the structure of the NTP, the majority of survey respondents were not from the public health department and may not be aware of what category conducted this function. In that case, a possible explanation could also be a poor understanding of what exactly
DOTS entails, and also limited awareness of mechanisms to train and/or monitor individuals who were not formally trained in health care. A key change to the NTP already noted in the recently completed strategic plan is the introduction of patient-selected DOTS partners. For successful transition to this approach to patient follow-up, this misconception will need to be addressed directly in order to engender a supportive environment to facilitate this change in policy.

The practice-related variables were included as a measure of behaviour of HCWs. Initially, the high level of respondents that indicated that general health education on TB was done with patients in clinical settings was fairly surprising and unexpected (Fig. 4.9). However, in Jamaica, BCG is routinely given to babies at birth as part of the immunization schedule, so it is assumed that the education given was primarily in relation to the BCG immunization.

Mantoux test was the most frequently noted test selected as the primary diagnostic tool requested to confirm active TB (Fig. 4.10). However, the Mantoux test cannot confirm a case of clinically active TB, and the interpretation of results is dependent on the assessment of each individual's risk. Even though the national guidelines indicates that Mantoux test is one of the four steps that should be explored and considered in conjunction with the patient’s medical and social history and other laboratory and clinical investigations, available guidelines also clearly warn about the possibility of misinterpretation of false-positives (Ministry of Health, 2007) or the possibility of obtaining false negatives if infection occurred recently (CDC, 2011). Over-reliance on
this test may therefore affect the level of case-detection and timely initiation of treatment.

5.3 Summary, Conclusions and Recommendations

5.3.1 Interpretation of Findings and Implications for Public Health

To the best of my knowledge, this is the first time a KAP survey of TB among HCWs was being conducted in Jamaica, or any other country within the English-speaking Caribbean. This study therefore provides an opportunity to explore the extent of understanding of and compliance with TB programme guidelines among HCWs in the epidemiological context of low incidence (for which there is limited data available), and also a unique economic and cultural context.

As it relates to the public health implications locally, the findings support the need to specifically include HCWs as one of the target groups for ACSM activities in order to improve capacity to manage TB from diagnosis to cure. The results also highlighted specific strengths and weaknesses that can be used to guide the development of targeted interventions to further enhance the development of ACSM activities within the National Strategic Plan, a policy designed to enhance the impact of activities conducted under the NTP.

Although the results were not generalizable to the wider health staff in KSA due to under-sampling, the baseline that has been established for survey participants may be used as a starting point that can be built from for other employees within KSA.
5.3.2 Conclusions and ‘lessons learned’

There was lots of room for improvement of the knowledge, attitudes and practices of TB among HCWs surveyed. Given the complexity of factors that have an effect on health behaviours, (in this case, compliance with national guidelines for the prevention and control of TB); any ACSM activity that is developed should aim to address a combination of these influences, focussing on specific findings to improve the effectiveness of such strategies.

However, despite being a low incidence setting for TB with suboptimal performance on several components of TB-related knowledge, attitudes and practices, there seems to be a fair amount of agreement that this disease is a concern for Jamaica. Several attitudes expressed may hence actually support the implementation of ACSM strategies among health staff in order to strengthen the success of the NTP.

5.3.3 Recommendations for Action

Justification for the inclusion of HCWs as a target group in the National Strategic Plan has been provided by this research and as such, the commitment to dedicate resources to building ACSM activities for HCWs should be followed through by the relevant departments within the Ministry of Health. Based on the experience of other programmes (Hashim, Al Kubaisy & Al Dulayme, 2003; Soltan et al, 2008), it is believed that the development of training packages and educational material for HCWs can serve as powerful cues for action. However, in order for these cues to have maximum impact on the intended audience, they need to incorporate the varying
influences on behaviour and directly address the specific gaps that this finding has highlighted.

However, given the low incidence of TB in Jamaica, the practical application of educational material may still be limited. It is thus being suggested that a creative combination of mechanisms be explored for presenting the information to HCWs. For example, incorporating the use of case studies may enhance practical application to HCWs and thus improve self efficacy for appropriate management of cases. In this regards, HCWs themselves may in fact be able to provide useful feedback on the teaching mechanisms that they enjoy and benefit from the most. Hence it is also being recommended that HCWs should be afforded the opportunity to provide further input in the development of the training packages. As behaviour change is a difficult process that rarely occurs within a short time, it is recommended that these training packages and educational material be made widely available and offered frequently through various fora to continually promote the desired changes among health staff.

At the completion of these studies, a full copy of this report will be made available to the Ministry of Health, the South East Regional Health Authority and also the KSA Public Health Department to facilitate access to the findings. It is hoped that these results will be considered closely and used to further develop the ACSM strategies for HCWs, particularly among the coordinators and units at each administrative level that are responsible for organizing the TB programme and training employees in health facilities.
5.3.4 Recommendations for Further Study

Ideally, in order to receive the maximum benefit of KAP surveys and to increase the validity of information obtained, they should be repeated over time and also triangulated with other mechanisms, particularly qualitative methods (Launiala, 2009) that can provide more in-depth understanding of behaviour.

Furthermore, this study was restricted in geographical area and also health staff that were targetted for inclusion. The NTP would therefore likely benefit from the implementation of this study in other areas in Jamaica, and broadening the target groups to include other health workers, including private physicians.
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Annex 1 Ethical Approvals

South East Regional Health Authority
Regional Office
The Towers, 2nd Floor, 28 Dominica Drive, Kingston 5
Voice: (876) 754-3439 Fax: (876) 926-4019, Emergency: 1-888-GO-SERHA
Website: www.serha.gov.jm Email: email@serha.gov.jm

Zahra White
Student Investigator
MPH, School of Medicine
University of Liverpool, England

Dear Miss White:

RE: Evaluation of Research Proposal (Survey on the knowledge, attitudes and practices on tuberculosis among health care workers in Kingston & St. Andrew, Jamaica)

The South East Regional Health Authority is pleased to inform you that approval has been granted for you to carry out the above captioned research.

Kindly forward a copy of the study to this office upon completion of the research.

Best wishes for a successful study.

Yours truly

SOUTH EAST REGIONAL HEALTH AUTHORITY

Dr. Dawn Padilla
Asst. Regional Technical Director

cc: Dr. Patrick Bhoorasingh, SMO, Kingston Public Hospital
Mr. Godfrey Boyd, CEO, Kingston Public Hospital
Dr. Mykyaw Oo, SMO, Bellevue Hospital
Mr. David Dobson, CEO, Bellevue Hospital
Dr. Pauline Weir, Senior MO(H), KSA Health Department
Ms. Claudette Lewis, Parish Manager, KSA Health Department
Dr. Terry Baker, SMO, National Chest Hospital
Mr. Anthony Wood, CEO, Liguanwa Region

Board of Directors:
Mr. Lytleton O. Shirley, J.P. (Chairman), Mr. Donald Farquharson (Regional Director, Actg.), Councillor Audley Gordon, Mr. Sean Azan, Dr. Maureen Irons-Morgan, Mrs. Dorothy Finlayson, J.P., Mr. Leslie Campbell, Dr. Heather Reid-Jones (Regional Technical Director, Actg.), Mr. Andrew Warnar, Mr. Godfrey Boyd, J.P. (Chief Executive Officer, KPHVJH, Actg.), Dr. Patrick Bhoorasingh (Senior Medical Officer, KPHVJH), Mrs. Annetta Brown-Porter (Principal Finance Officer, MOHE), Ms. Fay Hutchinson
Each of the ethical criteria below must be adequately addressed by the researcher in order to obtain ethics approval.

The **RESEARCHER** should perform a self-check using these 25 questions before submitting the ethics form to the DA.

The **ETHICS REVIEWER (DA)** will complete the yellow column for each question to indicate whether revisions are required for ethics approval. The DA will also render a decision at the end of this form.

The **RESEARCHER** must respond in the blue column when resubmitting ethics materials.

**Ethics Reviewer's** assessment:
(In each row, the Ethics Reviewer should either type "yes" or "no." With each "no." the reviewer must specify what revisions are needed to which specific parts of the ethics application to obtain ethics approval.)

<table>
<thead>
<tr>
<th>Researchers response:</th>
<th>The researcher must use this column to describe how and where each of the ethics reviewer's concerns (in the yellow column) has been addressed.</th>
</tr>
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</table>

**The first 6 questions apply to all studies, including analysis of existing data.**

1. Are procedures adequately described such that the study's potential risks and benefits can be discerned? **YES**

 procedures for data collection and details highlighting the subpopulation's low level of vulnerability is noted under the methodology of the project details (Section B) and also further spelled out in Section D of the Ethics Application Form.
<table>
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<tr>
<th>Question</th>
<th>Answer</th>
<th>Details</th>
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<tr>
<td>2. Are the research risks reasonable, relative to the importance of the knowledge that may reasonably be expected to result?</td>
<td>YES</td>
<td>Details of the expected outcomes and potential risks are noted in section E of the ethics application. The anticipated risks to participants and researchers are minimal but the findings of this study will contribute to the development of evidence-based, targeted communication strategies on tuberculosis (TB) for healthcare workers to support the reform of the National TB programme to address challenges in TB control.</td>
</tr>
<tr>
<td>3. Has the researcher proactively managed any potential conflicts of interest?</td>
<td>YES</td>
<td>No reimbursements or payments will be made to persons for their participation in the study. Findings of the research will also be made publicly available once it has been agreed by University of Liverpool.</td>
</tr>
<tr>
<td>4. Will the data be stored for at least 5 years with adequate provisions to maintain the confidentiality of the data?</td>
<td>YES</td>
<td>This has been corrected in section F4 of the ethics application form. Data will be kept for a minimum of 5 years. The dataset will not have any personal identifying information and the informed consent forms will be maintained under locked storage to which only the student investigator will have access therefore confidentiality of participants will be maintained throughout.</td>
</tr>
<tr>
<td>5. Will research subjects' identities and contact info be adequately protected? For secondary data analyses, the proposal must clearly state when/how de-identification will occur.</td>
<td></td>
<td>Questionnaires will be completed anonymously (i.e. no personal identifying information collected). Informed consent sheets will also have no link to the questionnaires so responses given will not be able to be traced back to individual participants. Details of these are outlined in Section F of the ethics application form.</td>
</tr>
<tr>
<td>6. Has the research site provided a letter or email (from a confirmable source) granting permission for all relevant data access, facility use, and use of personnel time for research purposes? Note that when medical, educational, or business records would be analyzed or used to identify potential research participants, the site needs to explicitly approve access to data for research purposes (even if the researcher normally has access to that data to perform their job).</td>
<td>YES</td>
<td>A scanned copy of approval received from the South East Regional Health Authority which is the administrative body responsible for delivery of health services in the parish of interest (Kingston &amp; St Andrew) will accompany ethics application.</td>
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The remaining questions only apply to studies that involve recruiting participants to collect new data.
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<tr>
<th>Question</th>
<th>YES/NOT YES</th>
<th>Notes</th>
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<tr>
<td>7. Do the informed consent procedures provide adequate time to review</td>
<td>YES</td>
<td>Sections B and D3 of the ethics application describe how the informed consent process will include time given to review the participant information sheet. All health facilities will also be notified in writing and verbally of the study prior to data collection.</td>
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<td>the study information and ask questions before giving consent?</td>
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<td>8. Will informed consent will be appropriately documented? (While a</td>
<td>YES</td>
<td>All participants will be asked to indicate their consent by either signing in full or initialing the informed consent form before completion of the survey. The consent form is included in the ethics application.</td>
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<tr>
<td>consent signature is standard, note that anonymous surveys can obtain</td>
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<td>implied consent by informing the participant. To protect your privacy,</td>
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<td>no consent signature is requested. Instead, you may indicate your</td>
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<td>consent by clicking here/returning this survey in the enclosed envelope.</td>
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<td>9. Is the participant information sheet (PIS) written using language</td>
<td>YES</td>
<td>The PIS is written in English which is the official language of Jamaica. As such, all health care workers are required to be fluent in both written and spoken English. This is indicated in section D5 (c) on the Ethics Application</td>
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<td>that will be understandable to the potential participants?</td>
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<td>10. Does the PIS explain how the subject was selected?</td>
<td>YES</td>
<td>This is outlined under the subheading Details of Participation on the PIS.</td>
</tr>
<tr>
<td>11. Does the PIS disclose all potential conflicts of interest?</td>
<td>YES</td>
<td>This is outlined under the subheading Details of Participation on the PIS.</td>
</tr>
<tr>
<td>12. Does the PIS include an understandable explanation of the research</td>
<td>YES</td>
<td>The purpose is detailed under the subheading Details of the Study on the PIS but is also implied in the title of the study and also in the opening statement for the instructions.</td>
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<td>purpose?</td>
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<td>13. Does the PIS include an understandable description of the data</td>
<td>YES</td>
<td>The data collection procedures are outlined under the subheading Details of Participation on the PIS.</td>
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<td>collection procedures?</td>
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<td>14. Does the PIS include an estimate of the time commitment for</td>
<td>YES</td>
<td>This has been corrected. The PIS indicates that the time commitment for participation is approximately 10 minutes. This is noted under the subheading Details of Participation on the PIS.</td>
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<td>participation?</td>
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</tr>
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<td>15. Does the PIS include a description of reasonably foreseeable risks</td>
<td>YES</td>
<td>This is outlined under the subheading Details of Participation on the PIS.</td>
</tr>
<tr>
<td>or discomforts?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. Does the PIS include a description of anticipated benefits to</td>
<td>YES</td>
<td>This is outlined under the subheading Details of Participation on the PIS and also under Details of the Study.</td>
</tr>
<tr>
<td>subjects or others?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. Does the PIS include information on compensation or reimbursement</td>
<td>YES</td>
<td>This is outlined under the subheading Details of Participation on the PIS.</td>
</tr>
<tr>
<td>(for travel costs, etc.)?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18. Does the PIS explain how the participant can contact the</td>
<td>YES BUT NEEDS</td>
<td>The updates have been made to the contact information for the researcher.</td>
</tr>
<tr>
<td>researcher and the</td>
<td>TO BE UPDATED</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TO REFLECT</td>
<td></td>
</tr>
</tbody>
</table>
19. Does the PIS include a statement that the participant should keep/print a copy of the PIS?

<table>
<thead>
<tr>
<th>THESE DETAILS</th>
<th>Research Participant Advocate in the PIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO</td>
<td>This has been corrected. A statement has been added in the instructions on the PIS asking participants to keep a copy of the document</td>
</tr>
</tbody>
</table>

20. If anyone is excluded from participating, is their exclusion justified? Is their exclusion handled respectfully and without stigma?

<table>
<thead>
<tr>
<th>YES</th>
</tr>
</thead>
<tbody>
<tr>
<td>This is described in section D (specifically D3).</td>
</tr>
</tbody>
</table>

21. Are adequate measures in place to adequately protect participants from coercion to participate, distress, loss of work/school time, damage to professional reputation, physical/psychological harm, and loss of privacy?

<table>
<thead>
<tr>
<th>YES</th>
</tr>
</thead>
<tbody>
<tr>
<td>The PIS clearly indicates more than once that participation is voluntary. Also, surveys will be self-administered to minimize any potential discomfort or embarrassment of the participants based on the possibility of knowing the student investigator or a perceived level of less than desirable knowledge, attitudes or practices. Questionnaires will also be completed anonymously and only data in aggregate form will be presented so individual responses cannot be traced back to participants.</td>
</tr>
</tbody>
</table>

The remaining questions regarding sensitive content and vulnerable populations should be reviewed and addressed by the student and DA, but must also be confirmed by the ethics committee.

| 22. If vulnerable individuals are included, is their inclusion justified? | NOT APPLICABLE |
| 23. If the researcher happens to also serve in a trusted or authoritative role to the participant (e.g., health care provider, teacher, etc.), do the recruitment procedures ensure voluntary participation? A researcher with a dual role must use anonymous surveys or some other method that permits potential participants to opt out without fear of negative consequences. Patients and students need explicit assurance that their decision about participation will in no way impact their ongoing treatment/studies. | NOT APPLICABLE |
| 24. If the research procedures might reveal criminal activity or child/elder abuse that necessitates reporting, are there suitable procedures in place for managing this? Are limits to confidentiality (i.e., duty to report) appropriately mentioned in the participant information sheet? | NOT APPLICABLE |
| 25. If the research procedures might reveal or create an acute psychological state that necessitates referral, are there suitable procedures in place to manage this situation? | NOT APPLICABLE |
# ETHICS APPROVAL DECISION

THIS DOCUMENT MUST BE POSTED IN THE DISSERTATION CLASSROOM AFTER THE DISSERTATION ADVISOR HAS RENDERED A DECISION.

The DA will mark an X next to box A, B, or C and also indicate which subcategory (1, 2, or 3) applies:

**A. APPROVED VIA EXPEDITED "LIGHT TOUCH" ETHICS REVIEW:**

- As the DA, I confirm that all applicable criteria 1-25 above are met with a "yes."

- I affirm that the researcher accurately responded "no" to the first set of expedited review checklist items a through k in SECTION 1.

- I affirm that the researcher accurately responded "yes" to the second set of expedited review checklist items a through f in SECTION 2.

- I affirm that the research activities fall entirely within the parameters of [mark one of the following designs that the Virtual Program Research Ethics Committee has authorized DAs to approve via expedited "light touch" review]:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. analyses of <strong>public</strong> documents, artifacts, behavior, or data;</td>
</tr>
<tr>
<td></td>
<td>2. secondary analysis of <strong>existing</strong> data that is privately held but released for research purposes (with all identifiers removed)</td>
</tr>
<tr>
<td><strong>X</strong></td>
<td>3. surveys or interviews of <strong>non-vulnerable</strong> adults on <strong>non-sensitive</strong> topics (i.e., no potential of coercion to participants, distress, loss of work/school time, damage to professional reputation)</td>
</tr>
</tbody>
</table>
B. REFERRED TO ETHICS COMMITTEE:

- As the DA, I am referring this study to the full ethics committee (IOREC) because [mark 1, 2, or 3 below]. I will email the student’s ethics application and all attachments as a single zip file to the ethics committee via liverpoolethics@ohecampus.com, copying the Programme Director (or DOS where the PD role does not exist).

The ethics committee accepts applications until 5 pm Liverpool timezone on the 3rd Thursday of every month. Decisions and feedback will be emailed to the student and DA via email within 5 business days after the 4th Thursday of the month.

| 1. the researcher proposes to collect data from vulnerable individuals such as children, prisoners, residents of a facility, students, patients, the researcher’s subordinates, mentally/emotionally disabled individuals, economically disadvantaged individuals, non-fluent English speakers, crisis victims, or the elderly |
| 2. some (potential) participants may find the research topic or premise sensitive |
| 3. participants’ jobs or livelihoods may be placed at any risk by the study activities |
| 4. the participants’ culture and/or international location suggest that extra participant protections may be necessary |
| Other: ____________________ |

C. REVISIONS REQUIRED:

- The student needs to revise the proposal and ethics materials to address the concerns in the yellow column and resubmit to me before I can select A or B above.
PARTICIPANT INFORMATION SHEET

School of Medicine, University of Liverpool
Research Supervisor: Dr. Tolulope Osoba
Student Investigator: Zahra White

You are being invited to participate in a survey assessing the knowledge, attitudes and practices of health care workers in Kingston & St. Andrew (KSA) on tuberculosis (TB). Before you decide whether to participate, it is important for you to understand why the research is being done and what it will involve.

Please take time to read the following information carefully and feel free to ask for more information, especially if there is anything that you do not understand. Please also feel free to discuss this with your colleagues. We would like to stress that you do not have to accept this invitation and should only agree to take part if you want to. Please keep a copy of this document.

Thank you for reading this.

Details of the Study
This study is being conducted by a student investigator, Zahra White as supervised by Dr. Tolulope Osoba, as partial fulfilment of the requirements for completion of the Masters in Public Health degree. Ethical approval has been sought from the University of Liverpool and also the Ministry of Health, Jamaica prior to the start of this research.

The overall purpose is to establish baseline levels of knowledge, attitudes and practices on TB among health care workers in the parish of KSA, Jamaica. These research findings are expected to contribute to the development of targetted communication messages and evidence-based strategies for health care workers as outlined in the National Strategic Plan which was recently completed in 2010. KSA was chosen as the focus of this research as this is the parish with the highest burden of TB in Jamaica, accounting for 36% of newly confirmed cases each year.

Details of Participation
Health care workers from randomly selected health facilities in KSA are being asked to complete this 10-minute self-administered questionnaire after reviewing this information sheet and providing written informed consent. Participation is voluntary and all respondents are free to withdraw at anytime without explanation and without incurring a disadvantage. There is no known risk to respondents for participation in this study. There is also no cost or payment to respondents for their participation in this study. Finally, there will be no individual benefit awarded to the respondents for participation in the study.
Confidentiality

All questionnaires are completed anonymously. No personal identifying information will be collected on the questionnaire. Furthermore, any data that is published or shared with any other organization will be presented in aggregate form so individual responses will not be able to be traced back to individual respondents.

After data collection, the informed consent form that will have your signature will be kept under lock and key by the student investigator who will be the only person allowed access to these unless requested by the University of Liverpool for validation purposes of compliance with research protocol. However, the informed consent will be stored separately from the questionnaires and will not have any link with the completed questionnaire. Therefore, responses will not be able to be traced back to individual participants. If requested, the University of Liverpool Personnel involved in review and assessment of this research will have access to the raw data obtained through this research, but again, no personal identifying information will be collected. However, all other institutions will only have access to the analysis and findings of the data presented in aggregate format.

Public Access to Results

After the completion of the studies with the University of Liverpool, analysis of the results in aggregate form will be disseminated to the relevant health authorities in Jamaica (i.e. Ministry of Health, Jamaica; South-East Regional Health Authority and Kingston and St. Andrew Public Health Department) and on file in the library at the University of Liverpool.

Notification of Problems

If you experience any problems or are unhappy with the conduct of this study, please feel free to let us know by contacting Dr. Tolulope Osoba, the Supervisor of this research, by email at tolu.osoba@my.ohecampus.com, and we will try to help. If you remain unhappy or have a complaint which you feel you cannot come to us with then you should contact the university’s Research Participant Advocate at 612-312-1210 or email address liverpoolethics@ohecampus.com.

When contacting the Research Participant Advocate, please provide details of the name or description of the study (so that it can be identified), the researcher(s) involved, and the details of the complaint you wish to make.
MODEL CONSENT FORM

Survey of knowledge, attitudes and practices on tuberculosis among
health care workers in Kingston and St. Andrew, Jamaica

Project Researcher(s): Tolulope Osoba Zahra White

1. I confirm that I have read and have understood the information sheet dated
   April 6, 2011 for the above study. I have had the opportunity to consider the
   information, ask questions and have had these answered satisfactorily.

2. I understand that my participation is voluntary and that I am free to withdraw
   at any time without giving any reason, without my rights being affected.

3. I understand that, under the Data Protection Act, I can at any time ask for
   access to the information I provide and I can also request the destruction of
   that information if I wish.

4. I agree to take part in the above study.

___________________________________________  __________  __________________________
Participant Name                        Date                                    Signature or Initial

___________________________________________  __________  __________________________
Name of Person taking consent                Date                                    Signature

___________________________________________  __________  __________________________
Researcher                                    Date                                    Signature

Contact Information for the Supervisor of this Research is as follows:-

Dr. Tolulope Osoba
University of Liverpool

Email: tolu.osoba@my.ohecampus.com
QUESTIONNAIRE

All questionnaires are completed anonymously. We would appreciate it if you answer all the questions and answer as honestly as possible.

Please place a check mark (✓) in the box that best answers the question. Kindly make only one selection unless otherwise instructed.

GENERAL AND DEMOGRAPHIC QUESTIONS

1. What sex are you?
   □ Male
   □ Female

2. How old are you?
   □ Under 30 years
   □ 31 – 40 years
   □ 41 – 50 years
   □ Over 50 years

3. What is the highest level of education you have completed?
   □ University/College Diploma
   □ Associates Degree
   □ Bachelor’s Degree
   □ Specialized/Professional Graduate or Post-graduate Degree (e.g. MBBS, MSc, MPH, PhD)
   □ Other (Please specify) ____________________________________________
4. What is your current job title?

___________________________________________________

5. How long have you been working in this current position?

☐ < 1 year
☐ 1 – 4 years
☐ 5 – 9 years
☐ 10 – 14 years
☐ ≥ 15 years

6. How long have you been working in a public health facility?

☐ < 1 year
☐ 1 – 4 years
☐ 5 – 9 years
☐ 10 – 14 years
☐ ≥ 15 years

7. What type of facility do you currently work in?

☐ Type 1 Health Centre ☐ Community Hospital
☐ Type 2 Health Centre ☐ Type C Hospital
☐ Type 3 Health Centre ☐ Type B Hospital
☐ Type 4 Health Centre ☐ Type A Hospital - Non-Specialist (KPH, CRH)
☐ Type 5 Health Centre ☐ Type A Hospital – Specialist (NCH, BHC)
TB-RELATED KNOWLEDGE AND AWARENESS

8. In the past 12 months, have you attended a lecture/seminar/workshop on tuberculosis (TB)?
   □ Yes
   □ No

9. What is/are the main symptom(s) that are used as an indicator for infectious, active TB disease? Please check all that apply.
   □ Cough ≥3 weeks
   □ Cough with blood
   □ Fever
   □ Weight loss
   □ Night sweats
   □ Diarrhoea
   □ Do not know for certain

10. Can someone become infected with TB more than once in their lifetime?
    □ Yes
    □ No
    □ Do not know for certain

11. What is the standard length of treatment for a newly diagnosed case of TB?
    □ <1 month
    □ 1 – 2 months
    □ 3 – 4 months
    □ 5 – 6 months
    □ >6 months
    □ Do not know for certain
12. How can someone with TB be cured? Please check all that apply.
☐ TB cannot be cured, only managed
☐ Herbal remedies
☐ Bed rest without medicine
☐ General antibiotics
☐ Specific anti-TB regimen
☐ Do not know for certain

13. What is the WHO classification criterion for a relapse case?
☐ Patient who remained or became smear positive again near the end of the treatment course
☐ Patient whose treatment was interrupted for two (2) months or more and returns to treatment with bacteriologically confirmed active TB
☐ Patient who was previously treated and cured, but once again has bacteriologically confirmed TB
☐ Do not know for certain

14. What is the WHO classification criterion for a defaulter case?
☐ Patient who remained or became smear positive again near the end of the treatment course
☐ Patient whose treatment was interrupted for two months or more and returns to treatment with bacteriologically confirmed active TB
☐ Patient who was previously treated and cured, but once again has bacteriologically confirmed TB
☐ Do not know for certain
TB-RELATED ATTITUDES AND PRACTICES

15. In your opinion, is TB a major public health threat in Jamaica?

☐ Yes, it is already more than just a "major threat"
☐ Yes, it poses a serious threat to Jamaica
☐ No. Cases are controlled so there is no major concern
☐ No. It is not even a small threat at this time
☐ Do not know for certain

16. In your opinion, who are the persons most likely to become infected with TB in Jamaica? Please check all that apply.

☐ Homeless persons
☐ Children under 5 years
☐ Senior Citizens
☐ People living with HIV/AIDS
☐ Health care worker treating a confirmed case
☐ Family members of a confirmed case
☐ Prison Inmates

17. Under what circumstances are health education messages on TB given to patients? Please check all that apply

☐ World TB Day
☐ BCG Immunization
☐ General health promotion/education messages delivered in clinical settings
☐ With suspected or confirmed cases only (i.e. no family members)
☐ With suspected cases and their families in a clinical setting
☐ With confirmed patients and their families in either a clinical or community setting
☐ Health education on TB is generally not done with patients
18. What is the primary diagnostic test that is usually requested in order to confirm or rule out a case of active pulmonary TB? Please select only one answer.

☐ Nasopharyngeal swab
☐ Chest X-ray
☐ Mantoux test
☐ Sputum Smear Microscopy/ Culture
☐ Blood Culture

19. In general, confirmed TB cases (adults) are referred for management during the initiation phase of treatment to:

☐ National Chest Hospital or Cornwall Regional Hospital Only
☐ Any Regional Hospital or the Nearest Type A hospital
☐ Type A hospitals only
☐ The Nearest Health Centre (outpatient management)

20. What do you think are the best ways a person can prevent getting pulmonary TB?

Please check all that apply.

☐ Immunization with BCG vaccine  ☐ Proper hand washing
☐ Avoid shaking hands  ☐ Through good nutrition
☐ Avoid sharing dishes  ☐ Cover mouth and nose when coughing or sneezing
☐ Practice safe sex  ☐ Opening windows at home and work
☐ Use of Personal Protective Equipment  ☐ Closing windows at home and work
☐ Prayer  ☐ Do not know for certain
21. In your opinion, what skill or training level is needed of someone to effectively conduct Directly Observed Treatment (DOT) with a patient with TB? Please select only one answer.

☐ Only highly qualified/ trained health care workers (e.g. Physician, Public Health Nurse; Pharmacist)

☐ Any health care worker with clinical training (E.g. Registered Nurse; Medical Technologist)

☐ Any health care worker regardless of clinical training (E.g. Community Health Aide; Medical Records)

☐ This is not a technical activity that requires professional training in health care

22. What do you consider to be the main risk to the patient associated with incomplete or interrupted treatment course for TB? Please select only one answer.

☐ Worsening of symptoms and prolonged treatment course

☐ Development of drug-resistance

☐ Death

☐ There is no serious risk

THANK YOU FOR TAKING THE TIME TO COMPLETE THIS SURVEY. 😊
<table>
<thead>
<tr>
<th>Variable (1)</th>
<th>Measure (1)</th>
<th>Variable (2)</th>
<th>Measure (2)</th>
<th>Statistical Test Used</th>
<th>Significance Value Found (p)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recent training</td>
<td>Categorical</td>
<td>Knowledge Level</td>
<td>Categorical</td>
<td>Chi-squared</td>
<td>0.104</td>
</tr>
<tr>
<td>Recent training</td>
<td>Categorical</td>
<td>Knowledge Score</td>
<td>Continuous</td>
<td>ANOVA</td>
<td>0.183</td>
</tr>
<tr>
<td>Highest Educational Level Obtained</td>
<td>Categorical</td>
<td>Knowledge Level</td>
<td>Categorical</td>
<td>Chi-squared</td>
<td>0.004</td>
</tr>
<tr>
<td># of Years Employed in a Public Health Facility</td>
<td>Ordinal</td>
<td>Knowledge Level</td>
<td>Categorical</td>
<td>Chi-squared</td>
<td>0.003</td>
</tr>
<tr>
<td>Recent training</td>
<td>Categorical</td>
<td>Perception of Threat</td>
<td>Categorical</td>
<td>Chi-squared</td>
<td>0.086</td>
</tr>
<tr>
<td>Recent training</td>
<td>Categorical</td>
<td>Appropriate Diagnostic Test Requested</td>
<td>Categorical</td>
<td>Chi-squared</td>
<td>0.442</td>
</tr>
</tbody>
</table>