Service learning in pharmacy: Evaluation of tuberculosis screening by pharmacy students in primary health care facilities.

A dissertation submitted by

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Abstract

Background: Tuberculosis (TB) is one of the arms of the so-called quadruple burden of disease in South Africa. One of the major impediments to TB control is failure to detect the disease, and undiagnosed cases in the community can remain a source of onward transmission promulgating the epidemic. TB screening is thus the starting point for any intervention in tuberculosis control. At UWC, the pharmacy educational curriculum includes a service-learning in pharmacy (SLiP) programme which entails pharmacy students of all years visiting designated community health care facilities, and then perform various priority health tasks. During 2014 the second year SLiP programme was launched at primary health care facilities. The first semester programme focussed on tuberculosis screening and cardiovascular risk assessment. The aim of this study was to evaluate the implementation of the TB screening aspect of the second year service-learning programme, based on the perceptions of the participating students and nurses, and students' TB screening reports; and also to find out the perceived impact of the TB screening aspect of the second year SLiP programme on the patients' health education, the nurses' workload, and on the students' learning and skill development at the various public primary health care facilities in the Cape Town Metro-pole area.

Objectives: To determine the perceptions of students and nursing staff on TB screenings done by pharmacy students at primary health care facilities, compare these perceptions with actual TB reports compiled by pharmacy students, and assess the perceived impact of students' TB screenings at the facilities.

Methods: The study was descriptive and quantitative in nature. Semi-structured questionnaires were used to obtain information from (n=99) students, and (n=38) nursing staff at 19 health care facilities. TB screening reports compiled by students were also collected. Second year pharmacy students are expected to complete a minimum of 15 TB screenings, under the indirect supervision of a nurse during their three visits of three hours per visit to PHC facilities. Students are required to conduct TB screenings, using the official tool of the National Department of Health (NDoH) (Appendix 6). Patients, care givers and the general public are interviewed using Motivational Interviewing skills (MI), by the students, to determine their risk of having TB. Pharmacy students refer all potential TB cases to the TB room for further investigation, which includes counselling and laboratory testing. Those with no or low

risk receive education on TB preventative measures. The aim of this study was to evaluate the TB screening aspect of the second year service-learning programme in public primary health care facilities in the Cape Town Metro-pole area. The target population for the study consisted of two groups of participants, namely the second year pharmacy students (registered for PHC213) and primary health care nurses employed at participating PHC facilities in the Northern and Tygerberg sub-districts of the Cape Town Metropole for the year 2017.

Primary health care facility selection was based firstly on whether it was included as a site for service-learning in the second year programme and secondly if the facility offered TB diagnosis and treatment services. The eligibility of nursing staff for participation in the study depended on the health care facility and their involvement with students at the facility. Data collected were captured into an electronic spreadsheet using Microsoft Excel. The final spreadsheet was then exported into SPSS version 22 for statistical analysis. The analysis included primarily descriptive statistics including frequency tables.

Main results: Out of 106 students registered for the second year module (PHC213) where SLiP was embedded; 99 students representing 19 facilities chose to participate in this study. A total of 38 nurses representing 15 facilities participated in the study. More than half of the students who participated in the study were female (62.6%) with almost half (49.5%) of the students speak English as their first language. The majority of the nurses that participated in the study were female (97.4%), with more than half (55.3%) speak Afrikaans as their first language. All nursing respondents (n=36) indicated that TB screening was a routine activity done at all facilities. However, the minority of nurse respondents (13.9%) thought that the number of TB screenings performed at their facilities were enough.

A total number of 1323 patients were screened and 210 were referred for further tests. The average number for patients screened per student was 13.5, which worked out to 90% of the initial target of 15 patients per student. The Pearson correlation test showed a statistically significant positive correlation between total patients screened and total patients referred to the TB nurse ($p=0.03$, $r=0.499$). The vast majority of students reported that they recruited (89/99 students) and screened (69/99 students) people in the general waiting room, while about a quarter (25/99) of students also recruited and screened (21/99 students) patients from the TB waiting room. A large percentage of the nurses (25 nurses) believed that the general waiting room of the health care facility was a good venue for the students to recruit and

screen patients for tuberculosis. Less than half (39.5%) of the participating nurses received patients referred by the students for further TB tests. Students seemed to find it easier to communicate with nursing staff than patients, with only about half of students (49%) finding it very easy/easy to communicate with patients. Just less than half of the students (46.5%) agreed that it was very easy/easy to recruit patients for TB screening. More students (68.7%) thought it was very easy/easy to screen patients for TB. A large percentage of the nurses (50%) agreed that it was easy for the students to recruit patients for tuberculosis.

About 63.4% of the students believed the TB screenings had a beneficial impact on the patients screened because they thought the patients learnt more about TB. Out of the 11 nurses who received patients referred to them by students, five nurses believed the referred patients were well informed by the students. The majority of the students (63.4%) believed they were adequately trained and prepared for conducting tuberculosis screening on patients. This is aligned well with nurses' opinions as most (60.1%) believed students were well prepared for the TB screening. About half of the nurse respondents (48.5%) believed the SLiP TB programme had an impact on the students in terms of more knowledge about TB, 39.4% of nurses believed students gained more clinical experience, and 12.1% of the nurses were unsure of the impact of the TB screening on student learning. This aligned with the student responses, with student reporting that they acquired more knowledge about TB (20/66 students), gained clinical experience (29/66 students), and also, improved their communication (motivational interviewing) skills (24/66 students). More than a third (38.4%) of the students believed their TB screenings helped the nursing staff in terms of reduced workload and time saved (as nurses would not need to screen these patients for TB).

In order to improve the TB SLiP programme and maximize benefits, 28.6% of nurses suggested that in addition to the TB screenings done by students, they could also give health talks and outreaches in the community on TB. Also, seven nurses (25%) reported that more student interaction with patients was needed as they believe more should be done in terms of patient TB education and awareness. Five nurses (17.9%) believed that students should help more in the pharmacy.

Conclusion: This research has shown the different perceptions of the second year students and nurses about the TB screening activity as part of the second years SLiP programme. This programme was perceived in a mostly positive way in terms of its effect on patients (TB

education, screening and counselling), the nursing staff (perceived decreased workload) and the students (more TB knowledge and clinical experience).

Two limitations of this study were the absence of the patient's voice as well as the limited participation of nursing staff. It is recommended that for future studies, patients are included as participants, the TB referral results are followed up and nurses are interviewed to extract richer information regarding the interactions between students and nurses.

Declaration

I declare that this thesis that I now submit for assessment on the programme of study leading to the degree Master of Pharmacy has not been submitted for the purpose of a degree at this or any other higher education institution. It is entirely my own work and has not been taken from the work of others, save to the extent that such work has been cited and acknowledged within the text of my work.

I agree to deposit this thesis in the University of Western Cape's library repository and /or allow this institution to do so on my behalf, subject to South African Copyright Legislation and the University of Western Cape's conditions of use and acknowledgement.

Signed…… Dated……..

Dedication

To my parents, Mr and Mrs Adeleye, for their constant support in every way, my brothers; Tobi and Samuel, for being the best brothers one could ever wish for, my lovely and supportive husband, Ayodeji Egunlusi for being my backbone and cheerleader, and my beautiful babies Israel and Elizabeth, for cooperating and making studying easy.

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Table of Contents

List of Tables

List of Figures

List of abbreviations and acronyms

BCG	Bacillus Calmette-Guerin
CDC	Centre for Disease Control
CHESP	Community Higher Education Services Programme
DoH	Department of Health
DOT	Direct Observed Therapy
DR-TB	Drug Resistant Tuberculosis
EPTB	Extra Pulmonary Tuberculosis
FIP	International Pharmaceutical Federation
HIV	Human Immunodeficiency Virus
IC	Infection Control
ICF	Intensified Case Finding
ID	Identification number
IPT	Isoniazid Preventive Therapy
MDR-TB	Multi-drug Resistant Tuberculosis
MTB	*Mycobacterium tuberculosis*
NDoH	National Department of Health
NSP	National Strategic Plan
PaCE	Patient Care Experience
PHC	Primary Health Care
PMTCT	Prevention of Mother to Child Transmission
PTB	Pulmonary Tuberculosis
RIF	Rifampicin

RR-TB	Rifampicin Resistant Tuberculosis
SLiP	Service Learning in Pharmacy
SPATS	Student Pharmacists as Tuberculosis Screeners
StatsSA	Statistics South Africa
STI	Sexually Transmitted Infections
TB	Tuberculosis
UNAIDS	Joint United Nations programme on HIV and AIDS
USA	United States of America
UWC	University of the Western Cape
WHO	World Health Organization

CHAPTER ONE

INTRODUCTION

The World Health Organization (WHO) estimated that 1.7 million people died globally from TB in 2016 (World Health Organization, 2017). Seven countries accounted for 64% of the total global TB burden, which included India, Indonesia, China, Philippines, Pakistan, Nigeria and South Africa (World Health Organization, 2017). About eighty percent of the South African population is estimated to be infected with latent TB (National Department of Health, 2013) and the WHO estimated an incidence of 454,000 cases of active TB in South Africa in 2015 (World Health Organization, 2016b). The WHO further estimated the total figure of TB deaths in South Africa, in the year 2015 to be about 25,000. This figure excludes those who were co-infected with TB and human immunodeficiency virus (HIV) at the time of death (Statistics South Africa, 2015). It has been estimated that 60% of people with TB in South Africa are co-infected with HIV (National Department of Health, 2014). The HIV prevalence rate for adults aged 15-49 was 19% in South Africa, in 2016 (Joint United Nations programme on HIV and AIDS, 2017).

TB and HIV are one of the arms of the quadruple burden of disease in South Africa, together with, maternal and child mortality, non-communicable diseases and violence and injuries. This disease burden is skewed towards poor socio-economic groups which primarily affect mothers and children (National Department of Health, 2016). A situational analysis of TB in South Africa identified key populations that are most likely to be exposed to and/or transmit HIV and/or TB. These included young women between the ages of 15 to 24 years, people living close to national roads and informal settlements, girls who drop out of school before matriculating, people with low socioeconomic status, uncircumcised men, sex workers and their clients, people who abuse alcohol and illegal substances, and men who have sex with men or transgender persons (National Department of Health, 2016). Also, populations at high risk of TB infection or re-infection include health workers, miners, prisoners, prison officers and household contacts of confirmed TB patients (National Department of Health, 2016).

In order to address the disease burden, the South African government is responding with a far-reaching reform plan to revitalise and restructure the South African health care system, which has been listed in the National Development Plan (National Department of Health, 2012). South Africa is also aiming for universal health coverage under the auspices of the

National Health Insurance (National Department of Health, 2012). Among others, goals are to strengthen the fight against HIV and TB, non-communicable diseases, as well as injury and violence, improving human-resource management at state hospitals and strengthening co-ordination between the public and private health sector, and, deploying "health teams" to communities and schools, etc. (National Department of Health, 2010).

The National Strategic Plan (NSP) for HIV, TB and STI 2012-2016 is driven by a long-term vision for the country with respect to the HIV and TB epidemic, and has adapted the Three Zeros as advocated by United Nations programme on HIV and AIDS. These include zero new HIV and TB infections, zero preventable deaths associated with HIV and TB and zero discrimination associated with HIV and TB (The South African National Aids Council, 2011). The National Strategic Plan (NSP) for HIV, TB and STI 2017-2022 also aims to accelerate progress by improving treatment, care and support; reaching key and vulnerable populations; and addressing the social and structural drivers of HIV, TB and STIs (The South African National Aids Council, 2018)

1.1 Problem statement

Despite the plans from the National Department of Health, South Africa is notorious for poor implementation of health policies and there has been little improvement in health service delivery and access (Gray & Vawda, 2017). In addition, hopes of totally controlling TB have been dramatically dampened because of a number of factors, including the difficulty of developing an effective vaccine, expensive and time-consuming diagnostic processes, the necessity of long duration of TB treatment, the increase in HIV-associated tuberculosis, and the emergence of drug-resistance (Lawn & Zumla, 2011).

One of the major impediments to tuberculosis control is failure to detect the disease, and undiagnosed cases in the community can remain a source of onward transmission spreading the epidemic (Calligaro et al., 2017; World Health Organization, 2015). In high burden settings such as some communities in Cape Town, South Africa, and Harare, Zimbabwe, case detection rates were found to be as low as 50% (Calligaro et al., 2017). This is despite the fact that, the National Department of Health, South Africa introduced a multifaceted TB screening programme focused on high-burden districts, which included household contact tracing, HIV counselling and testing campaigns, community mobilization, door-to-door

enquiry in areas with a high burden of smear-positive TB, and screening of high-risk populations (O'Donnell et al., 2010). In addition, in 2012 more than 949 800 HIV-positive South Africans were screened for TB, however it was still substantially below the total number of people living with HIV (6.4 million) (World Health Organization, 2012).

In addition to poor case detection, TB control in general is complicated by its stigmatization both at community and institutional levels. TB stigma is thought to hinder TB control at all phases of care, starting from patients not presenting for TB screening, delaying their diagnosis, going right through to not adhering to and not completing their treatment (Courtwright & Turner, 2010; Maswanganyi et al., 2014). Stigma is exacerbated by a lack of community knowledge regarding routes of TB transmission, and even among those with relatively good knowledge of TB transmission, the perceived risk of transmission can also lead to isolation of individuals with TB (Courtwright & Turner, 2010).

A TB infection control survey in adults was conducted in 2017, in 158 clinics across South Africa. A total of 114 clinics out of the 158, had poor TB infection control measures in place. The survey revealed that at present, TB infection control is a significant problem in primary health care facilities across South Africa, and this might be linked to the wider crises within the health system where over-stretched nurses at understaffed clinics lack the capacity and resources to engage effectively in infection control measures (Rutter, 2017). Indeed, the TB cure rate in 2008 in Limpopo Province was merely 65% and a defaulter rate of 7%; in Mopani District the TB cure rate was 68.4% and in Greater Giyani Municipality it was 70.2% – far below the national target of 85% (Maswanganyi et al., 2014).

Most state and local TB control programs that report high TB morbidity have inadequate resources to screen all persons in high-risk groups and treat those persons who are infected. Yet, systematic screening for active TB is predominantly provider-initiated (World Health Organization, 2013b), which puts the onus on healthcare workers to make sure this is done. One major barrier to universal health coverage in South Africa is the general shortage in health workforce with the ratio of healthcare professionals to the population reported to be 8 doctors, 41 nurses and 3 pharmacists per 10 000 population (Srinivas & Wrench, 2012). In addition to the general shortage, the unequal distribution of the health workforce is unevenly skewed towards the private health system (Ataguba, 2010) and urban areas (Britnell, 2015). Indeed, the public health system in South Africa serves approximately 84% of the population,

but is only receive approximately 42% of the total budget spent on health care (World Health Organization, 2008).

In addition, TB treatment in South Africa is provided by the public health care system in a vertical manner, being conducted primarily by nurses with minimal integration with the rest of the health care team (Daftary et al., 2017). Despite the fact that studies show that pharmacists from high burden communities indicate strong support to participate in TB programs (Daftary et al., 2017). To date, however, pharmacists' contributions have been restricted to their traditional role as 'drug-dispensers', that is to provide physician-prescribed treatment to notified TB patients, or at best to serve as treatment supervisors under the directly observed therapy (DOT) framework (Daftary et al., 2017).

1.2 Motivation and rationale for the study

The central pillars of TB control had been identified as finding, treating and preventing infection in order to avoid deaths and reduce transmission (O'Donnell et al., 2010). The ultimate goal is to improve treatment outcomes for people with TB and to reduce TB transmission in the community through improved case detection, reduction in diagnostic delays and early treatment (Ismail & Koornhof, 2013; Kranzer et al., 2013) to reduce the adverse social and economic consequences of TB (World Health Organization, 2013b). Earlier case detection with improved access to anti-tuberculosis therapy is thus a key objective of the WHO End TB campaign because it promises improved patient outcomes and reduced opportunities for transmission (Calligaro et al., 2017).

TB screening is thus the starting point for any intervention in TB control. Systematic screening for active TB is defined as the systematic identification of people with suspected active TB, in a predetermined target group, using tests, examinations or other procedures that can be applied rapidly (World Health Organization, 2013b). The screening tests, examinations or other procedures should efficiently distinguish people with a high probability of having active TB from those who are unlikely to have active TB. Among those with a positive screening test, the diagnosis needs to be established by one or several diagnostic tests and additional clinical assessments, which together have high accuracy, such as GeneXpert MTB/RIF (Ismail & Koornhof, 2013).

People living with HIV and young children are at a high risk of exposure to drug-susceptible and drug-resistant TB when attending health facilities for care. Furthermore, healthcare

workers are also at high risk of acquiring TB, which highlights the importance of stringent implementation of infection control policies in order to reduce TB transmission (O'Donnell et al., 2010). The South African Department of Health has proposed screening all clinic attendees for tuberculosis (McCreesh et al., 2016). A relatively high proportion of the population can be reached through clinic-based TB screening (McCreesh et al., 2016). These programmes have the potential to reach nearly half the adult population over a 6-month period in the Western Cape Province, and may be a cost effective way to reduce the prevalence of tuberculosis (McCreesh et al., 2016).

In addition to screening, informing communities and the general public about TB control practices has also been proposed to reduce the spread of TB and MDR TB to people (World Health Organization, 2016a). Increasing community awareness of TB symptoms will cause more persons with TB symptoms to present earlier to a health care facility for investigation for TB (National Department of Health, 2012). Several authors have suggested that TB education/support programs, aimed at health care providers, individuals with TB, and at-risk community members, may reduce TB stigma (National Department of Health, 2012). The involvement of community stakeholders in TB prevention, health promotion and education activities devoted to disease spread and cure is vital so that the stigma attached to TB can be eliminated (Maswanganyi et al., 2014).

Symptomatic screening for TB is a low cost venture and requires low expertise to perform. Involvement of other health-care providers such as pharmacists, laboratory technologists, and also medical, pharmacy and nursing students in screening and preventive treatment activities is thus practical. This involvement can augment the limited resources of health departments by conducting appropriate screening efforts. In reality, pharmacists can also contribute to TB care and control in several ways. However, their capacity to facilitate TB case detection, or to comprehensively support patients receiving treatment, remains underutilized (Daftary et al., 2017). Clearly, there is a need to train and educate pharmacy providers in TB prevention and treatment, with specific guidance on symptom screening, referral, and treatment support (Daftary et al., 2017).

Pharmacy students may play an important role in the goal of augmenting the efforts of health professionals in South Africa in screening people for, and preventing tuberculosis. At the University of Washington in the United States of America (USA), second-year pharmacy students receive certification in TB screening (Young, 2013). Pharmacists, are one of the

most accessible healthcare providers, and are well-positioned to reach out to populations at high risk for acquiring and developing complications from TB (Young, 2013).

1.3. Background to the study

The School of Pharmacy, of the University of the Western Cape (UWC), continues to commit to endeavours that make pharmacy education more relevant to the local societal context. This is shown by the various measures taken by the School in making students aware and committed to address the various priority health needs and betterment of the local community. At UWC, the pharmacy educational curriculum includes a service-learning programme which comprises of pharmacy students of all years visiting designated community sites or health care facilities in which they perform various priority health tasks. Service-learning in Pharmacy (SLiP) and the Patient Care Experience (PaCE) are the School's flagship experiential learning programmes (Davies-Coleman, 2016).

The service-learning programme which was initiated in 2002 was supported through the Community Higher Education Services Partnerships Programme (CHESP) fulfilling higher education's mandate towards national reconstruction and development (Bheekie et al., 2007). The complete overhaul of the national pharmacy curriculum in 2013, provided the School with the opportunity to embed service-learning from the first year of study. This provided for the expansion of SLIP into community-based and environmental health learning programmes. During the first semester of the first year pharmacy students are sensitized to the social determinants of health. The second semester programme focus on learning about environmental health and in particular addressing the seasonal high incidence of diarrhoeal disease in Cape Town. During 2014 the second year SLIP programme was launched at primary health care facilities. The theme of relevance was cemented into this programme with the first semester programme focussing on TB screening and cardiovascular risk assessment and the second semester programme focusing on maternal and child health, which covers three of the four major disease burdens in South Africa. The third year programme focuses on patient and population centred pharmaceutical skills development and include activities such as stock control, compounding and dispensing of medication, group education to patients, and, the conducting of a medicine use evaluations at facilities. Finally, the fourth year programme, called Patient Care Experience (PaCE), offers hands-on experiences with the primary goal of developing students' skills in identifying, solving and preventing medicine therapy problems on individual patient cases at hospital and community sites.

The focus of this study is to evaluate the TB screenings done by second year students in terms of programme implementation and contribution to the health system and community from the perception of students and nurses.

1.4 Research questions

This research study asked the following questions about the TB screening aspect of the second year service-learning programme:

- What are the perceptions of the students and nurses towards the TB screening aspect of the second year service-learning programme?
- What are the perceived outcomes of the TB screening aspect of the second year service-learning programme on patient health education and nurses' workload at the primary healthcare (PHC) facility?
- What are the perceived outcomes of the TB screening aspect of the second year service-learning programme on student learning and skills development at the PHC facility?

1.5 Primary aim and objectives

The aim of this study was to evaluate the implementation of the TB screening aspect of the second year service-learning programme in public primary health care facilities in the Cape Town Metro-pole area, based on the perceptions o the participating students and nurses, and students' TB screening reports; and also find out the perceived impact of the TB screening aspect of the second year SLiP programme on the patients' health education, the nurses workload, and on the students' learning and skill development at the various PHC facilities.

The objective of the study was to:

- Determine perceptions of students and nursing staff on TB screenings done by pharmacy students at primary healthcare facilities,
- Compare these perceptions with actual TB screening reports compiled by pharmacy students, and,
- Assess the perceived impact of students' TB screenings at the facilities.

CHAPTER TWO

LITERATURE REVIEW

This literature review will focus on TB infection, diagnosis, treatment, prevention, infection control, TB screening, pharmacy and pharmacy education and social accountability.

2.1 Tuberculosis infection

Tuberculosis (TB) is an infectious disease caused by the bacterium *Mycobacterium tuberculosis*. Most TB infections do not have symptoms and are not transmitted, known as latent tuberculosis. The diagnosis of a positive latent TB infection is shown through a positive reaction to the tuberculin skin test, or TB blood test. A person with latent TB infection has a normal chest x-ray and a negative sputum test; has TB bacteria that are alive but inactive in his/her body; does not feel sick, and cannot spread the TB bacteria to others (Centres for Disease Control, 2014). Only about 10% of latent infections progress to active disease *(*Konstantinos, 2010).

A number of factors make people more susceptible to develop active TB disease including HIV, smoking and young age (Konstantinos, 2010). HIV is the most important risk factor as studies have shown that 13% of those with TB infection are co-infected with HIV (Wallace et al., 1990). Indeed, the annual risk of TB in an HIV positive person is 10% compared to a lifetime risk of 10% in a healthy individual (National Department of Health, 2014a). In addition, children in general are more at risk to contract TB, and conditions such as malnutrition, measles, and whooping cough increase the risk of progression to active TB disease. Other risk factors that make people more susceptible to active TB infection are diabetes mellitus, silicosis, low body weight, severe kidney disease, substance abuse, cancer of the head or neck, and being born in countries where TB is common such as Africa, Asia and Latin America (Dreyer, 2015).

Therefore, Bacillus Calmette-Guerin (BCG) immunization is very important as it gives variable protection against the progression of TB from infection to disease (National Department of Health, 2014). BCG vaccine is used in many countries with a high prevalence of TB, to prevent childhood TB, however this vaccine is not generally recommended for use in low burden countries, such as the United States, due to the variable effectiveness of the vaccine against adult pulmonary TB, and the vaccine's potential interference with tuberculin skin test reactivity, which is used in low burden countries to diagnose TB. BCG vaccination

should only be considered in low burden countries for children who have a negative tuberculin skin test and who are continually exposed to TB and health workers who work in settings with a high percentage of TB patients (New South Wales Ministry of Health, 2018).

TB is usually transmitted from person to person through air droplet nuclei (<5 microns) that are produced when a person with pulmonary or laryngeal tuberculosis coughs, sneezes, talks or sings (National Department of Health, 2014). TB transmission has been linked to environmental and socioeconomic factors. Environmentally, transmission is more likely to occur indoors, in dark, poorly ventilated spaces where droplet nuclei stay airborne for a long time. Close contact and prolonged exposure to a person with active TB disease increase the risk of transmission (National Department of Health, 2014). Other environmental factors that increase the risk of contracting TB are overcrowded living conditions, indoor air pollution, tobacco smoke, malnutrition, and excessive alcohol use (Schmidt, 2008).

Due to the environmental nature of TB transmission, the WHO recommends that TB infection control practices should be in place in all congregate settings, and in health facilities providing HIV care. These practices include environmental, administrative and personal controls. The environmental aspect of TB infection control aim to reduce the concentration of infectious drop nuclei with practices such as ventilation [mechanical (e.g. fan-filter, and fan-UV room units) and natural], isolation of confirmed TB patients, use of TB sputum collection booths, and use of personal respirators (Nardell, 1993). The administrative aspect of TB infection control includes a triage system to identify TB suspects in crowded waiting rooms and streamlining their clinic visit to get them assisted at the clinic faster in order to decrease the contact time with other patients, separation of patients with confirmed or suspected TB infection, supplying every patient who come into the clinic with masks, teaching every patient the importance of cough etiquette and respiratory hygiene, and rapid diagnosis of suspected TB patients with GeneXpert. The personal aspect of infection control is about developing cough etiquette, avoidance of congregate settings if TB smear positive, and sleeping alone if TB smear positive. Healthcare workers and caregivers should also use protective equipment (standard masks) (World Health Organization, 2016a).

Although usually inhaled, TB can infect any part of the body. The classic symptoms of active pulmonary TB (PTB) are a chronic cough with blood-contained sputum, fever, night sweats, and weight loss (World Health Organization, 2015). Extrapulmonary TB (EPTB) occurs when tuberculosis develops outside of the lungs, although EPTB may coexist with PTB.

General signs and symptoms of PTB and EPTB include fever, chills, night sweats, loss of appetite, weight loss, and fatigue. The historical term "consumption" came about due to the weight loss associated with TB infection. Infection of other organs may cause a wide range of symptoms (Dolin et al., 2010). Screening tools used to identify TB suspects for diagnostic TB tests are the symptoms of TB in adults and children (symptoms based screening). These include a cough lasting more than two weeks, fatigue, weight loss, fever, and night sweats. If the patients' answers in the affirmative to any or all of the symptoms listed, they should be evaluated and tested for TB (National Department of Health, 2017).

Different countries have different methods of screening people for tuberculosis. Some examples include the symptom based screening, which is primarily used across South Africa, the tuberculin skin test (used in the USA and other low burden countries), and a chest radiograph. The tuberculin skin test is more sensitive than the chest radiograph, but has the disadvantage of giving a false negative in patients with active tuberculosis or HIV infection, and also giving a false positive people vaccinated with BCG, or in patients with cases of non-tuberculous mycobacteria.

In South Africa, all individuals suspected of having TB should have at least one sputum specimen examined for bacteriological confirmation of TB disease using rapid diagnostic tests (National Department of Health, 2014). There are three main TB diagnostic tests used in South Africa, which include GeneXpert, sputum microscopy and culture tests. GeneXpert is a molecular test used to diagnose TB in most primary health care facilities. It detects bacterial DNA in the sputum sample and takes only two hours to produce results. In 2011, South Africa introduced GeneXpert MTB/RIF as a replacement for sputum smear microscopy for the diagnosis of pulmonary TB and simultaneously detects rifampicin resistance (Churchyard et al., 2015). The introduction of GeneXpert MTB/RIF assay has been of great importance especially in people living with HIV who often presented with smear negative TB (Ismail & Koornhof, 2013) and children who often struggle to provide sputum for diagnosis. GeneXpert is highly sensitive and specific, thus requiring less TB organisms for a positive test as compared to the smear microscopy. Additionally, the GeneXpert assay is cost effective for TB diagnosis compared to smear microscopy (Poorjan et al., 2015). Another advantage of the GeneXpert include that MDR TB is more rapidly and accurately diagnosed (National Department of Health, 2012). Although the GeneXpert largely replaced the older smear microscopy and culture test for the diagnosis of TB, the latter two tests might still be used in areas where GeneXpert is not available. A test, known as Rapid diagnostic test which is still

being developed by South African, Cameroonian and Ethiopian scientists, is done with blood obtained from a finger prick and diagnosis is made in less than one hour. The device used is a hand held, battery operated instrument that measures chemicals in the blood of people with TB (Walzl et al., 2018).

Sputum microscopy tests, although being replaced by the GeneXpert for diagnosis, are still used to monitor response to TB treatment and measure the cure rate of TB. It requires the sputum slides of each patient to be individually checked. This test is inexpensive, but labour intensive which means that only a limited number of smear tests can be assessed per day. This test method poses challenges for children, and people living with HIV. In the case of young children, samples need to be taken from their stomachs, using a nasogastric tube and this is not a pleasant procedure for the child, and the health worker. This is because children cannot on their own, produce a sample of good quality sputum (Churchyard et al., 2015). For people living with HIV, their sputum often has low level of TB bacteria, and this can lead to a false negative test result. The culture test which is the most sensitive to low levels of bacteria also requires the production of a sputum sample, which are sent to a centralized laboratory, where a culture test is done. Positive results show up after ten days, and a confirmed negative result may take up to forty two days. The problem associated with culture tests is that, they are only available in centralized labs which mean that, patients must make several trips to get their results. Also, a culture test is quite expensive (Churchyard et al., 2015).

Tuberculosis (TB) remains a worldwide healthcare problem, although it can be cured within 6–8 months of taking anti-tuberculosis treatment (Maswanganyi et al., 2014). PTB and EPTB are treated in the same way. The first line TB drugs are isoniazid, rifampicin, pyrazinamide, and ethambutol. Standard treatment protocols with fixed dose combination medicines are used for TB treatment (National Department of Health, 2016). As first line TB treatment takes at least 6 months to complete and has to be taken regularly, most patients require encouragement in order to adhere to their treatment. Adherence to treatment means following the recommended course of treatment by taking all the prescribed medicines in the prescribed manner for the recommended duration of treatment (Mkele, 2010).

All other drugs used in the treatment of TB with the exception of isoniazid, rifampicin, etambutol and pyrazinamide are referred to as second line TB drugs, and are used to treat drug-resistant TB (DR-TB) and multi drug resistant (MDR) TB. A patient with DR-TB has confirmed resistance to one of the first line drugs, while MDR-TB is diagnosed in the case of

both rifampicin and isoniazid resistance. The WHO in 2016, recommended the drugs to be used for the treatment of drug resistant TB to include Levofloxacin or Moxifloxacin (fluoroquinolones) and Amikacin, Capreomycin or Kanamycin (injectable drugs), bedaquilline and delamanid. The treatment of drug resistant TB involves taking the second line TB drugs for up to two years (World Health Organization, 2016b). The WHO, made an update to the 2016 TB treatment recommendation and it states that; patients with rifampicin resistant (RR)-TB or MDR-TB who were not previously treated with second line drugs, and in whom resistance to fluoroquinolones and second line injectable agents was excluded or considered unlikely, a shorter MDR-TB regimen of 9 to 12 months maybe used; also patients with RR-TB and MDR-TB should be given a regimen with at least five different TB medicines made up of pyrazinamide and four core second line TB medications. In patients with RR-TB or MDR-TB, the regimen must be strengthened with high dose isoniazid and/or ethambutol (World Health Organization, 2016b).

In South Africa, about 15% of patients are said to default on the first line, six months treatment while almost a third of the patients default on the second line treatment (Mkele, 2010). In many developing countries such as South Africa less than half of the TB patients who started first line treatment were cured or completed the treatment course (Maswanganyi et al., 2014).

2.2 Tuberculosis prevention

One of the primary interventions for TB prevention is TB screening. Active case finding requires systematic screening and clinical evaluation of persons who are at high risk of contracting TB, such as contacts of someone who was diagnosed with TB, or people living with HIV (World Health Organization, 2013b). Distinctions has been made between community-based and clinic-based active case finding, the former previously being limited by the lack of effective diagnostic tools to assist case detection at the point-of-contact (Calligaro et al., 2017). Clinic-based screening should be supplemented by community-based case-finding programmes targeting key risk groups (McCreesh et al., 2016). Intensified case finding refers to strategies to identify people with TB, who have not presented to health care facilities on their own initiative (Kranzer, 2011).

The primary question in any intervention is who to screen? The WHO has identified screening tests as important for TB high prevalent areas, for those who are in households or close contact with those having TB, homeless people, immuno-compromised people, and

those living in areas with poor access to diagnostic services and those living with HIV (Walzl et al., 2018). The WHO further recommend, for HIV positive individuals that was found not to have an active TB infection, be treated for presumed latent TB infection, and placed on isoniazid preventive therapy (IPT). To help TB programs develop active case-finding strategies, future research could investigate HIV-negative persons who are at risk of having TB and are being missed by the healthcare system (Classens et al., 2017). The risk of developing TB is estimated to be between 26 and 31 times greater in people living with HIV than among those without HIV infection. The WHO thus recommends that people living with HIV are systematically screened for TB at each contact with the heath service, using a symptom screen. Active screening for TB among socially and clinically-vulnerable populations e.g. slum-dwellers, contacts of TB cases, diabetics, smokers, will detect patients earlier and reduce transmission (National Department of Health, 2012, Churchyard et al., 2014). Generally, persons at high risk for developing TB disease fall into two categories. 1) Close contacts of persons who have been recently infected with TB and, 2) babies, young children and persons with medical conditions that weaken the immune system, people with HIV infection, silicosis, diabetes mellitus, and low body weight (Centre for Disease Control, 2016).

WHO further recommends the three I's for TB/HIV control; namely intensified case finding (ICF), IPT, and infection control (IC) (World Health Organization, 2016a). The WHO defined intensified case finding for HIV-infected individuals as the regular screening of all people with HIV or at risk of HIV, or in congregate settings (such as mines, prisons, military barracks) for symptoms and signs of TB, followed promptly with diagnosis and treatment (Kranzer, 2011). WHO recommends that any intensified case finding strategy should consider the accuracy of the screening algorithm, the epidemiology of tuberculosis in the targeted group, and the availability, feasibility, and cost of the diagnostic tests, but little high-quality evidence is available to inform decision-making around community-based intensified case finding strategies in high-burden countries, particularly in sub-Saharan Africa (Calligaro et al., 2017). A few studies have used GeneXpert for intensified case finding in a targeted way in high-risk groups, such as people living with HIV, following negative sputum smear microscopy or in patients with suggestive chest radiographs (Calligaro et al., 2017).

Research has shown that stigmatization of tuberculosis hinder tuberculosis control (Courtwright & Turner, 2010) Future research should continue to characterize TB stigma in different populations; use validated survey instruments to quantify the impact of TB stigma

on TB diagnostic delay, treatment compliance, morbidity and mortality; and develop additional TB stigma-reduction strategies (Courtwright & Turner, 2010). Community norms which lead to TB stigmatization is seen in areas with a high HIV prevalence, where HIV and TB co-infection is common; therefore making TB a perceived marker for HIV positivity, therefore HIV-associated stigma is transferred to TB-infected individuals (Courtwright & Turner, 2010). At-risk individuals report that fear of TB stigma and the social and economic impact of stigma affects their willingness to undergo TB screening and to seek medical care after the onset of symptoms associated with TB (Courtwright & Turner, 2010). The social and economic impact of TB stigma is seen in cases where people infected with TB are isolated from other members of the community, attending community events and also, prohibited from selling goods in public markets as seen in Ghana for example (Courtwright & Turner, 2010). Similarly, when an individual dies of TB, fear of TB stigma can lead families to hide the cause of death from other members of the community, even when such information might be useful in targeted TB screening (Courtwright & Turner, 2010).

Even after diagnosis and the start of therapy, concern about being identified as having TB and suffering the consequences of TB stigma may lead individuals to drop out of treatment programs. Institutional norms, which leads to the most common cause of TB stigma is the perceived risk and associated fear attached to the transmission from TB-infected individuals to susceptible community members. TB stigma has also been raised as a potential barrier to home- and work-based direct observational therapy (DOT), given that the presence of TB nurses might mark a person as infected (Courtwright & Turner 2010). Research into the tuberculosis treatment default among HIV-TB co-infected patients in urban Uganda showed that, a lack of relationship between nurses and patients affects adherence, because patients do not have trust in the nurses and will not comply with the instructions given to them since they do not even trust that the treatment is the correct one and will be able to cure their disease (Elbireer et al. 2011).

Indeed, the socioeconomic factor which has been linked to increased risk of contracting tuberculosis in Ethiopia is poor knowledge of TB, which has been linked to poverty, illiteracy, age (young people) and low socioeconomic status (Gelaw, 2016). A study conducted by Muhammad et al. (2011) in Pakistan, Punjab province, also indicated that there was inequality in the knowledge of TB between urban and rural residents. This same study revealed poor knowledge of signs and symptoms, transmission, prevention and treatment of

TB in people from rural areas. Patient education has thus been suggested to be a key intervention in the addressing of TB stigma.

2.3 Pharmacy and TB control

Pharmacists constitute an important and essential part of the health work force. In many countries, pharmacists are the front-line health care providers and often a first time contact for people with symptoms of TB (World Health Organization, 2011). Systematic efforts to involve pharmacists in TB care and control therefore needs to be undertaken as part of strengthening health systems in general and health work-force in particular (World Health Organization, 2011). In addition, the International Pharmaceutical Federation (FIP) aims to increase the involvement of pharmacists as a vital link in national TB control programme efforts, scaling up public-private mix approaches and promoting rational use of anti-TB medicines (Federation Internationale Pharmaceutique, 2011). The FIP advocates for pharmacists to contribute significantly to different tasks essential for quality TB care (Federation Internationale Pharmaceutique, 2011), such as early identification of TB suspects and referral for diagnosis thereby reducing delays in diagnosis, saving costs of care and increasing case detection (Federation Internationale Pharmaceutique, 2011). Pharmacists can also provide supervision, educational information and support to patients living in the community thereby enhancing treatment success, reducing defaults and contributing to cutting the disease transmission (Federation Internationale Pharmaceutique, 2011, Mkele, 2010). Pharmacy services to this point have not been sufficiently engaged to utilize fully their comparative advantage for the treatment of TB (Federation Internationale Pharmaceutique, 2011).

Literature suggests that community pharmacies in South Africa can act as centres for directly observed treatment short course therapy (DOT) for patients living in their vicinity. Promoting adherence through a patient centered approach, including facilitating access to treatment, choosing with the patient the most convenient time and place for DOT and if possible, providing other social and medical services (Mkele, 2010).

South Africa, has approximately 20,000 pharmacy personnel distributed countrywide (Daftary et al., 2016). In many settings, pharmacists remain the first and only health care provider that patients utilize. Pharmacists can thus play an important role in facilitating optimal pathways to the care of tuberculosis (Daftary et al., 2016). In most high burden countries, despite the existence of national TB programs that provide free TB testing and

treatment services, persons with symptoms suggestive of TB and notified TB patients more commonly access care from private providers, including pharmacists (Daftary et al., 2016). Surveys from India, Vietnam, Tanzania, and Uganda, show that 40 to 60% of TB patients approached pharmacies before visiting a diagnostic facility or medical practitioner (Daftary et al., 2016). However, to date, pharmacists' contribution to TB eradication have been restricted to the traditional role of TB drugs dispensing, that is, to provide physician-prescribed treatment to TB patients, or at best to serve as treatment supervisors under the DOT framework (Daftary et al., 2016). The pharmacists' capability to facilitate TB case detection, or to comprehensively support patients' receiving treatment, remains underutilized (Daftary et al., 2016).

2.4 Pharmacy education

The FIP advocates for a needs-based approach to guide pharmacy education (Andersen et al., 2011). This is aligned with the concept of social accountability in health education that is measured by the ability of undergraduates to respond to the society's priority health needs and health system challenges (Anderson et al., 2011). Social accountability also emphasizes the potential of health education institutions to partner with key stakeholders in the health sector and organize medical education in a way that has the greatest chances to yield the most relevant outcomes and highest impact on people's health (Boelen et al., 2016). The priority health concerns are to be identified jointly by governments, health care organisations, health professionals and the public (Boelen et al., 2012). A major expression of the social obligation of a medical school and its medical education programme is the explicit commitment to produce graduates able to effectively respond to people's primary health needs (Boelen et al., 2012). Teaching social accountability in service-learning would help students remain altruistic and encourage work in underserved areas (Meil et al., 2011). Indeed, research has also found that service-learning further encourages students to gain valuable skills such as communication skills, empathy and professionalism, all of which have much bearing on their future roles as healthcare professionals (Vogelgesang & Astin, 2000).

A structured educational approach would provide opportunities for healthcare professionals, especially future pharmacists, in understanding the challenges and implications of chronic health conditions affecting South Africans. It is critical that future pharmacists engage actively in health promotion so that the shift in pharmacy practice from product to patient-

focus, which requires that more time be spent talking to and advising patients rather than in dispensing medicines, can be made.

The purpose of service-learning is to build bridges between academic institutions, the services and the communities to address South Africa's reconstruction and development through teaching, research and training (Bheekie et al., 2011). Service-learning has been shown to benefit both students in the healthcare profession and the communities they serve, by equipping students with skills that enable them to identify and meet the needs of these communities (Khan & Jacob, 2015). Future health professionals must not only be competent to practice as clinicians, they must also be competent to practice as human beings in a complex health care system in relationship with local communities (Ranelli & Nelson, 1998). All health professionals in all countries should be educated to mobilise knowledge and to engage in critical reasoning and ethical conduct so that they are competent to participate in patient and population-centred health systems as members of locally responsive and globally connected interprofessional teams (Frenk et al, 2010).

Interprofessional education (IPE) incorporates two or more professions of healthcare students, learning about, from, and with each other to enhance communication, understand roles and collaboration, and improve health care outcomes (Monahan et al., 2018). Role understanding can be enhanced by having students of one profession shadow another profession to improve understanding of that profession's role on the health care team (Monahan et al., 2018). Interprofessional collaboration core values promote improved communication through teaming with other health care professionals in an environment of mutual respect and shared values (Monahan et al., 2018).

CHAPTER THREE

METHODOLOGY

The various documents used for the research are as follows: i) Data collection forms which includes a questionnaire for students (Appendix 1), a questionnaire for nurses (Appendix 4), TB reports compiled by students (Appendix 5), ii) the informed consent form (Appendix 3), and, iii) study information sheet (Appendix 2).

3.1 Study design

The study was descriptive and quantitative in nature.

3.2 Study setting

Second year pharmacy students at the University of the Western Cape are required to apply their knowledge, obtained during on-campus activities of the clinical pharmacy and pharmacology module (PHC213), as part of the service-learning in pharmacy (SLiP) undergraduate programme. The service-learning component counts towards 20% of the continuous assessment mark for the PHC213 module.

Students are required to do their service activities at Primary Health Care (PHC) facilities within the Northern and Tygerberg sub districts of the City of Cape Town health services as these facilities fall within the geographic area immediately surrounding UWC. Every year the SLiP faculty meet with the facility managers of the PHC facilities to familiarise them with the SLiP dates, students' expected activities and learning objectives. At these meetings, the facilities willing to participate in the sub-districts and number of students to be allocated to each participating facility are collaboratively decided upon. Each year, about 21 PHC facilities participate in the SLiP programme and are able to accommodate about 120 students. The level of care at these health facilities are believed to be representative of the level of care which is offered at various PHCs within the Western Cape Province. These primary health care facilities offer various services to the public such as prevention of mother to child transmission (PMTCT), HIV/STI prevention, curative care, TB prevention, diagnosis, and treatment, mental health care, family planning, paediatric vaccinations, and, antenatal services, amongst others.

The learning objectives for students in this programme included] (1) providing a TB screening service to the clinic, which entailed TB screening and patient education regarding

TB testing and prevention, (2) developing students' communication skills through actual interactions with patients and, (3) interacting with nurses (interdisciplinary interaction) to give students insight and an appreciation for the job that nurses perform in the health care system, specifically primary health care facilities. Prior to going to the various PHCs for SLiP, students are orientated on the how's of TB screening, with the theory of TB infection control and prevention as well as motivational interviewing techniques already covered in first year. Second year pharmacy students are expected to complete a minimum of 15 TB screenings, under the indirect supervision of a nurse during their three visits of three hours per visit to PHC facilities. Students are required to conduct TB screenings, using the official tool of the National Department of Health (NDoH) (Appendix 6). Patients, care givers and the general public are interviewed using Motivational Interviewing skills (MI), by the students, to determine their risk of having TB. Pharmacy students refer all potential TB cases to the TB room for further investigation, which includes counselling and laboratory testing. Those with no or low risk receive education on TB preventative measures.

After the visits to the PHCs by students, a reflection session is organized by the SLiP staff, providing students the opportunity to give feedback about the SLiP TB screening exercise and the challenges met. Students are then required to prepare a reflective report on their experiences as well as submit a report describing the number of cases screened for TB and the number of cases referred for further investigation (University of the Western Cape, 2016).

3.3 Target population and recruitment

The target population for the study consisted of two groups of participants, namely the second year pharmacy students (registered for PHC213) and primary health care nurses employed at participating PHC facilities in the Northern and Tygerberg sub-districts of the Cape Town Metropole for the year 2017.

Primary health care facility selection was based firstly on whether it was included as a site for service-learning in the second year programme and secondly if the facility offered TB diagnosis and treatment services. The eligibility of nursing staff for participation in the study depended on the health care facility and their involvement with students at the facility.

Nursing staff that were employed at the nineteen (19) facilities participating in the 2017 SLiP programme were eligible to be selected for participation in this study. Inclusion criteria for the nursing staff at the facility were nurses who interacted directly with the second year

pharmacy students during the time they performed the TB screenings at the facility and/or nursing staff that interacted with patients referred by students at the selected facility. Nursing staff that did not interact with the students and/or patients referred by students were excluded from the study.

The inclusion criteria for the second year pharmacy students were those who registered for the Pharmacology and Clinical Pharmacy (PHC213) module were assigned to the primary health care facilities selected for this study, and who provided informed consent. Second year pharmacy students not registered for the specific module during 2017 were excluded from the study.

The second year students were informed of the research during their SLiP orientation. Questionnaires were distributed to the second year pharmacy students after their visits to the selected facilities. The nursing staff at the various primary health care facilities was approached to complete a questionnaire about their perceptions on the TB screenings done by the UWC second year pharmacy students.

3.4 Data collection and analysis

Semi-structured questionnaires were used to obtain information from students, and nursing staff at the health care facilities. Tuberculosis (TB) screening reports prepared by students were used to obtain information regarding the service-learning in pharmacy (SLiP) TB screening exercise.

The three data collection tools included:

1. Semi-structured questionnaire for students (Appendix 1)
2. Semi-structured questionnaire for nurses (Appendix 4), and,
3. TB screening report submitted by students (Appendix 5).

The semi-structured questionnaires for students and nurses had three main sections, which requested information on demographics, the TB screening process and perceived outcomes of the SLiP programme. Questions on demographics included gender and first language of the students and nurses. Questions pertaining to the ease or difficulty of students' communication with patients and nurses, and the level of difficulty experienced while conducting TB screenings were asked. Questionnaires assessed students' understanding of the programme,

how important they thought it was to their learning, and the benefits to the services and patients that were screened and referred for TB sputum tests and the surrounding community. Questionnaires assessed nurses' perceptions in terms of benefits and challenges for student learning, routine service delivery and patient referrals. The TB screening reports that were completed by students and submitted to the SLiP coordinator had information on the number of patients screened for TB as well as the number of referrals that were sent to the TB nurse for further investigation to confirm a TB infection.

Data collected from the questionnaires were captured by trained fourth year students into an electronic spreadsheet using Google Forms. The data were checked for accuracy by persons who were not originally involved in the data capturing, to ensure that no errors had been made during the data capturing stage. The final data set was then created, and exported into SPSS version 22 for descriptive statistical analysis, including frequency tables. Open ended questions were coded and thematically analysed.

3.5 Ethical considerations

Approval to conduct the study was obtained from two committees namely, the University of the Western Cape Biomedical Research Ethics Committee with registration number BM/16/4/08 and the City of Cape Town Research Committee with registration number 7754 before data collection commenced. The City of Cape Town Research Committee's approval gave access to use students' screening reports and to interview the nurses employed at the PHC facilities.

Students and nursing staff were recruited by the researcher to participate in the study. Participants received detailed written information regarding the study (Appendix 2). Informed consent was obtained from pharmacy students and nursing staff before the questionnaires were administered (Appendix 3). The anonymity of participants were ensured by the assignment of a unique identifier for each participant in the study. The data collection tool only contained the unique identifier. The signed consent forms with the identifying information were kept separate from the data collection sheets and were available only for senior researchers involved in the study. Only the unique ID was captured into the spreadsheet. Once the study is completed i.e. research reports and publications written, the electronic databases and paper data collection tools will be deleted and destroyed by the principle researcher after five years. The risks for study participants were minimal, and the

anonymity ensured the protection of all participants. No direct benefits for the study participants were anticipated.

CHAPTER FOUR

RESULTS

The data sources used in this study included two sets of questionnaire responses, one set completed by second year pharmacy students from the University of the Western Cape and the other set completed by practicing nurses working in primary health care clinics within the Western Cape. Reports on TB screening done by pharmacy students were also analysed.

Student response rate

One hundred and six (n=106) second year pharmacy students conducted their service-learning at nineteen (n=19) health care facilities during 2017. Ninety nine (n=99, %) students from nineteen (19) health care facilities agreed to participate in the study by completing consent forms and questionnaires used for the study. Of the 99 participating students only 98; % submitted their TB screening reports for analysis. The TB reports were submitted as group work, which showed details of the patients that were screened for TB at the various health care facilities. The maximum number of students per group was five (5), and the minimum number of students per group was two (2).

Nursing response rate

Thirty eight (38) nurses from fifteen (15) health care facilities agreed to participate in the study. Nurses from two (2) different facilities (N and J) declined to participate, as they could not recall the aim and objectives of the service-learning programme, as well as the specific activities performed by students placed at their respective facilities during the year 2017. For the two remaining facilities, no permission was granted to access the facility for research purposes. Table 4.1 provides a summary of the study participants per health care facility.

Table 4.1: Number of student (n=99) and nurse (n=38) respondents from 19 healthcare facilities participating in the study.

Facility	No of TB reports	No of students respondent (questionnaire)	No of nurses' respondent (questionnaire)
A	2	4 (4.2%)	6 (15.8%)
B	2	5 (5.2%)	2 (5.3%)
C	2	6 (6.25%)	1 (2.6%)
D	1	5 (5.2%)	1 (2.6%)

E	1	5 (5.2%)	1 (2.6%)
F	2	5 (5.2%)	No access granted
G	1	5 (5.2%)	1 (2.6%)
H	2	4 (4.2%)	2 (5.3%)
I	2	5 (5.2%)	4 (10.5%)
J	2	5 (5.2%)	0
K	2	4 (4.2%)	3 (7.9%)
L	1	2 (2.1%)	4 (10.5%)
M	1	4 (4.2%)	1 (2.6%)
N	2	4 (4.2%)	0
O	2	5 (5.2%)	No access granted
P	3	14 (14.1%)	1 (2.6%)
Q	2	3 (3.1%)	1 (2.6%)
R	2	4 (4.2%)	1 (2.6%)
S	2	6(6.1%)	9 (23.7%)
No name	-	4	-
Total	34	99 (%)	38 (%)

Results are presented under the following sub-headings: TB screening reports, student questionnaire responses, nurse questionnaire responses, and, comparative questions for students and nurses.

Demographic information

4.1 Patient screened for TB by students

Each student was required to complete a minimum number of 15 TB screenings at the health facility to which they were allocated. Patients that were identified as potential TB risk candidates were referred to the respective health care provider(s) at the health care facility. Preventative measures were discussed with each patient encountered.

A total of 1323 patients were screened for TB by 98 pharmacy students. The average number of patients screened per student was 14 patients per student (Table 4.2). Poor screening occurred at two facilities (E and N) where students only managed to screen an average of 8 patients per student. In contrast, at two other facilities (M and O) students managed to exceed the screening target by screening an average of 16 and 18 patients per student, respectively.

Table 4.2: Total number of patients screened, number of students, and total patients referred at each facility.

Facility	No of patients screened	No of students	Average number of patients screened per student	No of patients referred to TB nurse (%)
A	60	4	15	13 (21.7%)
B	90	6	15	28 (31.1%)
C	75	6	12.5	8 (10.7%)
D	43	3	14.3	0 (0%)
E	45	6	7.5	15 (33.3%)
F	78	6	13	3 (3.8%)
G	27	2	13.5	5 (18.5%)
H	52	4	13	25 (48.1%)
I	90	6	15	4 (4.4%)
J	135	9	15	4 (3.0%)
K	62	4	15.5	4 (6.5%)
L	45	3	15	1 (2.2%)
M	32	2	16	4 (12.5%)
N	30	4	7.5	2 (6.7%)
O	90	5	18	19 (21.1%)
P	174	13	13.4	26 (14.9%)
Q	58	4	14.5	21 (36.2%)
R	48	4	12	7 (14.6%)
S	89	7	12.7	21 (23.6%)
TOTAL	**1323**	**98**	**13.5**	**210 (15.9%)**

Of the 1323 patients screened by the students, 210 (15.9%) were referred to the TB nurse for further investigations to confirm a TB diagnosis (Table 4.2). Facility H had the highest referral rate (48.1%) while facility L had the lowest referral rate (2.2%). The Pearson correlation test showed a statistically significant positive correlation between total patients screened and total patients referred to the TB nurse ($p=0.03$, $r=0.499$). This means as the number of patients screened increased, so was the number of patients referred to the nurse for further TB tests.

4.2 Student questionnaire responses

The questionnaire responses were out of a total of 99 participants, however, not all participants completed all the questions. This is indicated in the number of responses. The gender and first language distribution of the participating students are summarised in Table 4.3. The majority (62.6%) of the students were female and (49.5%) spoke English as their first language.

Table 4.3: Demographics of participating students (n=99).

Demographic indicator	Number of responses		Number (Percentage)
Gender	99	Female	62 (62.6%)
		Male	37 (37.4%)
First language	97	Afrikaans	8 (8.2%)
		English	48 (49.5%)
		isiXhosa	21 (21.6%)
		Others	20 (20.6%)

4.2.1 Student's self-reported TB screening activities

Students were asked in the questionnaire to report on their own individual achievement of the target number of patients screened. The majority (n=64, 64.6%) of students reported screening more than 15 patients for TB. Fifty one percent (n=50) of the students did not refer any of the patients screened to the nurses for further investigations. In trying to determine if the people screened for TB by the students were patients, or relatives accompanying patients to the clinic, there was more or less an equal balance between the patients that was screened that had and did not have clinic files with them. This shows that the TB screening done by students spread across people who came to the PHC for medical services (and hence had clinic files) and people without clinic files who may be patient relatives.

Table 4.4 below shows the number of patients screened by each student, and the number of patients referred by students to the nurse for further TB tests. The questionnaire responses were out of a total of 99 participants, however not all participants completed all the questions. This is evidenced in the table below showing the number of responses.

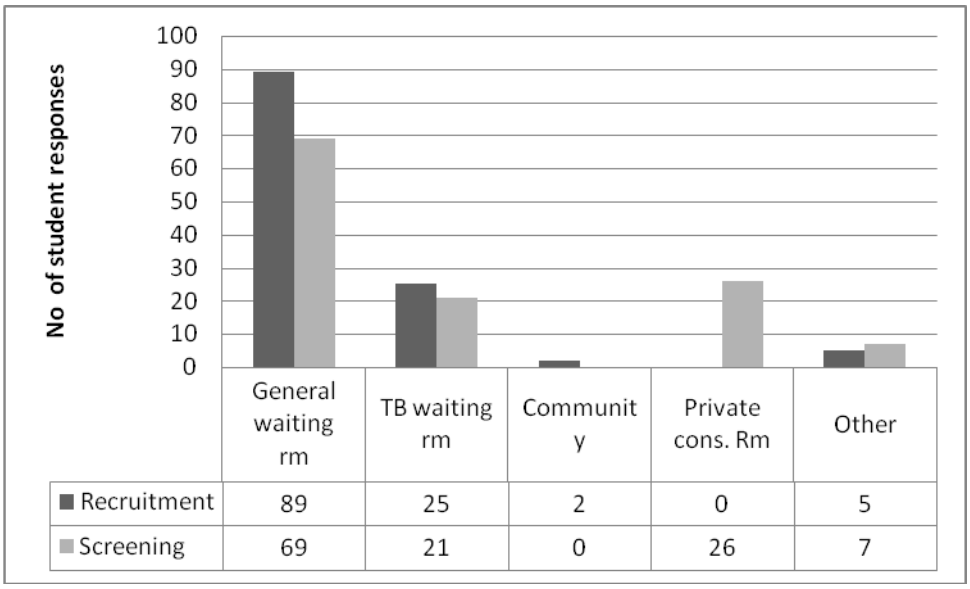
Table 4.4: TB screening information of students (n=99)

Question	Number of responses	Option	Number (%)
Number of patients screened	99	More than 15	64 (64.6%)
		About 15	13 (13.1%)
		Less than 15	22 (22.2%)
Number of patients referred to TB nurse	98	More than or equal to 5	11 (11.2%)
		About 1 to 4	37 (37.8%)
		None	50 (51.0%)
Patients screened without clinic files	95	Most without files	38 (40%)
		About half without files	21 (22.1%)
		Very few without files	36 (37.9%)

The screening process was split into two stages, namely recruitment and screening. Recruitment can be defined as the part of the process where students approached patients to request from them if they would be willing to participate in the screening process. Screening referred to the part of the process where students administered the TB suspect screening tool (Appendix 5). In order to get an idea where students were located in possibly very small and overcrowded facilities and the sensitive nature of TB screening, we needed to contextualize the recruitment and screening processes. For this question students could pick more than one location.

Students reported that most recruitment and screening of patients occurred at the general waiting room of the facility (89 responses and 69 responses respectively) (Figure 4.1). Students recruited patients from the general waiting room (n=89), the TB waiting room (n=25), outside the clinic (community) (n=3), the TB screening room (n=2), the pharmacy (n=1), and the reception area (n=1). Students proceeded to screen patients in the general waiting room (n=69), the TB waiting room (n=21), a private consulting room (n=26), the TB screening room (n=2), outside the clinic (n=3), in the pharmacy (n=1), and in a HIV/TB testing tent outside the clinic (n=1).

Some students recruited and screened their patients in the same location of the healthcare facility (e.g. patient were asked to participate and screened in the same place), which included: the general waiting room (n=69), the TB waiting room (n=21), the TB screening room (n=2) and 'other' (reception, pharmacy, outside) (n=4). Some students (n=26) recruited patients for screening at a particular location (e.g. waiting rooms), and screened such patients for TB at another location (the private consultation room).



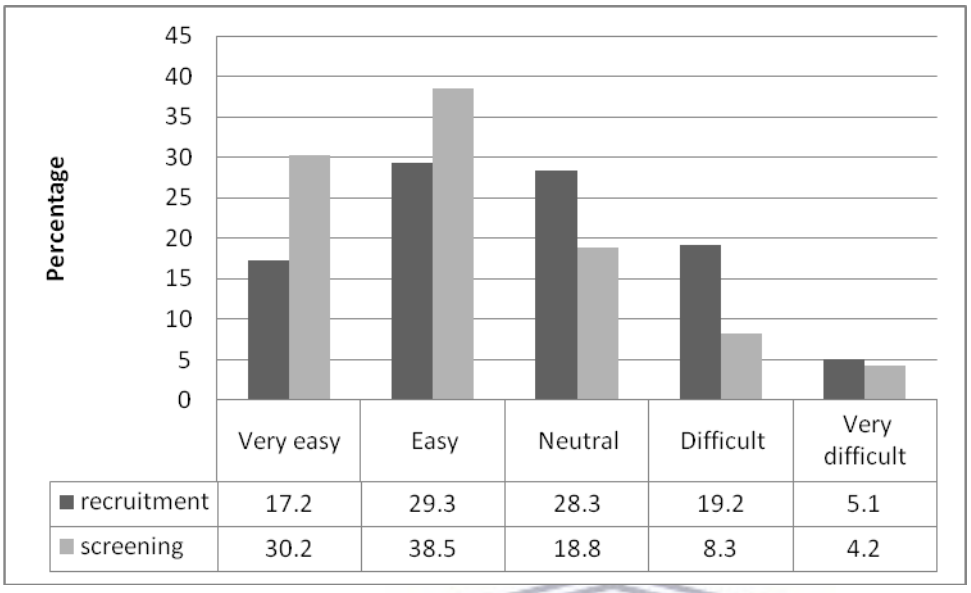
Rm = room.

Figure 4.1: Locations where students recruited patients from (n=121), and conducted TB screening at (n=123) the facility.

In terms of how students selected patients for screening, most (n=60; 60.6%) students selected patients for screening at random, and 17 (17.2%) students indicated that they screened all the patients present at the clinic, with no exceptions made. Fifteen (15.2%) students based patient eligibility for TB screening on symptoms exhibited by the patients, such as coughing.

Figure 4.2 compares on a scale of 1 to 5, how easy or difficult students found it to recruit patients for TB screening (n=99) and subsequently screen the patients (n=96). Almost half of the students (46.5%) agreed that it was "very easy" and "easy" for them to recruit patients for TB screening, and two-thirds (68.7%) indicated that it was "easy" and "very easy" to screen these patients for TB. Students who indicated that recruitment of patients were very easy/easy (n=46) felt that patients showed a willingness to get screened for TB, and felt supported from nurses at the facility. Students who felt neutral about the recruitment process (n=28) indicated that some patients were "reluctant to be screened for TB", "felt awkward approaching patients", "lacked the courage to approach patients for screening", "experienced a language barrier" between them and patients, indicated some clinics were "too full of patients" or "totally empty", and some patients at the clinics were "impatient to undergo TB screening". Students who found the recruitment process was very difficult/difficult (n=24) indicated that

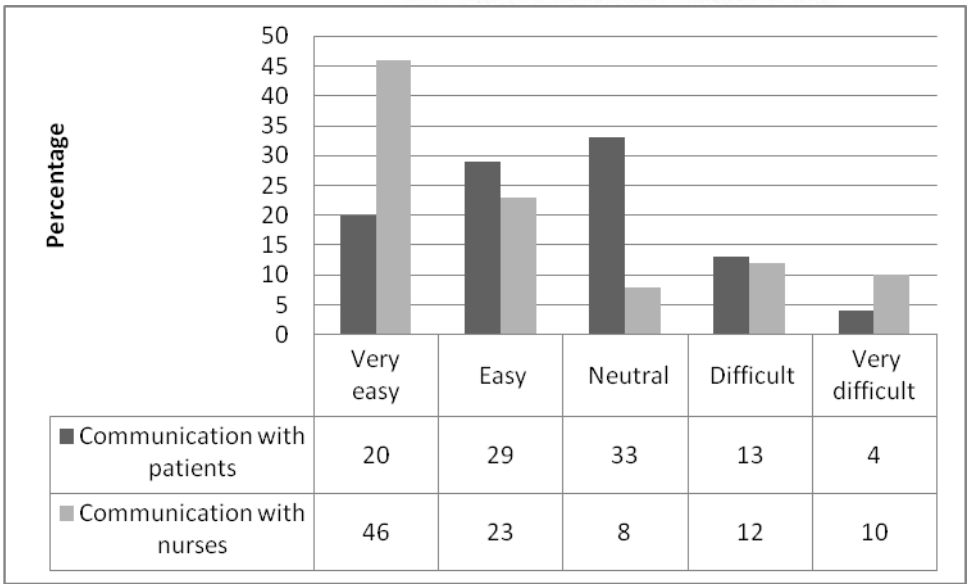
there was “no privacy to communicate effectively with patients”, and” most of the patients were disinterested in the TB screening exercise”.



	Very easy	Easy	Neutral	Difficult	Very difficult
recruitment	17.2	29.3	28.3	19.2	5.1
screening	30.2	38.5	18.8	8.3	4.2

Figure 4.2: Ease of recruiting (n=99) and screening (n=96) patients for TB by students.

Figure 4.3 represents how easy or difficult it was for students to communicate with patients (n=98) and nursing staff (n=99). Almost half of the students (49%) found it very easy/easy to communicate with patients. About two-thirds (68.7%) of students found it easy/very easy to communicate with the nursing staff.



	Very easy	Easy	Neutral	Difficult	Very difficult
Communication with patients	20	29	33	13	4
Communication with nurses	46	23	8	12	10

Figure 4.3: Students’ opinions on how easy or difficult it was to communicate with patients (n=98) and nursing staff (n=99).

4.2.2 Students' perceived outcomes of the SLiP programme

The last part of the student questionnaire inquired about students' thoughts on the effects (if any) of their TB screening efforts as it related to patients, the health facility staff and their own learning. Table 4.4 below summarizes students' thoughts on how their TB screening activities might have affected patients and facility staff.

Table 4.5: Students' opinion on their contribution when performing TB screening

	Yes	No	Maybe
TB screening helped staff (n=99)	38	32	29
TB screening helped patients (n=98)	59	8	31

Students were quite evenly divided on the question if they thought their TB screening helped staff at the facility (n=99), with about a third agreeing (39.4%), a third disagreeing (31.3%) and another third (29.3%) being unsure. When asked to give explanations for their opinions, 85 students gave reasons for their answer. Students who believed the TB screenings helped the nursing staff (n=28), felt their TB screening 'lessened the nurses' workload as it replaced some of the TB screenings which would have otherwise been done by the nurses (n=24), and others felt that nurses had too little time to conduct TB screening as part of their daily activities (n=4). The 29 students who chose the 'maybe' option also gave reasons for their answers. Most of these students believed some clinics already performed TB screenings with or without the students' help (n=9), some of the patients screened were already on TB treatment (n=5) and one student was unsure if the patients referred by him got the required care from the nurse. Also, 32 students believed the screening did not help staff (by choosing the option 'No'), and some of them gave reasons for this answer. These reasons included; screenings helped the students more than staff (n=4), screenings helped patients more than the staff (n=21), screenings had no impact as some of the staff were nonchalant about patients referred and so, was unsure if referred patient got attended to or no'(n=6), no patient referred to nurse (n=8), and Facility C had very few patients in attendance.

Most students (n=59; 60.2%) thought the TB screenings benefitted patients at the facility, 8 students (8.2%) believed the screenings had no impact on the patients and 31 students chose the option 'maybe'. Out of the 98 students that answered this question and chose either a

'yes' or 'no' or 'maybe' option, 87 provided reasons for their answers. Seventy-five students thought the TB screening helped patients, and ascribed the reasons for their answer to the fact that they felt patients learnt more about TB from the students in addition to being screened for TB. The students who chose "maybe" in Table 4.5 gave reasons that pointed to the fact that patients benefited from the screening exercise. Five students out of the 31 who choose 'maybe' admitted not being sure if the screening had any impact on patients as the patients they encountered already had knowledge about TB. The seven students that thought that the TB screening did not help patients provided reasons such as; patients were already screened for TB by the nurses (n=3), some patients were uncooperative with students (n=2), Facility D was empty (n=1), and one student complained about a language barrier.

Most students (n=75; 78%) reported that the TB screenings done at the facilities were a valuable learning experience for them (Figure 4.4). Sixty-six of the students that thought the experience was a valuable learning opportunity, provided reasons such as 'more clinical experience' (n=24), an 'improvement in their communication (motivational interviewing) skills' (n=23) and 'more knowledge about tuberculosis' (n=19). It was noted that most students who chose the option 'maybe' (n=7) gave reasons which showed that such students actually learnt from the TB screening exercise such as more clinical experience (n=5), improved communication skills (n=1) and more knowledge about TB (n=1). The six students that provided reasons why they thought they learnt nothing from the TB screening exercise provided reasons such as being uncomfortable with patients, patients being frustrated with the screening process, did not refer any patients to the nurse, lack of conversational skills between patients and students, receiving no help from nursing staff, and learning nothing new from the TB screening.

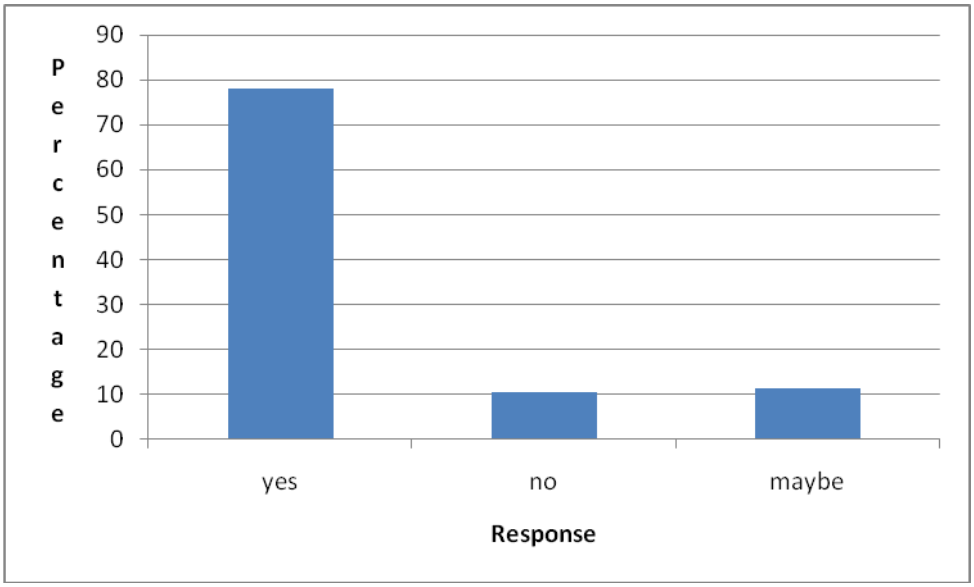


Figure 4.4: Students' opinion on increased learning from the TB screening exercise (n=96).

Figure 4.5 shows whether students thought they were adequately trained to perform TB screenings at health care facilities (n=93). The majority (63.4%) of students believed they were adequately trained to conduct TB screening at the facilities, 18.3% of students were unsure if they were trained adequately to perform TB screenings and, 18.3% of students noted they were not trained adequately, to perform TB screenings at health care facilities.

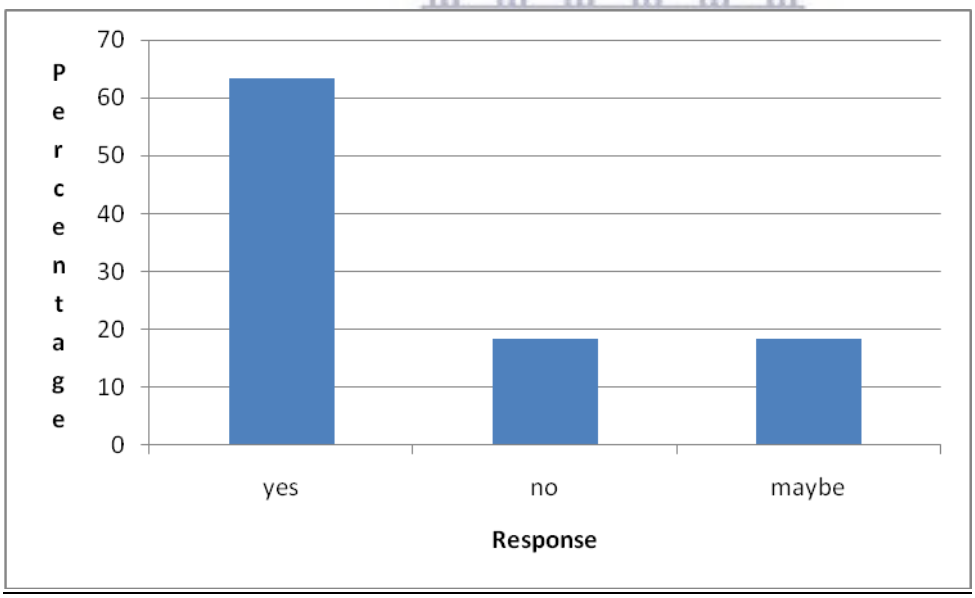


Figure 4.5: Students' perception on the adequacy of their training for SLiP TB (n=93).

4.3 Nurses' questionnaire responses

Table 4.6 summarises the demographic data of the 38 nurse respondents. The majority of the nurses (97.4%) were females, with more than half (55.3%) speaking Afrikaans as their first language. Almost three quarters (73.7%) were professional nurses with more than five years of nursing experience.

Table 4.6: Demographic information of nurse respondents (n=38).

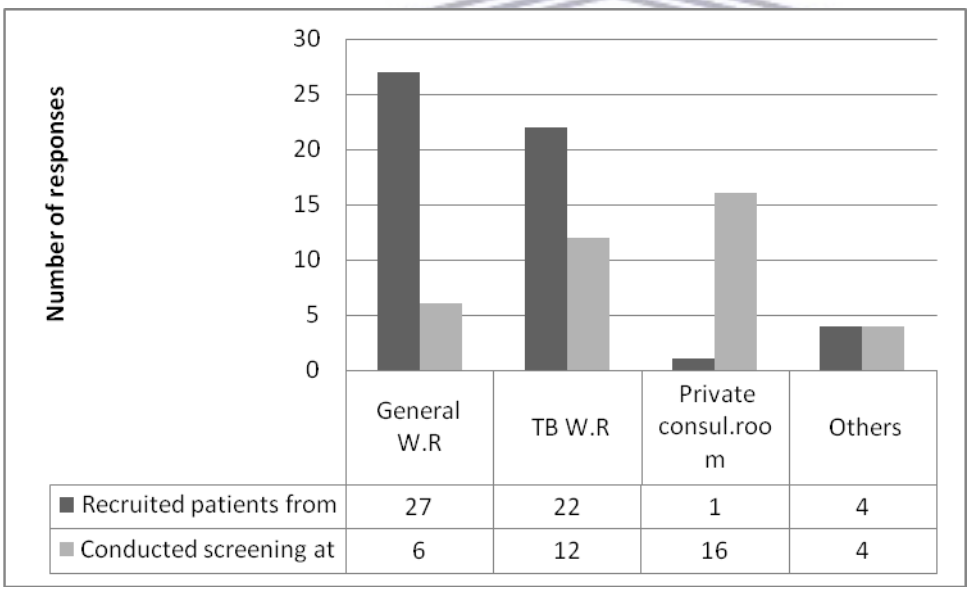
Demographic indicator	Number of responses		Number (%)
Gender (n=38)	38	Male	1 (2.6%)
		Female	37 (97.4%)
First language (n=37)	37	Afrikaans	21 (55.3%)
		English	8 (21.1%)
		isiXhosa	8 (21.8%)
		Others	1 (2.6%)
Job title (n=38)	38	Professional nurse	28 (73.7%)
		Clinical nurse practitioner	4 (10.5%)
		Enrolled nursing assistant	4 (10.5%)
		Mental health practitioner	1 (2.6%)
		Staff nurse	1 (2.6%)
Years of practice (n=38)	38	1-2 years	5 (13.2%)
		3-5 years	8 (21.1%)
		More than 5 years	25 (65.8%)
Role at facility	38	Facility manager	2 (5.3%)
		TB nurse	17 (44.7%)
		Other	19 (50%)

4.3.1 TB screening

All respondents (n=36) indicated that TB screening was a routine activity done at all facilities. About half of the respondents (52.8%) were unsure if enough TB screening was being done, a third of respondents (33.3%) thought the routine TB screening was inadequate and the minority of respondents (13.9%) though enough TB screening was done at their facilities. Nurses (n = 33) classified their interactions with students at the facilities as follows; 19 (50%) nurses orientated the students prior to the TB screening exercise, 10 (26.3%) nurses received referred patients from students for further screening and TB diagnostic tests, while 4 (10.5%) nurses interacted and assisted the students in general.

Figure 4.6 shows where nurses believed students recruited patients from for TB screening (n=54) (note: nurses could choose more than one answer), and where the TB screenings were

conducted (n=38). Half (50%) of the nurses believed pharmacy students recruited patients for TB screening from the general waiting room, 40.8% of the nurses believed patients were recruited from the TB room, and 9.3% believed students recruited patients from other places (prep room, ARV site and private consulting rooms). More than two-thirds (70.8%) of the nurses believed the general waiting room was an appropriate place to recruit patients from for TB screening and 8.3% believed private consultation rooms were a better place to recruit patients for screening. When nurses were asked where they believed the students performed the TB screenings on patients, 6 nurses (15.8%) believed the patients were screened at the general waiting room, 16 (42.1%) nurses believed students screened patients at the private consultation rooms, 12 (31.6) nurses believed patients were screened at the TB waiting room, 2 (5.2%) nurses believed patients were screened at the TB prep room, 1 (2.6%) nurse believed patients were screened at the HIV room, and 1 (2.6%) nurse believed students used all of the above spaces for screening patients for TB.



WR: waiting room

Consul: consulting

Figure 4.6: Locations where nurses believed students recruited patients from (n=54), and conducted TB screening (n=38).

Figure 4.7 shows how easy or difficult the nurses' thought it was for students to recruit patients for TB screening (n=36). Half of the nurses (50%) believed students found it easy and very easy to recruit patients for TB screening. This correlates with the students' opinion (46.5%)

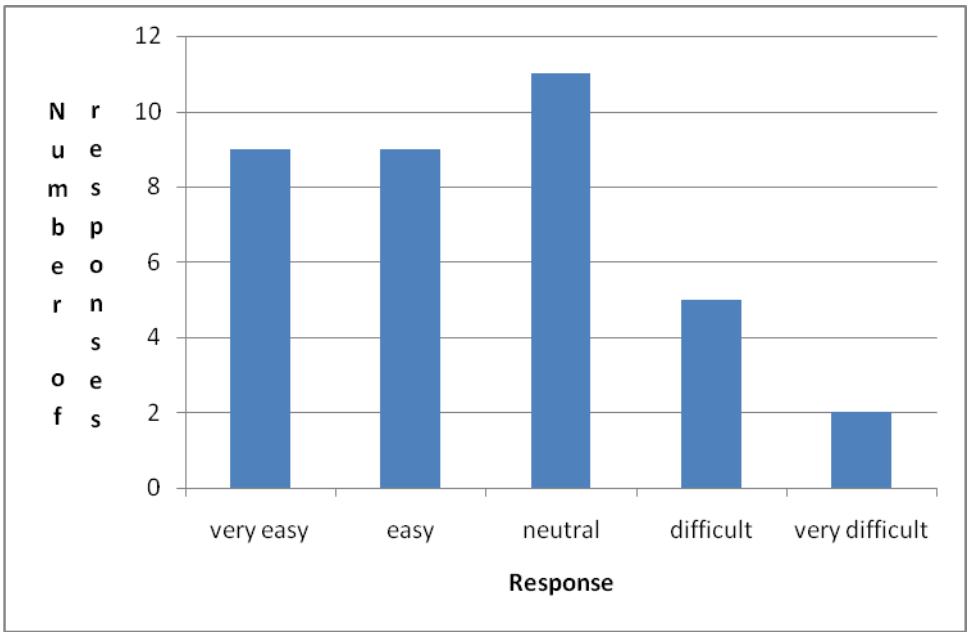


Figure 4.7: Nurses' opinion on the ease of recruiting patients for TB screening by students (n=36).

Nurses were asked if they received any patients referred by students, for further TB diagnostic tests. Table 4.5 represents the number of nurses (n=38), that received or did not receive patients referred by students and the amount of patients referred. More than half (60.5%) of the participating nurses did not receive any patients referred by the students for further TB tests. Of the nurses who received referrals from students, seven indicated they received between one and four patients, three nurses had more than five referrals, while one nurse had trouble remembering the exact number of patients referred by students.

Table 4.7: Number of nurses (n=38), that received or did not receive patients referred by students and the amount of patients referred.

Question	Number of responses	Response category	Number (%)
Number of respondents that received referrals from students	38	Yes	11 (28.9%)
		No	23 (60.5%)
		Maybe	4 (10.5%)
Number of patients referred by students	11	≥ 5 patients	3 (27.3%)
		About 1 to 4 patients	7 (63.6%)
		None	1 (9.1%)

Out of the 11 nurses who reported that they had patients referred to them by students, five nurses (including one nurse who formerly indicated she got no patient referred from students) believed the referred patients were well informed by the students, two nurses were not too sure if any of the patients referred were counseled by students, and four nurses thought the referred patients were not counseled by students.

4.3.2 Nurses' perceived outcomes of the SLiP programme

Table 4.8 summarizes the nurses' responses to the question of their opinion on the level of preparedness of pharmacy students for the TB screening exercise (n=23/38) and the learning outcomes of the students (n=33/38). Most (n=,60.1% of the 23, …% who responded) believed students were well prepared for the TB screening of patients, 26.1% of the nurses were unsure, 8.7% of the nurses reported that the students were not prepared enough for TB screening, and 4.3% of nurses believed more student preparation should be done. In terms of student learning, about half of the nurse respondents (48.5%) believed the SLiP TB programme had an impact on the students in terms of more knowledge about TB, 39.4% of nurses believed students gained more clinical experience, and 12.1% of the nurses were unsure of the impact of the TB screening on student learning.

Table 4.8: Perceptions of nurse respondents on student preparedness and learning from the TB screening experience

Question	Number of responses	Response category	Number (%)
Preparedness of students for TB screening	23	Well prepared	14 (60.9%)
		Unprepared	3 (13%)
		Unsure	6 (26.1%)
Student learning from TB screening	33	Improved knowledge about TB	16 (48.5%)
		Clinical experience	13 (39.4%)
		Unsure	4 (12.1%)

In order to improve the TB SLiP programme and maximize benefits, 8 nurses suggested that in addition to the TB screenings done by students, they could also give health talks and outreaches in the community on TB. About a quarter (7) of the nurses said more student interaction with patients was needed, and 5 of nurses believed the students should help more in the pharmacy in the areas of drug dispensing to patients. About 4 nurses advised that

students observe procedures in the clinics, 2 nurses advised that students also conduct TB tests and interpret results, 1 nurse said students should also conduct CVD and diabetes screenings. Also, 1 nurse advised that the SLiP clinical hours be extended, and be changed from Fridays to Mondays since more patients come to the clinics on Mondays.

4.4 Comparison of student and nurses responses

Comparisons of responses to similar questions by student and nurses are summarized in Table 4.9. The two sets of responses regarding the number of patients referred for further TB testing and diagnosis seemed to be aligned. However, the two sets of responses regarding the location of the recruitment and screening seemed to diverge. Both student and nurse respondents thought similarly about the ease of recruitment of patients.

Table 4.9: Comparison of answers given by students and nurses, to similar questions.

		Number of students' response	Number of nurses' response
Number of patients referred to nurse for TB tests	More or equal to 5	11 (11.2%)	3 (7.9%)
	1-4	37 (37.6%)	7 (18.4%)
	None	50 (51.0%)	23 (60.5%)
Location where patients were recruited from	General waiting room	89 (73.6%)	27 (50%)
	TB waiting room	25 (26.1%)	22 (40.1%)
	Other	7 (0.3%)	5 (10.3%)
Location where students conducted screenings	General waiting room	69 (56.1%)	6 (15.8%)
	Private consultation room	26 (21.1%)	16 (42.1%)
	Other	28 (22.7%)	16 (42.1%)
Ease of patient recruitment	Very easy	17 (17.2%)	9 (25%)
	Easy	29 (29.3%)	9 (25%)
	Neutral	28 (28.3%)	11 (30.5%)
	Difficult	20 (20.2%)	5 (13.9%)
	Very difficult	5 (5.1%)	2 (5.6%)

CHAPTER FIVE

DISCUSSION

This research aimed to evaluate the implementation of the TB screening aspect of the second year service learning programme, based on the perceptions of the participating students and nurses, and students' TB screening reports; and also to find out the perceived impact of the TB screening aspect of the second year SLiP programme on the patients' health education, the nurses' workload, and on the students' learning and skills development at the various PHC facilities. The overarching objectives of the larger SLiP programme entails the engagement of students in basic organized activities that address community needs, while at the same time increasing their skill and understanding of their education and fulfilling their contribution towards public commitment (Bheekie et al., 2011).

The structure of this discussion is as follows; description of study site and participants, outcomes of specific learning objectives for students, including an overview of TB screenings performed, communication with patients and nurses, and interdisciplinary interactions between students' and nurses' as well as perceived outcomes of the overall SLiP programme and recommendations on improving the SLiP TB screening programme. This section concludes with a description of the limitations of this study.

5.1 Study site and participants

There were 106 students registered for PHC213 (2017) where SLiP was embedded; of which 99 students chose to participate in this study. This is a good response rate (93%) as it gives an adequate representation of the views of the students in the class. The 99 students represented all (19) the primary healthcare (PHC) facilities that comprised the 2017 service learning programme.

A total of thirty eight (38) nurses employed at15 facilities participated in the study. These nurses were those who were in contact with the students at the various health care centres. Of the nineteen clinics pharmacy second year students went to for SLiP, the researcher could not get access to two facilities (F and O) to interview staff at those clinics. The researcher also, could not get feedback from nurses from two facilities (J and N) as they claimed there were minimal interaction between them and the students. The nurses' responses thus represented

79% of PHC facilities that comprised the 2017 service learning programme. In addition, the spread of participating nurses ranged between 0 and 9 participants per facility, which implies an overrepresentation of some facilities. This might limit the correlation between the student and nurse responses to the same questions.

More than half of the students who participated in this study were female (62.6%) with almost half (49.5%) of the students speaking English as their first language. The majority of the nurses that participated in the study were female (97.4%), with more than half (55.3%) speaking Afrikaans as their first language.

The language distribution census conducted within the Western Cape Province in 2011 showed that Afrikaans (34.9%), isiXhosa (29.2%) and English (27.8%) accounted for the majority of languages spoken by the population, while other languages accounted for the remaining 8.1% (Statistics South Africa, 2011). These statistics were mirrored better by that of the nurses' language distribution than the students' language distribution in this study. This can be explained by the fact that, the second year pharmacy students come from all over South Africa and even Sub-Saharan Africa, and not necessarily only from the Western Cape. Some of the students' responses from the questionnaire revealed that about 28.3% of the students felt their ease of recruiting patients for TB screening was average, and some of these students attributed this unease to a language barrier that existed between them (students) and patients. Also, when students were asked if they thought the TB screenings done by them helped patients in any way, eight (8) students said 'No' and one of the students attributed this to the language barrier that existed between her and the patient. A study by Clark and colleagues (2015) which evaluated the experiences of medical and pharmacy students of the University of Saskatchewan in Western Canada at their community service programme revealed that the students found language barrier to be one of the factors that might impede good health of the community. Also, a study by Naidoo (2014) revealed that in South Africa, language barriers compromise a large proportion of the population in their access to health care services and quality care. Language barriers have been found to cause misunderstandings and communication problems between health care practitioners and patients, and on occasion, breakdown in professional relationships (Naidoo, 2014). Language barriers have also, been found to decrease work efficiency as it makes communication time consuming and impede the provision of holistic treatment to patients, due to increased frustration levels and decreased empathy and approachability (Naidoo, 2014).

5.2 TB screening by pharmacy students at PHC facilities

In terms of the need for TB screening at the facilities, all nursing respondents (n=38) indicated that TB screening was a routine activity done at all facilities. However, the minority of respondents (13.9%) thought that the number of TB screenings performed at their facilities were enough, a few attributed this to the high workload (patient output) at clinics. Inadequate TB screening in other PHC facilities in South Africa has been attributed to understaffing and high workload of nursing staff (Mabuza & Shumba, 2018). Social accountability refers to measures by an individual or an organization to be aware of concerns of the community. This is reflected in a commitment to the health, safety and rights of individuals in the community (Reeve et al., 2017). This definition can be seen reflected in the UWC SLiP TB exercise. A study conducted by Reeve and colleagues (2017) showed that students of socially accountable schools were more skilled than students from more traditional schools, to meet the needs of the underserved community. Health professional schools have a critical role in addressing inequities and developing high quality primary health care systems, particularly in disadvantaged regions (Reeve et al., 2017).

One of the requirements of the SLiP TB programme was that students screen a minimum number of 15 patients at the health facility they were allocated to. The average number of patients screened per student was between 13 and 14 which worked out to 90% of the initial target. Students at 8 facilities managed to screen 15 patients and above, students at another 8 facilities screened between 12 and 14.5 patients per student and only two facilities had averages of 7.5 patients per student.

A closer look at the two clinics (clinic E and N) at which only half of the target number of patients were screened per student, showed that students found it difficult/very difficult to recruit patients for TB screening (60% and 50% of students respectively) from the general waiting room of the clinic because (according to students' self reports), the 'patients were uncomfortable and not eager to converse with the students'. Yet, the 60% of students at clinic E found the screening exercise neutral and 75% of students at clinic N found the screening easy/very easy. In addition, most students at both clinics found communication with patients easy (80% and 75%, respectively). All the students at clinic E believed they were adequately trained to perform TB screenings, while only half of students at clinic N though they were adequately trained. Therefore, the low screening rates of patients at clinic E and N seem to be due to the students' difficulty to recruit patients, patients' reluctance to be screened, and

possibly a lack of confidence of some students in their ability to screen a patient for TB. This corresponds with the overall responses from students which revealed that, there was a greater ease of students screening patients for tuberculosis, than when compared to students' recruiting patients for tuberculosis screening. This is most likely due to the fact that the initial step of establishing rapport with patients requires more uncomfortable effort than screening, because at the time of screening patients already agreed and were more open and receptive towards students.

A study conducted by McNair and colleagues (2016), to determine the confidence of medical students in an Australian medical school, in performing clinical tasks revealed that, the confidence of students increased over the course of their clinical trainings, and this was unrelated to the location of the clinical placements (McNair et al., 2016). These findings agree with results from the current research study that the more medical and pharmacy students undertook clinical tasks, the more confident and efficient they became.

In terms of the service learning programme, the intention was to recruit people at the facility that was less likely to be screened for TB through routine clinic practices as well as in locations where TB screening were less likely to be performed. In terms of people at the clinic that was less likely to be screened through routine practices, the students tried to target care-givers and those people accompanying patients to their clinic visit. Students self-report showed that about half of all patients screened did not have clinic files with them. This could indicate those patients were still waiting to be served at reception (although only one student reported screening at reception) or more likely that these people were accompanying other patients who were actually visiting the clinic for a medical reason. This might be an indication that students were able to engage people for TB screening that would routinely not have been a target for routine screening by the clinic. These results are in keeping with the aim of the national Department of Health in South Africa to screen every person for TB annually, starting with those presenting at health care facilities (National Department of Health, 2014).

In terms of the location of screening, the vast majority of students reported that they recruited (89/99 students) and screened (69/99 students) people in the general waiting room, while about a quarter (25/99) of students also recruited and screened (21/99 students) patients from the TB waiting room. This is despite the fact that students were instructed during on campus orientation not to recruit and screen from the TB waiting area of the screening, because these

patients were more likely to already be on TB treatment (diagnosed) or suspect that they might have TB and do not fit the target demographic of the SLiP programme (that is, those patients that would have been missed by the clinic's routine procedures). In contrast, only half (27) of the nurses believed pharmacy students recruited patients from the general waiting room, while 22 nurses believed patients were recruited from the TB room. This misalignment of responses could be explained by the fact that 9 of these nurse respondents were from the clinics (A, H and Q) where the majority of students from these facilities indicated that they recruited patients from the TB waiting room. The misalignment in responses between students and nurses were worse for the TB screening location, with only, 6 nurses (15.8%) from clinics A, C, S, H, L, reporting that patients were screened at the general waiting room, and 16 (42.1%) nurses responded that students screened patients at the private consultation rooms. The researcher believes the accounts given by the students with regards to the recruitment and screening locations were more accurate; and this is because half the nurses reported only orientating students and seeing the students recruit patients and perform TB screenings, but most of them (nurses) were busy with other patients and so, could not stay with the students and really observe them per se, as to give an accurate account of the screenings done.

It is a known fact that stigma associated with HIV/TB within the community remains a barrier to effective patient screening (Airhihenbawu et al., 2009), especially in this screening setting which were mostly the general waiting room of the clinic. A study conducted in Ghana, by Courtwright and Turner (2010) revealed that, TB stigma is one of the major reasons why patients are reluctant to screen for TB. Fear of stigma, can make members of the family of an infected individual hide their status and reject any random TB screening by health workers (Courtwright & Turner, 2010). In addition, concern about the side effects of TB drugs, has been shown to be one of the factors cited by most individuals who refused TB screening (Daftary et al., 2017).

A large percentage of the nurses (25 nurses) believed that the general waiting room of the health care facility was a good venue for the students to recruit and screen patients for tuberculosis. This is in agreement with literature that recommends TB screening to be done at facility reception and administrative areas to allow for patients who cough and with other associated symptoms to be identified by health care workers and be fast tracked through the facility to decrease contact time with patients not showing symptoms (McCarthy et al., 2012). WHO in the year 2013, listed hospital outpatient and inpatient departments, and primary

health care centres as one of the potential sites for TB screening (World Health Organization, 2013).

From the TB screening reports, a total of 210 patients were referred for further TB diagnostic tests, which gave an average referral rate for students of 2.1 patients referred per student. Despite some students performing their TB screening in the TB waiting rooms of some clinics, Pearson's correlation test showed a statistically significant positive correlation between total patients screened and total patients referred to the TB nurse at all sites. This implies that there were comparable referral rates at all service learning sites. However, for future reference, pharmacy students recruiting and screening patients for tuberculosis should do so at the general waiting rooms, because the aim of the TB screening by students should be to screen patients who are less likely to routinely be screened by nurses. In addition, the risks of contracting TB from the patients are higher in the TB waiting room. Indeed, research carried out by van der Westhuizen and Dramowski (2017), showed that poor implementation of TB infection control measures which were reported from South African health care facilities, contributed to TB exposure and development of occupational tuberculosis disease among South African health care workers and health science students. This study showed that, medical students acquired latent TB infection at a rate of 23 cases per 100 persons as a result of working at public health care facilities (van der Westhuizen & Dramowski, 2017).

The high referral rates at some facilities tended to support the students' self-reported referrals, which showed that half of students referred at least one patient to the nurse. Less than half (39.5%) of the participating nurses received patients referred by the students for further TB tests. Of the 11 nurses (8 professional nurses, 2 nursing assistants and 1 staff nurse) (from 9 clinics) who did receive referrals from students, seven nurses indicated they received between one and four referrals and three nurses had more than five referrals. Of the 9 clinics where nurses confirmed they received patient referrals from students, only 3 clinics (A, B and H) were of the high TB referral rate clinics.

5.3 Interaction and communication between pharmacy students and patients

In terms of the student interaction with patients, students seemed to find it easier to communicate with nursing staff than patients, with only about half of students (49%) finding it very easy/easy to communicate with patients. Although it was a small percentage of students who found it difficult to communicate with patients (17.4%), some of the students believed they could not get through to some of the patients due to the language barrier that

existed, lack of appropriate conversational skills on the students' part, and some patients being generally uncooperative. Similarly, a study by Pitkala and Manteranta (2014) relating to the feelings and thoughts of twenty two (22) medical students of the University of Helsinki, relating to their first patient experiences during their clinical year revealed that, the students had very strong emotional experiences. Their first patient interactions involved emotions being described as anxiety, provoking and confusing. Other emotions being reported by the students included a feeling of helplessness, confusion and guilt from believing the patients were being used by them (students) for learning purposes (Pitkala & Manteranta, 2014). In order to improve interactions between patients and clinicians, factors that are believed to influence challenging interactions between patients and practitioners/clinicians in a South African health care setting have been identified and they include but are not limited to; personality traits, cultural and language differences, time pressures, high patient volumes and, degree of training and skill of the students/clinician (Bhikhoo, 2014).

Just less than half of students (46.5%) agreed that it was very easy/easy to recruit patients for TB screening. More students (68.7%) thought it was very easy/easy to screen patients for TB as some of the patients were already informed and educated about TB and TB screening. These results revealed that, students found it more difficult to recruit patients for tuberculosis screening, than the actual screening exercise. This can be easily explained as, it is understandable that after getting over the initial awkwardness, the language barriers, and establishing some level of trust with patients, the students would find it much easier to screen such patients for TB, compared with their first approach with such patients. Similarly, McKennon and Arnold (2016) described the initial apprehension of pharmacy students to engage with patients in a TB screening exercise which comprised of using a Mantoux tuberculin skin sensitivity test, followed by students' surprise to see that the exercise was easier than anticipated. Half of the nurses (50%) agreed that it was easy for the students to recruit patients for tuberculosis, while 20% of the nurses believed it was difficult for students to recruit patients for tuberculosis.

In addition to the TB screening, students were also expected to discuss preventative measures with each patient encountered. About 63.4% of the students believed the TB screenings had a beneficial impact on the patients screened because; they thought the patients learnt more about TB. Literature agrees that patient education about TB is an important need in South Africa as, a study conducted by Edginton and colleagues (2005) at Chris Hani Baragwanath

hospital in Johannesburg, South Africa revealed that, half of the patients (51%) diagnosed and treated for TB did not know the causes of TB and half of patients referred to other clinics for continuation of their TB treatment defaulted, because they had no idea they had to take further treatments (Edginton et al., 2005). In alignment with the students self-report of their perceived effective TB education in this study, TB education for secondary school students performed by medical students from the Bharati Vidyapeeth Deemed University medical college (BVDUMC), Pune revealed improved the knowledge of school students regarding TB (Gothankar, 2013). This was determined by giving the students tests before and after the session, to determine their knowledge of TB, and the study showed that, the mean post-test scores of the students were higher than the pre-test scores.

Out of the 11 nurses who received patients referred to them by students, five nurses believed the referred patients were well informed by the students, two nurses were not too sure if any of the patients referred were counseled by students, and four nurses thought the referred patients were not counseled by students. This result can be compared with, and explained by the submission of the students regarding their preparedness towards the SLiP TB screenings. The majority of the students (63.4%) believed they were adequately trained and prepared for conducting tuberculosis screening on patients, while 18.3% of the students believed they were not adequately trained to perform such activities. This is aligned well with nurses' opinions as most (60.1%) believed students were well prepared for the TB screening, 26.1% of the nurses were unsure, 8.7% of the nurses admitted the students were not prepared enough for TB screening, and 4.3% of nurses believed more student preparation should be done.

5.4 Students' and nurses' interactions and perceived outcomes of the service learning programme

Nurses (n = 33) classified their interactions with students at the facilities as follows; 19 (50%) nurses orientated the students prior to the TB screening exercise, 10 (26.3%) nurses received referred patients from students for further screening and TB diagnostic tests, while 4 (10.5%) nurses interacted and assisted the students in general. The previously mentioned lack of alignment of responses between the nurses and the students, especially the location of recruitment and screening leaves questions about the quantity and quality of interaction between the students and the nurses. Yet, most (69.7%) students found it very easy/easy to communicate with the nursing staff. Although it is challenging to define the actual interaction

between nurses and pharmacy students from the results, literature has reported that role understanding between professions can be enhanced by having students of one profession shadow another profession to improve understanding of that profession's role on the health care team (Monahan et al., 2018). Academic health centres and related institutions are therefore encouraged to engage in interdisciplinary education to foster educational teamwork and cooperation amongst health professionals (Hudson & Croker, 2018).There should be an easy flow of communication between pharmacists/ pharmacy students and nurses so that there would be a synergistic relationship between all those who contribute to a patient's well-being (Hudson & Croker, 2018). This would then change the former narrative of healthcare of being a body of knowledge and techniques that eliminate disease in the society to that which maintains the health and well-being of the population (Hudson & Croker, 2018).

Students' opinions were divided regarding whether the TB screenings done by them had a positive effect on the nursing staff at the health care facilities. About 38.4% of the students believed their TB screenings helped in terms of reduced workload and time saved (as nurses would not need to screen these patients for TB), 32.3% believed it did not help, and 29.3% were unsure if the SLiP TB programme helped the nurses as they believed TB screenings were a normal part of the clinic's routine and were unsure if the patients screened and referred to the nurses by the students got the needed care. Although difficult to quantify in this study, research by Wilbur and Kelly (2015), which compared the inter-professional impressions among undergraduate nursing and pharmacy students of the University of Qatar college of pharmacy and the University of Calgary nursing programme revealed that, pharmacists working alongside nurses in the clinic reduced the workload of nurses in the area of educating and counselling patients. In late 2012, the Washington state department of Health services programme, and the Washington state pharmacy association teamed up to offer training for pharmacy practitioners to become certified in TB screening (Young, 2013). The goal was to increase the number of pharmacies throughout Washington that offer TB screenings. Pharmacy students from the University of Washington played an important role in this goal, as they also received certification in TB screening, as part of their PharmD curriculum (Young, 2013). Research from studies conducted in the United States of America in the year 2012 showed that TB screenings conducted by second year pharmacy students in public healthcare facilities were found to be a valuable resource, as they were an added manpower in light of budget cuts to publicly funded TB screening programs in the state and

therefore, public health agencies are increasingly relying on pharmacists and other healthcare providers to screen for TB (Young, 2013).

In terms of students learning, both nurse and student participants believed the SLiP TB programme improved students' knowledge about TB, provided more clinical experience, and improved their communication skills. These results corresponds with research conducted by McKennon and Arnold (2016), about pharmacy students at the University of Washington conducting TB screenings and the impact the exercise had on students. The study showed that pharmacy students' knowledge regarding TB significantly improved, with improved application of therapeutics infection disease knowledge. In terms of communication skills, a TB health education program helped the medical students acquire greater communication skills (Gothankar, 2013). Similarly, in terms of gaining more clinical experience, research conducted by Vesta and colleagues (2005) which looked into the perspectives of pharmacy students of the college of pharmacy, University of Oklahoma on the value of taking call duties with the medical team of the University teaching hospital revealed that, participating in call duties while still undergraduates provided a unique opportunities for students to learn about disease states, and build professional relationships with other healthcare professionals. This research showed that, this experience incorporates professional development into pharmacy education (Vesta et al., 2005).

5.5 Recommendations for the improvement of the service learning programme

In order to improve the TB SLiP programme and maximize benefits, 28.6% of nurses suggested that in addition to the TB screenings done by students, they could also give health talks and outreaches in the community on TB. This is in accordance to the National Tuberculosis Management Guidelines (2014) that stipulates that increasing community awareness of TB symptoms will cause more persons with TB symptoms to present earlier to a health care facility for investigation for TB. One of the nurses believed going out of the health care facility (the community) to recruit and screen patients was the most ideal. Although the effectiveness of screening house to house by community healthcare workers has been reported, these community healthcare workers were known to the community, which may have contributed to the high consent rate from the community concerning tuberculosis screening. A similar intervention by pharmacy students might not give the same results.

In addition, seven nurses (25%) reported that more student interaction with patients was needed as they believed more should be done in terms of patient TB education and awareness. A research by Littlewood and colleagues (2005), which explored the quality of educational benefit of early experience of medical students between 1992 to 2001 from comparative studies revealed that, early patient experience improved students' ability to relate to patients and communicate empathy. Early practical experience strengthens health professional students' affective and cognitive learning and made the students more confident to meet and interview patients (Littlewood et al., 2005).

Five nurses (17.9%) believed that students should help more in the pharmacy. This is in accordance with the typical daily activities of both private and public hospital pharmacists, which are reportedly dominated by medication dispensing and stock control (Gray, 2016). Other daily tasks of pharmacists vary by institution and may include activities such as extraporaneous compounds, cytotoxic and other sterile admixture services, ward rounds, patient education, training of health care professionals and medication safety monitoring (Gray, 2016). In addition, pharmaceutical services in public health care facilities tend to operate vertically and the high patient load resulted in pharmacists adopting a product-centred role through mechanical dispensing, stock control and management, and being perceived as medicine suppliers (Bheekie & Bradley 2016). The foregoing literature thus confirms the perception from the nurses in this study that students should help in the pharmacy.

In contrast, another group of nurses interviewed in this research, suggested more clinically-based activities for pharmacy students at the clinics, which included observing procedures in the clinics, conducting TB tests and interpreting the results and conducting cardio-vascular disease and diabetes screenings. In England, the pharmacists' role has expanded to provide enhanced patient services, integrating into general practice (GP) settings and working more closely as a member of the health care team (Silvaggi et al., 2016). However, despite the potential benefits of integrating clinical pharmacists into general practitioners' setting, the experiences of the pharmacists and other members of the health care team are yet to be explored (Silvaggi et al., 2016).

One nurse proposed that the SLiP clinical hours be extended, as she believed students would learn more and help out in the clinic more when students stay longer. In accordance with this suggestion, two strategies used to align the priorities of health professional institutions with those of the local populations have been suggested and include service learning through

community placements, and, more recently, longitudinal integrated clerkships (LIC), which places students for a prolonged periods in communities and has shown better outcomes (Reeve et al., 2017). There is also some evidence that having most undergraduate training taking place in the community or community health units rather than on campus and in teaching hospitals leads to more competent graduates (Reeve et al., 2017). It has been shown that community based training leads to positive student clinical learning experiences, and at least short term attitudinal changed towards general practice and /or community service (Reeve et al., 2017).

Another nurse recommended that the Fridays be changed to Mondays since more patients came to the clinics on Mondays. Indeed, a student also noted that the clinic where s/he was assigned to had no patients in attendance as that particular day (Friday) were reserved only for immunization of babies. These results might indicate that clinics which had a lower patient per student average would need less students to be posted for the SLiP TB screening and need to be further investigated for the causes, and ways for better outcomes.

5.6 Limitations of the study

The results of this study are primarily based on self-report by pharmacy student and nurses, and therefore are not entirely objective. The researcher could not get access to patient files, to see if the patients referred to the nurses for further TB tests got tested, and what the results were. This would have shown the percentage of the patients that were diagnosed with tuberculosis and hence, caught and treated early due to the SLiP TB exercise.

The researcher could not get the patients' opinions and thoughts about the students being TB screeners, if they (patients) thought they gained anything from the SLiP TB screening exercise, and if they had any advice or recommendations for the students. This was due to the fact that, the researcher was not present during the SLiP TB exercise, and so could not interview the exact patients met by the students. Not interacting with patients was a limitation in this study and should be included in future studies at evaluate the SLiP TB programme.

The student and nurse responses could not really be directly correlated; because nurses' participation was not spread evenly amongst the 19 participating clinics as was the student responses. Access for research was not given to the researcher for two clinics hence, the views and opinions of the nursing staff at those clinics could not be obtained.

The self-administered questionnaire of the nurses left many questions blank, or did not explain some of the answers very clearly. The actual interaction between pharmacy students and nurses could not be clearly defined.

CHAPTER SIX

CONCLUSIONS

This research aimed to evaluate the implementation of the TB screening aspect of the second year service learning programme, based on the perceptions of the participating students and nurses, and students' TB screening reports; and also to find out the perceived impact of the TB screening aspect of the second year SLiP programme on the patients' health education, the nurses' workload, and on the students' learning and skills development at the various PHC facilities. This was determined by means of a questionnaire drafted, and given to the second year students and nurses of the various PHC facilities where students conducted the TB screenings. It can be concluded that he implementation of this programme was relatively successful in terms of the number of patients that were screened, which came to 90 percent of the initial target of 15 patients per student.

The TB screening reports by the students showed that, a total of one thousand, three hundred and twenty three (1323) patients were screened for tuberculosis by the ninety eight (98) pharmacy students, at nineteen (19) health care facilities, and out of this number, two hundred and ten (210) patients were referred to the nurses, for follow up TB diagnostic tests. This meant 15.9% of the patients screened were referred, and this is a good thing as these patients may have gone through undetected, and eventually come down with tuberculosis.

Almost half (46.5%) of the students found recruiting patients for screening easy, and believed this was because patients were willing to get screened for TB, and nurses at the facilities helped. The rest of the students didn't find it easy to recruit patients for screening as they felt the patients were being impatient and disagreeable with them, and also some students could not converse well with patients due to a language barrier. After the recruitment process was done, a larger percent (68.7%) found the TB screening process easy, and this was attributed to the fact that, patients became more relaxed after getting educated about TB and the benefits of screening for TB. About half of the students reported that communication with patients was easy, during the screening exercise, but more students (69%) found communication with nurses easy. Majority of the students recruited and screened patients for TB at the general waiting room of clinics, and this was the most idea place to recruit patients from, although the screening process would have been better being done at private

consultation rooms, so as to afford the patients some privacy (although a few of the students did screen patients at private consultation rooms). Majority (86.1%) of the nurses admitted not being sure if enough or any routine TB screening was being done by nurses at the heath care facilities. Most of the nurses agreed with the students' reported ease or unease of recruitment and screening of patients, but only half (50%) of the nurses believed students recruited patients from the general waiting room; almost half (40.1%) of nurses believed students went to the TB room, to recruit patients for screening.

At the end of the TB screening exercises, about one-third of students believed they had an impact on the staff of the facility as they felt the TB screenings done by them lessened the workload of the nurses. Most of the students (60.2%) believed the TB screenings done by them, benefitted the patients as they got more knowledge about TB, and some of the patients referred to the nurses may have been found out to have TB hence, prompting early treatment and better outcomes. Almost one-third of the nurses confirmed receiving patients referred by the students for further TB diagnostic tests, and admitted the patients referred were well counselled by the students.

More than two-thirds (78%) of the students acknoweged the SLiP TB screenings benefitted them as regards more clinical experience, more TB knowledge and improved communication skills. About 18.3% of the students believed they were not adequately trained enough, to perform TB screenings at the various healthcare facilities while majority (63.4%) of students believed they were. More than half of the nurses believed students were well prepared for the SLiP TB screening exercise, and believed the students got a lot of clinical experience and a improved knowledge about TB. About one-fourth of the nurses recommended that the SLiP TB screening exercise be extended to the community at large, with the inclusion of health talks and outreaches.

The methodology used in this study (descriptive qualitative research method) was effective in answering the research questions, as the questionnaires used in the survey were constructed to directly ask those questions (open ended and multiple choice), and get the detailed responses. The researcher's approach to the study complemented the desired excepted outcomes of the research.

There are limitations in this research, and they are due to the fact that the patients' views about the TB screenings conducted on them by the students were not documented, and also, the feedback on the outcomes of the patients referred to the nurses for TB diagnostic tests

were not gotten, to see if the students' instincts and referrals were correct. Also, the nurses' completion of the questionnaires were brief and not detailed to satisfaction.

Further research on the effect of the SLiP programme on students and the community should be done, be more specific, and not limited only to the TB screenings conducted by the second year pharmacy students, so as to ensure social accountability of the pharmacy school. Also, research into if any of the other school of Pharmacy across South Africa has service-learning as part of their curriculum and if not, recommendations made for the inclusion. The researcher also recommends that TB screenings be done by the students in communities, as outreach programmes, as part of efforts to make students socially accountable. Also, for future research the data collection method for nurses should be interviews, which would probe actual interaction of nurses with pharmacy students, and the perception of nurses on the role of pharmacists.

This study has indeed revealed the perceptions of the students and nurses towards the SLiP TB programme, revealed the outcome of the SLiP TB exercise, on the health care system (nurses), the community (patients) and the pharmacy students (improved clinical skills and TB knowledge). This study showed that with the correct preparation, second year pharmacy students can contribute to conducting TB screenings in PHC facilities. This research also addresses the problem of pharmacists being restricted to certain roles of drug dispensing only, by revealing that pharmacy students (and pharmacists) can take a more active role in the control of TB, by screening patients for tuberculosis.

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APPENDIX

Appendix 1: Questionnaire for second-year pharmacy students

Ms AdeleyeAdeola T.Tel: 083 681 3386
Dr Mea van Huyssteen Tel: 0219592864
School of Pharmacy, University of the Western Cape, Robert Sobukwe Road, Bellville, Cape Town, 7535

Service learning in pharmacy: Evaluation of tuberculosis screening by pharmacy students in public sector primary health care facilities.

1. **Unique identifier:** _____

Instructions: Please tick in the appropriate boxes or complete answers in the space provided.

1. Gender Male ☐ Female ☐

2. Student's first language (mother tongue)
- Afrikaans ☐
- English ☐
- isiXhosa ☐
- Other (please specify) _____

3. Name of primary health care facility _____

4. Total number of patients screened for TB (by student alone)
- More than 15 ☐
- About 15 ☐
- Less than 15 ☐

5. Of the patients that you screening, how many did not have a patient file (by student alone)
- Most of them ☐
- About half of patients ☐
- Very few did not have files ☐

6. **Total number of patients referred to the TB nurse for TB test (by student alone)**
   More than or equal to 5 ☐
   About 1-4 ☐
   None ☐

7. **Where did you recruit patients from for TB screenings?**
   General waiting room ☐
   TB waiting room ☐
   Other (please specify) _____

8. **How did you decide which patients to screen?**

_____

_____

_____

_____

9. **Where did you conduct the TB screenings**
   General waiting room ☐
   Private consultation room ☐
   TB waiting room ☐
   Other (please specify) _____

10. **On a scale of 1 to 5, where 1 is very easy and 5 is very difficult; How easy was it to recruit patients for screening?***(please tick the appropriate box)*
    1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐

11. **Why do you think this was so?**

_____

_____

_____

_____

12. **On a scale of 1 to 5, where 1 is very easy and 5 is very difficult; How easy was it to screen patients for TB?***(please tick the appropriate box)*
    1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐

_____

13. **On a scale of 1 to 5, where 1 is very easy and 5 is very difficult; How easy was it to communicate with patients?***(please tick the appropriate box)*
    1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐

14. **On a scale of 1 to 5, where 1 is very easy and 5 is very difficult; How easy was it to communicate with the nursing staff?***(please tick the appropriate box)*
    1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐

15. Do you think your TB screening helped the staff at the facility?

Yes ☐
No ☐
Maybe ☐

16. Please elaborate on your answer in 15.

17. Do you think your TB screening helped the patients at the facility?

Yes ☐
No ☐
Maybe ☐

18 How do you think the TB screening helped / did not help patients

19. Do you feel you were adequately trained to do TB screening at the facility?

Yes ☐
No ☐
Maybe ☐

20 What advice do you have for the service learning staff in campus?

21. Do you think you have learnt anything from doing TB screenings at the facility?

Yes ☐
No ☐
Maybe ☐

22. Please elaborate on your answer in 21..

Thank you for taking the time to participate in this study.

Your feedback is valuable to us.

Appendix 2: Study information sheet

Ms AdeleyeAdeola T.Tel: 083 681 3386
Dr Mea van Huyssteen Tel: 0219592864
School of Pharmacy, University of the Western Cape, Robert Sobukwe Road, Bellville, Cape Town, 7535

Service learning in pharmacy: Evaluation of tuberculosis screening by pharmacy students in public sector primary health care facilities.

Study information sheet

Introduction

I would like to invite you to participate in a research study conducted by Ms. Adeleye Adeola Temitope, a masters student from the School of Pharmacy at the University of the Western Cape. The study is called: **Service learning in pharmacy: Evaluation of tuberculosis screening by pharmacy students in public sector primary health care facilities.**

Before you decide whether to participate or not in this study, I would like to tell you about the study and answer any questions that you have. If you agree to participate, you will be asked to sign a consent form. You will also be given a copy of this information sheet to keep for your own records.

Please note that you participation is voluntary and you may choose to withdraw from the study at any time. There will be no negative consequences if you choose not to participate.

Purpose of the study

I am interested to know how pharmacy students and nurses view the TB screenings done in the various primary health care facilities around the Western Cape as part of the service-learning programme of the school of Pharmacy at the University of the Western Cape.

Procedures

Data collection for this study will be done through self administered questionnaires for the second year pharmacy students and nursing staff at the primary health care facilities visited by the students.

Risks

We do not think there will be any risks for you in participating in this study.

Benefits

There will be no direct benefit for you from participating in this study. Participation is voluntary and you will not be paid for your time.

Confidentiality

All the information you provide us with will be kept confidential. We will not mention your name in any reports from this study. Study materials will be kept in a secure location where only the senior investigators will have access to it. The rest of the study materials will be destroyed after five years.

Voluntary participation

You do not have to take part in this study, your decision to take part in the study or not will not affect your interactions with UWC and the School of Pharmacy in any way. You can choose to withdraw from the study at any time. If you wish to take part in the study you will have to sign the consent form and indicate which data collection options you would provide the researchers access to.

Contact information

If you have any questions you can ask them now, or,
If you agree to participate in the study and you have more questions at a later time, you can contact:
Ms Adeleye Adeola T.
Pharmacy building, ground floor, Pharmacy practice laboratory School of Pharmacy, University of the Western Cape, Robert Sobukwe Road, Belville
Tel: 083 681 3386
Email: Adeleyeadeola12@yahoo.co.uk

OR
Dr Mea van Huyssteen
Pharmacy building, First floor Room F6, School of Pharmacy, University of the Western Cape, Robert Sobukwe Road, Bellville, 7535, South Africa.
Tel: +2721 9592864

The committee giving ethical approval for this study is the UWC Biomedical Research Ethics Committee. The biomedical research ethics administration is available in the Research Office in the New Arts Building, C-Block, Top Floor, Room 28 at the University of the Western Cape, Robert Sobukwe Road, Bellville, South Africa. If you have any problems or questions about this study you can also contact the Ethics committee directly at telephone number 021 9593170.

Appendix 3: Informed consent form

Ms AdeleyeAdeola T.Tel: 083 681 3386
Dr Mea van Huyssteen Tel: 0219592864
School of Pharmacy, University of the Western Cape, Robert Sobukwe Road, Bellville, Cape Town, 7535

Service learning in pharmacy: Evaluation of tuberculosis screening by pharmacy students in public sector primary health care facilities.

Consent form

Date:_____

Student _____ Nurse _____ (please select as appropriate)

Unique ID:_____

1. I agree to provide the necessary information
2. The purpose of the study has been explained to me and I understand the objectives.
3. I have been provided with an information sheet on this study.
4. I understand that I can withdraw my participation at any time.
5. Tick in the case of a nurse interview: I give permission for the interview to be audio recorded.
6. I understand that my interactions with UWC, School of Pharmacy will not be affected by my decision to participate in this study or not.
7. I understand that I will not be identified in any reports or presentations emanating from this study.
8. I understand that any information I provide for the study will be kept secure by the researchers and destroyed after five years of research reports being written.
9. The researchers have my permission to use information given by me, as long as I cannot be identified by name or through background information.

Signature (participant):_____

Date:_____

Signature (person taking consent):_____

Date:_____

The committee giving ethical approval for this study is the UWC Biomedical Research Ethics Committee. The biomedical research ethics administration is available in the Research Office in the New Arts Building, C-Block, Top Floor, Room 28 at the University of the Western Cape, Robert Sobukwe Road, Bellville, South Africa. If you have any problems or questions about this study you can also contact the Ethics committee directly at telephone number 021 9593170.

Appendix 4: Questionnaire for the nurses

Ms AdeleyeAdeola T.Tel: 083 681 3386
Dr Mea van Huyssteen Tel: 0219592864
School of Pharmacy, University of the Western Cape, Robert Sobukwe Road, Bellville, Cape Town, 7535

Service learning in pharmacy: Evaluation of tuberculosis screening by pharmacy students in public sector primary health care facilities.

Unique ID:_____

Instructions: Please tick in the appropriate boxes or complete answers in the space provided.

1. Gender Male ☐ Female ☐

2. Nurse's first language (mother tongue)
Afrikaans ☐
English ☐
isiXhosa ☐
Other (please specify) _____

3. Name of primary health care facility _____

4. Job title
Clinical nurse practitioner ☐
Professional nurse ☐
Staff nurse ☐
Other (please specify) _____

5. Years of practice
1-2 years ☐
3-5 years ☐
More than 5 years ☐

6. Role at facility
Facility manager ☐
TB nurse ☐
Other (please specify) _____

8. How did you routinely conduct TB screening at your facility and d you think

enough TB screening is being done?

8. **Describe your interaction with pharmacy students when they are at the facility to screen patients for TB.**
   I orientate students ☐
   I am the nurse patients are referred to ☐
   Other (or elaborate on your role) _____

9. **Where did the pharmacy students recruit patients from for TB screenings?**
   General waiting room ☐
   TB waiting room ☐
   Other (please specify) _____

10. **Do you think this is a good place in the facility to recruit patient for TB screening?**
    Yes ☐
    No ☐
    Maybe ☐

11. **Please elaborate on your answer in 10.**

12. **Where did the pharmacy students conduct the TB screenings?**
    General waiting room ☐
    Private consultation room ☐
    TB waiting room ☐
    Other (please specify) _____

13. **On a scale of 1 to 5, where 1 is very easy and 5 is very difficult; How easy do you think it was for pharmacy students to recruit patients for TB screening?***(please tick the appropriate box)*
    1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐

14. **Did you receive any patients who were referred by students TB sputum tests?**
    Yes ☐
    No ☐
    Maybe ☐

15. If yes to a question 14, how many patients were referred to the TB nurse for a TB test?

More than or equal to 5	☐
About 1-4	☐
None	☐

16. If yes to question 14; How well informed about TB prevention was the patients referred by the students, could you pick up on any counseling done by students?

17. What is your view on the effectiveness of TB screening done by pharmacy students; how well prepared was the students, impact on services / patients?

20. What do you think pharmacy students learnt from this TB screening exercise?

20 What else do you suggest pharmacy students so at your facility?

Thank you for taking the time to participate in this study.

Your feedback is valuable to us.

Appendix 5: Data collection tool for students

Ms AdeleyeAdeola T.Tel: 083 681 3386
Dr Mea van Huyssteen Tel: 0219592864
School of Pharmacy, University of the Western Cape, Robert Sobukwe Road, Bellville, Cape Town, 7535

Patient folder	**Has folder**						
	No folder						
Date of birth							
Gender	**M**						
	F						
Previous TB	**Y**						
	N						
Treatment outcome	**cure**						
	complete						
	default						
Previous MDR-TB	**Y**						
	N						
TB contact	**Y**						
	N						
MDR/XDR contact	**Y**						
	N						
Exposure risk	**Health worker**						
	Prisoner						
	Mines/..						
	Other						
Cough > 2 weeks	**Y**						
	N						
Night Sweats	**Y**						
	N						
Blood in sputum	**Y**						
	N						
Weight loss	**Y**						
	N						
Fever > 2 weeks	**Y**						

	N						
Chest Pain	**Y**						
	N						
Referred to Nurse	**Y**						
	N						
HIV status	**Unknown / HIV-**						
	HIV+						
	HIV+ on ART						
Referred for HCT	**Y**						
	N						

Appendix 6: Ethical clearance approval

UNIVERSITY of the WESTERN CAPE

OFFICE OF THE DIRECTOR: RESEARCH
RESEARCH AND INNOVATION DIVISION

Private Bag X17, Bellville 7535
South Africa
T: +27 21 959 2988/2948
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07 November 2016

Ms A Adeika, Dr M van Huyssteen, Dr R Coetzee and Prof A Bheekie
School of Pharmacy
Faculty of Sciences

Ethics Reference Number: BM/16/4/08

Project Title: Service learning in pharmacy: Evaluation of tuberculosis screening by pharmacy students in primary health care facilities.

Approval Period: 03 November 2016 – 03 November 2017

I hereby certify that the Biomedical Science Research Ethics Committee of the University of the Western Cape approved the scientific methodology and ethics of the above mentioned research project.

Any amendments, extension or other modifications to the protocol must be submitted to the Ethics Committee for approval. Please remember to submit a progress report in good time for annual renewal.

The Committee must be informed of any serious adverse event and/or termination of the study.

Ms Patricia Josias
Research Ethics Committee Officer
University of the Western Cape

PROVISIONAL REC NUMBER -130416-050

FROM HOPE TO ACTION THROUGH KNOWLEDGE

Appendix 7: Ethical clearance approval

CITY OF CAPE TOWN
ISIXEKO SASEKAPA
STAD KAAPSTAD

CITY HEALTH

Dr Hélène Visser
Manager: Specialised Health

T: 021 400 3981 F: 021 42 4894 M: 085 298 5715
E: Helene.Visser@capetown.gov.za

2016-11-21

Re: Research Request: Service learning in pharmacy: Evaluation of tuberculosis screening by pharmacy students in public sector primary health care facilities (7754)

Dear Dr van Huyssteen,

Your research has been approved as per your research protocol.

Northern Sub District:	Bloekombos, Brackenfell, Brighton, Harmonie, Fisantekraal, Northpine and Wallacedene Clinics
Contact people	Dr A Zimba (Sub District Manager) Tel/Cell: (021) 980-1230 / 084 627 2425 Mrs J Coetzee (Head: PHC & Programmes) Tel/Cell: (021) 980-1211
Tygerberg Sub District:	Adriaanse, Delft South, Elsies River, Netreg, Ravensmead, Kasselsvlei Parow, St Vincent, Uitsig and Valhalla Park Clinics
Contact People:	Mrs M Alexander (Sub District Manager) Tel: (021) 938-8279 / 084 222 1471 Mrs D Titus (Head: PHC & Programmes) Tel: (021) 938-8281 / 084 308 0598

Please note the following:

1. All individual patient information obtained must be kept confidential.
2. Access to the clinics and its patients must be arranged with the relevant Managers such that normal activities are not disrupted.
3. A copy of the final report must be sent to the City Health Head Office, P O Box 2815 Cape Town 8001, within 6 months of its completion and feedback must also be given to the clinics involved
4. Your project has been given an ID Number (7754). Please use this in any future correspondence with us.

Thank you for your co-operation and please contact me if you require any further information or assistance.

Yours sincerely

DR G H VISSER
MANAGER: SPECIALISED HEALTH

cc. Dr Zimba & Ms Coetzee
Mrs Alexander & Ms Titus
Dr Jennings
Ms J Caldwell