ACCEPTABILITY OF ISONIAZID PREVENTIVE THERAPY AMONG HEALTH CARE PROVIDERS IN SELECTED HIV CLINICS IN NAIROBI COUNTY, KENYA

BY

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DECLARATION

I Elvis Omondi Achach Wambiya declare that this research report is my own, unaided work. It is being submitted in partial fulfilment of the requirements for the Degree of Master of Science in Epidemiology (Field of Implementation Science) at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at this or any other University.

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Date: …25/01/2018……

DEDICATION

This work is dedicated to my parents, Mr. Paschal Wambiya and Mrs. Violet Wambiya for their continued love, support, encouragement, prayers and belief in me. This has been fundamental to my academic growth and success.

ABSTRACT

Background:

HIV/TB co-infection causes high morbidity and mortality among people living with HIV and places immense burden to health systems in developing settings. Isoniazid Preventive Therapy (IPT) is recognised as one of the most effective means of reducing TB burden in PLHIV yet its implementation still remains suboptimal, especially in sub-Saharan Africa. IPT implementation in Kenya (a high HIV/TB burden country) remains sub-optimal and little is known about the factors that influence its implementation. Data is also limited on the acceptability of IPT among health care providers in this context. This study assessed the factors influencing the acceptability of IPT among health care providers in selected HIV clinics in Nairobi County, Kenya.

Methods:

The study employed a cross-sectional design with an exploratory sequential mixed methods approach whereby a qualitative study was conducted followed by a quantitative survey. It was conducted in the HIV clinics of three purposively selected public health facilities. Qualitative data were collected through in-depth interviews with 18 purposively selected health care providers while quantitative data was collected from all health care providers in the clinics (74). Qualitative data on factors influencing IPT acceptability were analysed thematically and guided the development of the quantitative tool. An acceptability score was developed from nine items guided by four constructs of the Theoretical Framework for Acceptability. Explanatory variables were generated by grouping questionnaire items that assessed factors affecting acceptability. Multivariable linear regression analysis was performed to assess the relationship between the hypothesised factors and the acceptability scores.

Results

The qualitative inquiry found that policy and guideline-related, provider-related, patient-related, intervention-related, structural and operational factors influenced the acceptability of IPT among health care providers. The overall mean acceptability score in the study population was 70.33% (SD: 12.79) which was categorized as moderate. The health care providers did not find the intervention fully comfortable, agreeable or satisfactory to use. Among the determinants of acceptability of IPT, patient-related: model coefficient 5.12 (95% CI -0.39 – 10.63; P=0.050) and intervention-related: model coefficient 6.72 (95% CI 3.42–10.01; P=0.000) factors were significantly associated with the acceptability scores in the quantitative analysis. An increase in the average composite score of these factors increased the acceptability score on average. Patient-related factors included patients' adherence to IPT, pill burden, information on IPT, development of severe side-effects, refusal of IPT medication, clinical state and drug regimen. Intervention-related factors included INH resistance, side-effects and deaths, effectiveness of IPT, procedure of IPT related activities.

Conclusion

IPT was generally not fully acceptable among health care providers and was influenced by a number of different contextual factors. Among these, patient-related and intervention-related factors were important factors that affected the acceptability of IPT in the context of the three clinics. The promotion of evidence-based awareness and enforcement of implementation guidelines by policy makers and program managers are required to improve the acceptability of IPT among health care providers in the HIV clinics.

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DEFINITION OF TERMS

1. **Acceptability:** The perception among implementation stakeholders that a given treatment, service, practice or innovation is agreeable, palatable or satisfactory.

2. **Health Care Provider:** This refers to clinicians, nurses, pharmacists, counsellors, peer educators, nutritionists and laboratory staff who are involved in providing care at the HIV clinics in the selected health facilities.

3. **Innovation:** Newly introduced promotion and preventive approaches. This can also refer to a program or an intervention. For example, IPT.

4. **Isoniazid:** Is an antibiotic used as a first-line agent for the prevention and treatment of both latent and active tuberculosis. It is also known as isonicotinylhydrazide.

5. **Quality implementation**: Putting an innovation into practice in such a way that it meets the necessary standards to achieve the innovation's desired outcomes.

6. **Frontline providers:** These are health care providers who are involved in prescription and/or dispensation of IPT medication to the patients at the facilities.

7. **Non frontline providers:** These are health care providers who are not directly involved in prescription and/or dispensation of IPT medication to the patients at the facilities but are involved in the IPT programme and provision of care to PLHIV.

8. **Innovation climate for implementation:** The extent to which an organization values and rewards the evidence-based practice or innovation

LIST OF ABBREVIATIONS

AIDS	Acquired Immune Deficiency Syndrome
AMPATH	Academic model providing Access to healthcare
AMREF	African Medical and Research Foundation
ART	Anti-retroviral Therapy
ARVs	Anti-retroviral drugs
CCC	Comprehensive Care Centre (used interchangeably with HIV clinic)
CFIR	Consolidated framework for implementation research
CME	Continuous Medical Education
CTXp	Co-trimoxazole prophylaxis
ERC	Ethics and Research Committee
GOK	Government of Kenya
HIV	Human immune-deficiency Virus
HREC	Human Research Ethics Committee
ICF	Intensified Case Finding
INH	Isoniazid
IPT	Isoniazid Preventive Therapy
KNH	Kenyatta National Hospital
MDR-TB	Multi-drug Resistant Tuberculosis
mRDTs	Malaria Rapid Diagnostic Tests
MSF	Médicins Sans Frontières
NASCOP	National AIDS & STI control programme
NIRN	National Implementation Research Network
NTLD-Program	National TB, Leprosy and Lung Disease program
PEPFAR	US Presidents Emergency program for AIDS Relief
PLHIV	People Living With HIV

RHZE	Anti-TB drugs containing Rifampicin, Isoniazid, Pyrazinamide and ethambutal
SOPs	Standard operating procedures
TB	Tuberculosis
TB/HIV or HIV/TB	Co-infection with HIV and TB
TFA	Theoretical Framework for Acceptability
TST	Tuberculin Skin Test
TST	Tuberculin Skin Test
UNAIDS	The Joint United Nations Programme on HIV/AIDS
USAID	United States Agency for International Development
WHO	World Health Organization
XDR-TB	Extensively drug-resistant TB

CHAPTER ONE: INTRODUCTION

1.0. INTRODUCTION OF CHAPTER

This chapter gives background information and puts the study into context. The overall aim and objectives of the study are presented. In the literature review, the intervention IPT is introduced as well as the concept of acceptability as an implementation outcome. Furthermore, a review of the literature around the topic, pertinent issues and identified gaps are discussed. The chapter ends by presentation of the adapted conceptual framework used.

1.1. BACKGROUND

According to the World Health Organization (WHO) global tuberculosis report 2015, among the 9.6 million people infected with tuberculosis (TB) in 2014, 1.2 million were also co-infected with human immunodeficiency virus (HIV) (1). People living with HIV (PLHIV) are about 20 to 30 times more likely to develop active TB compared to people without HIV. Moreover, TB is the leading cause of death among PLHIV, and in 2015, one in three deaths in PLHIV was attributed to tuberculosis (1). The HIV/TB co-infection burden is heaviest in Africa which accounts for 74% of cases globally (1).

Kenya features on the WHO high burden country list for TB, HIV/TB co-infection and multi-drug resistant tuberculosis (MDR-TB) (2). TB, the 4th leading cause of death in Kenya, is a major cause of morbidity with approximately 90,000 cases notified in 2014, 9.2% of them being children. Nairobi County emerged with the highest number of cases at 13,917, 7.2% of them being children (3, 4). The Ministry of Health National TB, Leprosy and Lung Disease program (NTLD-Program) in their 2014 report indicated that TB deaths in PLHIV were increasing while deaths among those who are TB negative remained constant at around 4% (4). This is despite the global decline in mortality due to HIV associated TB (4).

To reduce the burden of TB among people living with HIV, the WHO recommends three interventions which are: intensified TB case-finding, isoniazid preventive therapy (IPT) and infection control for TB, collectively termed the three (3) Is for TB prevention (5, 6). These interventions are intended to be delivered in an integrated manner in both TB and HIV prevalent settings (6). The WHO encourages the integration of TB and HIV services and studies in sub-Saharan Africa have shown that integrated TB and HIV activities lead to improvements in TB treatment completion, improved case findings and reduced TB mortality (7, 8).

Isoniazid preventive therapy is recognised as an important component of collaborative TB and HIV activities to reduce the burden of TB in PLHIV (6). IPT is the provision of isoniazid (INH) tablets by health care providers to PLHIV who are TB negative or have latent TB. The dose varies between 5mg/kg for children to 300 mg/kg for adults (9, 10). This preventive therapy is evidence-based with proven effectiveness of reducing the risk of TB in PLHIV by 33-62% (11). The WHO 2011 guidelines for intensified tuberculosis case-finding and isoniazid preventive therapy for PLHIV in resource constrained settings strongly recommended at least 6 months of IPT for children and adults including pregnant women, PLHIV, those receiving anti-retroviral therapy (ART) and those who have successfully completed TB treatment (12). In areas of high prevalence and transmission of TB among PLHIV, IPT is conditionally recommended for a period of 36 months as a proxy for lifelong or continuous treatment (12).

Kenya has adopted the collaborative TB/HIV services according to international and national guidelines and has been considered a leader in implementing recommended WHO TB/HIV collaborative activities (3, 4, 13). By 2014 IPT was being administered in select health facilities and was scaled up nationally in 2015 (3). However, limited information exists on the factors affecting IPT implementation from the local context (14).

Implementation research is a growing field that involves scientific inquiry into questions concerning implementation and attempts to solve a wide range of implementation problems (15). More often than not, evidence-based interventions fail to achieve desired health outcomes due to the implementation gap that exists between what is known and routine practice (16-19). Widespread evidence of suboptimal IPT implementation has been reported in low-income settings (6, 20, 21). Researchers have continually emphasized the importance of understanding and assessing the implementation of health care interventions at different stages of implementation to ensure quality and effective implementation (22-24). Consequently, different strategies, methods, theories, models and frameworks have been developed to ensure quality and effective implementation of evidence-based innovations.

Acceptability is one of the implementation outcomes used to assess how well implementation has occurred as well as provide insights on how this contributes to important health outcomes (15, 25).

1.2. PROBLEM STATEMENT

The Kenya NTLD-Program in 2014 reported limited use of IPT among PLHIV noting that though 83% were screened during their clinic visit, only 2% of those who tested negative were initiated on IPT (3). The latest survey of IPT coverage, indicated that only 29 924 (3.6%) adults and 7 934 (10%) children eligible for IPT were initiated on IPT in 2015 (20). This indicates sub-optimal coverage, especially with regards to the National targets of initiating 90% of eligible population by the end of 2016 (20). HIV still remains the key driver of TB epidemic and National TB surveillance data indicates that HIV-infected TB patients are three times more likely to die compared to those who are TB negative (4). TB deaths in PLHIV have been increasing in Kenya despite a global decline in HIV associated TB deaths (3, 4). Coinfection with HIV and TB continues to be a major cause of morbidity and mortality in Kenya (20). However, there is a paucity of studies investigating reasons for the

suboptimal implementation of IPT. The few studies conducted on IPT implementation show limited use of guiding principles and frameworks of implementation research. Suboptimal implementation of IPT may be due to acceptability issues among the health care providers. To date, very little is known about the acceptability of IPT among health care providers in Kenya. Furthermore, present literature shows lack of consensus on the measurement of acceptability and offers little guidance on how to assess this outcome.

1.3. JUSTIFICATION

The outcomes of this study will shed light on the acceptability of IPT among health care providers in selected HIV clinics in Nairobi County and identify possible influencing factors in that context.

The study findings will be useful to health care providers in the HIV settings and hospital administrators as its findings will highlight the quality of TB care offered to PLHIV and more specifically, the 'quality' of implementation of IPT in the facilities. This is because IPT is a key TB prevention strategy particularly in HIV management. Ultimately this will be crucial in improving the quality of care for PLHIV in this context.

The findings of the study will additionally be of importance to the department of health at this early stage of IPT implementation as acceptability among health care providers serves as a proximal indicator of IPT administration as well as the quality and success of its implementation. It would encourage better monitoring and evaluation of the IPT program by program managers and policy makers. This will help in strategic planning to improve the administration of IPT among health care providers and their patients as well as tighten identified loop-holes that exist in its implementation.

The study has the potential to be replicated to facilities in other counties and later national level to give a more generalizable picture of IPT implementation. This could in turn contribute to the achievement of the 2015-2018 National strategic objectives for TB control.

1.4. RESEARCH QUESTION, AIM AND OBJECTIVES

RESEARCH QUESTION

What factors influence the acceptability of IPT among health care providers in HIV clinics in Nairobi County, Kenya?

AIM

The overall aim of the study was to assess the factors influencing the acceptability of IPT among health care providers in selected HIV clinics in Nairobi County, Kenya.

OBJECTIVES

The study sought to address the following objectives:

1. To understand factors affecting the acceptability of IPT (Isoniazid preventive therapy) among health care providers in selected HIV clinics in Nairobi County, Kenya.
2. To measure acceptability of IPT (Isoniazid preventive therapy) among health care providers in selected HIV clinics in Nairobi County, Kenya.
3. To examine the relationship between acceptability of IPT and identified determinants in selected HIV clinics in Nairobi County, Kenya.

1.5. LITERATURE REVIEW

1.5.1. The dual burden of HIV and TB

As resource-limited countries rapidly expand their HIV/AIDS treatment and care programmes, co-infection with TB and HIV has become a major public health threat for PLHIV and the society at large (11). TB is the most common opportunistic infection in HIV-infected patients in resource-limited settings and is associated with high mortality in patients commencing antiretroviral combination therapy (ART) (26). Co-infection with HIV and TB also places immense burden to health systems in developing settings and threatens efforts aimed at achieving globally set targets (27, 28). Kenya is among the world countries that account for 97% of the estimated global number of TB cases each year among PLHIV (2). According to the NTLD-Program, considerable progress has been made to reduce the HIV/TB co-infection rate in Kenya from 45% in 2008 to 33% in 2015 (20). Though higher than the 12% global co-infection rate, it is lower than the African region co-infection rate of 39%. In 2015, approximately 25,030 (31%) of the 81,518 persons who developed TB in Kenya were HIV infected (20). Despite the mentioned continuing efforts, TB/HIV co-infection continues to be a major cause of morbidity and mortality in Kenya. The case fatality among notified HIV/TB co-infected patients increased from 10% in 2013 to 11% in 2014 (20).

1.5.2. Interventions to reduce HIV/TB co-infection burden

To decrease the joint burden of HIV and TB, the WHO in its 2004 interim policy report recommended collaborative activities intended for decision-makers, TB and HIV/AIDS programme managers, donors, development agencies, and non-governmental organizations involved in TB and HIV/AIDS programmes (5). To reduce the burden of TB in PLHIV, the policy recommended the establishment of intensified TB case-finding, introduction of IPT, and ensuring TB infection control in healthcare and congregate settings (5). The policy also

recommended interventions to reduce the burden of HIV in TB patients which included: providing HIV testing and counselling, introduce HIV prevention methods, introduce co-trimoxazole preventive therapy, ensure HIV/AIDS care and support, and introduce antiretroviral therapy (5).

In 2012, an update of the 2004 policy on collaborative TB/HIV activities was published which recommended ART in addition to interventions proposed to reduce TB burden in PLHIV (6). International guidelines for monitoring and evaluation of collaborative TB/HIV activities have been published to assist in the implementation collaborative TB/HIV activities (29). To date, many countries have adopted the collaborative TB/HIV activities recommended by the WHO. However, the level of implementation and integration of TB and HIV/AIDS activities at the service delivery points vary from country to country and among different settings within the countries (30).

1.5.3. Isoniazid Preventive Therapy

IPT, part of the three I's for HIV/TB, is recognised as an important component of collaborative TB and HIV activities to reduce the burden of TB in PLHIV (6). It is recommended for provision to individuals with documented latent infection with *Mycobacterium tuberculosis* to prevent progression to active disease, and for PLHIV living in areas with high HIV prevalence and latent TB prevalence greater than 30% (5, 6, 11). IPT involves the provision of isoniazid (INH) tablets by health care providers to PLHIV who are TB negative or have latent TB. The dose varies between 5mg/kg for children to 300 mg/kg for adults (9, 10).

IPT has been proven from research to reduce the risk of TB in PLHIV at individual, community and population level (11). More evidence has also been generated indicating the effectiveness of combined use of IPT and ART in significantly reducing TB incidence among PLHIV (31, 32). Moreover, IPT was found to be cost effective in studies conducted in

settings with high TB and HIV prevalence (33-35). The WHO 2011 guidelines for IPT in resource constrained settings strongly recommended at least 6 months of IPT for children and adults including pregnant women, PLHIV, those receiving anti-retroviral therapy (ART) and those who have successfully completed TB treatment (12). In areas of high prevalence and transmission of TB among PLHIV, IPT is conditionally recommended for a period of 36 months as a proxy for lifelong or continuous treatment, whether or not ART is being received (6, 9) .

Eligibility for IPT includes the absence of active TB confirmed by the health care provider using a simplified screening algorithm as well as presence of latent TB. The screening algorithm involves absence of one of the symptoms of current cough, fever, weight loss or night sweats (6). Latent TB is identified through the tuberculin skin test (TST) and a positive result indicates presence of latent TB infection. Though PLHIV benefit more from ART, it is not a requirement for initiating IPT in PLHIV (5, 6).

1.5.4. Implementation of IPT

With improved monitoring of the scale-up of the HIV/TB collaborative activities since inception in 2003, considerable progress has been made in their implementation. For instance, the screening of TB among HIV-positive people and IPT provision more than doubled between 2007 and 2009 with the total number screened increasing from 0.6 million to 1.7 million globally (36). 80 000 eligible PLHIV were initiated on IPT in 2009; an increase from 30 000 people initiated in 2007. However, the figure only represented 1% of PLHIV worldwide (36). 933 000 PLHIV were initiated on IPT in 2014, which was an increase from just over 600 000 people reported in 2013 (1). The number of PLHIV initiated on TB preventive therapy in 2015 was 910 124, similar to the 2014 estimates (21). The data indicate great strides from the coverage levels in the early 2000s.

Since the recommendation of international guidelines on the three I's for TB/ HIV, adoption and implementation of IPT has been largely varied and relatively slow, especially in high burden TB countries (1, 10, 21, 37-40). Kenya has adopted and is implementing the recommended international and national guidelines for collaborative TB/HIV activities (6, 13, 20). IPT implementation for PLHIV in Kenya begun in 2012 through PEPFAR implementing partners such as AMREF, USAID and AMPATH, among others. The programme was rolled out in predetermined pilot treatment facilities across the country which gave the basis of development of health systems to ensure IPT is optimally provided (41).

Country-wide implementation of IPT was launched in March 2015, beginning with Siaya, Kisumu, Migori, Homa-bay and Nairobi as the pioneer counties due to their high HIV disease burden. Other counties followed suit from September 2015 (20, 41). It's roll-out was complemented with an ambitious target of enrolling 90% of PLHIV (839 797 adults and 79 594 children) on IPT by December, 2016 (20). The latest survey of IPT coverage, indicated that only 29 924 (3.6%) adults and 7 934 (10%) children eligible were initiated on IPT in 2015 (20). The WHO Global TB report indicated that, in 2015, only 33% of people newly enrolled in care were initiated on IPT in Kenya. In the same year, only 5.5% of children under 5 years were initiated on IPT in Kenya (21). As such, the implementation of IPT has been considered sub-optimal and still lagging behind with regards to the aforementioned national targets (20).

1.5.5. Implementation Outcomes

Implementation research is the scientific inquiry into questions concerning implementation (15). Evidence has consistently indicated that effective implementation is associated with better program outcomes (22, 23). Further implementation literature has been presented in Appendix F of this report. To understand the implementation process, implementation research utilises outcome variables. They have been defined as the effects of deliberate and

purposive actions to implement new treatments, practices and services (25). They assess how well implementation has occurred (15). In addition, they serve as indicators of implementation success, proximal indicators of implementation processes and are key intermediate outcomes to service or program outcomes (25, 42).

A conceptual model for implementation research was established by Proctor and colleagues in 2009, later updated in 2011 to describe a taxonomy of eight implementation outcomes: acceptability, feasibility, adoption (uptake), penetration, cost, fidelity, appropriateness and sustainability (25, 43). This study will focus on acceptability, with regards to IPT implementation in HIV/TB integrated services.

Acceptability has been defined as the perception among implementation stakeholders that a given treatment, service, practice or innovation is agreeable, palatable or satisfactory (25). It can be measured both from the perspective of the provider as well as the consumer, and at different stages of implementation vis early during the implementation process, during ongoing implementation of the intervention and later in the implementation process for sustainability (25). Researchers have used quantitative methods as well as qualitative methods to measure the acceptability of interventions in health. Some of the methods have been discussed in section 1.5.7.

1.5.6. Factors affecting the implementation of IPT

Stemming from reports of sub-optimal coverage and implementation of the intervention over the years, studies are increasingly being conducted to identify factors influencing the implementation of IPT. Though limited, studies have been conducted in low and middle-income settings most burdened by HIV and TB coinfection. They have been conducted in health care settings, among health care providers, patients or both, among policy makers and health systems to elucidate factors responsible for the sub-optimal IPT implementation.

A qualitative study conducted among health care providers in Ethiopia found that patient level factors including poor adherence; lack of understanding and patient non-disclosure of HIV sero-status; underlying mental health issues; weak patient-provider relationship; lack of patient information, patient empowerment and proper counselling on IPT; and the deficient reinforcement by health officials and other stakeholders affected the implementation of IPT in that context (38). A similar study in Ethiopia among health care providers found isoniazid stock-out, fear of isoniazid resistance, problems with patient acceptance and lack of commitment by health managers to scale up the program as the major factors hindering IPT implementation (10). In a South-African qualitative study, lack of knowledge and experience on IPT by health care providers was a major barrier to IPT implementation in addition to operational and patient-derived barriers (37). Consistent with other studies, fear of isoniazid resistance was cited as a perceived operational barrier in addition to poor integration of services and uncertainty of eligibility tests before IPT delivery. Patient-derived barriers included poor adherence, pill burden, poor information and socioeconomic problems (37).

Studies have also been conducted on barriers to policy level implementation of IPT in high HIV and TB burden countries. A study on national implementation of co-trimoxazole prophylaxis (CTXp) and IPT among policy managers reported inadequate ICF because of the inability to exclude active TB, logistic difficulties to exclude tuberculin skin test to diagnose latent TB infection, inadequate patient adherence causing isoniazid mono-resistance and lack of consensus among policy makers and uncertainty regarding the long-term benefits of IPT (44). A 2009 study assessed public health challenges and IPT implementation barriers. Perceived barriers included uncertainty on responsibility for IPT implementation among stakeholders; operational challenges in identification of latent TB; difficulties in excluding active TB and preventing isoniazid resistance, treatment of latent TB infection and duration of protective efficacy (45). Health system factors have also been largely found to affect IPT

implementation (46, 47). Leadership and governance, service-delivery, supplies and products, health workforce, health information system and health-system financing were broad health-system factors that affected the implementation and nationwide scale-up of IPT (46). Availability of health care facilities and health personnel have been reported as health system barriers affecting IPT implementation (47).

1.5.7. Acceptability of IPT

In their development of measures of acceptability, feasibility and appropriateness, Care and colleagues viewed acceptability in terms of innovation-individual (provider) fit (48). A limited number studies have assessed acceptability of IPT in low resource settings. However, in the few studies that have been conducted on IPT implementation, perception or attitude towards IPT by both the health care practitioners and patients has been found to be an important influencing factor, among others, on its implementation. For instance, a qualitative study conducted in South Africa found that a change in health worker perception was needed to improve IPT uptake in addition to overcoming operational barriers (37). In addition to drug stock-out, fear of isoniazid resistance and lack of commitment to scale up, problems in patients acceptance emerged as barriers to IPT implementation in a study conducted in Ethiopia (10). A study on the acceptability and adherence of IPT among HIV-infected patients in Tanzania found IPT to be highly accepted by HIV-infected patients with high level of adherence which contributed to improved IPT uptake (49).

Other studies conducted in different contexts have assessed the acceptability of other health interventions at different stages of implementation. Some have been conducted in well-resourced or high income settings while others have been conducted in low-resourced settings. A 2015 study by Dingwall and colleagues assessed the acceptability, feasibility and appropriateness of a new e-Mental health resource for service providers using qualitative methods. Visual appeal, ease of use, cultural relevance and innovative format emerged as

contributing factors to the acceptability levels (50). Another study in China assessed the acceptability and adoption of handheld computer data collection (HCDC) for public health research at initial implementation. They found that the innovation was feasible, acceptable and preferred among the interviewers (51).

Studies have also measured acceptability of health interventions among consumers. For instance, a study in Uganda on the acceptability, feasibility and use of malaria rapid diagnostic tests (mRDTs) at peripheral health facilities defined acceptability as "positive perceptions, beliefs and attitudes towards mRDTs and test results among users". Their study utilized an adapted conceptual framework for acceptance and found a variety of factors that affected the acceptability and adoption of RDTs among health workers. Some of the factors included the design and characteristics, availability and quality of mRDT supplies, health worker capacity, availability of effective malaria treatments, reliability of the supply chain, existing national policy recommendations, individual health worker dynamism, and vitality of supervision (52).

Different researchers have adopted context-specific instruments that were used to measure the acceptability or attitude towards different interventions in health care. For instance, Aaron's 2004, used an 18 item questionnaire containing four dimensions to measure mental health providers' attitudes towards the adoption of evidence-based practice (53). Similarly, Karlsson and Bendsten 2005 used a 12-item questionnaire to measure patients' acceptance of computerized alcohol screening in an emergency department (54). Acceptability of clinical decision rules in a paediatric emergency department utilized an adapted 12-item questionnaire, the Ottawa acceptability of decision rules instrument. The twelve items were categorized into three categories (55).

1.5.8. Conceptual framework for factors affecting acceptability

Using a review of empirical literature by and Durlak and Dupre (56), a synthesis of existing theories and frameworks by Damshroder et al. (57) into the CFIR (Consolidated framework for implementation research) and Chaudoir et al. 2013 (58) multilevel framework of factors that impact implementation outcomes, the study adapted a conceptual model that groups factors affecting acceptability under five main categories: Organizational factors, patient-level factors, provider level factors, structural factors and innovation characteristics. Reviewed literature on factors affecting the implementation of IPT from low resource settings guided the items grouped under each category.

A multi-construct theoretical framework of acceptability of health care interventions was developed by Sekhon et al. 2017, known as the theoretical framework for acceptability (TFA). This framework can be applied to assess both prospective and retrospective acceptability from the perspective of both intervention providers and recipients (59). The framework has got seven component constructs that can be used to measure acceptability of health interventions. For our study, four applicable component constructs were used to measure the acceptability of IPT among the health care providers. These are: affective attitude, intervention coherence, perceived effectiveness and self-efficacy. The conceptual model for factors affecting acceptability of IPT is shown in Figure 1.1:

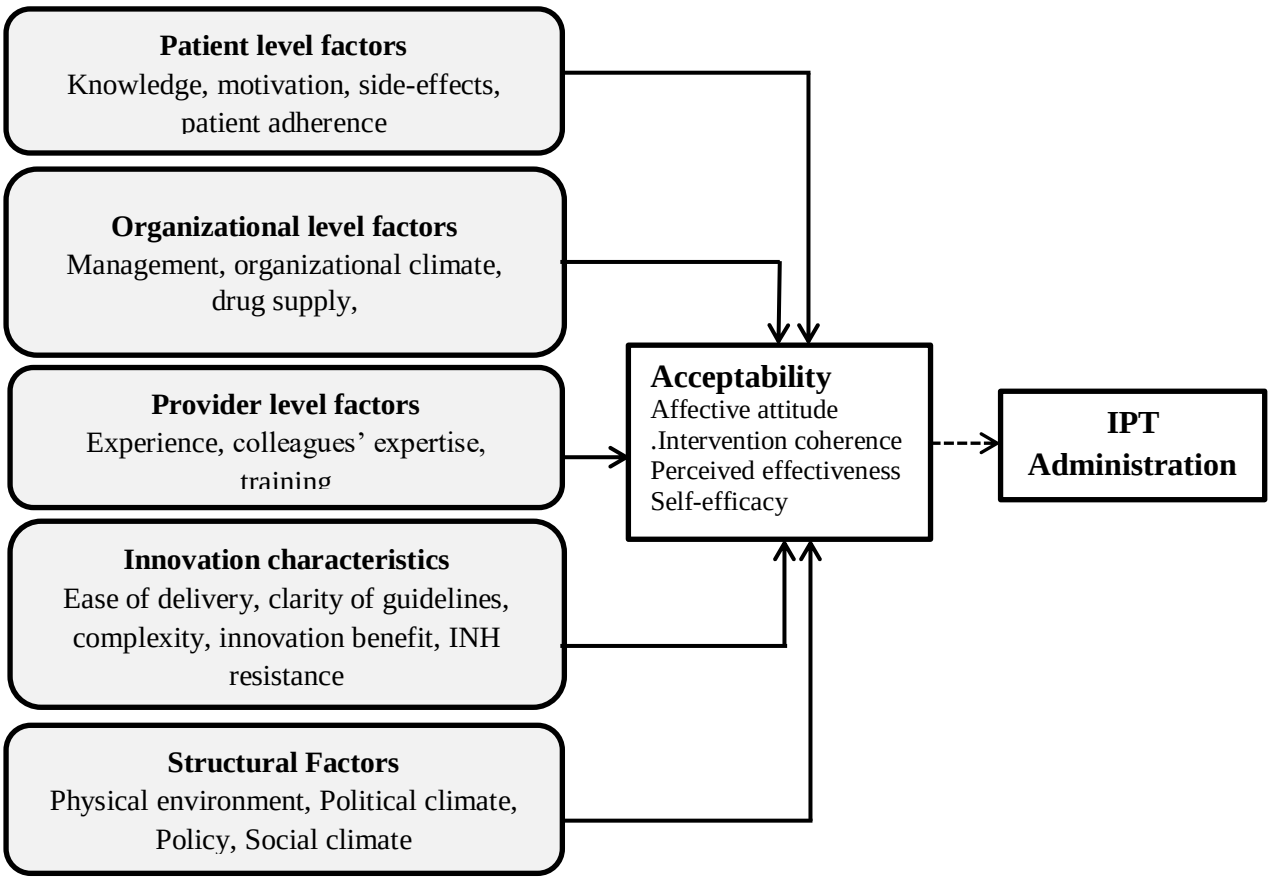


Figure 1.1 ***Conceptual model of factors affecting Acceptability of IPT among health care providers. Adopted from Chaudoir et al., 2013(58), Durlak and Dupre, 2008(56) and Damshroder et al.2009(57).*** **------ = Not operationalised**

CHAPTER 2: METHODOLOGY

2.0. INTRODUCTION

This chapter gives details on the methods involved in the study. Key aspects of the study such as the design, study setting, sampling strategy and participant selection, data collection and management are described. Variables used in the study as well as their analysis methods are presented. In addition, ethical considerations are outlined.

2.1. STUDY DESIGN

This was a cross-sectional study which employed a mixed-methods approach. Mixed methods enables a better understanding of the research problem (60). An exploratory sequential mixed-methods approach was employed which began with the collection of qualitative data to explore contextual factors affecting the acceptability of IPT and used the obtained information to inform the quantitative phase of the study (61). In this case, the obtained qualitative information collected was analysed and used to inform the development of the questionnaire for the quantitative enquiry.

2.1. STUDY SITE

Data were collected from health care providers working in the HIV clinics, also known as comprehensive care centres (CCC) of three public health facilities in Nairobi County, Kenya. Nairobi County is located in the central part of Kenya with an area of 694.9 km^2 and a population of about 3,138,369 people (62). The three health care facilities were purposefully selected based on their physical location, size of the facilities, high volumes of HIV and TB patients who access integrated treatment services. Additionally, Nairobi County was one of the pioneer counties for the national roll-out of IPT in 2015 and hence it was expected that the health facilities would be implementing the intervention. Additional description of the three study sites is as follows:

Kenyatta National Hospital

This is a national teaching and referral hospital in Kenya located in Nairobi County. It has a bed capacity of 1800 and over 6000 staff. The CCC in the facility houses about 45 health personnel of different cadres namely: clinical officers, nurses, counsellors, pharmacists, medical officers, nutritionists, clinical psychologists, peer educators and social workers. The total number of patients in HIV care was 10,226 during the stud period. IPT uptake in the last quarter of 2016 stood at 5,733. An average of 1,974 patients visited the clinic per month in the last quarter of 2016.

Mbagathi District Hospital

Mbagathi Hospital is a County referral hospital located on the outskirts of the Kibera informal settlement in Nairobi County. The CCC in the hospital began in 2005 with the aid of the Government of Kenya (GOK) and Médecins Sans Frontières (MSF). The CCC has got about 25 health care workers of different cadres namely: clinical officers, nurses, counsellors, pharmacists, medical officers, nutritionists, peer educators and social workers. The total number of patients in HIV care was 4,860 during the study period. IPT uptake in the last quarter of 2016 stood at 839 patients. 400-500 patients visit the clinic weekly on average.

Mama Lucy Kibaki Hospital

This is a sub-county hospital located in Embakasi West Constituency in Nairobi County. This hospital has a bed capacity of 112 and serves a population close to 187,020 patients. The CCC of the health facility, which started in January 2016, houses about 25 health care providers. Clinical officers, nurses and pharmacists constitute a small percentage of the providers while other cadres (nutritionists, counsellors, peer educators and community health care workers) constitute the bulk of the health care providers. A total of 1,133 patients were enrolled in care at the time of study, 205 of them being initiated on IPT. An average of 100 to 200 patients visit the centre per week.

2.2. STUDY POPULATION

Respondents were selected from health care providers (clinicians, nurses, pharmacists, counsellors, peer educators, nutritionists, clinical psychologists and laboratory staff) working in the HIV clinics of the selected health facilities within Nairobi County, Kenya between January and June, 2017. Frontline providers (clinicians, nurses, pharmacists) are involved in prescription and/or dispensation of IPT medication to the patients at the facilities. Non-frontline providers (counsellors, peer educators, nutritionists, clinical psychologists and laboratory staff) are not directly involved in prescription and/or dispensation of IPT medication to the patients at the facilities but are involved in the IPT programme and provision of care to PLHIV i.e. provision of information regarding IPT, identification of emotional, mental, behavioural and nutritional problems and provision of support with regards to IPT as well as ascertainment of clinical eligibility for IPT.

2.3. SAMPLING PROCEDURES

2.3.1. QUALITATIVE

Eighteen health care providers, from the three health facilities, were purposefully selected and participated in the in-depth interviews. They were selected based on their sex, cadre and length of stay at the HIV clinic.

2.3.2. QUANTITATIVE

All health care providers in the HIV clinics of the facilities were included in the study. Ninety five healthcare providers were reported to be working in the 3 health facilities at the time of study. Since the total study population size for the CCC in the three health care facilities was small, and the study being largely exploratory, the survey was conducted with all the health care providers in the clinic in order to quantify their acceptability of IPT in HIV care in the facilities (61). A total of 74 health care providers out of 95 provided informed consent and participated in the survey.

Calculated Power of the study

Using the study sample of 95 health care providers, a power of 95.94% was obtained at the 5% level of significance. The parameters are as below:

Acceptability level obtained in the study = 0.7034; estimated acceptability level in population (null)=0.5; precision=0.2

2.4. DATA COLLECTION

2.4.1. QUALITATIVE

In-depth interviews were conducted using a developed interview guide (See Appendix C). Open, non-directed questions were asked to elucidate perceptions about IPT and factors influencing the acceptance of IPT in the HIV clinics. The interviews were conducted by the researcher at the health facilities in English language, in private and at the convenience of the participant. They were about 45 minutes long and were audio-recorded.

2.4.2. QUANTITATIVE

Quantitative data on the acceptability of IPT services for PLHIV were collected from the health care providers using a questionnaire which was developed based on the qualitative findings (See Appendix E). The questionnaire was administered to the participants by the researcher and trained field-assistants at the HIV clinics in the selected health facilities. Variables were measured on a 5 point scale (Strongly agree, agree, neither agree nor disagree, disagree and strongly disagree) to obtain the level of acceptability of IPT and influencing factors among the health care providers. Both the qualitative interview guide and questionnaires were pilot tested at an HIV clinic of a different health facility within Nairobi County. The data were collected between February and April, 2017. The data collection tools are in Appendices C and E.

2.5. DATA MANAGEMENT

2.5.1. QUALITATIVE

Qualitative data were transcribed verbatim. Data verification for accuracy and completeness was done through reading and re-reading of the interview transcripts by the principal investigator and one research assistant to ensure all the recorded information and variations were identified. The soft copies of the interview transcripts were stored in a password protected computer while hard copies were filed and stored in a lockable cabinet.

2.5.2. QUANTITATIVE

Quantitative data were collected using paper questionnaires and captured using REDCap (Research Electronic Data Capture) software and stored on assigned secured Wits Institution database. The completed questionnaires were edited by the researcher and a research assistant to ensure completeness and accuracy during data entry into the electronic database. Some of the data cleaning activities performed on the REDCap platform included screening of the captured data for missing values and inconsistencies. The data were exported to Microsoft Excel software as a spreadsheet file and subsequently to Stata Version 14.0 as a data file for statistical analysis.

The outcome variable, acceptability was measured using a composite score created from nine items that assessed acceptability over four constructs of the Theoretical Framework for Acceptability. Acceptability was defined in this study as the perception among health care providers that IPT is agreeable, comfortable and satisfactory.

Variables were recoded from continuous to categorical for data analysis. This included participants' age which was recoded into three categories (less than 30 years, 31-40 years and above 40 years). Job-category of the participants was recoded from nine categories into two categories: frontline providers (clinical officers, nurses, pharmacists) and non-frontline providers (counsellors, peer educators, medical social workers, nutritionists, clinical pychologists and laboratory scientists) to facilitate analysis.

A score was generated for the determinants of acceptability by calculating the mean of questionnaire items that measured that item. Highest score was 5 while lowest score was 1. A higher score indicates positive perception to IPT with regards to the determinant i.e. Agreement with a positive statement or disagreement with a negative statement assessing a construct. A lower score indicates negative perception with regards to the determinant i.e. disagreement with a positive statement of agreement with a negative statement assessing a construct.

2.6. VARIABLES AND THEIR DEFINITIONS

Outcome Variable: Acceptability

According to the Implementation Outcome Framework (IOF) by Proctor et al. 2011, acceptability is defined as the perception among implementation stakeholders that a given treatment, service, practice or innovation is agreeable, palatable or satisfactory.

Explanatory variables:

These comprised factors that influence acceptability of IPT identified from the in-depth interviews. They included provider-related, policy/ guideline-related, intervention-related, operational, structural factors and patient-related factors which were generated from grouping of questionnaire items into the different constructs (as explained in section 2.5). Demographic characteristics of health care providers (Age, sex, job category, and years of experience in providing HIV/TB care) were also included.

2.7. DATA ANALYSIS

Qualitative analysis

Objective 1: To understand factors affecting the acceptability of IPT among health care providers.

The data collected from in-depth interviews was analysed through inductive thematic analysis. Coding of the transcripts was done to identify key words, messages, and patterns.

The developed codes were matched to ensure integrity and similarity between the researchers. A code book was then developed after integration and collation of the identified codes. From the codebook, broader themes and sub-themes that emerged from the data were identified and reviewed to ensure they were appropriate for the interpretation (63). A refined conceptual model (see Figure 2.1) was then developed from the identified themes that guided the questionnaire development for the quantitative enquiry. There was much similarity in the constructs between the refined and the original conceptual model. Policy and guideline-related factors were added as a construct while organizational factors did not feature in the modified framework.

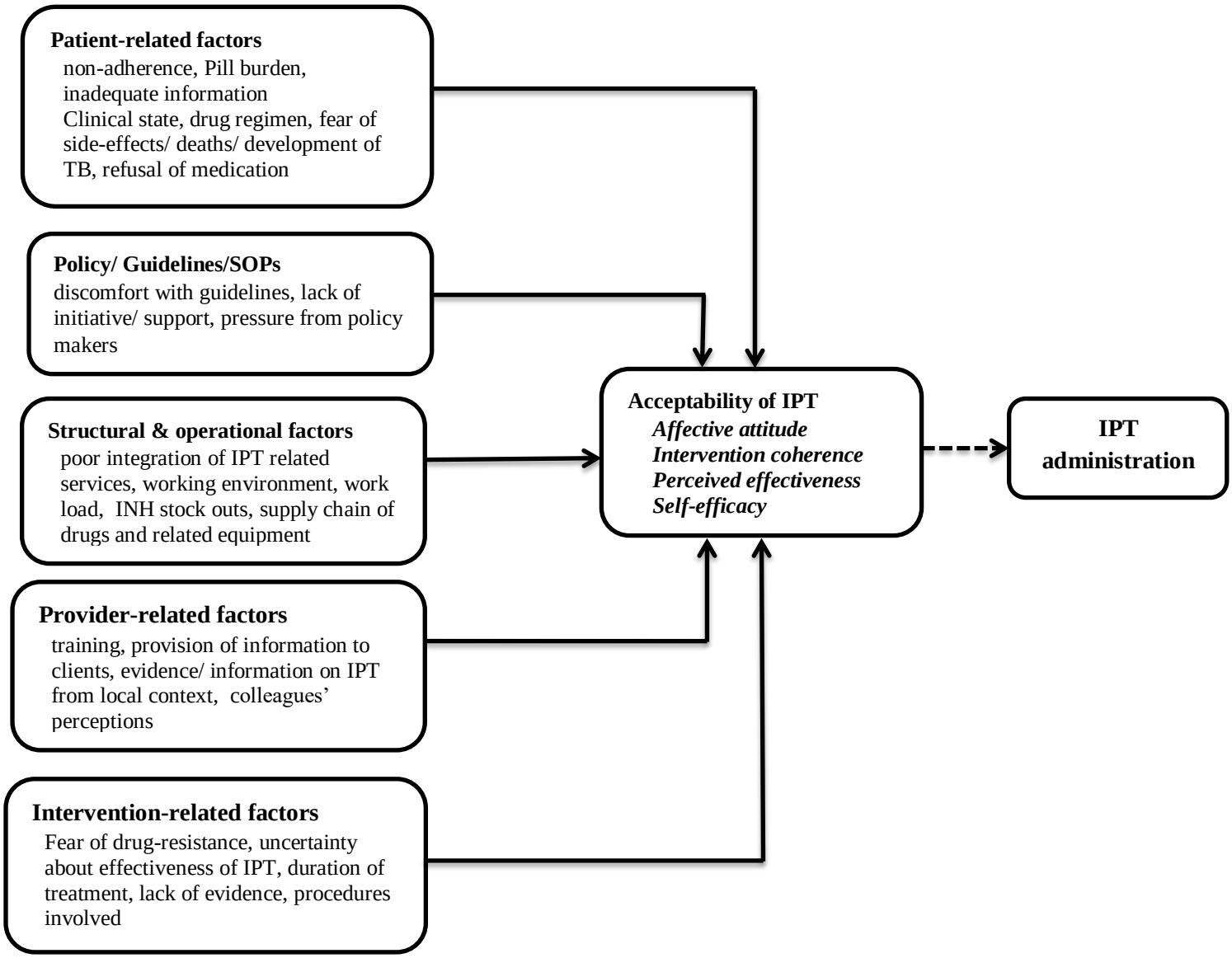


Figure 2.1 Refined conceptual model for factors influencing the acceptability of IPT among health care providers in selected HIV clinics in Nairobi County, Kenya
------ = Not operationalised

Quantitative data analysis

Objective 2: To measure acceptability of IPT (Isoniazid preventive therapy) among health care providers.

Acceptability was measured using a composite score created from nine items that assessed acceptability over the four constructs of: affective attitude, intervention coherence, perceived effectiveness and self-efficacy. The internal consistencies of the items were computed and guided the decision to sum up the score for each respondent. The acceptability score was converted to percentages and described using tertiles categorized as follows:

High acceptability: acceptability score between 80 and 93 (tertile 3)

Moderate acceptability: acceptability score between 64 and 78 (tertile 2)

Low acceptability: Acceptability score between 44 and 62 (tertile 1)

Box plots were used to graphically present the acceptability scores. Tables were used to summarise the acceptability scores and distribution by different characteristics in the study population. Means and standard deviations as well as medians and IQR of the acceptability scores were reported.

Objective 3: To examine the relationship between acceptability of IPT and identified determinants.

The factors influencing acceptability were presented in frequency distribution tables to show the distribution of the likert responses across the different categories. The Chronbach's alpha values for internal consistency were reported for constructs created using questionnaire items that investigated different factors influencing acceptability of IPT (See Table 3.5).

General linear models were fitted to examine the relationship between acceptability scores and the determinants. Unadjusted linear regression analysis was conducted to test for independent association between acceptability scores and each of the explanatory variables. An adjusted linear regression model was fitted with all the explanatory variables included. Variables that were non-significant in the unadjusted model were still included in the adjusted model since they had already been found to be factors influencing IPT acceptability

from the qualitative inquiry. The regression coefficients and the 95% confidence intervals were reported for each of the models.

Qualitative and quantitative findings were mixed in the discussion section (Chapter 4).

2.8. LIMITATIONS OF THE DATA

The quantitative portion of the study had a small sample size (74 participants). This may have limited the ability to detect an existing effect.

2.9. ETHICAL CONSIDERATIONS

tudy approval and ethical clearance to conduct the research was obtained from the Wits Human Research Ethics Committee (HREC) (approval No. M161164), The Kenyatta National Hospital-University of Nairobi Ethics and Research Committee (approval No. P11/01/2017) and the Kenya Medical Research institute Ethics and Research Committee (approval No. RES/7/3/1) (See Appendix G-I). A research permit was obtained from the National Commission for Science, Technology and Innovation (NACOSTI) to conduct the study in Nairobi County, Kenya (See Appendix F). Permission to access the selected health facilities was obtained from the management of the respective health facilities.

Information about the study was provided to the study participants through a detailed information sheet. Voluntary, written informed consent was obtained from all the participants before their participation in the study. Participation in the study was voluntary and participants were free to withdraw at any time during the session without any recourse. The provided information from study participants was anonymized during analysis and reporting. For the qualitative reporting, only the facility information was reported against quotations. After data collection, the interview audio recordings and survey electronic responses were stored in a password protected computer and will not be used for any other research related activities. They will be completely deleted from the system six and ten years respectively after storage.

CHAPTER 3: RESULTS

3.0. INTRODUCTION

This chapter presents the results from both the qualitative and quantitative enquiry. Quotations are presented to illustrate the emergent themes from the qualitative inquiry. Quantitative results are presented in tables and graphs.

3.1. Factors affecting the acceptability of IPT (Qualitative results)

Eighteen health care providers from the CCC of the selected health care facilities participated in the in-depth interviews. Their demographic characteristics are presented in Table 3.1. Their median age was 36 (32 - 40) years. The sample comprised of eight clinical officers, four nurses, four counsellors and two pharmacists. A majority of the participants (78%) had more than four years' experience in providing HIV/TB care. After thematic analysis of the qualitative data, six broad themes were elucidated. These included: factors related to IPT policy and guidelines, patient-related factors, provider-related factors, intervention-related factors, structural and operational factors. The emergent themes and their interrelationships are presented in the following sections.

Table 3.1: Demographic characteristics of health care providers who participated in in-depth interviews at selected HIV clinics in Nairobi County, Kenya

Variable	Value	Frequency (n)	Percentage (%)
Sex	Males	7	31
	Females	11	61
Job category	Clinical officers	8	45
	Nurses	4	22
	Counsellors	4	22
	Pharmacists	2	11
Years of Experience in HIV/TB care (years)	< 1	2	11
	2 – 4	2	11
	> 4	14	78
Age (years)	≤ 30	4	22
	31 – 40	10	56
	41 – 50	1	5
	> 50	3	17

3.1.1. Policy, guidelines and standard operating procedures (SOPs)

Factors related to policy makers and program managers as well as IPT guidelines and SOPs in the HIV clinics were found to affect the acceptability of IPT among the health care providers.

Discomfort with IPT guidelines and SOPs

The participants indicated that the guidelines followed for IPT in the clinics were those implemented at National level by the NTLD-Program and NASCOP, guided by the WHO international guidelines. However, health care providers expressed discomfort with the guidelines and SOPs citing lack of clarity, which affected their perception and delivery of the intervention. The health care providers proposed revision of the guidelines on IPT with specific regard to eligibility criteria and clarity on ruling out active TB and latent TB before prescription, duration of IPT and national consensus on IPT-related services as part of the HIV/TB collaborative activities, since some of the services differed among facilities.

"I think it's a good idea but the problem is with the protocol. Yeah! the SOPs. They are not well...they are not very clear. They are not well documented..."(health care provider, KNH)

"...Because sometimes you find there are some areas that give IPT, that is isoniazid and pyridoxine. Some don't give isoniazid and pyridoxine…So you wonder whether it is the SOP or is it something that centre has come up with?..." (health care provider, KNH)

Limited staff involvement in IPT guideline implementation

The participants also indicated that there was pressure from policy makers to implement the proposed IPT policy guidelines at introduction and revision without provider involvement. This made them to prescribe the intervention without actually being comfortable with its delivery.

"...They assume you know all that…But if you ask someone, "Why are you doing re-treatment for six months?" They don't know why. It's just you are pushed to do things but you're not empowered with so much knowledge to understand why you are doing it."(health care provider, Mama Lucy Kibaki Hospital)

Inadequate policy makers' commitments to IPT implementation

Another factor cited by the health care providers was the limited commitment by the policy makers and IPT program managers in ensuring the effective implementation and streamlining of the IPT program, which consequently demotivates the health care providers.

"...there is no initiative by those who are concerned in the TB program. They need to make sure that they insist on IPT, and put some regulations or some rules to be followed to ensure IPT is given to every eligible patient…"(Health care provider, KNH)

3.1.2. Intervention-related factors

Factors related to IPT itself were also found to affect the participants' comfort or satisfaction with the intervention. These factors were related to guidelines, provider and patient factors.

Perceived effects of IPT

Fear of drug resistance emerged as a major factor that affected their perception of IPT and consequently, delivery. They expressed concern over the development of MDR or XDR-TB in patients who had been previously on TB medication or developed TB within the period after taking the IPT regimen as a result of poor adherence to the medication. A number of them also expressed uncertainty about the effectiveness of IPT in complete TB prevention. The participants pointed out that there was limited or no evidence from the local context on the effectiveness of IPT and reported having few TB cases during IPT and upon treatment completion. This was said to lower their confidence and raise doubts with the intervention. The need for additional evidence from the local context was recommended to build confidence and comfort with the intervention.

> *"…You will not be able to monitor these patients considering that they know that they don't have TB, adherence will be affected… I am not very comfortable with IPT…In case the IPT fails, I risk the patient getting MDR, of which they will have to cough some money…" (health care provider, KNH)*

> *"…That is always my question when I find someone that has been on isoniazid now coming with signs of TB or being confirmed to be having TB. You just give but you really wonder whether you are doing the right thing."(health care provider, Mama Lucy Kibaki Hospital)*

> *"Also, I wish that more research will be done on the uptake. We want to see what numbers, as much as they've been on IPT, what percentage of clients are still developing TB?..."(health care provider, Mbagathi District Hospital)*

Discomfort with IPT duration

Health care providers largely expressed dissatisfaction with the long duration of the IPT treatment regimen and considered it a major factor that affected their comfort with the intervention. Most of them recommended a reduced duration of the drug with the help of suitable research. This was because of pill-burden and adverse effects reported by the patients to the providers.

> *"…you see the shorter the period that one takes the drugs, the better. So I would be of the opinion that if research could be carried out to at least shorten the period of giving IPT or even if it involves changing the drugs themselves..." (health care provider, KNH)*

> *"If I had a chance, I would give an IPT that would be taken once. Not the daily one for six months. That's a long time..." (health care provider, Mama Lucy Kibaki Hospital)*

Discomfort with IPT initiation procedures

Some of the participants reported that the procedures involved in IPT initiation resulted in irregularities in IPT implementation and increased workload. A number of examinations on the patients had to be performed before prescription of IPT and the fact that these tests were conducted elsewhere and not in the CCC caused delays and loss of some patients. Heath care providers recommended better integration of IPT-related services i.e. clinical examinations within the clinic and a separate department developed dedicated to IPT initiation and follow-up in order to make them more comfortable with initiation procedures.

> *"Then, if you can follow the standard operating procedure to give IPT, it will take you very long to complete all those investigations, examinations and what have you… The procedure becomes too long…Will you give that IPT?" (health care provider, KNH)*

3.1.3. Provider-related factors

Factors related to the health care providers themselves were considered to affect the perception and implementation of IPT in the clinics.

Provider information/ training on IPT

Health care providers indicated that they required more information and training on IPT in order to be more empowered and comfortable with the intervention. They cited discomfort or uncertainty with different IPT-related activities due to lack of information and evidence on the same. They recommended revision of guidelines and more training on IPT, driven by policy makers as well as regular monitoring and reporting of IPT outcomes from research.

> *"...Some of us have not been taken through training on IPT. It was just introduced and you are told, "Give IPT for this duration"... So I feel we should have been taken through a training to know more about the IPT even before rolling it out." (health care provider, KNH)*

> *"I can talk about the level of training on IPT. Especially in paediatric IPT...Personally I don't have enough information on the safety of this IPT in pregnancy...The experiences that the patients report make me hesitant to continue to prescribe to other patients." (health care provider, Mbagathi District Hospital)*

Peer influence on IPT perceptions

Peer influence also affected the perception of health care providers about IPT. The satisfaction of other health care workers with the intervention contributed to that of other health care providers. Negative perceptions or doubts about the intervention by other health care workers affected the perception and delivery of IPT by the fellow providers.

> *"...Colleagues say that patients tell them "I've seen a friend of my husband who took...",you know. So that experience with my colleagues from the patients' mouth talking. In fact, part of it was the reason why Mbagathi delayed as a hospital to start IPT." (health care provider, Mbagathi District Hospital)*

"…because it's like you feel like you're the only one who is pressuring people to take IPT, or you're really encouraging patients to take IPT…So sometimes you feel discouraged like, "Ah! After all nobody is giving"…" (health care provider, Mama Lucy Kibaki Hospital)

3.1.4. Patient-related factors

Factors relating to the patients were thought to considerably affect health care providers' perceptions and delivery of IPT.

Patients' side-effects and non-adherence to IPT

Participants mentioned non-adherence of the patients to the medication as a factor that affected their perception on IPT. Non-adherence was believed to be as a result of fear of side-effects and pill burden among the patients. Participants expressed concern that non-adherence would eventually lead to development of resistance to isoniazid among the patients in the long run. They reported development of serious side effects among patients that affects adherence of other patients. Due to this, some health care providers reported basing their decision to deliver IPT on the immunological, virological and clinical state of the patients, while some considered the drug regimen of the patients. This made a number of health care workers hesitant in initiating IPT. They recommended considerations of patient clinical state and drug regimen it to be added to the IPT guidelines as well.

"…They are getting some rumours and misconceptions that when you take those prophylaxis for TB, when you get TB, it will develop resistance, then they throw the drugs away. They tell you they are taking the drugs."(health care provider, KNH)

"…At least for them to do a research and find out if these side-effects are really associated with IPT. But if it is found to be safe to use, I would not have any other recommendations…Uptake reduced because they were not starting anyone else on IPT for fear of side-effects and death." (health care provider, KNH)

Pill burden among patients

Health care providers also felt that Isoniazid increased the pill burden among the patients which affected their adherence to the medication. Patients complained of the difficulty in consuming the medication while some completely declined to take the medication due to high number of pills. As a result, they recommended that a shorter duration formulation of IPT for the patients would help tackle this problem.

> *…"So due to that you find that there is sort of pill burden. Yeah, patients feel that these drugs are so many. And some say they don't want to start these drugs together…" (health care provider, KNH)*

> *"…I was thinking like, if they can review the concentration now, then may be find out the concentration that can still work and still be mild to the patients…because of the pill burden to these clients..." (health care provider, Mbagathi District Hospital)*

Inadequate patient information on IPT

Information about the benefits and effects of IPT was reported to be limited among the patients. Rumours and misconceptions about IPT among the patients were thought to strain the IPT program with patients refusing to be initiated or disposing the medication even after being briefed about it. Providers expressed concern over the lack of consensus and support regarding patient education activities in the CCCs for IPT and recommended intervention from stakeholders and policy makers.

> *"…and also lack of understanding. "Why should you give me?"…Inadequate information....We conduct Continous Medical Education (CME), then we formulate something. Information which should be given to the patient and how the information should be given…" (health care provider, KNH)*

> *"I think they need to do more education to the people. 'Actually most of the clients they decline because they have never heard about it…"I am being treated for TB yet I don't have TB signs."..." (health care provider, Mama Lucy Kibaki Hospital)*

3.1.5. Structural and operational factors

Structural factors relate to the physical and working environment of the health care providers. Most frontline providers expressed discomfort with the working environment and consequently suggested changes with regard to the structuring and lay out of IPT related services.

Poor integration of IPT-related services

Health care providers reported poor integration of IPT services in the clinic that affected the program. They felt that clinical examinations required before IPT initiation should be performed in the same facility and subsidized in terms of cost so that all patients undergo the tests to ascertain eligibility for IPT. They considered this a role of the management and policy makers to ensure that the IPT program was effectively implemented.

> *"...It will even be faster for the patients. Because if we do the tests from here, it will take like 30 minutes to do everything and give the patient IPT. When they come again for check-ups, we can still do them again from here, and it takes less time and we get results in real time." (health care provider, KNH)*

> *"Number one is lack of space in our facility. We do not have enough space to accommodate all services that we provide… now since they have to move around the hospital, some of them, they kind of disappear along the way…" (health care provider, Mama Lucy Kibaki Hospital)*

Increased workload

Front line providers complained of the high workload in the facility which they felt negatively affected the IPT program. They were concerned with the limited number of clinicians and the high volume of patients in the CCC. The procedures involved before IPT initiation were considered very long and hence a burden to be managed and monitored by a single clinician. Providers felt that more clinicians should be hired with some dedicated to IPT related activities in the CCCs.

"…You see now by the time you do all this screening for like hepatitis, what…what…convincing the patient to start IPT. You see now it becomes a big work load because we have many patients waiting in line to be served." (health care provider, KNH)

"To comment about the environment and the working condition, here as a national referral, we have very high workload. Then, if you can follow the standard operating procedures to give IPT, it will take you very long to complete all those investigations, examinations and what have you… " (health care provider, KNH)

Poor INH drug supply

Most of the health care providers also mentioned stock-out of Isoniazid medication and other supplies related to the IPT program in the facilities. They reported stock-outs in the previous year and considered this as a factor that greatly affected delivery of IPT to the patients. The providers felt that the erratic stocks and poor supply chain of the medications indicated poor support and monitoring of the IPT program by the policy makers and management, which lowered their morale and affected their perception and delivery of the medication to the patients.

"…We had started the program nicely. We are empowering patients, we are counselling them on IPT, we are encouraging them to take IPT. And then all of a sudden from nowhere, IPT is no more" (health care provider, Mama Lucy Kibaki Hospital)

"My biggest challenge with the management is when there is erratic supply of IPT…So the patients were out of medication for some time and when you send them out to buy them, of course it's not possible for them to get the drug…" (Clinical Officer, Mbagathi District Hospital)

3.2. Measuring the acceptability of IPT among health care providers (Quantitative survey results)

Summary of key findings

The overall acceptability score was 73% on average among health care providers from the three HIV clinics, which was categorized as moderate acceptability. Patient and intervention-related factors showed a significant relationship with the acceptability scores in the multivariable linear regression.

3.2.1. Demographic characteristics of the study population

Table 3.2 presents selected characteristics of the study population. A total of 74 health care providers were enrolled and participated in the survey. Kenyatta hospital CCC had the most participants (30) then Mama Lucy hospital CCC (23) and Mbagathi hospital CCC had the least participants (21). Out of these, 32% participants were male and 68% were female. Majority of the healthcare providers (70%) were below 40 years of age with the median age of the study population being 35 years (IQR: 27 - 43). Most of the participants had more than 4 years working experience in providing HIV and TB care (60.81 %). Clinical officers, nurses and counsellors were the cadres with most participants, accounting for 20%, 23% and 20%, respectively. Frontline providers (clinical officers, nurses and pharmacists) accounted for 53% of the study population while non-frontline providers (counsellors, peer educators, medical social workers, nutritionists, clinical psychologists and laboratory scientists) accounted for 47%. IPT uptake in the three facilities stood at 56% in Kenyatta hospital CCC, 17% in Mama Lucy hospital CCC and 18% in Mbagathi hospital CCC.

Table 3.2 Demographic characteristics of health care providers in the study population

Variables	Kenyatta n=30 (%)	Mbagathi n=21 (%)	Mama Lucy n=23 (%)	Total N=74 (%)
Gender				
Male	12 (16.2)	4 (5.4)	8 (10.8)	24 (32.4)
Female	18 (24.3)	17 (23)	15 (20.3)	50 (67.6)
Age (years)				
< 30	8 (10.8)	14 (18.9)	7 (9.5)	29 (39.2)
31-40	12 (16.2)	3 (4.1)	8 (10.8)	23 (31.1)
> 40	10 (13.5)	4 (5.4)	8 (10.8)	22 (29.7)
Job category				
Clinical officer	8 (10.8)	4 (5.4)	3 (4.1)	15 (20.3)
Nurse	8 (10.8)	4 (5.4)	5 (6.8)	17 (23.0)
Pharmacist	5 (6.8)	-	2 (2.7)	7 (9.5)
Counsellor	3 (4.1)	9 (12.2)	3 (4.1)	15 (20.3)
Peer educator	1 (1.4)	2 (2.7)	4 (5.4)	7 (9.5)
Medical social worker	2 (2.7)	-	2 (2.7)	4 (5.4)
nutritionist	-	2 (2.7)	3 (4.1)	5 (6.8)
Clinical psychologist	2 (2.7)	-	-	2 (2.7)
Laboratory scientist	1 (1.4)	-	1 (1.4)	2 (2.7)
Years of experience in HIV/TB care				
< two years	2 (2.7)	7 (9.5)	1 (1.4)	10 (13.5)
2-4 years	4 (5.4)	9 (12.2)	6 (8.1)	19 (25.7)
> 4 years	24 (32.4)	5 (6.8)	16 (21.6)	45 (60.8)

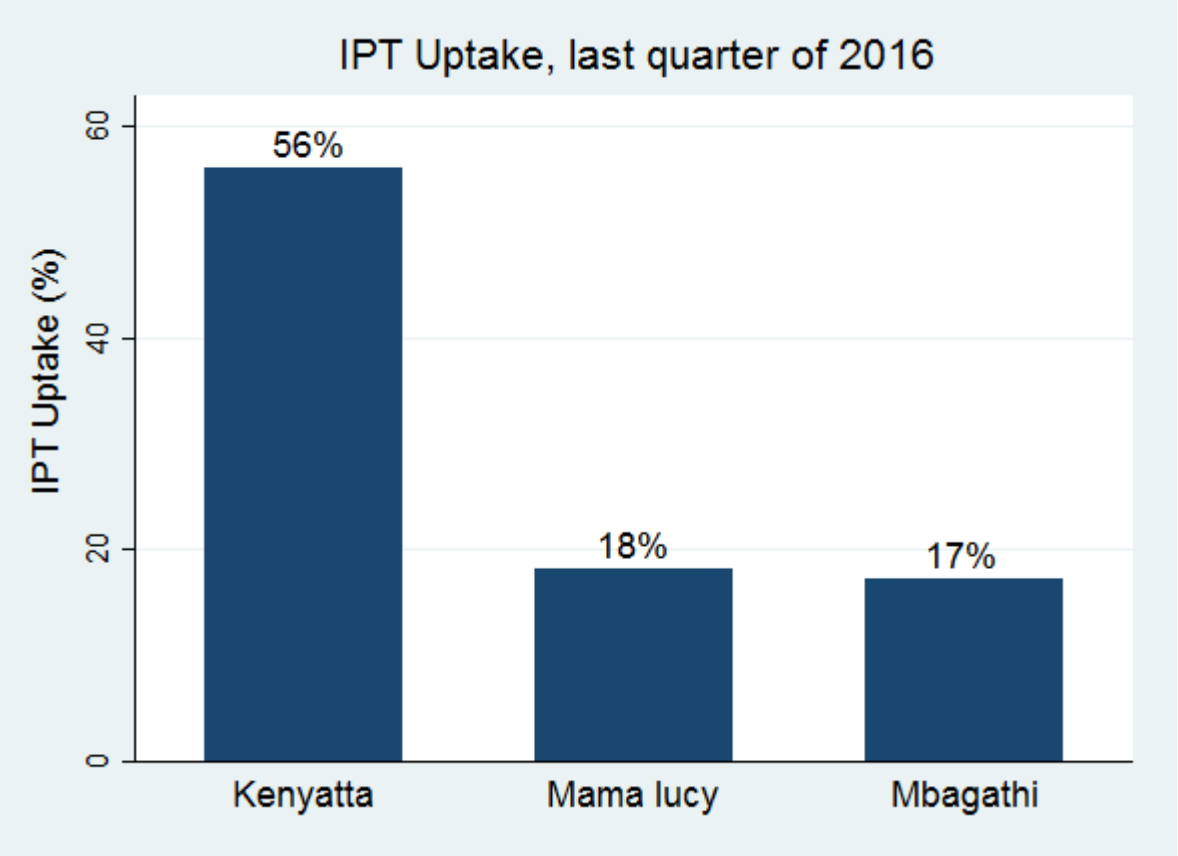


Figure 3.2 Bar graph of IPT uptake among health care providers in the three HIV clinics (% of total patients enrolled in care in the clinics)

3.2.2. Acceptability of IPT among health care providers from selected HIV clinics

The overall median acceptability score in the study population was 73% (IQR: 58-80) while the overall mean and standard deviation was 70.33% (12.79). The range of the acceptability scores was between 44% and 93%. The distribution of acceptability scores within the study population is shown in the box plot in Figure 3.2. A histogram showing the distribution of the acceptability scores among the study participants is also presented in Figure A1 of Appendix A. The acceptability scores were observed to follow a normal distribution from the bell-shaped normality curve overlaid on the histogram.

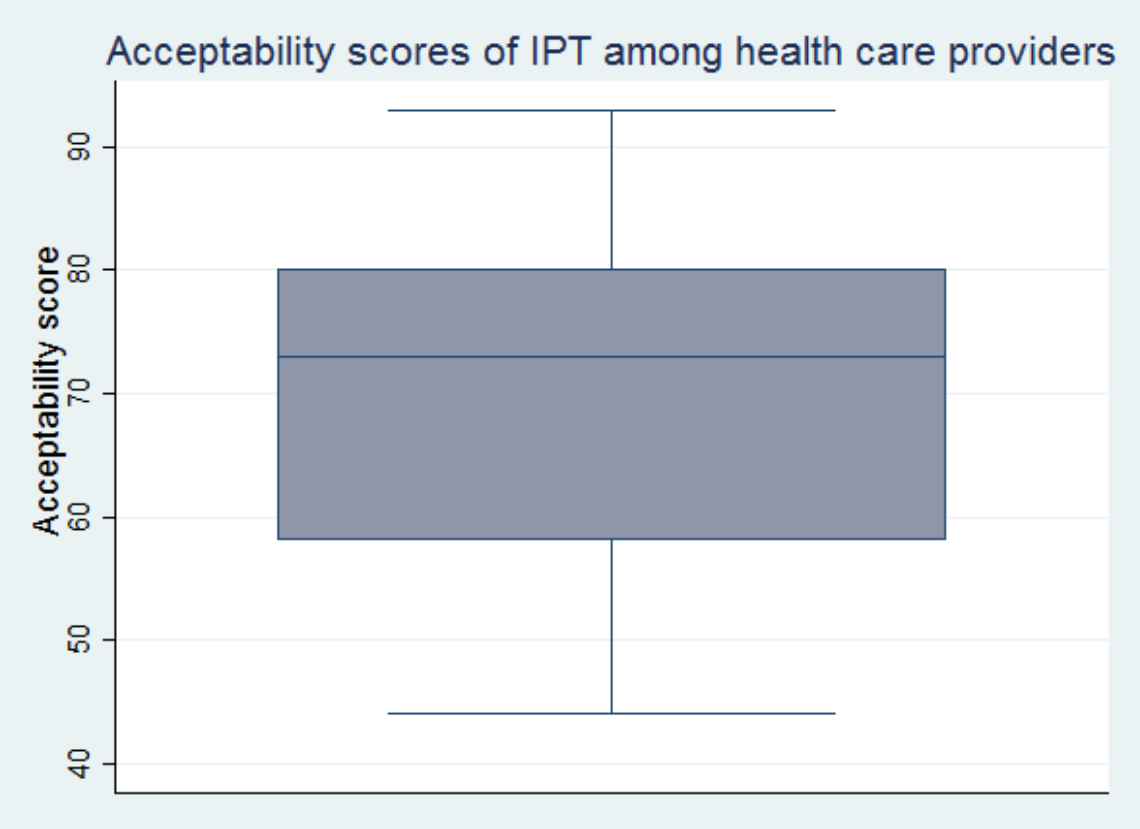
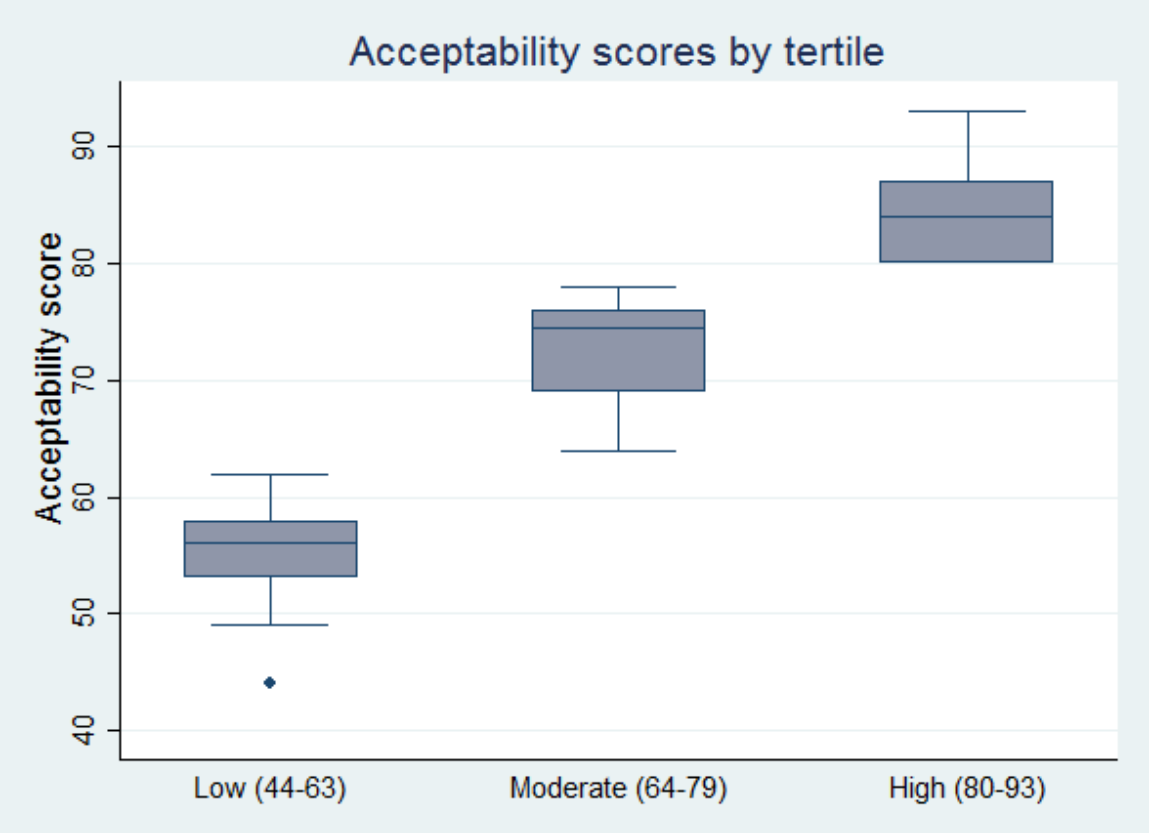


Figure 3.3 Box plot of acceptability scores of IPT among health care providers

The distribution of the three tertiles to rank the acceptability scores are shown in Table 3.3 and Figure 3.3. The mean acceptability scores were 55% (SD: 4.5), 73% (SD: 4.4) and 85% (SD: 4.6) for the low, moderate and high acceptability tertiles respectively.

Table 3.3 Acceptability scores by category

Acceptability category	Range	Number of observations	Mean (SD)	Median (1QR)
Overall score	44-93	74	70.3 (12.8)	73 (58-80)
Low	44-63	25	55.1 (4.5)	56 (53-58)
Moderate	64-79	28	73.0 (4.4)	74.5 (69-76)
High	80-93	21	85.0 (4.6)	84 (80-87)



. **Figure 3.4 Box plots of acceptability scores by tertile**

Table 3.4 shows the acceptability levels of IPT among health care providers by selected characteristics. The level of acceptability of IPT varied across the study population. 28% expressed high acceptability, 38% expressed moderate acceptability while 34% showed low acceptability of IPT). The highest mean acceptability scores were observed in Mama Lucy Hospital CCC (78.14%), followed by Mbagathi District Hospital CCC (74.13%), then Kenyatta hospital CCC (61.97%) having the lowest mean acceptability scores. Non-frontline providers (counsellors, Peer educators, medical social workers and nutritionists) accounted for higher mean acceptability scores (75.88%) than frontline providers (clinical officers, nurses and pharmacists) whose mean value was 65.88%. A detailed graph of acceptability score by job cadre is presented in Figure 2 in appendix A.

Table 3.4 Acceptability levels of IPT among health care providers by selected characteristics

Variables	Acceptability Score Mean (SD)	High acceptability n (%) 21 (28.38)	Moderate acceptability n (%) 28 (37.84)	Low acceptability n (%) 25 (33.78)	Total N (%) 74 (100)
Facility					
Mbagathi	78.1 (8.9)	20 (27.03)	7 (9.46)	3 (4.05)	30 (40.54)
Kenyatta	62.0 (11.1)	1 (1.35)	9 (12.16)	11 (14.86)	21 (28.38)
Mama Lucy	74.1 (11.9)	4 (5.41)	12 (16.22)	7 (9.46)	23 (31.08)
Sex					
Male	68.1 (12.1)	3 (4.05)	13 (17.57)	8 (10.81)	24 (32.43)
Female	71.4 (13.1)	18 (24.32)	15 (20.27)	17 (22.97)	50 (67.57)
Age					
< 30	74.4 (10.4)	11 (14.86)	12 (16.22)	6 (8.11)	29 (39.19)
31-40	66.1 (11.2)	2 (2.70)	13 (17.57)	8 (10.81)	23 (31.08)
41-50	69.4 (15.8)	8 (10.81)	3 (4.05)	11 (14.86)	22 (29.73)
Job category					
Frontline	66.2 (12.9)	7 (9.46)	14 (18.92)	18 (24.32)	41 (55.41)
Non-frontline	75.0 (11.0)	14 (18.92)	14 (18.92)	7 (9.46)	33 (44.59)
Years of experience in HIV/TB care					
<1	77.7 (7.3)	4 (5.41)	5 (8.11)	1 (1.35)	10 (13.51)
2-4	73.3 (13.1)	8 (10.81)	5 (8.11)	6 (8.11)	19 (25.68)
> 4	67.5 (12.9)	9 (12.16)	18 (24.32)	18 (24.32)	45 (60.81)

3.3. Relationship between acceptability of IPT and identified determinants

3.3.1. Description of determinants of acceptability of IPT among health care providers

The five groups of determinants of acceptability in the framework in Figure 2.1 are: policy and guideline-related, patient-related, provider-related, intervention-related, structural and operational factors. The Chronbach's alpha values of these determinants as well as participant responses are as shown in Table 3.5. An average of the components of each determinant is generated to produce a single value for the determinant for each respondent.

Table 3.5 Description and internal consistency of determinants of acceptability of IPT

Category	Variables/ questionnaire items	SA n (%)	A n (%)	Neither n (%)	D n (%)	SD n (%)	Chronbach's α value
Policy/Guidelines	Policy makers consulted with HCP (introduction)	8 (10.8)	16 (21.6)	15(20.2)	22 (29.7)	13(17.6)	0.5281
	Policy makers consulted with HCP (Revision)	9 (12.6)	21 (29.4)	17(23)	16 (21.6)	11 (14.9)	
	Pressure from policy to implement IPT	17 (23)	29 (39.2)	16(21.6)	11 (14.9)	1 (1.4)	
Intervention	IPT may develop resistance	15(20.3)	25 (33.8)	17 (23)	11 (14.9)	6 (8.1)	0.6124
	Concerned about adverse effects and/or deaths.	21(28.4)	31 (41.9)	6 (8.1)	9 (12.2)	7 (9.5)	
	More research required on effectiveness	39(52.7)	31 (41.9)	1 (1.4)	3 (4.1)	0	
	Procedure before delivery lengthy	8 (10.8)	16 (21.6)	17 (23)	26 (35.1)	7 (9.5)	
Provider	Require more training	35(47.3)	34 (46)	5 (6.8)	0	0	0.5380
	Require more evidence on IPT effectiveness	30(40.5)	27 (36.5)	4 (5.4)	11 (14.9)	2 (2.7)	
	Require more evidence on adverse effects & deaths	32(43.2)	34 (46)	4 (5.4)	3 (4.1)	1 (1.4)	
	Colleagues are positive about IPT	2 (2.7)	17 (23)	18(24.3)	27 (36.5)	10 (13.5)	
Patient	Patients adhere to IPT	5 (6.8)	14 (18.9)	7 (9.5)	33 (44.6)	15 (20.3)	0.7287
	IPT increases pill burden	29(39.2)	25 (33.8)	6 (8.1)	9 (12.2)	5 (6.8)	
	Patients require more information	49(66.2)	22 (29.7)	1 (1.4)	2 (2.7)	0	
	Clinical state should be considered before IPT	1 (1.4)	4 (5.4)	2 (2.7)	28 (37.8)	39 (52.7)	
	Drug regimen should be considered before IPT	2 (2.7)	8 (10.8)	3 (4.1)	30 (40.5)	31 (41.9)	
	Patients develop severe side-effects	7 (9.5)	26 (35.1)	20 (27)	19 (25.7)	2 (2.7)	
	Patients refuse to take IPT	7 (9.5)	34 (46)	14(18.9)	14 (18.9)	5 (6.8)	
Structural	IPT related services well integrated	3 (4.1)	8 (10.8)	6 (8.1)	37 (50)	20 (27)	0.6014
	The working environment in the clinic is very comfortable	1 (1.4)	8 (10.8)	6 (8.1)	38 (51.4)	21 (28.4)	
Operational	There is high workload	13(17.6)	23 (31.1)	10(13.5)	23 (31.1)	5(6.8)	
	We experience INH stock out	27(36.5)	28 (37.8)	8 (10.8)	11 (14.9)	0	
	The supply chain of INH and other IPT-related supplies is effective.	4 (5.4)	23 (31.1)	15(20.3)	25 (33.8)	7 (9.5)	

3.3.2. Relationship between acceptability scores and determinants

Unadjusted analysis was performed to observe the independent relationship between the determinants and acceptability scores while the adjusted model included both determinants of acceptability and demographic characteristics of health care providers. The results are presented in Table 3.5.

Variables significantly associated with acceptability scores in the unadjusted model include job category, years of experience, policy/guideline-related factors, patient factors, provider factors and intervention-related factors. In summary, non-frontline providers show higher acceptability scores on average as compared to frontline providers (Coeff: 8.79; 95% CI 3.18-14.40). Compared to those with less than two years' experience in HIV/TB care, health care providers with more than four years of experience show higher acceptability scores on average (Coeff: 10.23; 95% CI -18.86--1.61). For the determinants, a unit increase in the policy/guideline, patient, provider, and intervention factor scores leads to an increase in the acceptability scores by 4.70% (1.45 - 7.96), 15.72% (10.20 - 21.23), 11.20% (6.73 - 15.66) and 7.95% (4.46 - 11.44) on average respectively.

Patient and intervention-related factors are significantly associated with the acceptability scores in the adjusted model. A unit increase in the patient factors score leads to an increase in the acceptability score by 5% on average (95% CI -0.39– 10.63; P=0.050). Similarly, a unit increase in the intervention-related factors score leads to an increase in the acceptability score by 7% on average (95% CI 3.42– 10.01; P=0.000).

Table 3.6 Crude and adjusted coefficients of determinants of acceptability of IPT among health care providers in selected HIV clinics

Variable	Unadjusted Coefficients Coeff (95% CI)	p-value	Adjusted Coefficients Coeff (95% CI)	p-value
Sex				
Male (ref)	0.00	-	0.00	-
Female	3.28 (-3.05-9.60)	0.31	0.11 (-4.44 - 4.66)	0.96
Age (Years)	-0.17 (-0.47 – 0.12)		-0.13 (-0.38 – 0.11)	0.28
Job category				
Frontline (ref)	0.00	-	0.00	-
non-frontline	8.79 (3.18-14.40)	0.003*	0.83 (-3.96 – 5.62)	0.35
Years of experience				
< 2 years (ref)	0.00	-	0.00	-
2-4 years	-4.44 (-14.07- 5.20)	0.36	-5.29 (-12.53 - 1.95)	0.15
> 4 years	10.23 (-18.86--1.61)	0.02*	-4.41 (-12.34 - 3.52)	0.27
Policy/Guidelines	4.70 (1.45 - 7.96)	0.01*	0.25 (-2.43 - 2.94)	0.85
Patient factors	15.72 (10.20 - 21.23)	0.00*	5.12 (-0.39 - 10.63)	0.05*
Provider factors	11.20 (6.73 - 15.66)	0.00*	3.06 (-1.08 – 7.20)	0.16
Structural/ operational factors	1.81 (-2.67 - 6.28)	0.42	-0.24 (-3.84 - 3.37)	0.90
Intervention	7.95 (4.46 - 11.44)	0.00*	6.72 (3.42 - 10.01)	0.00*

R-squared (adjusted)=65.4%; ref = reference category; CI=95% confidence interval;
*** Significant at $p \leq 0.05$; coeff=coefficients**

CHAPTER 4: DISCUSSION

4.0. Introduction

This study is among the first to assess the factors influencing the acceptability of IPT among health care providers in selected HIV clinics in Nairobi County, Kenya. From the study, factors influencing the acceptability of IPT fell into six broad categories; policy/guideline-related, intervention-related, patient-related, provider-related, structural and operational factors. Patient and intervention-related factors emerged as significant in the quantitative enquiry.

4.1. Acceptability of IPT among health care providers

Acceptability of IPT among health care providers in the HIV clinics was found to be moderate. The health care providers did not find the intervention fully comfortable, agreeable or satisfactory to use, which was influenced by different factors at different levels. If the delivery of an intervention is considered to have low acceptability, the intervention may not be delivered as intended, which would impact its overall effectiveness (43, 59). Furthermore, acceptability is a proximal indicator of IPT uptake and may be used to model implementation success of the intervention (25). This finding therefore warrants further investigation on the implication of acceptability levels to the delivery of IPT. The literature indicated a paucity of studies assessing the acceptability of IPT in the Kenyan context and the few studies on IPT implementation in Kenya have shown sub-optimal implementation of the intervention (64). The use of a context specific tool is not unique to our study. Quantitative studies on acceptability have employed adapted context specific tools (53, 65).

4.2. Factors influencing the acceptability of IPT among health care providers.

Factors influencing acceptability of IPT emanating from the study were in agreement with those presented in the implementation literature. A review by Durlak and Dupre, 2008 and a synthesis by Damshroder et al. 2009 found that factors influencing implementation outcomes comprised patient, structural, organizational, provider and innovation-level (56, 57). Notably, the qualitative findings were consistent with those from some of the studies conducted to assess the implementation of IPT in low-resource settings.

4.2.1. Policy/ guideline-related factors affecting the acceptability of IPT

Consistent with the study findings, lack of commitment to the IPT programme by higher managers and policy makers has emerged from other studies as a factor that influenced IPT implementation (10, 38). Poor monitoring and lack of supervision of the IPT program by higher managers has been found to influence IPT uptake (10, 37). Participants expressed discomfort with IPT guidelines and SOPs in the facilities and felt that there was pressure from policy makers to implement the intervention This echoes other studies whereby no availability or lack of clarity of guidelines was found to be a major barrier to IPT implementation (37, 39). Identification of latent TB has emerged as a challenge that affected IPT implementation in low-resource settings, and health care providers have called for clarity of guidelines (45). Development of operational guidelines and strong policy presence has been considered essential for effective IPT implementation (44, 66). The quantitative enquiry did not show a significant relationship between policy and guideline-related factors and the acceptability score. However, the importance of policy makers and guidelines in the implementation of evidence-based interventions has been emphasized as well as the interaction between policy makers and practitioners to ensure effective implementation of IPT (15, 67).

4.2.2. Intervention-related factors affecting the acceptability of IPT

Factors concerning the interventions themselves affect the implementation outcomes of evidence-based interventions in health care (56-58). This lends support to our findings that intervention-related factors greatly influenced the acceptability of IPT among the health care providers. The few studies conducted in sub-Saharan Africa to date have found fear of drug resistance among health care providers, patients and policy makers as an important influencing factor of IPT implementation, especially driven by high prevalence of MDR and XDR-TB in these contexts (37, 44, 68). This finding, despite this study being largely exploratory, is cause for concern with the gradual increase in drug-resistant TB cases in Kenya from 112 to 433 in 2015, as reported by the NTLD-Program (20). Both rifampicin and Isoniazid resistance has been reported in the pulmonary and extra pulmonary TB cases, 41% of whom were co-infected with HIV and TB (20). Uncertainty on the effectiveness of IPT in preventing TB, discomfort with the duration and the difficulty with IPT-related activities and procedures were also found the influence acceptability of the intervention. A 2009 study on the implementation of CTXp and IPT policy recommendations among 69 high burden countries for HIV infection found uncertainty on the long term benefits of IPT among policy makers as one of the key impediments to the implementation of IPT policy nationally (44). Similarly, prescribers were unaware of the benefits of IPT and unclear about guidelines in a 2010 Ethiopia study (37). Intervention-related factors were significantly related to the acceptability of the intervention in the quantitative enquiry. Investigation of optimal duration, safety and efficacy of IPT and its role in reducing the risk of active TB, particularly under programme conditions has been strongly recommended by the WHO, Stop TB plan (36).

4.2.3. Provider-related factors affecting the acceptability of IPT

Provider-level factors have been hypothesized to predict implementation outcomes from rigorous reviews of empirical results as well as existing conceptual frameworks (56, 57). Limited information and empowerment on IPT was found as an influencing factor to the

acceptability of IPT. This is consistent with other studies conducted in sub-Saharan Africa. A study conducted in South Africa found lack of knowledge and experience with IPT to be the primary barrier to IPT implementation (37). Similarly, lack of training and guidelines was a considered an influencing factor of IPT implementation in a 2016 mixed methods study conducted in Ethiopia (10). Providers form part of the prevention delivery system who implement innovations in the field, according to the ISF. Training and information regarding an innovation should be adequately provided by the support system before implementation to achieve the desired outcomes (18). Similarly, technical assistance was recommended by Durlak and Dupre, 2008 to be important once implementation has begun including retraining of the providers, training new staff, emotional support, and mechanisms to promote local problem solving (56). The NIRN implementation drivers contain training as one of the important competency drivers to produce consistent use of innovation and reliable outcomes (69). Perceptions of health care providers were affected by the attitudes and perceptions of their colleagues. Innovation climate for implementation has been reported in the literature to affect the implementation of health innovations (58). Providers recommended more research and dissemination of evidence on the effectiveness of IPT and program outcomes from the local context. This has also been mentioned as a recommendation of other studies on IPT implementation by health care practitioners as well as policy makers (44).

4.2.4. Patient-related factors affecting the acceptability of IPT

Patient-level predictors explain meaningful variance in implementation outcomes and are considered important factors that must be measured when assessing the implementation of interventions (58). Patient-related factors identified from this study included poor adherence, pill burden, lack of adequate information on IPT and fear of adverse effects among the patients. These findings are consistent with studies that have been conducted in the sub-Saharan African context on IPT implementation. A recent study conducted in Kenya found

fear of TB acquisition and relationship with health care providers as factor that influenced the initiation of IPT among patients (64). Teklay et al. 2016 found drug side-effects, pill burden and poor adherence among patients to be barriers to the implementation of IPT in an Ethiopian setting (10). INH has been reported from randomized studies to have some side-effects. Adherence to IPT treatment is a critical factor that needs to be considered when scaling up treatment services in developing countries (70, 71). A long-standing question that has caused uncertainty among policy makers, health care providers and practitioners has been the implications of adherence to drug-resistant TB disease especially in the case of long course INH mono-therapy (70). Policy makers have indicated that concerns regarding inadequate patient adherence potentially leading to INH mono-resistance was a barrier to national IPT policy implementation (44). A study conducted in resource-constrained settings in Addis Ababa found poor adherence to be an influencing factor to IPT implementation in addition to lack of patient empowerment and proper counselling for IPT by health care providers (38). A study conducted in Zimbabwe assessing a district's IPT programme implementation found cessation of IPT due to INH toxicity, development of TB during IPT and pill burden for the HIV patients as influencing factors to implementation (39). Patient-level factors emerged from the quantitative survey to have a significant relationship with the acceptability scores of the participants, which reiterates the importance of these factors in the acceptability of IPT in this context. As in the study, advocacy for IPT at national and international level has been recommended to improve information on IPT among patients in order to boost uptake (44). The Global Plan to Stop TB has also recommended the investigation of implementation of IPT recommended policies on the proportion of PLHIV who develop TB disease and mortality (36).

4.2.5. Structural and operational factors affecting the acceptability of IPT

Health care providers requested better integration among IPT-related services to enable smoother operations in the facility. These findings are not unique to this study alone. For instance, Lester et al. found lack of coordination between TB and HIV activities as a barrier mentioned by staff to IPT implementation (37). A similar study indicated that performing, reading and interpreting TSTs in the context of busy HIV clinics was a challenge for both patients and staff and hence affected the IPT program (45). Likewise, a policy-implementation study of IPT found logistic difficulties in diagnosing latent TB infection as one of the barriers affecting implementation (44). Heavy workload for the clinicians and INH stock-outs in the HIV clinics has been reported from other studies to affect IPT implementation, which is consistent with our findings. Evaluation of the IPT program in a district in Zimbabwe reported health workers' being overwhelmed by other competing programs apart from IPT that compromised the quality of implementation (39). This inadequacy of formally trained staff compromises the quality of HIV/TB care, which includes the IPT program (39). A major problem with IPT implementation in studies conducted is the stock-out of INH in the facilities. This emerged as a major influencing operational factor from our study. INH supply for the intervention has been reported to be irregular in different studies which affected the implementation of the intervention (10, 39).

4.3. Implications of the study findings to policy and practice

This study has many implications for policy makers, IPT program managers and health care providers in the study sites.

The findings of the study highlight the need for further research on the implementation of IPT in Kenya. IPT program managers and health care providers both have a role to play in promoting successful implementation of IPT to ensure that intended patient outcomes are achieved. This includes ensuring that the intervention is fully acceptable among health care

providers as well as patients. Program managers should collaborate with researchers to conduct further studies on IPT implementation to identify key barriers and facilitators of IPT implementation.

The study also highlights the important role that health care providers play in the implementation of IPT. While health care providers receive implementation guidelines from the policy makers, they should be involved every step of the way, from development to revision of guidelines for IPT, being the frontline implementers who deliver the intervention. This can be achieved through data driven decision making from the health facilities which is a key recommendation from the study.

4.4. Limitations of the study

Since the study was context specific leading to the development of a tool, the findings emanating from the study are not expected to be reproduced in other HIV clinics in Nairobi County. However, it is expected that the tool can be adapted for collection of acceptability data in different contexts. Additionally, the study findings cannot be generalised to other HIV clinics in Nairobi County since the facilities were purposefully selected for the study.

The small sample size for the quantitative survey may have limited the ability to detect an existing effect of the explanatory variables on the outcome. In this case, the failure to observe a possible association between determinants of acceptability and acceptability scores. Only two determinants were significantly associated with the acceptability scores in the quantitative inquiry which may have been due to the effect of small sample size. However, while the qualitative inquiry gave an understanding of factors affecting acceptability of IPT, the quantitative survey served to present the magnitude of this relationship.

This study was conducted among city hospitals which are assumed to be better resourced than those in other locations. Therefore, the IPT program was expected to be better managed as opposed to other non-city facility clinics. This could contribute to over-reporting of

acceptability levels of IPT among the providers. Hence, the acceptability findings were context specific to the selected HIV clinics.

4.5. Strengths of the study

Despite the aforementioned limitations, the study has a number of strengths.

Firstly, the study employed mixed methods which provided a better understanding of the acceptability of IPT among health care providers than would have been possible with either qualitative or quantitative methods alone.

Furthermore, the data collection for the study was guided by existing theoretical frameworks for implementation research and acceptability measurement. This helped to increase validity of the study and further demonstrates the feasibility of using quided theories and frameworks in tool development for implementation research.

CHAPTER 5: CONCLUSION AND RECOMMENDATIONS

5.1. CONCLUSION

In conclusion, IPT is not considered fully comfortable, agreeable or satisfactory to use by health care providers in the context of three HIV clinics in Nairobi County. This is influenced by different factors at different levels.

The use of mixed methods enabled the elucidation of context specific factors that influenced acceptability as well as presenting a clear picture of the implementation outcome. The feasibility of using theoretical frameworks to guide the assessment of implementation outcomes has also been demonstrated in the study.

Factors that influenced the acceptability of IPT in the HIV clinics included policy/guideline-related factors, patient-related factors, provider-related factors, intervention-related factors, structural and operational factors. Notably, patient and intervention-related factors emerged as important predictors of acceptability as they were significantly related to acceptability scores in the quantitative survey.

5.2. RECOMENDATIONS

1. The results from this exploratory study give prospects for further research on the implementation of IPT by health care providers in HIV clinics. Considering the limitation to generalizability of our study findings, the study should be scaled up in Nairobi County and other high HIV and TB burden settings in Kenya.
2. Development of operational guidelines and strong policy presence are required to improve the acceptability of IPT among health care providers in the clinics. This may be achieved through collaboration and concerted efforts among policy-makers, program managers and health care providers from the HIV clinics. The fact that health

care providers expressed discomfort with guidelines and perceived a lack of commitment to implement the intervention should be concerning. This calls for operational research and data-driven decision making by policy makers and program managers on factors affecting implementation of IPT in the context of the three HIV clinics.

3. As an initial step to improve the acceptability of IPT among health care providers in the HIV clinics, patient and intervention-related influencing factors should be acted upon by program managers in collaboration with facility administrators and health care providers. This will effectively require advocacy for IPT and dissemination of context-specific information regarding benefits of IPT among providers and patients. This requires a strategic plan developed among stakeholders involved to improve IPT acceptability considering all the identified factors.
4. The research has demonstrated the feasibility of assessment of acceptability using a context-specific quantitative tool guided by existing frameworks. It is recommended that future research should consider adapting the tool in their measurement of acceptability. Content and construct validity of the tool as well as reliability tests in measuring acceptability among health care workers should be assessed to enable repeated measures of acceptability using a single tool.
5. Lastly, the author recommends the assessment of other implementation outcomes at policy-level, organizational and provider-level to give a better picture of IPT implementation success and quality. This includes but not limited to the fidelity of IPT implementation by health care providers in HIV clinics. Subsequently, the feasibility of quality improvement in improving IPT implementation in HIV/TB health care settings should be explored.

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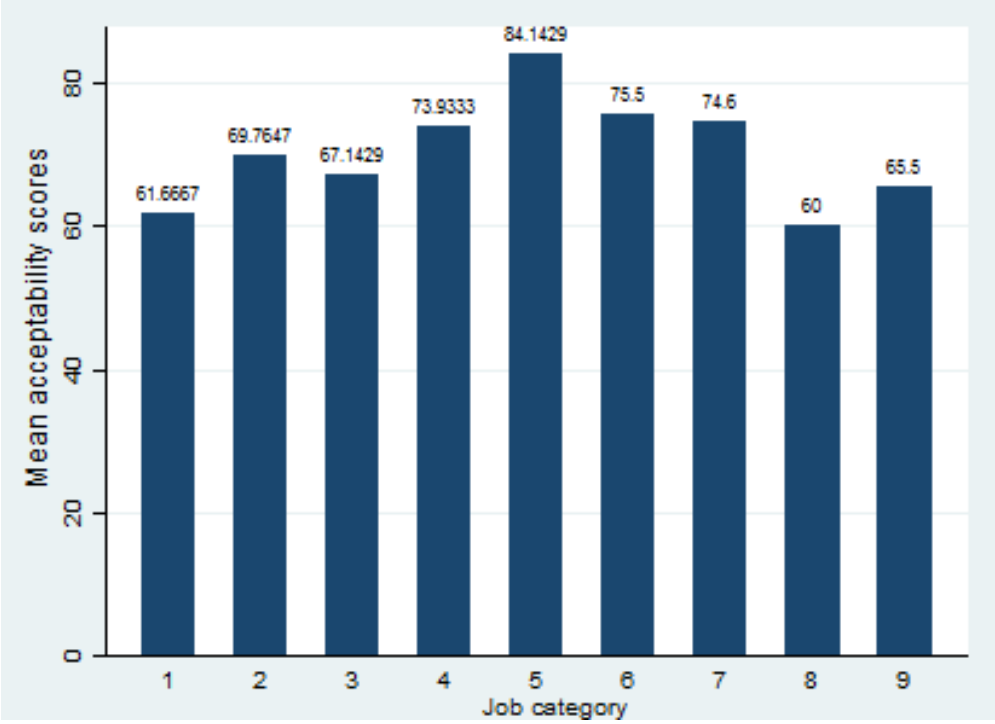
APPENDICES

APPENDIX A: ADDITIONAL FIGURES

. **Figure A1 Distribution of acceptability scores across the study population**



Key: 1=Clinical officer, 2=Nurse, 3=Pharmacist, 4=Counsellor, 5=Peer educator, 6= Medical Social Worker, 7=Nutritionist, 8=Clinical psychologist, 9=Laboratory scientist

Figure A2 Distribution of the mean acceptability scores by job category of the health care providers

APPENDIX B: INFORMATION SHEET AND INFROMED CONSENT FOR IN-DEPTH INTERVIEWS

School of Public Health
University of the Witwatersrand, Johannesburg

Information sheet for in-depth interviews.

Good day.

Introduction:
My name is Elvis Omondi Achach Wambiya and I am an MSc Epidemiology (Implementation Science) student at the School of public Health, University of the Witwatersrand, Johannesburg, South Africa.

Purpose of the study and methods:
I am conducting a study to assess the acceptability of IPT (Isoniazid Preventive Therapy) among health care providers in selected HIV clinics in Nairobi County, Kenya. This research is a partial fulfilment of the requirements for the degree of MSc Epidemiology (Implementation Science) from the University of the Witwatersrand, Johannesburg, South Africa. The study utilized a mixed methods approach and therefore will involve in-depth interviews as well as filling in of a questionnaire. In-depth interviews will be conducted first and after analysis, participants will be required to fill a refined questionnaire.

Invitation to participate:
As a health care provider in one of the select facilities for the research, you have been selected to participate in this interview because we believe that you will be able to provide us with valuable information about IPT. We would like to invite you to participate in this study and to request your permission to conduct an interview with you.
We would also kindly request your permission to audio tape record the interview to enable analysis of the data and document the findings. The interview will take place in a private and conducive location at your convenience.
I would like to know your thoughts and perceptions about the intervention, as well as factors you think affect the way you feel about the intervention. This will include personal/ individual views as well as views about how the environment or organization as well as other factors affect your perception of IPT.

Benefits and Risks:
Though the study has no direct benefit to you, your views will help to highlight the quality of TB care that is offered to PLHIV at your clinic. This will not only be useful to health care providers and facility administrators but also to policy makers to improve IPT administration.

There is no anticipated risk of harm from participating in the study. However, if you experience any distress following participation you are encouraged to inform the researcher and contact the resources provided at the end of this sheet.

Confidentiality and anonymity:
All information will be kept confidential. No one apart from the researcher and supervisors will know what you have said. The audio recordings from the interview will be stored in a password protected computer for a maximum period of two years after publication of the study in a peer-reviewed journal, after which they will be deleted from the computer storage entirely. In case the findings are not published, the audio recording will be stored in a password protected computer for a maximum period of six years after which they will be deleted from the computer storage entirely.

The typed version of your interview will be made anonymous by removing any identifying information including your name from the transcript and allocating a research code, known only to the researcher. Any direct quotations from your interview used in the research report or publications from the study will be anonymized and your name will not appear. All your personal data will be confidential and will be kept separate from your interview responses and stored safely in a password protected computer.

Voluntariness:
Participation in the interview is voluntary and you are free to withdraw your participation at any time during the session without any recourse. Similarly there will be no negative consequences if you do not want to be interviewed. You will be asked to sign a consent form to show that you voluntarily agreed to take part.

Reimbursement:
Please note that there will be no reimbursement for taking part in the interview.

Duration:
The interview will take about one and a half hours will be conducted in English language and as per your convenience.

This study has been reviewed by the University of the Witwatersrand Faculty of Public Health and the Wits Human Research Ethics Committee (Medical).

If you have any concerns or questions regarding any aspect of this study, please contact me or my supervisors on:

Elvis Omondi Achach Wambiya
Tel No. **+254797184545**
Email: **eowambiya@gmail.com**

Dr. Latifat Ibisomi (Supervisor)
Senior Lecturer and Course Coordinator,
School of Public health,
The University of the Witwatersrand.
Email: **Latifat.Ibisomi@wits.ac.za**

Dr. Martin Atela (Supervisor)
Knowledge Translation Scientist - AFIDEP (African Institute of Development and Policy),

Lecturer – School of public Health, University of Nairobi,
Nairobi,
Kenya.
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In case of any complaint or other concerns about any aspect of this study, please get in touch with the Ethics Committee on the following contacts:

Chairperson: **peter.cleaton-jones1@wits.ac.za**
Administrators - Ms Zanele Ndlovu/ Mr Rhulani Mkansi/ Mr Lebo Moeng
Tel: 011 717 2700/2656/1234/1252
Email: HREC-Medical.ResearchOffice@wits.ac.za

Consent for in-depth Interviews

I have been presented with the Information sheet for the study on acceptability of Isoniazid Preventive Therapy among health care providers in selected HIV clinics in Nairobi County, Kenya. I have read and understood the Information sheet and all my questions have been answered to my satisfaction.

I understand that it is my decision whether or not to participate in the interview and that there will be no negative consequences if I decide not to participate. I also understand that I do not have to answer any questions that I am uncomfortable with and that I can stop the interview at any time.

I understand that the researchers involved in this project will ensure confidentiality and that my name will not be used in the study reports, and that comments that I make will not be reported back to anybody else.

Yes, I consent voluntarily to be interviewed	☐
No, I do not give consent to be interviewed	☐

Interviewee's signature: _____ Date: _____

Consent to tape record the interview

I have read the project information sheet, and I understand that it is my decision whether or not the interview is tape-recorded. My decision will not affect in any way how the interviewer treats me if I do not want the interview to be tape-recorded.

I understand that if the interview is tape-recorded that the tape will be destroyed two years after the interview.

I understand that I can ask the person interviewing me to stop tape recording, and to stop the interview altogether, at any time.

I understand that the information that I give will be treated confidentially and that my name will not be used when the interviews are typed up.

Yes, I give my permission for the interview to be tape recorded	☐
No, I do not give my permission for the interview to be tape recorded	☐

Interviewee's signature: _____ Date: _____

APPENDIX C: INTERVIEW GUIDE FOR FACTORS AFFECTING ACCEPTABILITY OF IPT AMONG HEALTH CARE PROVIDERS IN SELECTED HIV CLINICS IN NAIROBI COUNTY.

PART A: General information:

Please tick (✓) on an appropriate answer of your choice or fill the blanks accordingly

Health facility Information:

1. Hospital Name: _____
2. Level of health facility:_____
3. Constituency:_____
4. HIV/TB integrated services model:
   Partial integration ( )
   Full integration ( )

Health Worker Demographic details:

5. Sex:
   Male ( ) Female ( )

6. Age: _____ Years
7. Job Category:
   General practitioner/ doctor ( )
   Clinical officer ( )
   Nurse ( )
   Community health worker ( )
   HIV counsellor ( )
   Other (specify)_____

8. Years of experience in the HIV/TB department:
   (a) Less than 1 year
   (b) 2 - 4 years
   (c) More than 4 years

Part B:

Briefly introduce yourself in terms of your background and your work in the clinic.

1. (a) What do you think about IPT as an intervention for TB prevention in PLHIV?
   (b) May I know about your satisfaction and comfort with the intervention?
   (c) What factors make you feel that way about the intervention?

2. How does the environment of the HIV clinic affect your delivery of IPT to your patients? (probe on the environment within the clinic/ health facility and the environment outside the heath facility i.e. community)

3. How does the management affect your delivery of IPT to PLHIV at the facility? (Probe on the management of the clinic, management of the entire health facility, County/ district management of health services)

4. (a) How would you describe your colleagues' perception of IPT delivery to PLHIV?
   (b) How does their perception affect your perception and delivery of IPT for PLHIV?

5. How do you think personal level factors affect your delivery of IPT to PLHIV at the facility? (Probe on level of experience, training and any other factors that the participants may think about or mention)

6. (a) Could you please describe your patients' response to IPT?
   (b) Are there any patient level factors affect your delivery of IPT to other patients? How do they affect your perception of the intervention?

7. If you had a chance, is there anything you would have liked to change regarding IPT administration at your clinic?

8. To sum it up, what is your overall perception of IPT?

APPENDIX D: INFORMATION SHEET AND INFORMED CONSENT FORM FOR QUESTIONNAIRE SURVEY

School of Public Health

University of the Witwatersrand, Johannesburg

Information Sheet for Questionnaire

Good day.

Introduction:

My name is Elvis Omondi Achach Wambiya and I am an MSc Epidemiology (Implementation Science) student at the School of public Health, University of the Witwatersrand, Johannesburg, South Africa.

Purpose of the study and methods:

I am conducting a study to assess the acceptability of IPT (Isoniazid Preventive Therapy) among health care providers in selected HIV clinics in Nairobi County, Kenya. This research is a partial fulfilment of the requirements for the degree of MSc Epidemiology (Implementation Science) from the University of the Witwatersrand, Johannesburg, South Africa. The study utilizes a mixed methods approach and therefore will involve in-depth interviews as well as filling in a questionnaire survey. Surveys will be conducted after analysis of in-depth interviews.

Invitation to participate:

As a health care provider in one of the select facilities, you have been selected to participate because we believe that you will be able to provide us with valuable information about IPT. We would like to invite you to participate in this study and to request your permission to conduct this survey.

I would like to know your thoughts and perceptions about the intervention, as well as factors you think affect the way you feel about the intervention.

Benefits and Risks:

Though the study has no direct benefit to you, your views will help to highlight the quality of TB care that is offered to PLHIV at your clinic. This will not only be useful to health care providers and facility administrators but also to policy makers to improve IPT administration.

There is no anticipated risk of harm from participating in the study. However, if you experience any distress following participation, you are encouraged to inform the researcher or contact the resources provided at the end of this information sheet.

Confidentiality and anonymity:

All information you provide will be kept confidential. The questionnaire that you fill will be made anonymous and your name will not be attached to it. Instead, the questionnaire will have a research code attached to it which only the researcher will know about. The electronic version of your survey responses will be stored in a password protected computer and the files encrypted to ensure that no one else has access to your given information. Hard copies

of questionnaires will be kept securely in a locked cabinet for ten years. At the end of this period, they will be destroyed.

Voluntariness:
Participation in the survey is voluntary and you are free to withdraw your participation at any time during the session without any recourse. There will be no negative consequences if you do not want to be interviewed. You will be asked to sign a consent form to show that you voluntarily agreed to take part.

Reimbursement:
Please note that there will be no reimbursement for taking part in responding to the survey.

Duration:
The survey will take about half an hour to complete and will be in English language.

Data collected will be compiled in a thesis report, and may be shared in publications or presentations.

Contacts:

If you have any concerns or questions regarding any aspect of this study, please contact me or my supervisors on:

Elvis Omondi Achach Wambiya
Tel No. **+254797184545**
Email: **eowambiya@gmail.com**

Dr. Latifat Ibisomi (Supervisor)
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School of Public health,
The University of the Witwatersrand.
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Dr. Martin Atela (Supervisor)
Knowledge Translation Scientist - AFIDEP (African Institute of Development and Policy),
Lecturer – School of public Health, University of Nairobi,
Nairobi,
Kenya.
Email: **martin.atela@afidep.org**

In case of any complaint or other concerns about any aspect of this study, please get in touch with the Ethics Committee on the following contacts:

Chairperson: **peter.cleaton-jones1@wits.ac.za**
Administrators - Ms Zanele Ndlovu/ Mr Rhulani Mkansi/ Mr Lebo Moeng
Tel: 011 717 2700/2656/1234/1252
Email: HREC-Medical.ResearchOffice@wits.ac.za

INFORMED CONSENT FORM

I consent and volunteer to participate in a study to assess the acceptability of Isoniazid Preventive Therapy among health care providers in selected HIV clinics in Nairobi County, Kenya.. The study is being conducted by Mr. Elvis Omondi Achach Wambiya; a Master's student from University of the Witwatersrand, Johannesburg, South Africa.

I confirm that:

1. I was provided with an information sheet that explained what the study is about I have read and understood the information about the study as provided in the information sheet.
2. I have been given the opportunity to ask questions about the project and my participation.
3. I understand that I will not benefit directly from participating in the study.
4. I understand that I can withdraw at any time without giving reasons and there are will be no risks or penalty for withdrawing.
5. It has been clearly explained to me that the research is confidential and anonymous. i.e. and what I say will not be linked to me as a person and that the information will only be used for this research purpose and not shared with other people that are not part of this research team.
6. It has been clearly explained to me that information from this research may be used in a thesis report, publications or presentations.

Participant

Signature: _____ Date: _____

APPENDIX E: QUESTIONNAIRE FOR ACCEPTABILITY OF IPT AMONG HEALTH CARE PROVIDERS

Code: …….

Date: ……...

A. ***Please give the health facility details below by ticking [✓] against your selected response.***

FACILITY DETAILS	
Hospital Name	**Kenyatta National Hospital [ ]** **Mama Lucy Kibaki Hospital [ ]** **Mbagathi District Hospital [ ]**
Level of health facility	**National referral [ ]** **County referral [ ]** **County Hospital [ ]** **Sub -County Hospital [ ]**
HIV/TB integrated services model	**Partial integration [ ]** **Full integration [ ]**

Please provide your demographic details below by ticking [✓] against your selected response or filling the blanks accordingly.

PARTICIPANT DEMOGRAPHIC DETAILS	
First Name	
Last Name	
Gender	**Male [ ]** **Female [ ]**
Age in Years	☐
Job Category	**Medical officer [ ]** **Clinical officer [ ]** **Nurse [ ]** **Pharmacist [ ]** **Counsellor [ ]** **Other _____**
Years of Experience	**Less than 2 years [ ]** **2 – 4 years [ ]** **More than 4 years [ ]**

B. ***Kindly respond to the following short questions regarding IPT by ticking [✓] on the circle that best represents your response.***

COMFORT/ SATISFACTION WITH THE INTERVENTION					
I always provide IPT (front line providers) / IPT must always be provided (other cadres) to people living with HIV who meet the eligibility criteria	(1) Strongly Agree	(2) Agree	(3) Neither	(4) Disagree	(5) Strongly Disagree
IPT is a very effective intervention in preventing TB in people living with HIV	(1) Strongly Agree	(2) Agree	(3) Neither	(4) Disagree	(5) Strongly Disagree
I have no queries or doubts about IPT	(1) Strongly Agree	(2) Agree	(3) Neither	(4) Disagree	(5) Strongly Disagree
If I was an eligible patient, I would comfortably take the required IPT regimen	(1) Strongly Agree	(2) Agree	(3) Neither	(4) Disagree	(5) Strongly Disagree
I am comfortable with the guidelines set for IPT delivery to people living with HIV	(1) Strongly Agree	(2) Agree	(3) Neither	(4) Disagree	(5) Strongly Disagree
The guidelines set for IPT need some revision	(1) Strongly Agree	(2) Agree	(3) Neither	(4) Disagree	(5) Strongly Disagree
I am concerned about adverse effects and/ or deaths related to IPT among the patients	(1) Strongly Agree	(2) Agree	(3) Neither	(4) Disagree	(5) Strongly Disagree
I am comfortable with the duration of IPT treatment (6 months) to our patients	(1) Strongly Agree	(2) Agree	(3) Neither	(4) Disagree	(5) Strongly Disagree
Patients can still get TB while on IPT treatment	(1) Strongly Agree	(2) Agree	(3) Neither	(4) Disagree	(5) Strongly Disagree

C. ***Kindly respond to the following short questions regarding IPT by ticking [✓] on the circle that best represents your response.***

FACTORS AFFECTING IPT ADMINISTRATION					
Question	**SURVEY SCALE**				
1. Policy makers consulted with the health care providers in the clinic before introduction of the IPT program in the clinic	(1) Strongly Agree	(2) Agree	(3) Neither	(4) Disagree	(5) Strongly Disagree
2. Policy makers consulted with the health care providers in the clinic before revision of the IPT program in the clinic	(1) Strongly Agree	(2) Agree	(3) Neither	(4) Disagree	(5) Strongly Disagree
3. There is pressure from policy makers to deliver IPT to patients	(1) Strongly Agree	(2) Agree	(3) Neither	(4) Disagree	(5) Strongly Disagree

4. IPT may develop resistance to TB- related drugs among the patients	(1) Strongly Agree	(2) Agree	(3) Neither	(4) Disagree	(5) Strongly Disagree
5. I am very confident about the effectiveness of IPT in preventing TB among the patients	(1) Strongly Agree	(2) Agree	(3) Neither	(4) Disagree	(5) Strongly Disagree
6. More research is required on the effectiveness of IPT	(1) Strongly Agree	(2) Agree	(3) Neither	(4) Disagree	(5) Strongly Disagree
7. The procedure for eligibility before IPT delivery takes a long time	(1) Strongly Agree	(2) Agree	(3) Neither	(4) Disagree	(5) Strongly Disagree
8. I need more training and information about IPT	(1) Strongly Agree	(2) Agree	(3) Neither	(4) Disagree	(5) Strongly Disagree
9. I require more evidence/ information on the effectiveness of IPT in preventing TB among the patients	(1) Strongly Agree	(2) Agree	(3) Neither	(4) Disagree	(5) Strongly Disagree
10. I require more evidence/ information on adverse effects and/ or deaths related to IPT among the patients	(1) Strongly Agree	(2) Agree	(3) Neither	(4) Disagree	(5) Strongly Disagree
11. My colleagues are positive about IPT	(1) Strongly Agree	(2) Agree	(3) Neither	(4) Disagree	(5) Strongly Disagree
12. Patients in our clinic adhere to IPT medication	(1) Strongly Agree	(2) Agree	(3) Neither	(4) Disagree	(5) Strongly Disagree
13. IPT increases pill burden to our patients	(1) Strongly Agree	(2) Agree	(3) Neither	(4) Disagree	(5) Strongly Disagree
14. Patients require more information about IPT	(1) Strongly Agree	(2) Agree	(3) Neither	(4) Disagree	(5) Strongly Disagree
15. The clinical state of the patient immunologically and virologically is important before IPT initiation	(1) Strongly Agree	(2) Agree	(3) Neither	(4) Disagree	(5) Strongly Disagree

16. The drug regimen of the patients (ARVs and others) is important before IPT initiation	(1) Strongly Agree	(2) Agree	(3) Neither	(4) Disagree	(5) Strongly Disagree
17. Patients develop severe side-effects while on IPT treatment	(1) Strongly Agree	(2) Agree	(3) Neither	(4) Disagree	(5) Strongly Disagree
18. Patients refuse to take IPT medication	(1) Strongly Agree	(2) Agree	(3) Neither	(4) Disagree	(5) Strongly Disagree
19. IPT related services (screening, drug delivery, support) are well integrated in our clinic	(1) Strongly Agree	(2) Agree	(3) Neither	(4) Disagree	(5) Strongly Disagree
20. The working environment in the clinic is very comfortable	(1) Strongly Agree	(2) Agree	(3) Neither	(4) Disagree	(5) Strongly Disagree
21. There is a high workload for health care providers in the clinic as far as IPT is concerned	(1) Strongly Agree	(2) Agree	(3) Neither	(4) Disagree	(5) Strongly Disagree
22. We experience isoniazid (INH) stock-outs sometimes in the clinic	(1) Strongly Agree	(2) Agree	(3) Neither	(4) Disagree	(5) Strongly Disagree
23. The supply chain of Isoniazid and other IPT related supplies is effective	(1) Strongly Agree	(2) Agree	(3) Neither	(4) Disagree	(5) Strongly Disagree

APPENDIX F: IMPLEMENTATION LITERATURE

A number implementation research studies have highlighted the importance of quality and effective implementation of health care interventions and are continually stressing the importance of assessing the implementation of health interventions to ensure desired health outcomes (22-24, 56). Effective evidence-based interventions often fail to produce their desired outcomes due to the 'implementation gap' that exists between knowledge or evidence and practice (16, 17, 19, 72). There is therefore a need for bridging that gap to ensure that evidence-based programs in health care produce their desired outcomes (16, 18, 19, 67).

Implementation researchers have developed different theories, frameworks and models to understand, guide and assess the implementation of interventions. This has been inspired by the need to effectively bridge the research to practice gap (73). Wandersman et al. 2008 developed the interactive systems framework (ISF) to guide effective implementation by describing the systems and processes involved in moving from research and testing to widespread implementation (18). It highlights three systems required to carry out functions necessary for dissemination and implementation, namely: synthesis and translation system, support system and delivery system. Meyers et al. 2012 enhanced the ISF's emphasis on implementation by developing the Quality Implementation Framework (QIF) through a synthesis of previous literature on 25 different implementation frameworks (74). The QIF presents critical steps in the implementation process along with specific activities to be followed to achieve quality implementation (74).

Frameworks and models have also been developed for factors hypothesized to influence implementation of interventions. Durlak and Dupre (2008) developed the ecological framework for understanding effective implementation where they hypothesized that implementation is influenced by five categories of variables: innovations, providers, communities, the prevention delivery system (i.e., features related to organizational capacity) and the prevention support system (i.e., training and technical assistance), the latter two

factors connected to the ISF (56). Some of the factors identified by Durlak and Dupre (2008) were consistent with literature from other researchers (73). Damschroder et al (2009) reviewed existing implementation theories and frameworks to identify common constructs that affect successful implementation across a wide variety of settings. Their resulting typology, Consolidated Framework for implementation Research (CFIR), largely overlaps with Durlak and Dupre's (2008) analysis where they concluded that structural, organizational, provider and innovation-level factors predicted implementation outcomes (57). Chaudoir et al. (2013) went ahead to evaluate measures available to assess constructs within five factors hypothesized to predict implementation outcomes, namely: structural-, organizational-, patient-, provider- and innovation-level (58). Structural, patient and innovation factors were less frequently assessed by the measures (58).

Context plays a central role in implementation research and its importance when conducting implementation research has been highly emphasized by different authors (15, 23, 24, 75). Contexts in which implementation efforts occur are complex and involve multiple interacting levels (e.g., providers, patients, teams, service units) with wide variation across settings (24). This must be taken into account while conducting the research. An evidence-based practice (EBP) may fail to be adopted or may be adapted with compromised fidelity due to contextual pressures (24). Therefore implementation research requires clear, consistent and collective use of theory to build knowledge about what works, where it works and why it does (76).

A wide range of qualitative and quantitative methods can be used in implementation research. Most implementation evaluation processes involve mixed qualitative and quantitative measures and have been highly recommended in implementation research (15). Research methods specifically developed to answer implementation research questions include: pragmatic trials, effectiveness-implementation hybrid trials, quality improvement studies, participatory action research and mixed methods research (15).

APPENDIX G: RESEARCH PERMIT FROM NACOSTI, KENYA

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Telephone:+254-20-2213471, 2241349,3310571,2219420
Fax:+254-20-318245,318249
Email:dg@nacosti.go.ke
Website: www.nacosti.go.ke
when replying please quote

9th Floor, Utalii House
Uhuru Highway
P.O. Box 30623-00100
NAIROBI-KENYA

Ref: No. **NACOSTI/P/17/46504/16244**

Date: **31st March, 2017**

Elvis Omondi Achach Wambiya
University of the Witwatersrand
SOUTH AFRICA.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on ***"Acceptability of isoniazid preventive therapy among health care providers in selected HIV Clinics in Nairobi County, Kenya,"*** I am pleased to inform you that you have been authorized to undertake research in **Nairobi County** for the period ending **30th March, 2018.**

You are advised to report to **the County Commissioner, the County Director of Education and the County Director of Health Services, Nairobi County** before embarking on the research project.

On completion of the research, you are expected to submit **two hard copies and one soft copy in pdf** of the research report/thesis to our office.

DR. STEPHEN K. KIBIRU, PhD.
FOR: DIRECTOR-GENERAL/CEO

Copy to:

The County Commissioner
Nairobi County.

COUNTY COMMISSIONER
NAIROBI COUNTY
P. O. Box 30124-00100, NBI
TEL: 341666

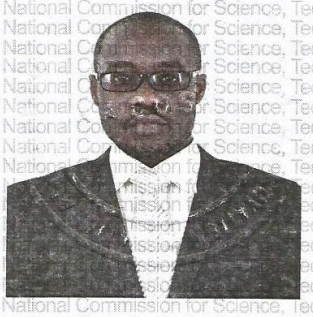
The County Director of Education
Nairobi County.

THIS IS TO CERTIFY THAT:
MR. ELVIS OMONDI ACHACH WAMBIYA
of UNIVERSITY OF THE WITWATERSRAND, SOUTH AFRICA., 0-242 KITENGELA,has been permitted to conduct research in *Nairobi County*

on the topic: *ACCEPTABILITY OF ISONIAZID PREVENTIVE THERAPY AMONG HEALTH CARE PROVIDERS IN SELECTED HIV CLINICS IN NAIROBI COUNTY, KENYA.*

for the period ending:
30th March,2018

Permit No : NACOSTI/P/17/46504/16244
Date Of Issue : 31st March,2017
Fee Recieved :Ksh 1000



.....
Applicant's Signature

.....
Director General
National Commission for Science, Technology & Innovation

APPENDIX H: ETHICS CLEARANCE LETTER FROM KNH-ERC, KENYA

UNIVERSITY OF NAIROBI
COLLEGE OF HEALTH SCIENCES
P O BOX 19676 Code 00202
Telegrams: varsity
Tel:(254-020) 2726300 Ext 44355

KNH-UON ERC
Email: uonknh_erc@uonbi.ac.ke
Website: http://www.erc.uonbi.ac.ke
Facebook: https://www.facebook.com/uonknh.erc
Twitter: @UONKNH_ERC https://twitter.com/UONKNH_ERC

KENYATTA NATIONAL HOSPITAL
P O BOX 20723 Code 00202
Tel: 726300-9
Fax: 725272
Telegrams: MEDSUP, Nairobi

KENYATTA NATIONAL HOSPITAL APPROVED 20 FEB 2017 KNH/UoN-ERC P.O. Box 20723-00202 NBI

Ref: KNH-ERC/A/53

20th February 2017

Elvis Omondi Achach Wambiya
Reg. No.1478990
Wits School of Public Health
The University of Witwatersrand
Johannesburg, South Africa

Dear Elvis

REVISED RESEARCH PROPOSAL: "ACCEPTABILITY OF ISONIAZID PREVENTIVE THERAPY AMONG HEALTH CARE PROVIDERS IN SELECTED HIV CLINICS IN NAIROBI COUNTY, KENYA (P11/01/2017)

This is to inform you that the KNH- UoN Ethics & Research Committee (KNH- UoN ERC) has reviewed and **approved** your above revised proposal. The approval period is from 20th February 2017 – 19th February 2018.

This approval is subject to compliance with the following requirements:

a) Only approved documents (informed consents, study instruments, advertising materials etc) will be used.
b) All changes (amendments, deviations, violations etc) are submitted for review and approval by KNH-UoN ERC before implementation.
c) Death and life threatening problems and serious adverse events (SAEs) or unexpected adverse events whether related or unrelated to the study must be reported to the KNH-UoN ERC within 72 hours of notification.
d) Any changes, anticipated or otherwise that may increase the risks or affect safety or welfare of study participants and others or affect the integrity of the research must be reported to KNH- UoN ERC within 72 hours.
e) Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. (*Attach a comprehensive progress report to support the renewal*).
f) Clearance for export of biological specimens must be obtained from KNH- UoN ERC for each batch of shipment.
g) Submission of an *executive summary* report within 90 days upon completion of the study. This information will form part of the data base that will be consulted in future when processing related research studies so as to minimize chances of study duplication and/ or plagiarism.

APPENDIX I: ETHICAL CLEARANCE LETTER FROM KEMRI-ERC, KENYA

KENYA MEDICAL RESEARCH INSTITUTE

P.O. Box 54840-00200, NAIROBI, Kenya
Tel: (254) (020) 2722541, 2713349, 0722-205901, 0733-400003, Fax: (254) (020) 2720030
E-mail: director@kemri.org, info@kemri.org, Website. www.kemri.org

KEMRI/RES/7/3/1 **March 13, 2017**

TO: **ELVIS OMONDI ACHACH WAMBIYA, (PRINCIPAL INVESTIGATOR),**
THE UNIVERSITY OF THE WITWATERSRAND

Dear Sir,

RE: **PROTOCOL NO. NON-KEMRI 562 (*RESUBMISSION OF INITIAL SUBMISSION*): ACCEPTABILITY OF ISONIAZID PREVENTIVE THERAPY AMONG HEALTH CARE PROVIDERS IN SELECTED HIV CLINICS IN NAIROBI, COUNTY, KENYA**

Reference is made to your letter dated 27th February, 2017. The KEMRI/Scientific and Ethics Review Unit (SERU) acknowledges receipt of the revised study documents on the 1st March, 2017.

This is to inform you that the Committee noted that the issues raised during the 260th Ethics Review Committee (ERC) meeting held on 14th February, 2017 have been adequately addressed.

Consequently, the study is granted approval for implementation effective this day, **13th March, 2017** for a period of one year. Please note that authorization to conduct this study will automatically expire on **March 12, 2018.** If you plan to continue data collection or analysis beyond this date, please submit an application for continuation approval to SERU by **January 29, 2018**.

You are required to submit any proposed changes to this study to SERU for review and the changes should not be initiated until written approval from SERU is received. Please note that any unanticipated problems resulting from the implementation of this study should be brought to the attention of SERU and you should advise SERU when the study is completed or discontinued.

You may embark on the study

Yours faithfully,

FOR: **DR. EVANS AMUKOYE,**
ACTING HEAD,
KEMRI/SCIENTIFIC AND ETHICS REVIEW UNIT

APPENDIX J: ETHICS CLEARANCE CERTIFICATE FROM WITS HREC

R14/49 Mr Elvis Omondi Achach Wambiya

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M161194

NAME: (Principal Investigator)	Mr Elvis Omondi Achach Wambiya
DEPARTMENT:	Epidemiology and Biostatistics School of Public Health Kenyatta National, Mama Lucy and Mbagathi District Hospitals - Nairobi, Kenya
PROJECT TITLE:	Acceptability of Isoniazid Preventive Therapy among Health Care Providers in Selected HIV Clinics in Nairobi County, Kenya
DATE CONSIDERED:	25/11/2016
DECISION:	Approved unconditionally
CONDITIONS:	The Researcher must provide research permit from National Commission for Science and Technology
SUPERVISOR:	Dr L. Ibisomi and Dr M. Atela
APPROVED BY:	Professor P Cleaton-Jones, Chairperson, HREC (Medical)
DATE OF APPROVAL:	

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Research Office Secretary in Room 301, Third Floor, Faculty of Health Sciences, Phillip Tobias Building, 29 Princess of Wales Terrace, Parktown, 2193, University of the Witwatersrand. I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to resubmit the application to the Committee. **I agree to submit a yearly progress report**. The date for annual re-certification will be one year after the date of convened meeting where the study was initially reviewed. In this case, the study was initially reviewed in November and will therefore be due in the month of November each year. Unreported changes to the application may invalidate the clearance given by the HREC (Medical).

Principal Investigator Signature Date 24/2/2017

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES