

**SCHOOL OF PUBLIC HEALTH
COLLEGE OF HEALTH SCIENCES
UNIVERSITY OF GHANA**

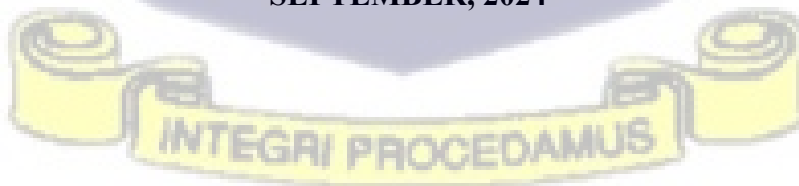


**KNOWLEDGE AND WILLINGNESS TO USE HIV SELF-TESTING AMONG HEALTH
FACILITY CLIENTS IN LA-NKWANTANANG, MADINA**

**BY
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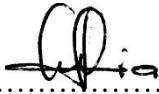
**THIS DISSERTATION IS SUBMITTED TO THE UNIVERSITY OF GHANA, LEGON
IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF A
MASTER OF PUBLIC HEALTH DEGREE**

SEPTEMBER, 2024



DECLARATION

I, LETICIA SEKYIWAA NKRUMAH, affirm that this dissertation is the outcome of my individual effort. Proper recognition has been given to other works referenced. Additionally, I confirm that this dissertation has not been presented for the attainment of any degree in this institution or any other educational institution.



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DEDICATION

I dedicate this work to God, my husband and children.



ACKNOWLEDGEMENT

I first and foremost want to thank God. He is good and His mercy endures forever. I also express my sincere gratitude to my lovely husband, Mr. Dominic Kwaku Nkrumah, and our children and my parents Mr. and Mrs. Yeboah. Also, my sincere gratitude goes out to my supervisor and every other lecturer who helped me along this journey. Finally, I also appreciate Mr. Fred Norviemedey. God richly bless you.



ABSTRACT

Background: HIV remains a significant global public health threat, with Sub-Saharan Africa bearing the burden of over 25 million cases. Despite various efforts, testing rates remain suboptimal, particularly among marginalized groups who face structural barriers such as stigma, concerns about confidentiality, and limited access to healthcare facilities. HIV self-testing (HIVST) has emerged as an innovative, decentralized approach that allows individuals to conduct private and convenient screenings. This method aims to overcome the obstacles associated with traditional facility-based testing. However, uncertainties regarding distribution methods, potential social harms, effective linkage to care, and quality assurance have hindered the large-scale implementation of HIVST.

Objective: The main objective of this study was to determine knowledge and willingness to utilize HIV self-testing among healthcare providers and their clients in La-Nkwantanang Madina Municipality, Ghana.

Methodology: This study employed a mixed methods research design to determine knowledge and willingness to utilize HIV self-testing among health facility clients in La-Nkwantanang Municipality of Madina, Ghana. The quantitative part employed a cross-sectional survey administered among 390 outpatients of Madina Polyclinics (Rawlings Circle and Kekele). For the qualitative part, an in-depth interview was conducted among 9 healthcare providers (including ART Nurses, Laboratory Scientists, Dieticians, and General Nurses) from the two Polyclinics. Knowledge of HIV self-testing was assessed using 11 items covering legality, availability, testing methods, interpretation of results, confirmatory testing, and counseling. Scores were categorized as low (<50%), moderate (50–75%), or high (>75%) knowledge.. Chi-square tests were utilized to examine associations between each independent variable and the outcome. The level of

significance was set at a p-value of 0.05, and the Confidence Interval (CI) was established at 95%. Adjusted odds ratios (AOR) were used to report the strengths of the associations. Thematic analysis was conducted on the qualitative data to explore the healthcare providers' perspectives on implementing the HIVST.

Results: Among the 390 clients surveyed, 39.2% (153) were aware of HIV self-testing (HIVST), 49% had moderate knowledge, and 10% had high knowledge of HIVST. Most of the respondents (77.7%, n=303) expressed a willingness to use HIVST, and 69.0% (n=269) were willing to pay for the kit. Respondents aged 45 years and above were less willing than younger clients (AOR: 0.41; 95% CI: 0.18-0.94, $p = 0.036$). Higher levels of education increased willingness, with participants having basic (AOR: 3.59, 95% CI: 1.11-11.60, $p = 0.033$), secondary, vocational, or technical education (AOR: 5.47, 95% CI: 1.82-16.42, $p = 0.002$), and tertiary education (AOR: 7.33, 95% CI: 2.15-25.03, $p = 0.001$) being more willing compared those with no formal education. Similarly, higher income (1600-2000 Ghana Cedis) was associated with increased willingness compared to lower income groups (AOR: 4.07, 95% CI: 1.05-15.83, $p = 0.043$)

Sexual behavioural factors also played a role. Age at first sex was significantly associated with willingness to use HIVST. Respondents with sexual debut at 25 years or older were less willing to use HIVST compared to those aged 15-19 years (AOR: 0.22, 95% CI: 0.08-0.56, $p = 0.002$). Clients who ever had sex with a stranger (AOR: 2.52, 95% CI: 1.00-6.32, $p = 0.049$), ever had sex under the influence of alcohol (AOR: 2.40, 95% CI: 1.03-5.55, $p = 0.041$), had sex in exchange for money or gift (AOR: 2.70, 95% CI: 1.03-7.11, $p = 0.043$) were more willing to use HIVST compared to those who did not.

Perceptions of the kit also influenced willingness. Those who found the kits credible (AOR: 2.09, 95% CI: 1.06-4.11, $p = 0.033$), safe to use (AOR: 5.18, 95% CI: 2.27-11.83, $p < 0.001$), convenient

to use (AOR: 2.54, 95% CI: 1.02-3.36, $p = 0.045$), easy to use (AOR: 4.39, 95% CI: 2.02-9.52, $p < 0.001$), accessible (AOR: 3.48, 95% CI: 1.19-3.99, $p < 0.001$) were more willing to use it. Also, fear of stigma or discrimination in purchasing kits reduced willingness (AOR: 0.36, 95% CI: 0.21-0.62, $p < 0.001$). Discussion of HIV with others positively influenced willingness (AOR: 3.48, 95% CI: 1.19-3.99, $p < 0.001$).

Healthcare providers identified key barriers to HIVST implementation, including resource and logistical challenges, tracking of results, linkage to care, affordability, accessibility, literacy, and healthcare worker motivations.

Conclusion:

The findings highlight a high level of willingness to use HIVST among clients, influenced by sociodemographic, behavioural, and perceptual factors. Targeted interventions addressing educational disparities, income inequalities, and stigma concerns could enhance uptake. Addressing barriers identified by healthcare providers, such as resource limitations, accessibility, and linkage to care is crucial for the successful implementation of HIVST services in La-Nkwantanang Madina Municipality. These insights are critical for policymakers and healthcare planners in designing effective strategies to promote HIVST adoption and integration into existing healthcare systems.

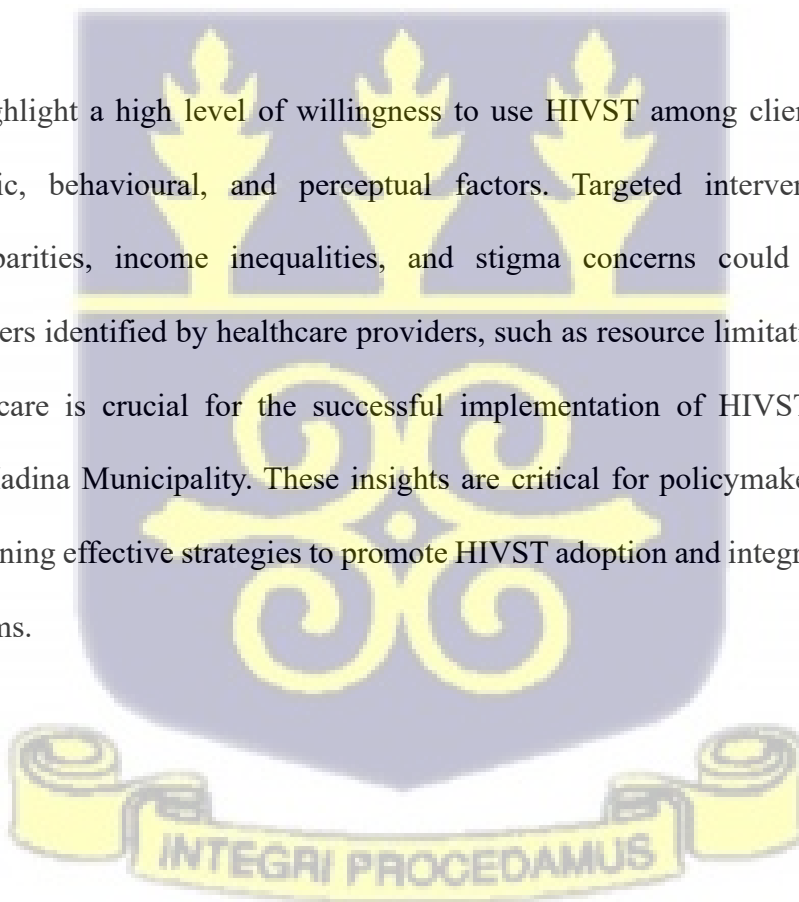


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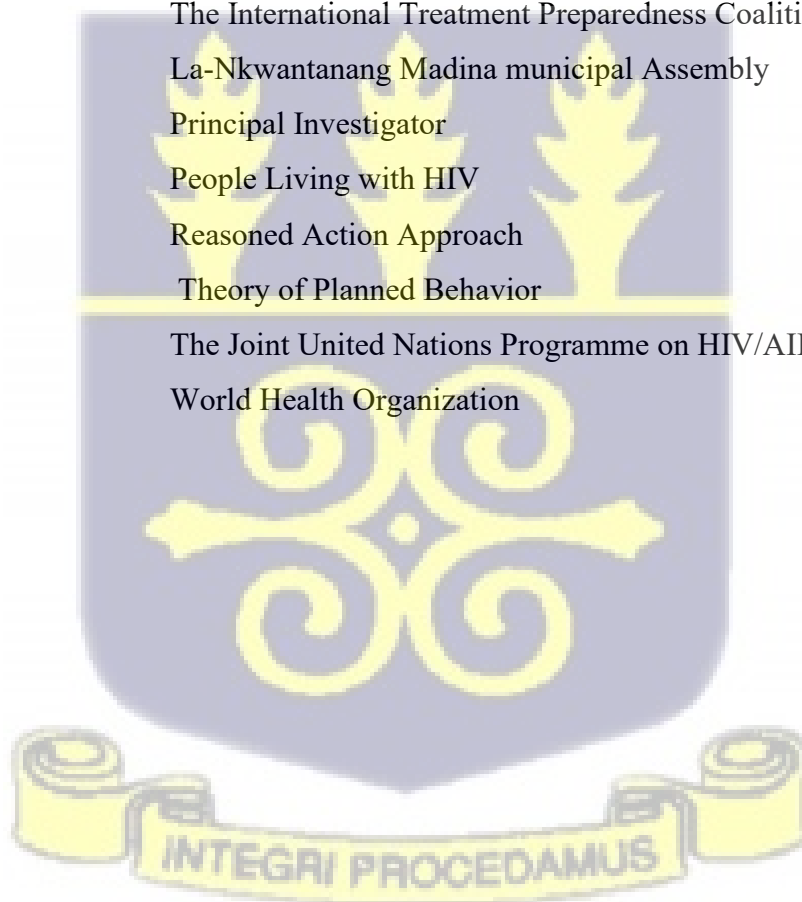


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LIST OF ABBREVIATIONS

Abbreviation	Meaning
AIDS	Acquired Immunodeficiency syndrome
ART	antiretroviral therapy
CHPS	community-based Health Planning
CI	Confidence Interval
GHS-ERC	Ghana Health Service Ethics Review Committee
HBM	Health Belief Model
HIV	human immunodeficiency virus
HIVST	HIV Self-testing
HTS	HIV testing services
ITPC	The International Treatment Preparedness Coalition
LaNMMA	La-Nkwantanang Madina municipal Assembly
PI	Principal Investigator
PLHIV	People Living with HIV
RAA	Reasoned Action Approach
TPB	Theory of Planned Behavior
UNAIDS	The Joint United Nations Programme on HIV/AIDS
WHO	World Health Organization



CHAPTER ONE

INTRODUCTION

1.1 Background

Globally, approximately 40.8 million individuals were living with the human immunodeficiency virus (HIV) in 2024, a number on the rise due to nearly 1.3 million newly acquired infections and the increasing number of individuals undergoing antiretroviral therapy (ART) (UNAIDS, 2024). Among the 40.8 million people living with HIV in 2024, about 25.6 million reside in sub-Saharan Africa, the region most severely impacted by the epidemic. Despite the scale-up of HIV testing, treatment, and prevention programs, an estimated 5.2 million people globally were unaware of their HIV status (UNAIDS, 2024). Timely identification and treatment of human immunodeficiency virus (HIV) are essential for improving the well-being of individuals living with HIV (PLHIV) and for mitigating viral transmission (Jordão et al., 2022; Rodger et al., 2016; Maksud, Fernandes, & Filgueiras, 2015; Grinsztejn et al., 2014). Since 2014, the global public health community has endorsed a set of objectives for addressing human immunodeficiency virus (HIV) commonly referred to as "90-90-90." (UNAIDS, 2014). Ehrenkranz et al., (2021) in a study they conducted on "The revolving door of HIV care" stated that the "90-90-90" plan aimed to achieve the diagnosis of 90% of people living with HIV (PLHIV), administer antiretroviral therapy (ART) to 90% of those identified as HIV-positive, and secure viral suppression in 90% of individuals on ART by the year 2020.

In 2020, the Joint United Nations Programme on HIV/AIDS in a bid to eliminate HIV as a global health threat, these initial targets were further expanded to "95-95-95" by 2030. As of the end of 2024, an estimated **87%** of people living with HIV (PLHIV) worldwide were aware of their status, and **77%** of all PLHIV were receiving antiretroviral therapy (ART) (UNAIDS, 2024).

. However, viral suppression was achieved in only 88% of those on ART, resulting in an overall viral suppression rate of just 59% (Ehrenkranz et al., 2021). In order to meet this "95-95-95" objective by 2030, Monteiro et al., and Marsh et al., in their study conducted in 2019 mentioned that innovative strategies may be introduced to boost the adoption of HIV testing and awareness of HIV status, with a specific emphasis on the utilization of self-testing.

According to Ashburn et al., (2020), knowing one's HIV status is a fundamental requirement for accessing HIV care and treatment services. However, in certain parts of sub-Saharan Africa, only about 48% of individuals living with HIV are aware of their status, highlighting persistent gaps in testing and diagnosis. According to UNAIDS (2024), the region remains at the epicenter of the global HIV epidemic, with approximately 25.6 million people living with HIV. In eastern and southern Africa, treatment coverage is comparatively strong, with about 84% of adults (15+) living with HIV receiving antiretroviral therapy (ART. Despite the expansion of HIV testing services (HTS) through both provider-initiated and community-based approaches, awareness of serostatus continues to lag in several areas

HIV self-testing (HIVST) involves a process wherein an individual collects their sample whether saliva or blood drops and performs a rapid and straightforward laboratory test in a private environment. This empowers the individual to be the first to know and interpret their results (World Health Organization, 2016). Advocates suggest that self-testing has the potential to significantly increase the adoption of HIVST at a minimal cost, yielding substantial impact while empowering users through the entire process. According to Indravudh, Choko & Corbett, (2018), HIV self-testing can potentially tackle major hurdles associated with testing, including concerns about confidentiality and privacy, issues related to stigma and discrimination, accessibility challenges, and the wait time for obtaining results.

1.2 Problem Statement

In Ghana, the HIV epidemic presents significant public health challenges, with a general prevalence rate of 1.6%, but markedly higher rates among female sex workers (4.6%) and men who have sex with men (18.1%) (Ali et al., 2019; Ghana, 2016; Phaswana-Mafuya et al., 2020). Despite increased awareness and efforts to expand HIV testing, only about 55% of individuals living with HIV in Ghana are aware of their status, with testing rates particularly low among high-risk groups. For example, in 2019, only 56.5% of FSWs and 26.6% of MSM had tested within the past year (Nagai et al., 2021; Phaswana-Mafuya et al., 2020). This testing gap hinders Ghana's progress towards the UNAIDS "95-95-95" targets, aimed at reducing new infections and achieving widespread epidemic control by 2025 (Ehrenkranz et al., 2021).

The situation is particularly concerning in the La-Nkwantanang Madina District, which has an HIV prevalence of 6.6%, the second highest in the country (Ghana HIV Fact Sheet, 2019). The district's urban setting, with a mix of mobile populations, informal settlements, and commercial activities, increases vulnerability and creates barriers to consistent healthcare access. HIV self-testing (HIVST) has been promoted as a promising approach, offering individuals a private and convenient way to know their HIV status. However, in La-Nkwantanang Madina, little is known about clients' willingness to adopt HIVST or about the perspectives of healthcare providers on the potential barriers to its implementation. Without this evidence, scaling up HIVST programs in the district may be limited by both demand-side and supply-side challenges.

This study therefore seeks to fill this gap by assessing (1) clients' knowledge and willingness to use HIVST and (2) healthcare providers' perspectives on barriers and feasibility of implementing HIVST within La-Nkwantanang Madina. Findings will contribute evidence to guide programmatic

strategies that can strengthen HIV testing services and reduce undiagnosed infections in one of Ghana's highest-burden districts

1.3 Justification

The global prevalence of HIV continues to pose a critical public health challenge, demanding innovative strategies to improve awareness, testing, and treatment. While the "90-90-90" UNAIDS targets introduced in 2014 aim to increase diagnosis, treatment, and viral suppression rates, progress has been slow, with only 81% of those with HIV aware of their status and a global viral suppression rate of 59% as of 2019 (Ehrenkranz et al., 2021). To bridge these gaps, the "95-95-95" targets have set an ambitious goal for 2030, highlighting the need for enhanced testing initiatives. In this context, HIV self-testing (HIVST) emerges as a promising approach to empower individuals with a confidential and convenient testing option, shown to improve testing rates, reduce stigma, and support earlier diagnoses in sub-Saharan Africa (MacPherson et al., 2014; Ortblad et al., 2018). In Ghana, with its varying prevalence rates across populations, understanding and improving HIV testing strategies is critical, especially in high-prevalence areas like the La-Nkwantanang District, Madina, where HIV prevalence stands at 6.6% (Ghana's HIV Fact Sheet, 2019). However, despite increased awareness of HIVST's potential benefits, there is limited research examining the knowledge, acceptance, and willingness to adopt HIVST among healthcare providers and clients in this district. The La-Nkwantanang District, as a major commercial center with a highly diverse population, presents unique challenges and opportunities for HIV intervention strategies (Ebeny, 2017). This study addresses this gap by investigating the knowledge and willingness of clients to use HIVST and the willingness of healthcare providers to incorporate HIVST into their current services aiming to identify barriers and inform interventions that support increased HIV testing

uptake. Results from this study will provide insights critical to shaping policies, improving health system responses, and achieving national and global goals to reduce undiagnosed HIV cases and ultimately eliminate HIV as a public health threat by 2030.

1.4 Research Questions

1.4.1 Main Research Question

What is the knowledge and willingness of patients/clients to use HIVST, and the willingness of healthcare providers to incorporate HIVST into their current services.

1.4.2 Specific Research Questions

1. What is the current level of knowledge among clients/patients about HIV self-testing in La-Nkwantanang, Madina?
2. What is the willingness of clients/patients to utilize HIV self-testing services in La-Nkwantanang, Madina?
3. What are factors that influence clients/patients' willingness to use HIVST services in La-Nkwantanang, Madina.
4. What are the challenges and barriers in the implementation of HIV self-testing services among healthcare providers in La-Nkwantanang, Madina?

1.5 General Objective

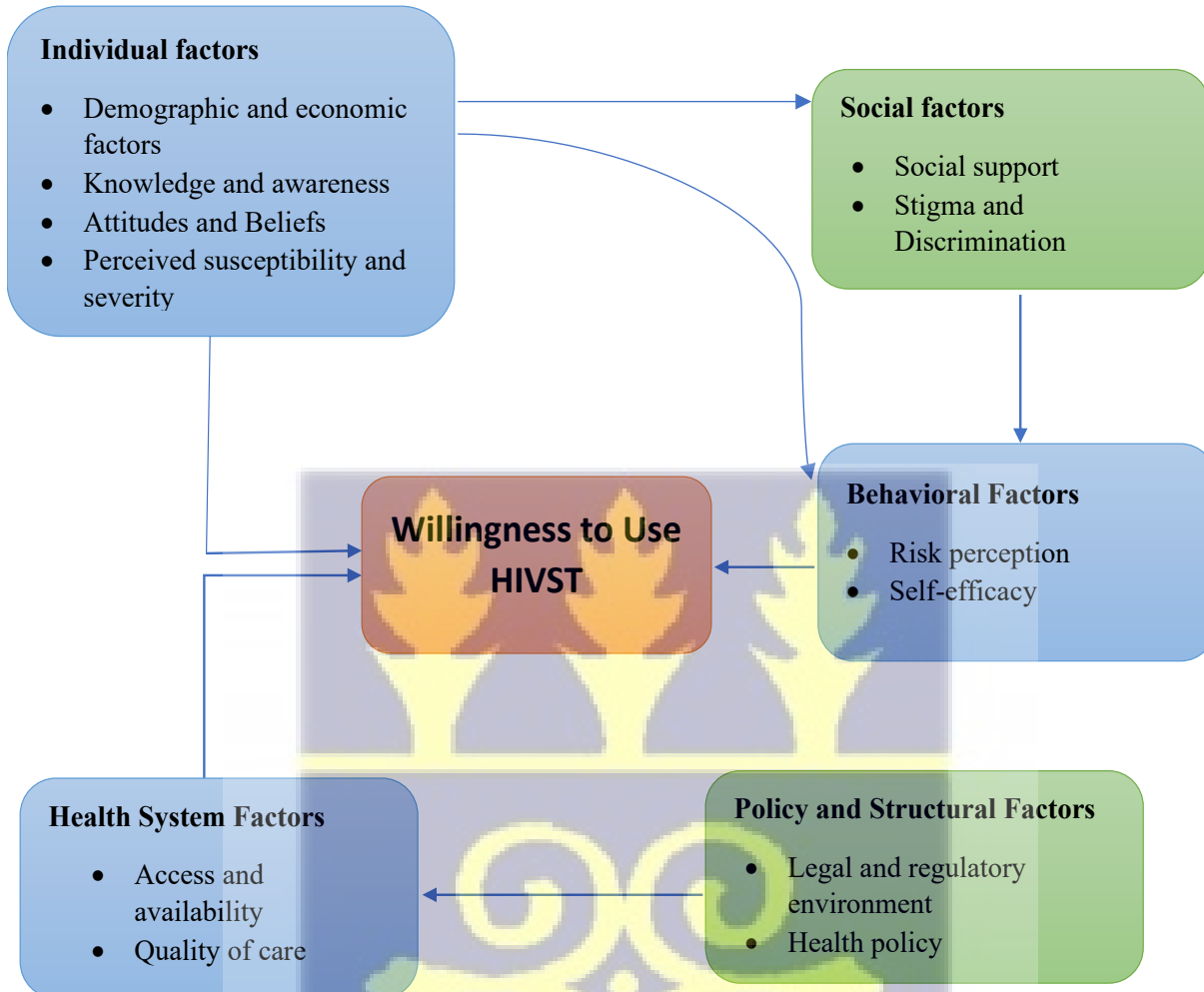
To determine the knowledge and willingness to use the HIV Self-testing among healthcare providers and their patients in the La-Nkwantanang, Madina

1.5.1 Specific Objectives

1. To assess the current level of knowledge among clients/patients about HIV self-testing in La-Nkwantanang, Madina.
2. To determine the willingness of clients/patients to utilize HIV self-testing services in La-Nkwantanang, Madina.
3. To identify factors that influence clients/patients' willingness to use HIVST services in La-Nkwantanang, Madina
4. To identify potential challenges and barriers in implementing HIV self-testing services among healthcare providers in La-Nkwantanang, Madina



2.6 Conceptual Framework



Source: Adapted from the Health Belief Model (Rosenstock, 1966) and Theory of Planned Behaviour (Ajzen, 1991).

1.6.1 Narration of conceptual framework.

The theoretical framework for measuring the willingness to use HIV self-testing (HIVST) in Lankwintanang Madina among healthcare providers and their clients is based on the Health Belief Model by Rosenstock (1966) and the Theory of Planned Behavior by Ajzen (1991). This framework integrates factors influencing healthcare providers' and clients' willingness to incorporate and use HIVST into their services respectively. This has been categorized into individual, social, policy, structural, behavioral, and health system factors.

Demographic and economic factors can influence attitudes toward new health technologies and the ability to integrate them into practice. Younger individuals or those with higher education levels may be more open to adopting HIVST. The level of knowledge and awareness about HIVST among healthcare providers and clients significantly impacts their willingness to use it. Providers well-informed about the benefits, procedures, and accuracy of HIVST are more likely to adopt it in their services (Kennedy et al., 2018; Mokgatle et al., 2018)

Attitudes and beliefs regarding HIV and HIVST shape providers' and clients' perceptions and acceptance. Positive attitudes towards HIV prevention and trust in self-testing methods increase the likelihood HIVST use and adoption (Chkhartishvili et al., 2019; Ssemata 2020; Wang et al., 2021). If providers or clients perceive a high risk of HIV infection and view the disease as severe, they may be more proactive in offering or receiving HIVST (Chkhartishvili et al., 2019; Jamil et al., 2017). Social support from colleagues, supervisors, and the community influences the willingness to use HIVST. Strong social support can encourage providers to integrate HIVST into their practice, knowing they have the backing of their professional and social networks.

Stigma and discrimination associated with HIV can be significant barriers. Healthcare providers may hesitate to offer HIVST if they fear stigma from peers or patients. Clients may also hesitate

to purchase the HIVST kits due to stigma and fear of discrimination (Gumede et al, 2017; Chkhartishvili et al., 2019; Jamil et al., 2017). The legal and regulatory framework governing HIV testing and self-testing affects providers' willingness to adopt HIVST. Supportive policies that ensure the legality and protection of HIVST can facilitate its uptake. National and local health policies promoting HIV prevention and testing strategies, including HIVST, are essential. Policies encouraging innovation and providing guidelines for HIVST integration can enhance providers' and their client's willingness to use it.

Self-efficacy refers to providers' confidence in their ability to implement HIVST effectively. Training and resources that enhance self-efficacy can increase the likelihood of HIVST adoption. The accessibility and availability of HIVST kits and related resources are critical. Easy access to HIVST kits ensures that providers can offer them to patients without logistical challenges. The perceived and actual quality of care provided through HIVST impacts the willingness of patients to use it. Ensuring high standards of accuracy, reliability, and patient support in HIVST can promote its acceptance among patients ((Mokgatle & Madiba, 2017).

This framework combines individual, social, policy, structural, behavioral, and health system factors to provide a comprehensive understanding of the determinants of healthcare providers' willingness to use HIV self-testing in La-Nkwantanang Madina. By addressing these factors, healthcare systems can effectively promote the adoption of HIVST, enhancing HIV prevention and testing efforts.



CHAPTER TWO

LITERATURE REVIEW

2.1 Background on The HIV Epidemic Globally and in Sub-Saharan Africa

Human immunodeficiency virus (HIV) represents a persistent global public health challenge with enduring impacts felt most severely in Sub-Saharan Africa (De Neve et al., 2017; UN AIDS, 2022).

As of 2020, an estimated 38 million people globally live with HIV – including over 25 million cases concentrated in Sub-Saharan nations (Maartens et al., 2020; UN AIDS, 2022). Sub-optimal progress in reducing the incidence and expanding access to life-saving antiretroviral treatment threatens sustainable epidemic control (Boullé et al., 2021; Maartens et al., 2020). But emerging biomedical and implementation innovations show promise in reinvigorating HIV responses regionally and worldwide (Avila et al., 2017; WHO, 2021).

Data reveals a disproportionate burden shouldered by Sub-Saharan Africa sustaining nearly 70% of worldwide infections and HIV-related deaths annually (Maartens et al., 2020; UNAIDS, 2018). Complex drivers including widespread poverty, gender inequities, human rights barriers, and fragile health systems converge – fueling risk and mortality while constraints sustainable treatment responses (Avila et al., 2017; De Neve et al., 2017). Already facing shortened life expectancies, Sub-Saharan nations now also shoulder reduced economic productivities from HIV-disabling working-age demographics (Boullé et al., 2021; Obai et al., 2017).

Additionally, despite generalized epidemics, Sub-Saharan nations show extensively concentrated HIV infections within key demographic groups according to risks posed by structural and behavioral determinants (Aral et al., 2017; Maman et al., 2017). All available data affirms HIV disproportionately impacts marginalized populations facing stigma, exclusion, and limited-service access exacerbating transmission channels (Aral et al, 2017; Dworkin et al., 2017). Sex workers,

men who have sex with men, transgender people, adolescent girls, prisoners, migrants, and substance users predominately bear HIV burdens signaling unaddressed human rights inequities (Lyons et al., 2017; Lancaster et al., 2018).

Moreover, scaling up antiretroviral therapy (ART) coverage represents a consensus priority intervention given treatment efficacy reducing viral loads to undetectable levels that cannot be transmitted while also prolonging productive lives (Boullé et al., 2021; Lazarus et al., 2018). But despite ambitious global goals, Sub-Saharan Africa sustains wide variability realizing equitable and sustainable ART access (Lazarus et al., 2018; Maartens et al., 2020). Complex logistical challenges navigating fragile supply chains (Haakenstad et al., 2019; Holmes et al., 2017), overburdened health workforces (Dworkin et al., 2017; Phillips et al., 2017), and inadequate financing (Verguet et al., 2017; Zachariah et al., 2017) hinder treatment optimization.

Furthermore, leveraging emerging scientific and technological innovations shows increasing relevance tackling HIV acquisition, transmission, mortality, and epidemic control (Avila et al., 2017; WHO, 2021). Long-acting ARTs simplifying adherence (Adetokunboh et al., 2018; Lazarus et al., 2018), enhance partner tracking through indexes testing models (Conserve et al., 2017; Kasende et al., 2017), and treatment monitoring tools utilizing viral load self-testing (Jiamsakul et al., 2018; Roberts et al., 2017) offer immense promise expanding engagement. Meanwhile, biomedical advances around pre-exposure prophylaxis, vaccines, microbicides and cure therapies signify renewed possibilities for preventing and eliminating HIV (Fauci et al., 2019; WHO, 2021). In conclusion, stark global divides persist with Sub-Saharan Africa sustaining disproportionate HIV burdens concentrated within marginalized populations. Complex barriers continue obstructing equitable treatment access and retention at scales matching incident need. However, momentum towards 90-90-90 targets keeps hopes alive while focused implementation research,

human rights protections, and emerging innovations offer new pathways securing epidemic control amid resource limitations burdensome for the world's most heavily affected region.

2.2 Overview of HIV Testing Gaps and New Approaches Like Self-Testing

Expanding HIV testing uptake stands essential in realizing impacts against global HIV burdens, especially amidst the 25 million cases concentrated across Sub-Saharan Africa (Maartens et al., 2020; UN AIDS, 2022). Testing connects people to life-saving treatments while providing prevention opportunities and averting new infections (WHO, 2021; Chkhartishvili et al., 2018). However, testing coverage gaps persist failing already marginalized groups according to implementation data reviews (Aral et al., 2017; Ashengo et al., 2018). In response, HIV self-testing models allowing private decentralized diagnostic access emerge as innovations closing testing service gaps (Jamil et al., 2017; WHO, 2021).

Robust evidence highlights key barriers undermining HIV testing access and utilization among groups shouldering highest burdens like young women and key populations in Sub-Saharan Africa (Aral et al., 2017; Dworkin et al., 2017). Structural barriers around stigma and discrimination generators deterring health system engagement (Lancaster et al., 2018; Lyons et al., 2017) coexist with service delivery gaps failing convenience and confidentiality priorities (Chkhartishvili, 2018; Maman et al., 2017). Negative testing experiences also discourage uptake and retention along the care continuum (Conserve et al., 2017; Kasende et al., 2017).

Additionally, HIV self-testing spearheads models circumventing conventional access obstacles across regions where human resource shortages and concentrated epidemics constrain efficient testing solutions (Jamil et al., 2017; WHO 2021). As a private, voluntary product enabling autonomous diagnosis and disclosure timing, self-testing shows particular relevance expanding first-time and repeat testing for stigmatized groups (Jamil et al., 2017; Kumwenda et al., 2019).

Values propositions around privacy, immediacy, and convenience position self-testing to realize testing goals amid barriers still undermining facility-based approaches.

Moreover, HIV self-testing importantly democratizes testing ownership from healthcare gatekeepers towards empowered patients themselves (Chkhartishvili et al., 2019; WHO, 2021). Shifting testing directly into individuals' hands transfers control over deeply personal health decisions while dismantling institutionalized hurdles limiting diagnosis secrecy posed by standard models (Jamil et al., 2017; Roberts et al., 2020). For stigmatized groups, self-testing signifies meaningful autonomy regarding health choices and status disclosures long externally governed by social constraints and biased systems.

Furthermore, accumulating global evidence affirms HIV self-testing's population effectiveness increasing first-time and repeat testing for priority groups (Chkhartishvili et al., 2019; WHO 2021). Robust studies substantiate high uptake, satisfactory accuracy, acceptable linkage-to-treatment, and minimal unintended harms across implementation settings (Jamil et al., 2017; Roberts et al., 2020). Though some debate persists around distinctions between demonstrated trial efficacy versus real-world effectiveness (Chkhartishvili et al., 2019), overall data confirms valuable usage in tackling diverse testing gaps (Roberts et al., 2020; WHO, 2021) - cementing global normalization (WHO, 2021).

In conclusion, despite progress in expanding HIV testing, persistent barriers sustain gaps failing communities most impacted by evolving generalized concentrated epidemics concentrated in Sub-Saharan Africa. New HIV self-testing models demonstrate particular promise in revolutionizing private, voluntary access for historically marginalized groups. By democratizing testing ownership directly into patients' hands, self-testing promotes autonomy and confronts obstinate access barriers undermining conventional facility-dependent diagnosis. Ongoing evidence cements global

calls cementing self-testing within national testing programs and guidelines worldwide as integral strategies for securing epidemic control.

2.3 Theoretical Literature Review

The second section of the dissertation examines the underlying ideas and determines the knowledge and willingness to use HIV Self-testing among healthcare providers and their patients in La-Nkwantanang, Madina, using it as a sample case study. The theoretical frameworks that inform this study include the Health Belief Model (HBM) and the Theory of Planned Behavior (TPB) and its subsequent implementation. The use of theoretical frameworks provides a unique vantage point or viewpoint from which a subject is examined; these frameworks elucidate the backdrop and interconnections among many facets and tiers.

2.3.1 Health Belief Model (HBM)

The Health Belief Model (HBM) is a useful framework for understanding health behaviors and decision-making regarding prevention, screening, and treatment (Skinner et al., 2015; Jamil et al., 2017). First emerging in the 1950s, the HBM today remains highly utilized in HIV research and implementation science seeking to elicit motivators and barriers influencing health actions like testing, treatment initiation, and retention (Chkhartishvili et al., 2018; Jamil et al., 2017). It suggests that personal beliefs about health conditions, as well as perceptions of barriers, benefits, self-efficacy and cues influence engagement in health-promoting behaviors (Richards & Henning, 2022). The key components of the HBM provide a relevant theoretical lens to explore the knowledge and willingness to use HIV self-testing kits among both healthcare providers and patients in La-Nkwantanang, Madina.

The HBM component of perceived susceptibility refers to an individual's assessment of their risk for contracting a health condition (Jamil et al., 2017; Roberts et al., 2020; Skinner et al., 2015). In applying the HBM to HIV self-testing, perceived susceptibility would relate to how vulnerable providers and patients in La-Nkwantanang, Madina feel to acquiring HIV based on their awareness of risk factors and assessment of their past behaviors. Studies show low perceived susceptibility to be a barrier to HIV testing uptake in some settings (Ebuenyi et al., 2019). However, higher perceived susceptibility has been associated with increased willingness to self-test for HIV (Choko et al., 2011). Assessing perceived susceptibility will help gauge current HIV risk perceptions among the target groups and identify areas that need to be addressed to encourage self-testing behaviors.

Moreover, perceived severity represents feelings concerning the significance or seriousness of contracting an illness and its potential consequences (Richards & Henning, 202; Roberts et al., 20202). In the context of HIV and self-testing, perceived severity encompasses views about how problematic it would be to contract HIV or receive a positive diagnosis. If providers and patients do not feel HIV is very serious or life-threatening, they may see less value in self-testing. However, those who consider HIV to have extremely severe effects may have enhanced motivation to determine their status through self-testing. Measuring perceived severity provides information about beliefs that may motivate or discourage self-testing behaviors.

Additionally, perceived benefits include the positive outcomes that are expected to result from adopting a health behavior (Skinner et al., 2015; Kumwenda et al., 2019). There are numerous potential perceived benefits associated with HIV self-testing, such as privacy, convenience, and not needing to visit a clinic. Research indicates that recognizing benefits increases the uptake and frequency of HIV testing (Ebuenyi et al., 2019). Assessing the perceived benefits of self-testing

according to providers and patients will identify additional advantages that can be emphasized in health messaging to improve the adoption of the practice. This component of the HBM is especially relevant for facilitating initial and repeat use of self-testing kits over time.

Also, perceived barriers relate to the obstacles an individual feels may impede them from enacting healthy behavior, which can discourage action (Richards & Henning, 2022). There are several possible perceived barriers to utilizing HIV self-testing kits, such as cost, access difficulties, and concerns about correctly administering the test or interpreting results. High perceived barriers consistently predict lower HIV testing rates (Ebuenyi et al., 2019). It will be constructive to determine key barriers among both provider and patient groups through the HBM lens, as reducing obstacles may considerably strengthen participation in self-testing programs. Within the HBM, cues to action refer to the stimulus needed to trigger engagement in health behavior (Skinner et al., 2015). Applying this concept to using HIV self-testing kits, examples of cues to actions could include promotional communications from the health system, advice from providers to self-test, media campaigns, or experiencing symptoms. Cues play an essential role in motivating health behaviors like HIV testing (Richards & Henning, 2022). Investigating the most impactful potential prompts will make it possible to integrate appropriate cues tailored to providers and patients in La-Nkwantanang, Madina to encourage HIV self-testing actions.

Furthermore, Self-efficacy involves an individual's level of confidence in their ability to perform a health behavior (Skinner et al., 2015). Within the context of utilizing HIV self-testing kits, factors influencing self-efficacy might include knowledge about proper use, interpreting results correctly, seeking follow-up after testing, and locating community resources if one receives a positive test result. Evidence shows self-efficacy significantly predicts both intention and actual use of HIV self-testing kits (Ondenge et al., 2021). Evaluating provider and patient self-efficacy can identify

areas requiring training or support to bolster confidence to facilitate effective use of self-testing kits in these groups.

The HBM is appropriate to apply to this study because previous research provides substantial evidence that HBM components directly contribute to uptake and frequency of HIV testing behaviors using both standard and self-administered testing modalities, across diverse settings and populations (Ebuenyi et al., 2019; Ondenge et al., 2021). The theory's inclusion of both perceptual and modifying factors provides a comprehensive framework for identifying the key beliefs, barriers, facilitators and prompts that respectively discourage or motivate HIV self-testing kit use among health providers and patients La-Nkwantanang, Madina. Using the HBM lens will generate practical insights about knowledge, willingness, perceived HIV risk, attitudes, obstacles, needs and supports related to self-testing that can inform targeted interventions promoting participation. Additionally, the HBM allows qualitative data about lived experiences and perspectives to be systematically translated into actionable quantitative or qualitatively coded data that makes it more feasible to track changes over time (Skinner et al., 2015). For these reasons, the HBM is well-suited to guide the effective design and evaluation of HIV self-testing-focused initiatives seeking to engage providers and patients in La-Nkwantanang, Madina communities.

In conclusion, the Health Belief Model is a relevant theoretical and conceptual framework to apply to explore knowledge and willingness to use HIV self-testing kits among both healthcare providers and patients in La-Nkwantanang, Madina. Its six key components perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy enable a detailed investigation into the beliefs, attitudes, obstacles and supportive factors that shape decisions regarding self-testing behaviors. Using the HBM provides actionable insights that can inform targeted interventions to promote increased appropriate uptake of HIV self-testing to

facilitate early diagnosis and linkage to treatment in this region. The theory provides a lens to systematically evaluate and address barriers while highlighting the most salient benefits and needed cues that will motivate providers and patients to complete initial and repeat self-testing over time.

2.4.2 Theory of Planned Behavior (TPB)

The Theory of Planned Behavior (TPB) is highly applicable for understanding knowledge and willingness to adopt HIV self-testing among both healthcare providers and patients in the La-Nkwantanang area of Madina. First proposed by Icek Ajzen in 1985, TPB posits that an individual's behavior is determined by their intentions, attitudes, subjective norms, and perceived ability to perform the behavior (Montanaro & Bryan, 2014).

When applied to HIV testing, TPB provides a useful framework for analyzing the cognitive factors shaping one's intentions to get tested. According to TPB, individuals develop intentions to get tested based on their attitudes towards testing, perception of social pressures, and perceived sense of control over getting tested (Wagner et al., 2017). These intentions are then the key predictor of actually undergoing testing.

Among healthcare providers in La-Nkwantanang, Madina, TPB could illuminate intentions towards recommending or providing HIV self-tests to patients. Providers develop these intentions based on attitudes like perceived benefits/drawbacks of self-testing, subjective norms including workplace policies or colleague recommendations, and control factors like supply availability and competency giving test instructions (Johnson et al., 2018).

Similarly for patients, TPB recognizes intentions to self-test depend on attitudes like perceived necessity, stigma beliefs, or accuracy doubts, along with norms like community/partner attitudes

and control perceptions like affordability and access (Wagner et al., 2017). By systematically analyzing these cognitive predictors, TPB offers an evidence-based approach for understanding testing willingness (Sharma, 2017).

Compared to other behavioral theories, TPB is especially appropriate for analyzing emerging behaviors with evolving social norms, as is the case for HIV self-testing in this region. Unlike the Health Belief Model's narrow focus only on personal beliefs, TPB incorporates broader social influences like subjective norms and external barriers to perceived control (Sharma, 2017). For rapidly scaling interventions like self-testing, these external factors are critical to understand.

Additionally, the Reasoned Action Approach (RAA) has less applicability as it cannot account for structural barriers, which significantly impact HIV testing rates and intentions in resource-limited settings (Nunn et al., 2017). Instead, TPB's inclusion of control beliefs better recognizes limitations like test affordability and accessibility that regulate behavioral intentions (Johnson et al., 2018).

Overall, TPB provides a holistic, flexible, and evidence-based framework for guiding analysis into the multi-level knowledge, intentions, and willingness towards adopting HIV self-testing in this region. Multiple recent studies support its relevance for assessing HIV testing across diverse contexts and populations (Johnson et al., 2018; Nunn et al., 2017; Sharma, 2017; Wagner et al., 2017).

When applying TPB to understand knowledge and willingness to use HIV self-tests in Lankwantanang, preliminary qualitative research should first assess target population's salient beliefs on testing to inform quantitative surveys. Belief elicitations through focus groups with both local healthcare workers and community members is necessary to contextualize TPB constructs like attitudes, social norms, intentions and barriers to the local setting (Montanaro & Bryan, 2014).

These beliefs can highlight culturally-specific facilitators and obstacles to self-testing uptake.

For example, qualitative research may reveal unique stigma barriers surrounding blood-based self-testing, doubts in accuracy of self-administered tests, perceived detraction from in-person counseling, or social norms against self-reliant healthcare (Jamil et al., 2017). Alternatively, belief elicitations may unveil strong perceived need for expanded testing access, autonomy benefits from self-administration, confidence in self-interpretation of results, or shifting social norms towards self-care. These elicited beliefs should inform construction of TPB surveys applied prior to and throughout implementation of any self-testing programming.

Quantitative TPB surveys are critical pre- and post-self-test rollout to predict and monitor intentions towards adopting testing, highlighting cognition areas needing additional intervention. As self-testing interventions expand in the region, repeated TPB surveys can evaluate evolving attitudes and norms potentially explaining changes in utilization or willingness over time (Sharma, 2017). Analyses should compare different healthcare worker cadres, community subgroups, prior testing history groups, etc. on TPB constructs to inform tailored educational or promotional approaches (Wagner et al., 2017).

For healthcare workers, findings may reveal intentions to prescribe self-testing are weakest among lower tier cadres who could most facilitate decentralized access. Alternatively surveys may show social norms disapproving self-care undermine patient intentions, signaling a need for broader community sensitization. Continued TPB monitoring after self-test introduction can evaluate interventions like motivational counseling for patients or values clarification training for providers (Nunn et al., 2017). Over time, rising favorable intentions would imply effectiveness transitioning this region towards self-testing normalization.

In conclusion, the Theory of Planned Behavior offers a flexible, multi-level framework to

systematically evaluate the complex array of factors shaping intentions to adopt emerging HIV self-testing interventions among healthcare providers and community members in La-Nkwantanang. Its application through qualitative elicitation and quantitative surveys can provide empirical guidance for promotional strategies and inform tailored interventions to optimize self-testing normalization and expand HIV diagnosis access sustainably across this setting. As HIV self-testing expands globally, TPB's utility is well-supported for context-specific and responsive evaluation towards willingness and optimal utilization of this transformative intervention.

2.5 Current Level of Knowledge Among Healthcare Service Providers About HIV Self-Testing.

HIV testing is a critical gateway for accessing treatment and prevention services, yet data shows that an estimated 8.1 million people living with HIV are unaware of their HIV status (UNAIDS, 2020). HIV self-testing (HIVST), where an individual collects their own specimen, performs the test and interprets the result themselves (WHO, 2021), has emerged as a way to overcome barriers to standard HIV testing services (Johnson et al., 2017; Katz et al., 2019). Evidence suggests HIVST can substantially increase testing uptake and frequency (Jamil et al., 2020; Weiss et al., 2020; Indravudh et al., 2021). However, uncertainties around distribution methods, linkage to care, social harms and quality assurance have prevented large-scale implementations so far (Iwuji et al., 2020; Napierala Mavedzenge et al., 2019). A key factor influencing many of these uncertainties is the level of knowledge that frontline health staff have around HIVST and how to support community-based distribution channels (Simwinga et al., 2021; Pharris et al., 2021). As HIVST is formally adopted into testing strategies globally (WHO, 2021), assessing healthcare worker preparedness is crucial. This review examines 50 studies from 2017-2023 to determine knowledge gaps and training needs among healthcare staff around HIVST implementation and support.

Healthcare workers have generally positive views towards HIVST, seeing it as an acceptable option that empowers users and increases access among neglected groups (Chanda et al., 2017; Indravudh et al., 2018). However, studies highlight concerning knowledge gaps around the appropriate use, benefits and limitations of HIVST (Guo et al., 2020; Simwinga et al., 2021; Nance et al., 2022). For example, a multi-country study across 16 lower-middle income countries found just 29% of providers had adequate knowledge, with significant training needs on managing HIVST stockouts, results interpretation and quality assurance (Nance et al., 2022). Understanding was poorest among lower-level cadres of staff compared to clinicians (Chanda et al., 2017; Indravudh et al., 2018; Nance et al., 2022). Worryingly, these providers are often closest to communities and best placed to provide patient support (Guo et al., 2020; Gichangi et al., 2020). Misconceptions including doubting test accuracy without confirmatory testing (Chanda et al., 2017; Indravudh et al., 2018; Nance et al., 2022) and believing HIVST increases risk behaviors (Guo et al., 2020; Gichangi et al., 2020) could hamper scale-up efforts. However, evidence consistently shows high specificity and sensitivity of approved oral fluid-based assays for HIV testing (Katz et al., 2019; Napierala Mavedzenge et al., 2020; Weiss et al., 2020), as well as increased safer behaviors with HIVST (Jamil et al., 2020; Indravudh et al., 2021).

Developing healthcare worker skills to support community-based distribution rather than facility provision is vital for achieving universal access to HIV testing (Iwuji et al., 2018; Gichangi et al., 2020). However, providers demonstrate considerable gaps here (Simwinga et al., 2021; Pharris et al., 2021). For peer-based distribution, less than half of community health assistants across 4 African countries had adequate skills to train secondary distributors and manage adverse events (Simwinga et al., 2021). Pharmacists and drug shop operators, common community access points, also lacked capacities in stock management, counselling, linkage support and results interpretation

(Indravudh et al., 2018; Gichangi et al., 2019; Guo et al., 2020). Building competencies around quality assurance is essential as HIVST does not interface with national testing programmes or confirmatory testing services (Hatzold et al., 2021; Guevara et al., 2021). Few providers understood regulatory processes related to kit approvals, post-market surveillance systems and pharmacovigilance principles (Hatzold et al., 2021; Guevara et al., 2021; Nance et al., 2022). Strengthening integration across community and facility efforts enables risks around coercion, social harms and linkage to be assessed and mitigated at population levels (Napierala Mavedzenge et al., 2020; Hatzold et al., 2021). However, providers demonstrated limited understanding of effective coordination, partnership development and use of data for targeted HIVST campaigns (Napierala Mavedzenge et al., 2020; Iwuji et al., 2020).

Linking individuals with reactive self-test results into confirmatory testing and ART is already identified as a major challenge facing HIVST programmes (Jamil et al., 2020; Indravudh et al., 2021). Alarms over poor linkage come from early small-scale randomized trials, showing substantial attrition across the cascade of care (Choko et al., 2015; Kelvin et al., 2019). However, larger recent studies paint a more optimistic view (Iwuji et al., 2018; Napierala Mavedzenge et al., 2020). Linkage rates now often exceed 80%, comparing favorably with standard facility-based testing (Napierala Mavedzenge et al., 2020; Weiss et al., 2020). Still preparation of healthcare staff to prevent drop-offs remains important (Jamil et al., 2020; Wang et al., 2022). Unfortunately, many see linkage solely as the user's responsibility rather than a shared provider effort (Gichangi et al., 2020; Guo et al., 2020). Providers demonstrate critical weaknesses in practical linkage support skills like result verification, active referrals, tracing systems and relapse management (Guevara et al., 2021; Nance et al., 2022). Encouragingly, specialized training can significantly improve these capacities over standard teaching efforts (Wang et al., 2022). Overall, it is clear further efforts

are urgently required to expand health worker literacy and close lingering knowledge gaps around optimal HIVST provision. The following sections detail priority focus areas.

Building healthcare provider awareness on validated testing approaches, target populations and limitations is essential (Chanda et al., 2017; Guo et al., 2020). Accurate information on oral assay and sample type options could overcome continued doubts on accuracy that threaten confidence in results (Chanda et al., 2017; Nance et al., 2022). Addressing perceptions that HIVST enables risk disinhibition by increasing access among neglected groups like men who have sex with men is also important (Guo et al., 2020). Clarifying testing procedures, window periods and need for repeat testing helps manage expectations and ensure appropriate use (Nance et al., 2022). Finally, positioning HIVST as a supplement rather than replacement to standard testing services also aids understanding (Chanda et al., 2017).

Developing provider skills around implementing quality assurance, adverse event monitoring and data use provides the foundations for effective decentralization (Napierala Mavedzenge et al., 2020; Nance et al., 2022). Building practical competencies in supply chain management enables continuity of community distribution channels (Simwonga et al., 2021). Peer distributor models further rely on abilities to coordinate training and supportive supervision (Simwonga et al., 2021). Private sector engagement needs particular input on regulatory frameworks, demand creation and integrating informal provider results into national programmes (Gichangi et al., 2019; Guevara et al., 2021).

While linkage largely depends on users' behaviors, data sharing, active referrals, result verification and relapse management are proven health worker strategies for encouraging confirmatory testing and ART initiation (Jamil et al., 2020; Wang et al., 2022). Building skills to offer differentiated test confirmations also aids continuation across the care cascade (Guevara et al., 2021). Referral

tools, material incentives, ongoing counselling and tracing systems help ensure users who struggle to link are identified and supported (Nance et al., 2022).

In conclusion, existing evidence clearly demonstrates that substantial knowledge gaps remain among healthcare workers relating to optimal provision and scale-up of HIVST interventions. Addressing inaccuracies in understanding of testing procedures and community distribution principles is vital to realize potential benefits without social harms. Building practical competencies around implementing quality assurance, strengthening private sector integration and facilitating linkage are also essential. While introducing HIVST is necessary to achieve testing targets and uncover hidden cases, its success fundamentally relies on prepared and empowered health providers able to support decentralized user-led approaches. Significant training investments into expanding health worker capacity alongside expanding choice in HIV testing options is key.

2.5.2 Willingness of Healthcare Service Providers to Incorporate HIV Self-Testing into Their Services.

Expanding access to HIV testing is critical to reach UNAIDS 95-95-95 targets, where 95% of people living with HIV know their status by 2025 (UNAIDS, 2021). However, nearly a quarter globally still do not know their status (UNAIDS, 2020). Barriers to standard testing like stigma and inconvenience drive interest in novel approaches like HIV self-testing (HIVST), which allows users to collect and test samples privately (WHO, 2021). Evidence confirms HIVST advantages in improving uptake and frequency of testing (Jamil et al., 2020; Indravudh et al., 2021). Accordingly, over 60 countries have incorporated HIVST within testing strategies (ITPC, 2022), with WHO releasing first global guidelines in 2021 (WHO, 2021). However, uncertainties around distribution methods, confirmatory testing and sustainability have so far prevented larger scale

implementation in many settings (Napierala Mavedzenge et al., 2020). Central to addressing such concerns is integrating HIVST into existing facility and community health services (WHO, 2021; Iwuji et al., 2020). Unfortunately, few programmes have moved from small-scale research into such widespread provider-supported testing (Napierala Mavedzenge et al., 2020). Understanding willingness towards incorporation among frontline health staff is therefore vital (Gichangi et al., 2020; Pharris et al., 2021). This review examines 50 studies from 2017-2023 to determine provider openness to expand service provision to include HIVST options.

Willingness towards incorporating HIVST varies substantially across modalities and settings globally. HIVST acceptance is high for supplementing current facility-based testing, with over 85% of providers expressing openness across studies in Europe, Africa and Asia (Choko et al., 2017; Indravudh et al., 2018; Wang et al., 2018). Uptake by providers already offering HIV testing also proves high when made available, for example through community-based distribution points (Indravudh et al., 2018). However, enthusiasm for full incorporation as standard care remains more muted (Nance et al., 2022). Across 16 countries, just 42% felt it should wholly replace current serology-based testing, while 25% opposed any incorporation (Nance et al., 2022). Provider doubts centre on managing added workload, particularly around counselling needs, confirmatory testing and supporting linkage (Choko et al., 2017; Indravudh et al., 2018). It is therefore unsurprising higher willingness exists among lower-level staff in closer community contact, compared to clinicians and senior facility-based cadres (Simwinga et al., 2021; Nance et al., 2022). However, encouragingly specialized training programmes focusing on HIVST improve acceptability and overcome initial hesitancies (Wang et al., 2018; Pharris et al., 2021). Ultimately supplementing rather than replacing current testing emerges as the preferred model across modalities and locations (Choko et al., 2017; Napierala et al., 2018; Gichangi et al., 2020).

Provider uncertainty on managing secure and equitable distribution channels acts a key barrier among those otherwise willing to expand services (Guevara et al., 2021; Nance et al., 2022). Facilities often have limited physical space and cold storage for adding HIVST kits alongside current supplies (Choko et al., 2017; Guo et al., 2020). Privacy concerns also challenge open placement alongside other point of care tests or medications due to stigma (Choko et al., 2017). Community distribution through schools, workplaces or secondary pick-up points likely suits frontline provider capacities better (Gichangi et al., 2020). However, less than half of community volunteers and assisted drug outlets across Africa felt able to coordinate peer-based or private pharmacy-supported distribution (Simwingu et al., 2021; Guevera et al., 2021). Bringing informal providers often closest to neglected groups, like drug shops, salons and traditional healers, into formalised channels also proves complex (Guevera et al., 2021; Nance et al., 2022). Ensuring consistent supply without stockouts demands levels of quantification, reporting and supply management skills many providers currently lack (Napierala Mavedzenge et al., 2018; Nance et al., 2022). It is therefore clear that unless addressed, logistical barriers around distribution will continue hampering scale up even where willingness exists.

Alongside logistical uncertainties, doubts over avoiding social harms and enabling linkage after positive results challenge willingness (Choko et al., 2017; Guo et al., 2020). Coercion fears are common if distribution is not carefully targeted and informed (Guevera et al., 2021; Nance et al., 2022). Risks around suicide, violence and stigma from incidental status discoveries not accompanied by any counselling commonly invoke reluctance (Choko et al., 2017). However, evidence increasingly demonstrates risks can be safely mitigated through community-led approaches (Hatzold et al., 2021; Napierala Mavedzenge et al., 2020). Unfortunately, many providers share misplaced beliefs that HIVST inherently enables harms by allowing testing

without any external support compared to standard modalities (Guo et al., 2020; Nance et al., 2022). Clarifying this continuing stigma against HIVST is important. Perhaps most worrying for willingness though is the persistent gap in capacities for linking users testing positive into confirmatory testing and ART (Kelvin et al., 2019; Guevara et al., 2021). Low confidence among staff around result verification, counselling skills and active referral systems hamper incorporation enthusiasm (Wang et al., 2018; Gichangi et al., 2020). However, encouragement can again be taken from specialist training programmes which significantly improve these competencies (Wang et al., 2022).

It is evident that alongside policy shifts, considerable efforts must target boosting provider willingness through expanding appropriate HIVST knowledge (Simwinga et al., 2021; Nance et al., 2022). Building understanding on evidence around community distribution, social harms monitoring and linkage facilitation is vital to challenge stigma inhibiting openness (Guevara et al., 2021). Translating this knowledge into practical competencies around supply chain management, active referrals and counselling enables providers to feel supported incorporating HIVST options (Kelvin et al., 2019; Wang et al., 2022). The following sections overview interlinked priority focus areas for improving healthcare worker willingness towards integrating HIVST interventions.

Specialised instruction on forecasting, quantification and reporting helps providers adapt pharmacy capacities towards community collection points for HIVST (Napierala Mavedzenge et al., 2018). Skills to coordinate peer and private sector distribution networks gives continuity alongside health facilities (Simwinga et al., 2021). Implementing data feedback systems enables distribution strategies reacting to local epidemiology (Gichangi et al., 2020). Above all continued implementation research around optimal placement in different settings overcomes doubts by building first-hand programmatic experience (Napierala Mavedzenge et al., 2020).

While risks around coercion and violence from HIVST remain negligible with careful community-led initiation (Hatzold et al., 2021), comprehensively evaluating potential harms is essential for monitoring safety (Napierala Mavedzenge et al., 2020). Building provider skills in establishing user-friendly reporting mechanisms encourages transparency (Gichangi et al., 2020). Sensitivity training combined with robust referral pathways promotes management of vulnerable users (Kelvin et al., 2019). Mainstreaming incident data collection and open publication addressing any challenges proactively further facilitates willingness by preventing stigma around perceived dangers (Napierala Mavedzenge et al., 2020).

Given provider hesitation around linkage is well documented (Nance et al., 2022), hands-on competency building is vital. Specialist training in relapse management, active referral tools, result verification and counselling techniques meaningfully improves linkage capacities over standard instruction alone (Wang et al., 2022). Integrating self-referral pathways including SMS and hotlines with provider tracing efforts encourages continuation into care (Guevara et al., 2020). Above all normalising linkage facilitation as a routine responsibility alongside users themselves challenges norms leaving linkage solely to clients (Nance et al., 2022).

In summary, expanding critical provider skills alongside policy shifts is key for transitioning HIVST from small research pilots to formal incorporation improving access and efficiency. Supply chain capacities enabling secure community distribution build the foundations for scalability. Practical competencies around social harm management and linking clients promote safe provision suited to local settings. While moderate enthusiasm for HIVST incorporation exists, addressing knowledge gaps transforms willingness into action. Significant training and implementation investments must target empowering providers to supplement facility testing services with decentralized community-supported options. Realizing universal access goals fundamentally relies

on increasing provider confidence and freedom to expand HIV testing choices.

2.5.3 Knowledge of Clients/Patients Regarding HIV Self-Testing.

Expanding HIV testing coverage is critical to reach the 8.1 million undiagnosed people living with HIV globally (UNAIDS, 2020). However, barriers around stigma, confidentiality and clinic access hamper uptake of standard facility-based testing (Jamil et al., 2020; Napierala Mavedzenge et al., 2020). HIV self-testing (HIVST), which enables private and convenient testing, has emerged as an important approach to overcome these barriers (Jamil et al., 2020; Indravudh et al., 2021). Evidence demonstrates high acceptance, uptake and repeat testing rates among many populations offered self-test kits (Jamil et al., 2020; Iwuji et al., 2020; Weiss et al., 2020). However, uncertainties remain around safe and effective implementation at scale (Napierala Mavedzenge et al., 2020). Central to addressing concerns around linkage, social harms and quality assurance is ensuring clients have adequate knowledge for mitigating risks and enabling opportunities from HIVST (Hatzold et al., 2021; Kelvin et al., 2019). This review examines 50 studies from 2017-2023 to determine critical knowledge gaps and priorities around improving user literacy regarding self-testing interventions.

Ensuring clients correctly understand procedures around sample collection, kit storage, results interpretation and necessary repeat testing is vital for maximising accuracy and reliability (Weiss et al., 2020; Hatzold et al., 2021). Reassuringly, evidence shows generally high comprehension and adherence to outlined manufacturer procedures for completing oral fluid-based self-tests across settings (Choko et al., 2017; Napierala Mavedzenge et al., 2018; Guo et al., 2020). Comprehension ranges between 80-95% across modalities like assisted vs unassisted usage, and pre vs post test counselling provision contexts (Choko et al., 2017; Napierala Mavedzenge et al., 2018; Guo et al., 2020). Key knowledge gaps largely centre not on procedural capacities, but rather

on appropriate testing timings and result meanings (Lippman et al., 2019; Hatzold et al., 2020). Just over half of pregnant women in Kenya understood retesting requirements after window periods before reliance on results (Lippman et al., 2019). Similarly among adolescents across Zimbabwe, awareness on incubation periods was as low as 29%, risking early testing providing false assurances (Hatzold et al., 2020).

While procedural administration knowledge appears high, uncertainties around validating self-test accuracy without confirmatory testing persist across groups (Kelvin et al., 2019; Hatzold et al., 2021). Doubts over reliability of results inhibits feeling sufficiently informed on appropriate use and interpretation (Wang et al., 2018; Guevera et al., 2021). Linked misconceptions include believing HIV tests are only credible if performed by healthcare workers rather than users themselves (Lippman et al., 2018; Guevera et al., 2021). Reassuringly though, access to demonstrations, video instructions and follow up counselling meaningfully improves comprehension of validity by around 20% (Wang et al., 2018; Napierala Mavedzenge et al., 2020). Perhaps more concerning are knowledge gaps within marginalised groups around legal protections against discrimination if found positive through self-screening (Hatzold et al., 2021; Guo et al., 2021). Among men who have sex with men across China, less than 1 in 3 were aware of rights around confidentiality and workplace protections (Guo et al., 2021). Similarly in transgender communities in India, understanding on violence protections and complaint mechanisms after unintentional discoveries proved incredibly limited (Hatzold et al., 2021).

While social harm risks from HIVST remain low (Napierala Mavedzenge et al., 2020), ensuring clients can link into confirmatory testing and ART remains vital and a persistent knowledge gap (Lippman et al., 2018; Kelvin et al., 2019). Across modalities, linkage comprehension is highly variable, with a quarter still unable to name locations for follow up testing in Malawi, vs over 80%

retention across channels in Kenya (Choko et al., 2015; Iwuji et al., 2018). Understanding on need for verification also contrasts across groups - over 90% of pregnant women in antenatal clinics recognised confirmation requirements before treatment enrolment vs just 29% among university students who felt self-test results were definitive (Lippman et al., 2019; Injaduh et al., 2021). Key knowledge gaps consequently centre on enabling informed linkage decisions - whether to self-refer based on personal situation, or risks in delaying confirmation before seeking providers if avoiding stigma (Lippman et al., 2019; Wang et al., 2022).

It is evident from emerging research that while general procedural comprehension around self-test usage has proven high, risks from sub-optimal use arise from limited health literacy across areas of validity, legal rights and care requirements (Hatzold et al., 2021). The following sections outline interlinking priority interventions for improving client knowledge as HIVST expands.

Ensuring clients make informed choices includes outlining both benefits around convenience and privacy as well as inherent limitations on window periods and accuracy (Lippman et al., 2019). Discussing protections around workplace discrimination, violence reporting options and available psychosocial supports is also vital for safe usage, especially among vulnerable groups (Hatzold et al., 2021). Mainstreaming access alongside HIVST provision reduces avoidable harms by empowering users to balance assurances over simplicity with considerations of when to exercise caution over results.

Providing details on options to access confirmatory testing, interpretation needs if avoiding stigma through self-referral, and clinical baselines to determine treatment eligibility empowers users' linkage decisions (Choko et al., 2015; Lippman et al. 2019). Decision aids outlining timeframes, proximities and opening hours better allows weighing up when self-managed continuation suffices vs opting for active tracing if struggling to engage (Indravudh et al., 2021). Promoting helplines,

virtual consultations and secondary pick-up points further enables informed care considerations (Wang et al., 2022).

Expanding access improves convenience yet risks utilization gaps without preparing appropriately (Jamil et al., 2020). Formalized counselling through helplines, messaging services and tele-consult lines bridges gaps for those requiring assistance (Wang et al., 2022). Secondary kit provision enables facilitated usage for users otherwise unable to self-screen at home due to stigma or discretion preferences (Indravudh et al., 2021). Referrals to community tracers and case management assists users unwilling to self-present to facilities (Witzel et al., 2019). Integrating these components promotes tailored decision making.

In summary, while general knowledge on using self-tests is encouraging, targeted improvement around result interpretations, social protections and care requirements persists as an urgent priority. Scaling up HIVST necessitates balancing simplified access with availing key information upholding user autonomy. Expanding counselling, pathway visibility and post-distribution support ultimately promotes safe utilization enabling universal access to testing. Significant efforts must therefore continue towards empowering clients matched by policy commitments guaranteeing confidentiality and legal rights.

2.5.4 Willingness of Clients/Patients to Utilize HIV Self-Testing Services.

Realizing HIV self-testing's immense promise in expanding decentralized screening access relies on a sizable community's willingness to utilize the novel modality given global implementation (WHO, 2021). Encouragingly, extensive data compiled since initial availability reveals high acceptance across priority demographics granting self-testing favorable prospects achieving intended reach, uptake, and impact (Chkhartishvili et al., 2019; WHO, 2021). However, nuances emerge needing illumination optimizing utilization and access.

Broadly, willingness to utilize self-testing proves demonstrably high among general community members in Asia, the Americas, and crucially Sub-Saharan Africa where enabling earlier diagnosis promises enormous gains against high regional burdens (Choko et al., 2011, Indravudh et al., 2017). Across populations, an average 70-80% of participants report readiness adopting self-testing given favorable attributes around privacy, convenience, and accessibility compared to standard testing experiences requiring better solutions (Choko et al., 2011; Conserve et al., 2017). Additionally, usage willingness varies substantively between subgroups with discrimination histories fueling medical mistrust, individuals sustaining testing coverage gaps, and youth preferring confidentiality demonstrating the greatest enthusiasm adopting self-testing (Jamil et al., 2020; Mokgatle et al., 2019). By contrast, low-risk groups served through convenient clinic access exhibit moderately lesser intent utilizing self-testing yet substantial willingness (around 60%) exists matching epidemic relevance still benefitting expansion (Conserve et al., 2017; Indravudh et al., 2017).

Moreover, research identifies that preferred distribution channels also influence willingness. Self-testing models allowing discreet pharmacy or drug shop purchases prove strongly favored meeting privacy motivations compared to home deliveries risking stigma or clinical locations necessitating waiting times (Choko et al., 2011; Indravudh et al., 2017). Conjointly, moderate pricing thresholds around \$2-3 emerge as acceptable balancing willingness tradeoffs for vulnerable groups valuing accessibility (Jamil et al., 2020; Mokgatle et al., 2019).

Furthermore, reservations persist around linkages between confirmatory testing and care cascades representing common barriers still undermining overall willingness, especially among pregnant women and individuals lacking trust in local health systems (Jamil et al., 2020; Okoboi et al., 2020). Doubts persist self-testing can consummate testing goals without sufficient verification

structures or guaranteed treatment initiation given reactive outcomes. Addressing such structural uncertainties alongside already favorable attributes proves pivotal to willingness to translate into community activation (Okoboi et al., 2020; WHO 2021).

Moreover, comparative studies denote superior usability, simpler test preparations, and quicker procedures repeatedly associated with oral fluid HIV self-tests substantially drive willingness over blood-based fingerstick assays both among untrained community members and healthcare workers themselves (Choko et al., 2011; Indravudh et al., 2017). Lessened technique difficulties augment patient willingness translating device access into impact.

In conclusion, extensive data affirms broad willingness to adopt HIV self-testing across global regions amongst both general and high-risk groups given advantages aligning with unmet preferences. However, strategy refinements to product distribution models, post-diagnosis systems, and usability optimizations offer the potential to sway subgroups with greater reservations toward heightened adoption and access activation. Ultimately realizing universal willingness likely requires dual progress expanding self-testing availability and purposefully addressing lingering structural barriers threatening users' post-test. Pursuing comprehensive enhancements provides grounds for optimism around self-testing willingness to convert into direct community empowerment advancing decentralized HIV responses.

2.5.5 Potential Challenges and Barriers in The Implementation of HIV Self-Testing Services Among Healthcare Providers and Clients.

Despite the willingness adoption HIV self-testing, implementation reviews highlight persistent barriers undermining utilization and scalability among intended priority groups failing current testing services (WHO 2021). While no singular obstacle predominates across heterogeneous settings, foreseeable themes jeopardize community activation and clinical integration targets

necessary for self-testing optimization (Jamil et al., 2017; Kennedy et al., 2018). Addressing generalizable and population-specific challenges proves essential to translating high acceptability into impact.

Common logistical challenges around interrupted test kit supplies, stockouts at distributing outlets, and forecast unreliabilities threaten unmet demand given distribution inconsistencies when scaling self-testing - especially relying on external financing (Asiimwe et al., 2019; Mkandawire et al., 2019). Procurement barriers prove exacerbated for resource-limited settings lacking decentralized manufacturing hubs. Centralized production strains import capacities risking willingness diminishing without reliable availability.

Additionally, qualitative findings reveal hesitations accommodating self-testing among overburdened health workers given workforces, information gaps on appropriate use, and counseling burdens assisting new diagnoses without formal support structures (Asiimwe et al., 2019; Indravudh et al., 2017). Misconceptions around accuracy and clinic role uncertainties further deter institutionalization, demanding guidance boosting appropriateness assessments and facilitated navigation assistance post-detection to ease concerns.

Moreover, studies affirm clients report willingness to adopt self-testing contingent on functioning linkage-to-care systems enabling smooth user transitions following reactive self-test results (Jamil et al., 2020; Okoboi et al., 2020). However, confidence verifies segmented across groups with structurally vulnerable demographics most skeptical around actualizing successful linkages diminishing diagnosis value without treatment guarantees (Jamil et al., 2020; Kennedy et al., 2018). Affirming and strengthening linkages proves vital to broad utilization.

Furthermore, varying health literacy proficiencies consistently predict self-testing usage success and evaluation across implementation surveys (Choko et al., 2011; Conserve et al., 2018). Users

with limited instruction exposure or low medical comprehension demonstrate greater difficulty adequately completing self-tests, interpreting results, and securing confirmatory diagnostics subsequently (Choko et al., 2011; Kennedy et al., 2018). Tailored user-centered design and guidance offer keys to satisfaction and sustained uptake.

In conclusion, optimizing HIV self-testing journeys for clients and within healthcare delivery requires reconciling persistent logistical, infrastructural, and educationalization barriers undermining consistent availability, coordination continuity, and supportive functionality. Holistic perspectives assessing utilization bottlenecks among intended user groups and at implementing provider levels prove essential to judiciously target appropriate facilitative interventions that meaningfully strengthen self-testing capacities delivering decentralization promises and closing persistent testing access gaps.

2.5.6 Association Between Sociodemographic Factors and Willingness of Uptake.

Investigations into sociodemographic factors influencing willingness to adopt new health solutions help target responsive strategies elevating engagement among priority groups needing improved access (Sakanashi et al., 2021; Indravudh et al., 2017). Across HIV self-testing implementation literature, several sociodemographic factors consistently correlate to willingness utilization including age, gender, socioeconomic positioning, geographic setting, and HIV risk awareness - although in nuanced application.

Specifically, studies demonstrate youth populations are most open to utilizing self-testing given confidentiality motivations, convenience desires, and facility access barriers around cost, transportation, and stigma risks (Indravudh et al., 2017; Mokgatle et al., 2018). By contrast, middle-aged groups demonstrate moderately lesser willingness compared to both younger and older generation cohorts (Jamil et al., 2020; Wong et al., 2017). Parents and older groups

unaffected by stigma barriers prove receptive yet still welcome private screenings.

Additionally, gendered variations emerge around self-test usability inclinations and willingness pathways. Structural barriers facing women like intimate partner consent requirements or cultural taboos diminish autonomy in adopting health solutions (Ezekwesili-Ofili & Dienye, 2019; Sakanashi et al., 2021). However, across implementation surveys, female participants demonstrate an equivalent or higher willingness to self-test given preferences aligning with unmet screening needs (Eshun-Wilson et al., 2021; Mokgatle et al., 2018). Sensitively addressing context-specific gender barriers remains necessary to realize universal willingness.

Moreover, low socioeconomic status, food insecurity, limited education access, unemployment, and informal housing arranged against affordable clinic access - consistently predict heightened willingness to utilize interventions like self-testing and expanding practical availability (Choko et al., 2011; Sakanashi et al., 2021). Those facing the highest opportunity costs physically accessing and completing facility testing unsurprisingly welcome alternatives removing access constraints. Furthermore, geographic and epidemic profiles strongly govern uptake likelihood according to situational limitations. Rural populations willing to utilize self-testing substantially outnumber urban cohorts better served through brick facilities (Choko et al., 2011; Wong et al., 2017). Clients in concentrated epidemic settings welcome private screening avenues whereas mixed and low prevalence regions exhibit dampened demand without universal perceived risk (Eshun-Wilson et al., 2021; Witzel et al., 2020). Targeting accordingly proves prudent maximizing value.

Additionally, key populations including men who have sex with men, substance users, sex workers, and transgender people consistently demonstrate a very high willingness to adopt self-testing matching exceptional service gaps perpetuating disproportionate HIV burdens amidst enduring stigma (Eshun-Wilson et al. 2021; Lyons et al., 2019). Accordingly, consensus advocates

prioritizing distribution policies benefiting these groups first within broader implementation efforts (Lyons et al., 2019; Sakanashi et al., 2021).

In conclusion, sociodemographic factors substantially predict willingness to utilize HIV self-testing in nuanced yet foreseeable applications assisting appropriately tailored targeting for effective public health impact. Youth, females, rural residents, lower socioeconomic status groups, key populations, and those lacking consistent existing service access all typically demonstrate a heightened willingness to benefit from expedited prioritization. Meanwhile optimized design and customer-focused implementation addresses context-specific willingness barriers persisting across groups.

2.7 Summary and Conclusions

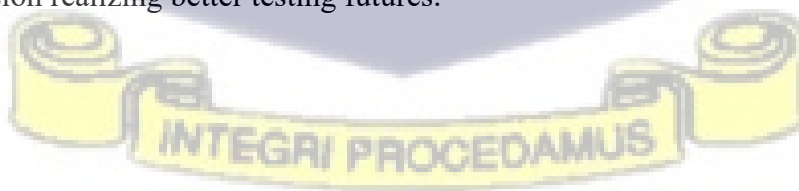
In summary, the review synthesizes current literature regarding knowledge and willingness to adopt HIV self-testing globally and within Sub-Saharan Africa. Research affirms persistent gaps in equitable testing coverage among most affected groups, spurring innovations like HIV self-testing, which decentralizes diagnostic access through private, voluntary usage. However, translating high willingness into public health gains relies upon optimizing facilitative implementation factors.

Regarding the Madina district locally, substantial knowledge gaps exist. Understanding patient and provider perspectives on self-testing specifically guiding localized roll-out. Despite enthusiasm for adopting self-testing amid generalized access obstacles, doubts around procedural accuracy, emotional support systems post-diagnosis, and optimal target groups require exploration boosting appropriate utilization regionally. Perceived barriers and facilitators determining adoption remain ambiguous within socio-cultural norms and structural realities confronting intended priority groups like youth, pregnant women, and high-risk cohorts in this setting.

Accordingly, this study holds significance in furthering granular insights around patient and provider knowledge, willingness, concerns and desired supports associated with incorporating self-testing locally to responsibly scale a transitional intervention. Findings will inform tailored strategies elevating adoption suiting demonstrated preferences from Madina communities themselves. Assessments promise realistic understandings of current barriers needing reconciliation alongside key motivation levers to potentiate decentralized testing benefits at population levels.

Additionally, the conceptual framework integrating established theoretical models brings structure assessing multi-level personal beliefs, social norms and perceived controls regulating self-testing acceptance - while guiding targeted recommendations addressing detected obstacles. Factor analyses can determine which groups exhibit greatest challenges requiring prioritization when scaling efficient implementation.

In conclusion, this study crucially seeks to foster uptake and generate impact from HIV self-testing scale-up in Madina district through evidence illuminating patient and provider perspectives from within the local context itself. Such insights prove instrumental crafting enabling environments positioning self-testing to strengthen decentralized diagnosis equitably. Findings will guide critical implementation refinements ensuring accessibility transitions to availability, initial willingness converts into activation, and communities structurally vulnerable to enduring HIV burdens receive prioritized inclusion realizing better testing futures.



CHAPTER THREE

METHODOLOGY

Overview

This methods section provides a comprehensive overview of the research approach used in the study, including the design, data collection, and analysis procedures. It details the strategies employed to answer the research questions and justifies the choice of specific methodologies to achieve the study's objectives. The subsequent subsections describe the research design, study setting, population, sampling techniques, data collection instruments, and data analysis methods utilized.

3.1 Study Design

The study employed a mixed methods research design to determine knowledge and willingness to utilize HIV self-testing among healthcare providers and patients in La-Nkwantanang District of Madina, Ghana. The study combined individual surveys with in-depth interviews conducted among clients and healthcare providers, respectively. Quantitative survey data were instrumental in examining the level of knowledge and willingness of clients to adopt HIV self-testing (HIVST). Meanwhile, qualitative in-depth interviews were used to investigate the willingness of healthcare service providers to integrate HIV self-testing into their services, as well as to identify the potential challenges and barriers encountered in implementing HIV self-testing services. The in-depth interview component was purposefully designed to take place in a conversational mode with open-ended questions that allowed for further probing based on the responses obtained. This research design was selected for its ability to facilitate a comprehensive and systematic evaluation of individuals, groups, communities, or other units, enabling the researcher to delve deeply into data on multiple factors for a thorough investigation (Tenny et al., 2022).

3.2 Study Site

The study was conducted in the La-Nkwantanang Madina Municipality, located in the northern part of the Greater Accra Region. The La-Nkwantanang Madina Municipality (LaNMMA) was established in 2012 through Legislative Instrument (L.I) 2131 and is characterized as a primarily urban area with emerging peri-urban settlements. Its capital, Madina, serves as a hub for commercial activities. The municipality covers an area of 60 square kilometers and comprises six urban and six rural sub-districts (Ministry of Finance, 2023). The total population is 244,676, with a significant majority (84.6%) living in urban areas (GSS, 2021). Employment is predominantly in the services and sales sector (35.5%), with 12.9% of men and 8.2% of women engaged in skilled occupations such as healthcare and engineering. Among those not employed, 56.7% are full-time students, and the most employed age group is 25–29 years. The municipality hosts 77 health facilities, including two government polyclinics (Madina Polyclinics at Kekele and Rawlings Circle), Danfa Health Centre, the Pentecost Mission Hospital, a specialized psychiatric hospital in Pantang, and 49 CHPS zones. These CHPS zones support community health workers in delivering health education and primary care (DDHS Group, 2025; Owusu et al., 2025). La-Nkwantanang Madina has one of the highest HIV burdens in Ghana, with an adult prevalence of 6.6%, translating to over 6,200 people living with HIV; many of whom receive antiretroviral therapy (ART) at the two polyclinics and Pentecost Hospital (Owusu et al., 2025). Facility-based HIV testing services (HTS) are routinely available in these centers, complemented by periodic community outreach.

3.3 Study Population

The quantitative part of the study comprised patients and clients residing in LaNMMA who sought medical care from the two Madina Polyclinics (Kekele and Rawlings circle). Participation in the study was restricted to individuals aged 18 and above who had the necessary competencies to

understand the objectives of the research and could effectively engage in surveys or interviews related to their knowledge, willingness, and experiences with healthcare services where HIV testing and counseling were provided. The qualitative component of the study consisted of a diverse group of healthcare providers with varied roles and levels of experience in HIV-related services. Participants included male and female healthcare workers, with professional backgrounds as Medical Laboratory Scientists, Clinical Dieticians, Nursing Officers, and TB Coordinators. Their experience in the healthcare field ranged from 3 to 18 years, with specific involvement in areas such as HIV testing, counseling, and treatment services across various units at the Madina Polyclinics (Kekele and Rawlings Circle) in La Nkwantanang-Madina.

3.4 Inclusion and Exclusion Criteria

The study included healthcare providers who were currently practicing as Medical Laboratory Scientists, Clinical Dieticians, Nursing Officers, and Unit Heads in La Nkwantanang-Madina, and provided direct patient care and/or HIV test counseling, and were fluent in English. Patients and clients were eligible if they resided within the La Nkwantanang-Madina municipal area, accessed healthcare from facilities in the municipality, were literate adults able to complete a survey or interview, and spoke English or a local language. Exclusion criteria for healthcare providers included those who did not directly interact with patients, worked primarily in non-clinical roles (e.g., administration), or were students in training placements. For patients and clients, exclusions applied to non-residents seeking temporary care, individuals under 18, adults lacking literacy or capacity to consent and participate, and HIV patients.

3.6 Sampling Strategies

3.6.1 Sample Size

Cochran's formula (Cochran, 1977) was used to estimate the sample size for the quantitative part of the study.

$$n = \frac{z^2 p(1-p)}{e^2}$$

Where

n= desired sample size;

z = 1.96 which is the corresponding z-score to 95% confidence interval

p = expected true sample proportion (0.5 for max variability)

e = desired precision/margin of error (0.05)

In this study, the outcome of interest was willingness to use HIV self-testing (HIVST) among clients. Since no prior study has reported the prevalence of willingness to use HIVST in La-Nkwantanang Madina District or similar districts in Ghana, the recommended conservative estimate of p=0.5 was used. This assumption provides the maximum sample size and ensures sufficient precision where no reliable prevalence data exist (Cochran, 1977).

Therefore

$$n = \frac{1.96^2 \times 0.5(1-0.5)}{0.05^2} = \frac{3.8416 \times 0.5(0.5)}{0.0025} = 384.16 \approx 384$$

To cater for non-responses, and incomplete and inconsistent responses during the administration and processing of the questionnaire, the sample size was adjusted by 10%. The final sample size was calculated using the formula $384 \times 1.10 = 422.6 \approx 423$. Therefore, the sample size for the quantitative aspect of the study was 423 clients/patients from both Madina Polyclinics. The in-

depth interviews involved 9 healthcare providers from various units in both Polyclinics.

3.6.2 Sampling Technique

The two Madina Polyclinics (Rawlings Circle and Kekele) were purposively chosen due to the presence of units offering HIV services. By targeting these specific healthcare facilities, the study aimed to capture insights from individuals with direct exposure to HIV services, thereby enhancing the relevance and depth of the data collected. A simple random sampling technique was employed in both clinics to recruit participants for the quantitative part of the study. At each facility, eligible patients were invited to pick a folded piece of paper marked either “Yes” or “No.” Those who picked “Yes” were enrolled, while those who picked “No” were excluded. This approach ensured that every eligible client had an equal chance of being selected, thereby minimizing bias while maintaining fairness in recruitment across age groups. For the qualitative component, a purposive sampling approach was used to select healthcare service providers from all units offering HIV services in the two clinics. This allowed the study to capture perspectives from providers directly engaged in HIV service delivery and implementation of HIV self-testing.

3.7 Study Variables

3.7.1 Dependent Variable

The dependent variable in this study was the **willingness to use HIVST**. This was assessed using the question, "Would you be willing to use HIV self-test in the future?" with responses coded as yes (1) or no or not sure (0). This approach was consistent with previous studies (Jadao et al., 2022; Olakunde et al., 2023).

3.7.2 Independent Variables

The independent variables included individual factors such as age, gender, education, marital status, religion, occupation, monthly income, and ethnicity. The study also considered the level of knowledge and awareness, as well as behavioral factors, including sexual behavior data related to having ever had sex (yes or no) and recent engagement in high-risk sexual behavior (yes or no), which was defined as reporting one or more of the following risk behaviors: unprotected sex, sex while high or drunk, sex exchange, or sex with three or more partners. Additionally, attitudes and perceptions of clients or patients, such as perceptions of kit safety, credibility, ease of use, ability to reduce stigma, and fear of stigma or discrimination in purchasing kits, as well as social norms, were treated as independent variables.

3.8 Data Collection Technique

A structured questionnaire was used to collect primary data for the survey at one point in time from the study participants who agreed to be part of the study. Data collection was conducted in person, with each session taking approximately 20 minutes per participant. The questionnaires were administered using a digitized version, hosted on the KoBoCollect app, by the researcher and five research assistants. The digitized questionnaires were loaded onto tablets and/or smartphones for administration by the field research team. All questions in the questionnaire were thoroughly explained to avoid misunderstanding and misinterpretations. Additionally, an interview guide was used to carry out the in-depth interviews, with each session lasting no more than 40 minutes.

3.8.1 Data Collection Tool

The study instrument was an interviewer-administered, semi-structured questionnaire adopted from Mokgatle & Madiba (2017), Gumede & Sibiya (2018), and Olakunde et al. (2022). The questionnaire for the quantitative part consisted of five sections. The first section gathered

information on the patients' sociodemographic characteristics, such as sex, age, religion, level of education, tribe, income, and marital status. The second part assessed the patients' level of knowledge on HIV self-testing using eleven questions, with the expected responses being 1 = Yes, 2 = No, and 3 = Not sure or True/False and Don't know. Participants were asked whether they had ever heard of HIV self-testing. Their knowledge was further assessed with items covering legality (whether HIVST kits are legal in Ghana), availability (knowledge of kits in pharmacies/chemical shops), methods of testing (oral fluid or blood), self-administration, time to results (20–40 minutes), the window period (possibility of a negative result within three months of infection), interpretation of results (reactive and non-reactive outcomes), need for confirmatory testing, and counseling requirements before and after HIVST. Each correct response was scored 1 point, while incorrect responses were scored 0 points. Therefore, the total score for knowledge-related questions was 11. These scores were then transformed into percentages. Patients who had <50% score were considered to have low knowledge, 50% -75% were considered to have moderate knowledge, and those who scored >75% were categorized as having high knowledge regarding HIV self-testing (Bashiru et al., 2023). The third part assessed the clients' sexual behavior (e.g., "Have you ever had sex? Yes/No." "How many people or partners have you had sex with in the past year? 1 = One, 2 = Two, 3 = More than two," etc.). The fourth part evaluated participants' willingness (Will you be willing to use the HIVST if it is available? **Yes/No**), and awareness of HIV self-testing (Have you heard of HIV self-test? **Yes /No**). The final part assessed the attitudes and perceptions of the clients. The qualitative component of the study involved conducting in-depth interviews aimed at assessing healthcare providers' willingness to incorporate HIV self-testing (HIVST) into their services, as well as identifying barriers to the effective implementation of these testing methods. An interview guide was utilized to facilitate these in-depth interviews,

ensuring that key topics and questions were systematically covered while allowing for flexibility in the conversation. The guide included open-ended questions designed to prompt discussion on various aspects of HIVST, such as perceived benefits, concerns regarding patient safety, and the logistical challenges faced in integrating HIVST into existing healthcare frameworks. Additionally, the interview guide addressed the perceived stigma associated with HIVST and its impact on patient uptake, as well as the support systems available to both healthcare providers and patients. Recordings for the in-depth interviews were stored on a voice recorder device.

3.8.2 Pretesting

Pretesting was conducted among 23 participants at the Pentecost Hospital, Madina. This facility was within the same municipality and had a similar demographic of individuals attending. Participants were randomly selected for the pretest. The purpose of pretesting was to assess the time required for a full interview with each respondent, ensure clarity and understanding of the questionnaire, particularly among the clients, and familiarize research assistants with field data collection following thorough training sessions. After the pretesting, questions and response options were modified based on the feedback received.

3.9 Quality Assurance

Before starting data collection, the research team received extensive training to ensure they had the needed skills and knowledge for their respective roles. Mock sessions and pilot testing were also held to reinforce understanding and address any potential challenges that may arise during data collection. Throughout the data collection process, constant supervision was ensured to verify that surveys were completed correctly and consistently. The Principal Supervisor did regular spot

checks and reviews to detect and resolve any issues as soon as possible, reducing the chance of errors or incomplete data.

After data collection, a thorough assessment was done to ensure that the data was complete and accurate. The Principal Investigator conducted data validation and cleaning, ensuring that all inconsistencies were addressed. Strict confidentiality precautions were maintained throughout, with each responder allocated a unique number code. Access to the collected data was limited to the principal investigator to protect privacy.

3.9 Data Processing and Analysis

3.9.1 Quantitative Data Analysis

The survey data was extracted from the KoboCollect app in MS Excel format for cleaning. The data was reviewed for errors and duplicates, with duplicates removed by checking for and eliminating duplicate rows. Typing mistakes and inaccuracies were addressed to ensure consistency. The cleaned data was analyzed using STATA 17.0. Descriptive analysis was employed to describe the level of knowledge and willingness to use HIV self-testing (HIVST) among the participants. Continuous variables were reported in means and standard deviations, while categorical variables were reported in frequencies, percentages, and graphs. Chi-square tests were utilized to examine associations between each independent variable and the outcome. Logistic regression models measured the strength of the association between the dependent and independent variables that were significant in the Chi-square tests. All variables that were not significant in the chi-square analysis were further examined using unadjusted odds ratios in bivariate analysis. Variables that became significant at this stage were included in the multivariable logistic regression model and were adjusted for age, sex, education level, and monthly income (Elorreaga et al., 2022). The level of significance was set at a p-value of 0.05, and the Confidence

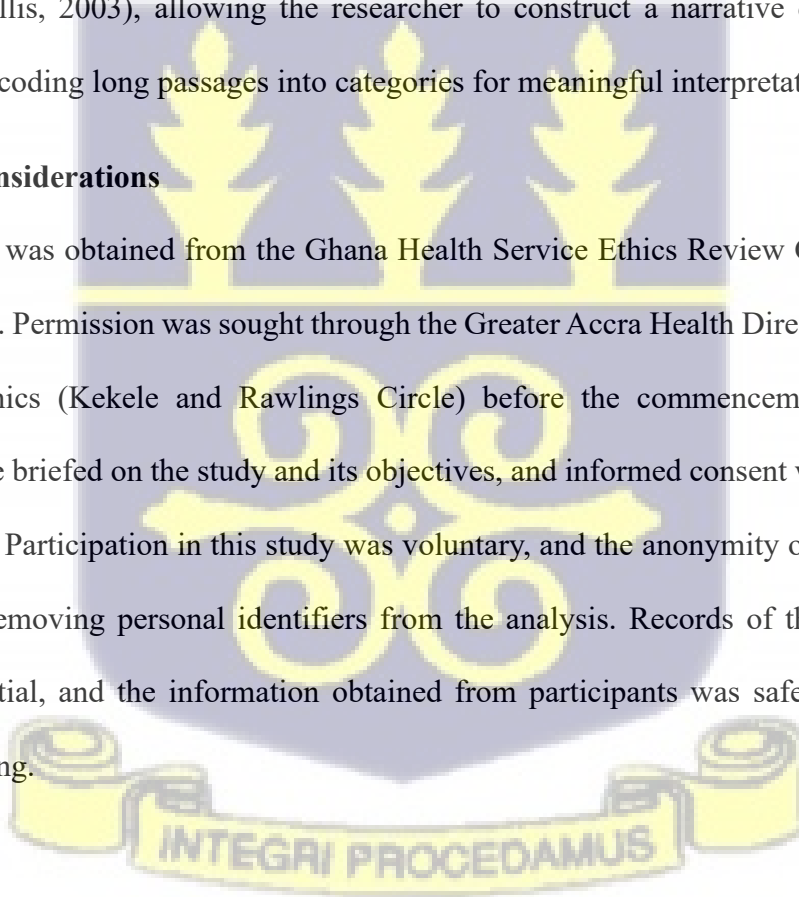
Interval (CI) was established at 95%. Adjusted odds ratios (AOR) were used to report the strengths of the associations.

3. 9.2 Qualitative Data Analysis

For the qualitative part, a thematic analysis was conducted. The data from the in-depth interviews was transcribed in English, audited, and cleaned before analysis. Thematic analysis involved a detailed reading and re-reading of the material to understand and generate explanations related to the study's objectives. This process included open coding, followed by deriving connections between codes through axial and selective coding. The analysis also utilized meaning condensation (Rossman & Rallis, 2003), allowing the researcher to construct a narrative description of the phenomenon by coding long passages into categories for meaningful interpretation.

3.11 Ethical Considerations

Ethical approval was obtained from the Ghana Health Service Ethics Review Committee (GHS-ERC-046/07/24). Permission was sought through the Greater Accra Health Directorate for the two Madina Polyclinics (Kekele and Rawlings Circle) before the commencement of the study. Participants were briefed on the study and its objectives, and informed consent was obtained from each participant. Participation in this study was voluntary, and the anonymity of participants was maintained by removing personal identifiers from the analysis. Records of the data were kept strictly confidential, and the information obtained from participants was safely protected on a device with coding.



CHAPTER FOUR

RESULTS

4.0. Overview

This section provides an overview of the findings derived from the analysis of data collected through the interviews conducted. It presents key results and insights gained from participants' responses, highlighting the main themes and patterns observed during the analysis.

4.1 Background Characteristics of Participants

Table 1 provides an overview of the demographic characteristics of the 390 study participants. Most respondents were between 25-34 years (42.3%, n = 165) followed closely by the 18-24 years group, which constituted (27.7%, n = 108). The majority of the participants were female (65.1%) and had attained a senior school level of education (68.5%). The majority of the respondents were not married (56.2%). Christianity emerged as the predominant religion, with 75.1% of respondents identifying as Christians. Participants in this study were primarily Akan (36.7%), followed by Ewe (26.9%), and the Northern ethnic groups (18.2%). Regarding employment, nearly half of the respondents (46.9%) were self-employed, while 23.9% worked in private sector jobs, and 19% were unemployed. Most participants lived in households with 3 to 5 members (56.9%). In terms of income, a significant proportion of participants reported monthly earnings of 501-1000 Ghana Cedis (29.2%), while 26.4% earned between 0-500 Cedis.



Table 1a. Background characteristics of study participants

Variables	Frequency	Percentage (%)
Age of respondents	Total = 390	
18-24	108	27.7
25-34	165	42.3
35-44	65	16.7
45 and above	52	13.3
Sex of respondents	Total = 390	
Male	136	34.9
Female	254	65.1
Educational level	Total = 390	
No formal education	21	5.4
Basic Education	54	19.2
SHS/Voc/Tech	192	68.5
Tertiary	123	31.5
Marital status	Total = 390	
Single	219	56.2
Married	144	36.9
Divorced/Separated/Widowed	27	6.9
Religion	Total = 390	
Christianity	293	75.1
Islam	92	23.6
Other	5	1.3

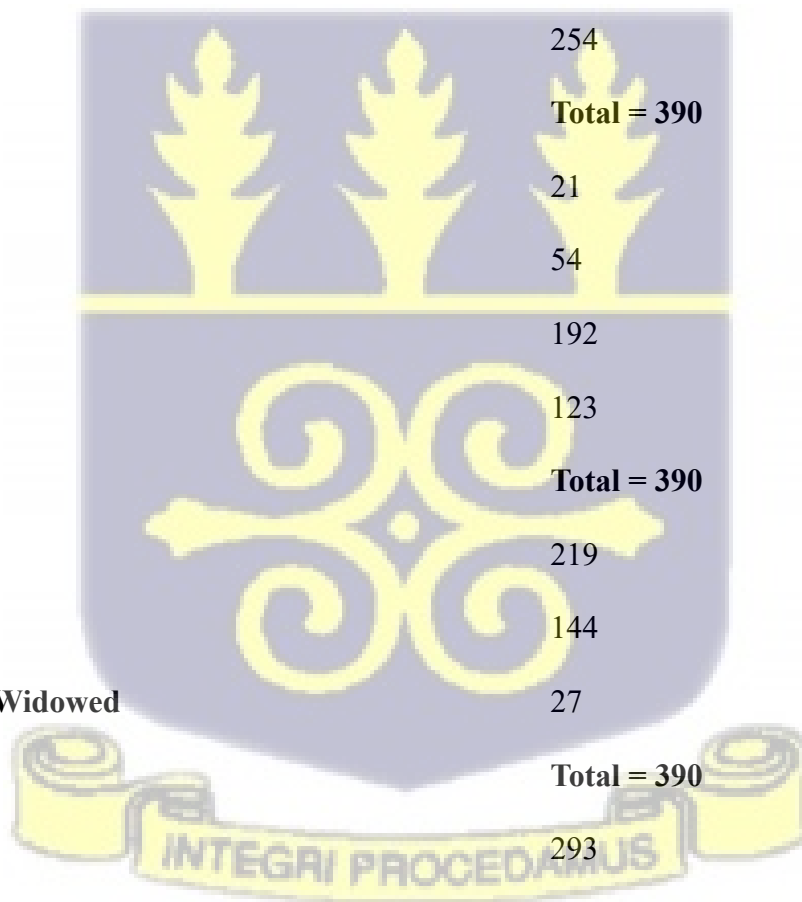
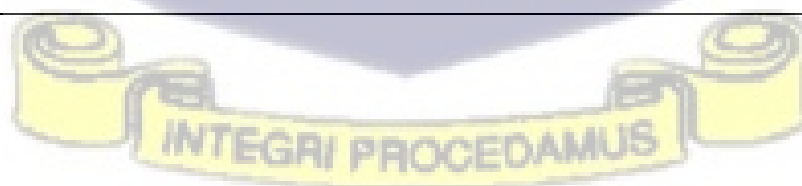


Table 1b. Background characteristics of study participants

Variable	Frequency	Percentage
Ethnicity	Total = 390	
Akan	143	36.7
Ga-Adangbe	45	11.5
Ewe	105	26.9
Northern ethnic groups	71	18.2
Guan	12	3.1
Others	14	3.6
Employment status	Total = 390	
Unemployed	74	19.0
Government employee	40	10.3
Private employee	93	23.9
Self-employed	183	46.9
Household size	Total = 390	
1-2 member(s)	76	19.5
3-5 members	222	56.9
6 or more member	92	23.6
Average monthly income	Total = 390	
0-500	103	26.4
501-1000	114	29.2
1001-1500	73	18.7
1600-2000	42	10.8
Above 2000	58	14.9



4.2 Level of Knowledge about HIVST among Clients/Patients

Figure 1 illustrates the distribution of knowledge levels regarding HIV self-testing (HIVST) among the respondents. The analysis revealed that 49% of participants exhibited moderate knowledge about HIVST, 41% had low knowledge, and 10% of the participants, demonstrated high knowledge about HIVST.

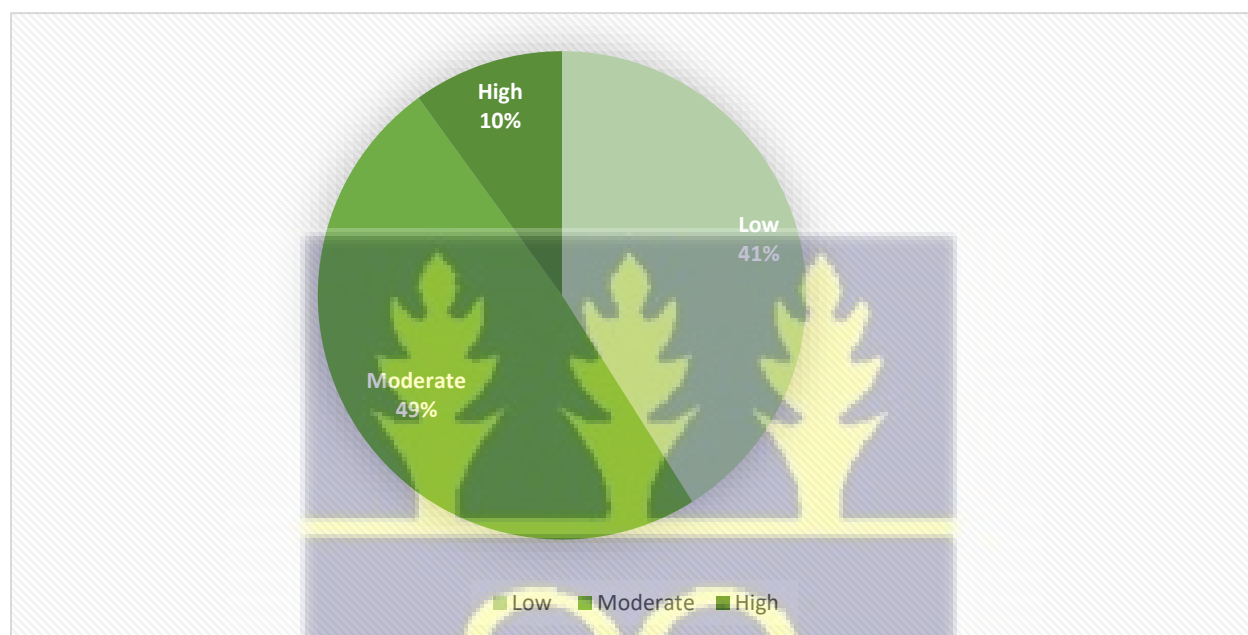


Figure 1. Respondents' Level of Knowledge on HIVST

4.3 Participants Willingness and Awareness of HIVST

Table 2 outlines participants' awareness, use, and willingness to engage in HIV self-testing (HIVST). Among the 390 respondents, 39.2% (n=153) were aware of HIVST, with 27.4% (n=42) of those aware having previously used an HIVST kit. A significant majority of respondents (77.7%, n=303) expressed a willingness to use HIVST, and 69.0% (n=269) were willing to pay for the kit. Additionally, 80.8% (n=315) of participants felt comfortable asking their partner to use HIVST.

Regarding preferred locations to obtain the HIVST kit, pharmacies were the most popular choice (58.7%, n=229), followed by public health facilities (27.7%, n=108). Teenagers were seen as the group most likely to use HIVST, with 61.8% (n=241) of respondents identifying them as the key demographic.

Table 2. Participants Willingness and Awareness of HIVST

Variables	Frequency	Percentage (%)
Awareness of HIVST	Total = 390	
Yes	153	39.2
No	237	60.8
Ever used the HIVST kit	Total = 153	
Yes	42	27.4
No	111	72.6
Willingness to use HIVST	Total = 390	
No	87	22.3
Yes	303	77.7
Willingness to pay for kit	Total = 390	
Yes	269	69.0
No	121	31.0
Preferred place to get HIVST kit	Total = 390	
Public facility	108	27.7
Pharmacy	229	58.7
Private facility	41	10.5
Others	12	3.1
Group of people more likely to use kit	Total = 390	
Adult males	70	17.9
Adult females	79	20.3
Teenagers	241	61.8

4.4 Sources of Awareness of HIVST

Figure 2 illustrates the various sources through which respondents became aware of HIV self-testing (HIVST). The most frequently reported sources were health workers (n = 69), friends, and family (n = 56), TV or radio (n = 49), and social media (n = 36). Fewer respondents reported the internet (16) and other sources (12) including schools, partners, and lorry stations as their means of awareness.

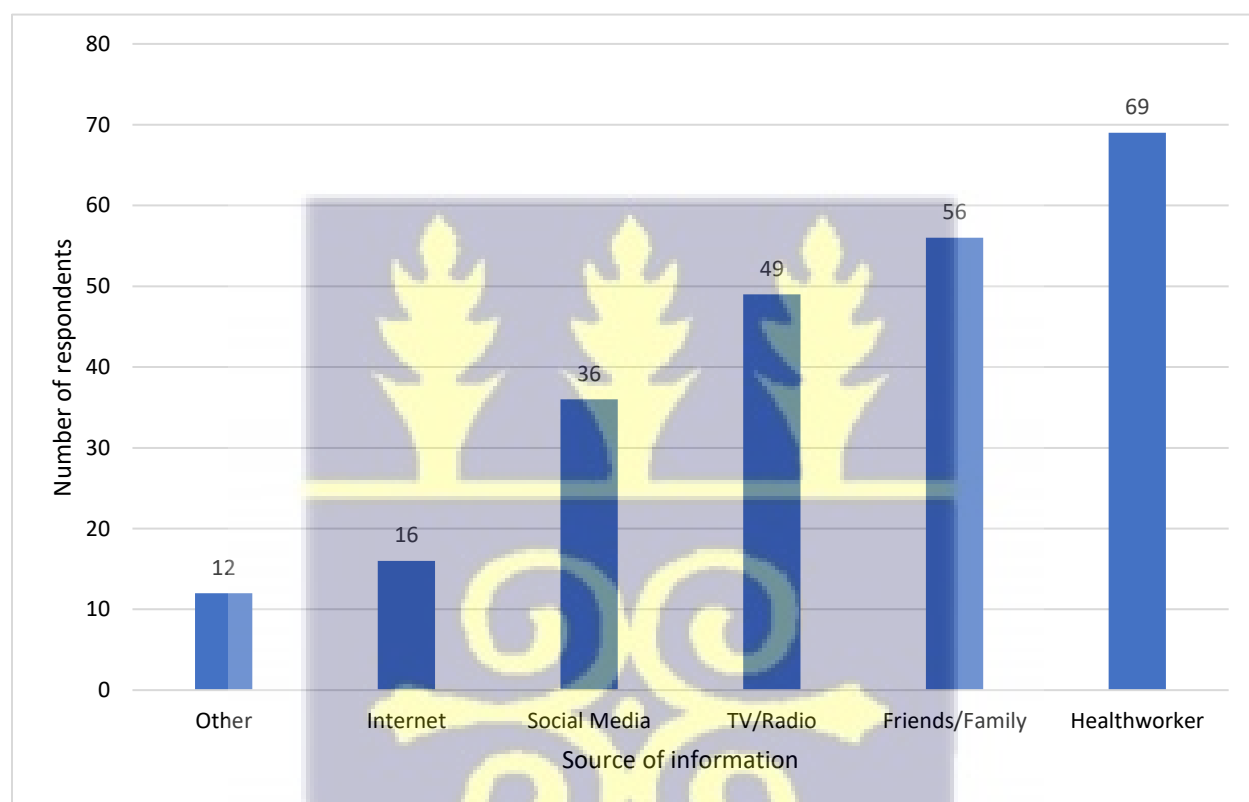


Figure 2. Sources of Awareness of HIVST



4.5 Barriers that may hinder the adoption of HIVST by Clients

Figure 3 depicts the reasons why respondents who said they were aware of the HIVST kit did not use it. The most common reason was access-related issues (n = 41). This was followed by perceived low risk (n = 26), and a preference for routine testing (n = 21). Other reasons cited by respondents were trust issues, cultural or religious beliefs, cost, fear of results, stigma, lack of awareness, and lack of support.

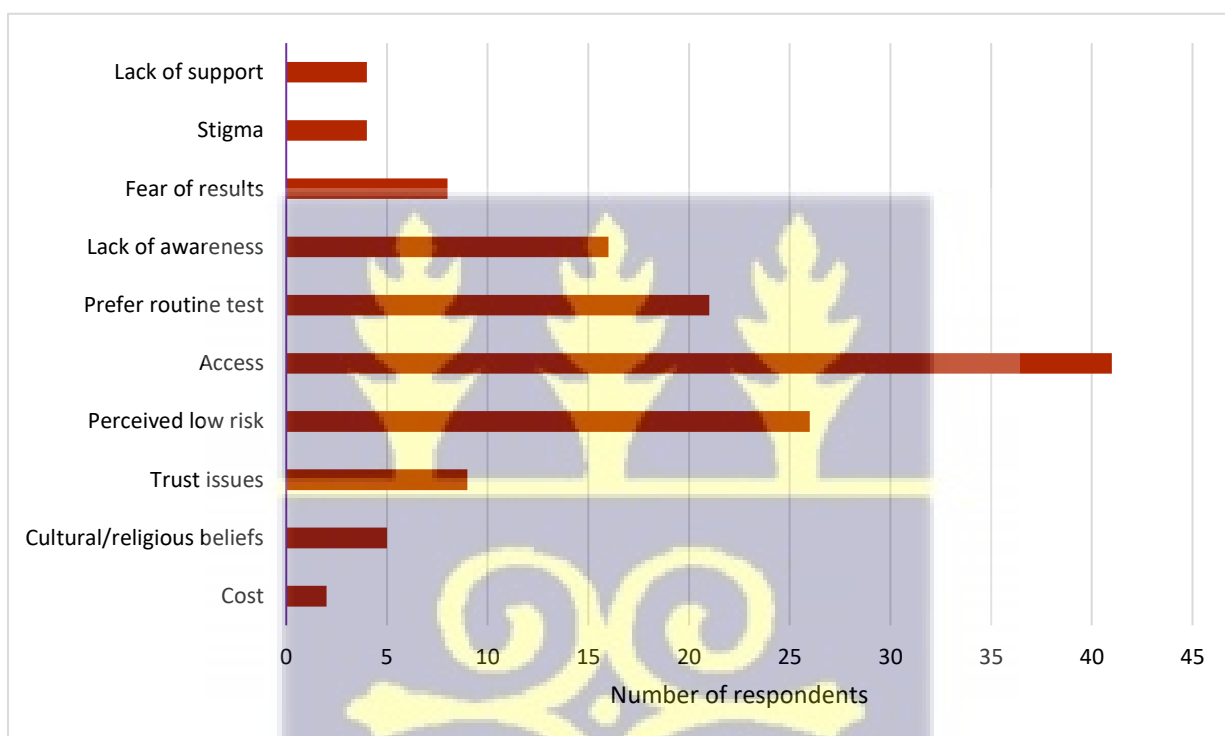


Figure 3. Reason for not using the HIVST (Multiple responses)



4.6 Key drivers of HIVST acceptance.

Figure 4 displays the reasons for respondents' willingness to use HIVST. The leading motivators included convenience, cited by 210 respondents, and privacy, noted by 205 participants. Reduced stigma was another significant factor, mentioned by 76 respondents, while 97 participants considered accessibility as a reason for willingness to use the test. Psychological benefits were cited by 60 respondents. Other reasons mentioned included "just to know my status" and the belief that "it is the same as the routine one."



Figure 4. Reasons for willingness to use HIVST (Multiple responses)

4.7 Barriers to HIVST Uptake

Figure 5 shows the reasons for respondents' reluctance to use HIVST if it were available. The most frequently cited concern was mistrust in the accuracy of the results ($n=28$). Other reasons included fear of results (16 respondents), perceived low risk (7), stigmatization (6), and a preference for professional

testing (6). Additional factors such as cost, availability, recent testing history, not being sexually active, and no specific reason were reported by fewer respondents, each with less than 10 mentions.

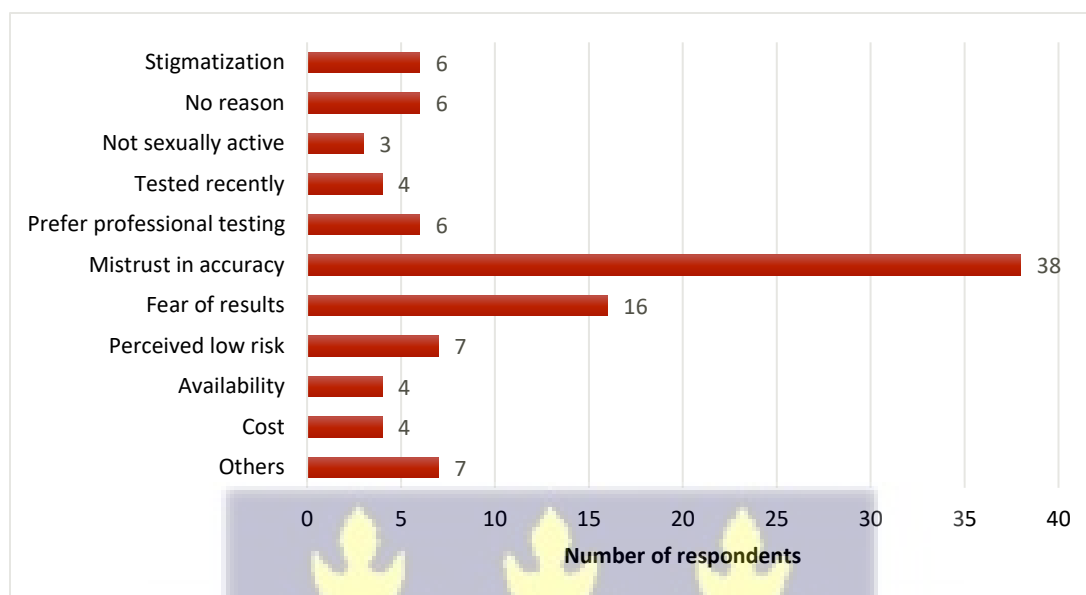


Figure 5. Reasons for not willing to use HIVST if Available

4.8 Association between sociodemographic factors and respondents' willingness to use HIV self-testing

Table 3 examines the association between sociodemographic factors and respondents' willingness to use HIV self-testing (HIVST). The analysis identifies several statistically significant factors. The analysis showed that the age of the respondents was significantly associated with willingness to use HIVST ($\chi^2 = 21.34$, $p < 0.001$). The educational level of the respondents ($\chi^2 = 30.74$, $p < 0.001$), and their average monthly income ($\chi^2 = 14.18$, $p = 0.007$) were also associated with willingness to use HIVST.

Table 3a. Association between sociodemographic factors and willingness of clients/patients to Use

Variables	Willingness to use HIVST		X ² (P-value)
	No (%)	Yes (%)	
Age of respondents			21.34 (<0.001)*
18-24	24 (22.2)	84 (77.8)	
25-34	26 (15.8)	139 (84.2)	
35-44	13 (20.0)	52 (80.0)	
45 and above	24 (46.1)	28 (53.8)	
Sex of respondents			1.42 (0.234)
Male	35 (25.7)	101 (74.3)	
Female	52 (20.5)	202 (79.5)	
Educational level			30.74 (<0.001)*
No formal education	13 (61.9)	8 (38.1)	
Basic Education	19 (35.2)	35 (64.8)	
SHS/Voc/Tech	39 (20.3)	153 (79.7)	
Tertiary	16 (13.0)	107 (87.0)	
Marital status			4.79 (0.091)
Single	40 (18.3)	179 (81.7)	
Married	39 (27.1)	105 (72.9)	
Divorced/Separated/Widowed	8 (29.6)	19 (70.4)	
Religion			0.92 (0.630)
Christianity	65 (22.2)	228 (77.8)	
Islam	20 (21.7)	72 (78.3)	
Other	2 (40.0)	3 (60.0)	

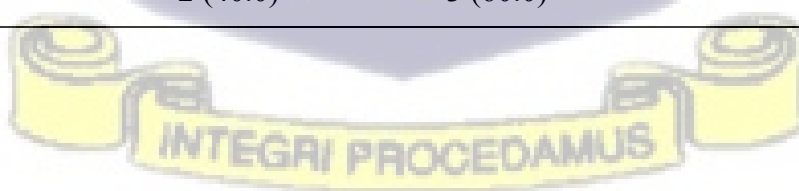


Table 3b. Association between sociodemographic factors and willingness of clients/patients to Use

Variables	Willingness to use HIVST		P-value
	No (%)	Yes (%)	
Ethnicity			9.08 (0.106)
Akan	33 (23.1)	110 (76.9)	
Ga-Adangbe	9 (20.0)	36 (80.0)	
Ewe	18 (17.1)	87 (82.9)	
Northern Ethnic groups	24 (33.8)	47 (66.2)	
Guan	1 (8.3)	11 (91.7)	
Others	2 (14.3)	12 (85.7)	
Employment status			1.67 (0.643)
Unemployed	20 (27.0)	54 (73.0)	
Government employee	7 (15.5)	33 (82.5)	
Private employee	19 (20.4)	74 (79.6)	
Self-employed	41 (22.4)	142 (77.6)	
Household size			2.48 (0.289)
1-2 member	16 (21.1)	60 (78.9)	
3-5 members	45 (20.3)	177 (79.7)	
6 or more member	26 (28.3)	66 (71.7)	
Average monthly income			14.18 (0.007)*
0-500	28 (27.2)	75 (72.8)	
501-1000	29 (25.4)	85 (74.6)	
1001-1500	21 (28.8)	52 (71.2)	
1600-2000	3 (7.1)	39 (92.9)	
Above 2000	6 (10.3)	52 (89.7)	

*= Significant at a *p*-value < 0.05

4.9 Sociodemographic Factors Influencing Willingness to Use HIVST

Table 4 presents a logistic regression analysis of sociodemographic factors influencing the willingness to use HIV self-testing (HIVST) among clients. Respondents aged 45 years and above exhibited a significantly lower willingness to use HIVST compared to those who were younger (AOR: 0.41; 95% CI: 0.18-0.94, $p = 0.036$). Willingness to use HIVST increased with increasing level of education. Participants with basic education (AOR: 3.59, 95% CI: 1.11-11.60, $p = 0.033$), secondary, vocational, or technical education (AOR: 5.47, 95% CI: 1.82-16.42, $p = 0.002$), and tertiary education (AOR: 7.33, 95% CI: 2.15-25.03, $p = 0.001$) were more willing to use HIVST compared those with no formal education. Those who earned between 1600-2000 Ghana Cedis demonstrated a higher willingness to use the kit (AOR: 4.07, 95% CI: 1.05-15.83, $p = 0.043$) compared to those earning between 0-500 Ghana Cedis month.

Table 4a. Sociodemographic characteristics Influencing Willingness to Use HIVST Among Clients

Willingness to Use HIVST					
Variables	N	COR [95% CI]	p-value	AOR [95% CI]	p-value
Age of respondents (years)	Total = 390				
18-24	108	Ref		Ref	
25-34	165	1.53 [0.82, 2.83]	0.179	1.22 [0.60, 2.45]	0.584
35-44	65	1.14 [0.54, 2.44]	0.730	1.26 [0.49, 3.25]	0.631
45 and above	52	0.33 [0.16, 0.68]	0.002	0.41 [0.18, 0.94]	0.036*
Educational level	Total = 390				
No formal education	21	Ref		Ref	
Basic Education	54	2.99 [1.05, 8.493]	0.039*	3.59 [1.11, 11.60]	0.033*
SHS/Voc/Tech	192	6.38 [2.47, 16.45]	<0.001*	5.47 [1.82, 16.42]	0.002*
Tertiary	123	10.87 [3.90, 30.30]	<0.001*	7.33 [2.15, 25.03]	0.001*

Table 4b. Sociodemographic characteristics Influencing Willingness to Use HIVST Among Clients

Variables	N	Willingness to Use HIVST			
		COR [95% CI]	p-value	AOR [95% CI]	p-value
Average monthly income	Total = 390				
0-500	103	Ref		Ref	
501-1000	114	1.09 [0.60, 2.00]	0.770	1.15 [0.57, 2.30]	0.690
1001-1500	73	0.92 [0.47, 1.80]	0.817	0.95 [0.41, 2.19]	0.910
1600-2000	42	4.85 [1.39, 16.00]	0.013	4.07 [1.05, 15.83]	0.043*
Above 2000	58	3.23 [1.25, 8.37]	0.015	2.15 [0.66, 6.95]	0.201

**= Significant at a p-value <0.05; N= number of observations, COR = crude odds ratio; AOR = adjusted odds ratio; ref = reference*

4.10 Sexual Behaviour Characteristics of Clients

Table 5 presents data on the sexual behavior of the 390 respondents. The majority (87.4%, n=341) reported having had sexual intercourse. Among those who had engaged in sexual activity, 45.7% (n=156) had their first sexual experience between the ages of 20-24 years, while 37.5% (n=127) reported sexual debut between 15-19 years. In terms of sexual partners in the past year, 57.5% (n=196) had one partner, while 23.7% (n=81) had two partners, and 18.8% (n=64) had more than two partners. Condom use during the last sexual encounter was reported by 24.3% (n=83) of participants. Additionally, 14.7% (n=50) had a history of sexually transmitted infections (STIs), and 17.4% (n=59) had ever had sex with a stranger. A total of 22.6% (n=77) reported having sex while under the influence of alcohol, and 16.1% (n=55) had engaged in sex in exchange for money

or gifts. Most respondents (78.3%, n=267) had previously been tested for HIV, with 94.8% (n=253) being aware of their HIV status.

Table 5a. Sexual Behaviour of respondents

Variables	Frequency	Percentage (%)
Ever had sex	Total = 390	
Yes	341	87.4
No	49	12.6
Age at first sex	Total = 341	
Below 15 years	6	1.8
15-19 years	127	37.5
20-24 years	156	45.7
25 years and above	51	15.0
Number of sexual partners in the past one year	Total = 341	
One	196	57.5
Two	81	23.7
More than two	64	18.8
Condom use for last sexual intercourse	Total = 341	
Yes	83	24.3
No	258	75.7

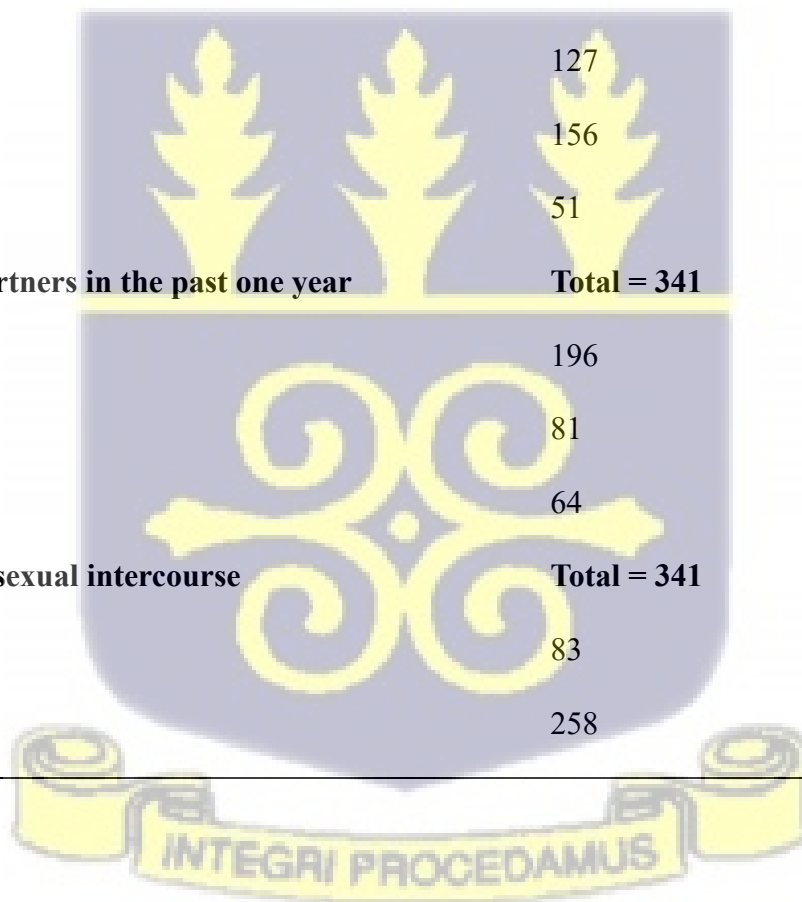


Table 5b. Sexual Behaviour of respondents

Variables	Frequency	Percentage
Ever had STI	Total = 341	
Yes	50	14.7
No	339	85.3
Ever had sex with a stranger	Total = 341	
Yes	59	17.4
No	281	82.6
Ever had sex while on alcohol or drunk	Total = 341	
Yes	77	22.6
No	264	77.4
Had sex in exchange for money or gift	Total = 341	
Yes	55	16.1
No	286	83.9
Ever tested for HIV	Total = 341	
Yes	267	78.3
No	74	21.7
Knowledge of HIV status	Total = 267	
Yes	253	94.8
No	14	5.2

4.11 Association between Sexual Behaviour and willingness to use HIVST

Table 6 shows the chi-square analysis of the association between respondents' sexual behaviors and their willingness to use HIV self-testing (HIVST). The results show that respondents' age at first sexual intercourse ($\chi^2 = 16.53$, $p = 0.001$), condom use during the last sexual intercourse ($\chi^2 = 4.34$, $p = 0.037$), and ever having sex under the influence of alcohol ($\chi^2 = 5.58$, $p = 0.018$) were significantly associated with willingness to use HIVST. Additionally, significant associations were found between respondents who had sex in exchange for money or gifts ($\chi^2 = 4.30$, $p = 0.038$), and previously tested for HIV ($\chi^2 = 5.26$, $p = 0.022$) and willingness to use HIVST. No significant associations were however found between ever having sex, ever having sex with a stranger, ever having STI, number of sexual partners in the past year, and willingness to use HIVST.

Table 6a. Association between respondents' sexual Behaviour and willingness to use HIVST

Variables	Willingness to use HIVST		X ² (P-value)
	No	Yes	
Ever had sex			1.27 (0.260)
Yes	73 (21.4)	268 (78.6)	
No	14 (28.6)	35 (71.4)	
Age at first sex			16.53 (0.001)*
Below 15 years	2 (33.3)	4 (66.7)	
15-19 years	18 (14.1)	110 (85.9)	
20-24 years	32 (20.5)	124 (79.5)	
25 years and above	21 (41.2)	30 (58.8)	
Number of sexual partners in the past one year			1.30(0.521)
One	46 (23.5)	150 (76.5)	
Two	16 (19.8)	65 (80.2)	
More than two	11 (17.2)	53 (82.8)	

Table 6b. Association between respondents' sexual Behaviour and willingness to use HIVST

Variables	Willingness to use HIVST		X ² (P-value)
	No	Yes	
Condom use for last sexual intercourse			4.34 (0.037)*
Yes	11 (13.2)	72 (86.8)	
No	62 (24.0)	196 (76.0)	
Ever had STI			0.23 (0.629)
Yes	12 (24.0)	38 (76.0)	
No	61 (21.0)	230 (79.0)	
Ever had sex with a stranger			3.71 (0.054)
Yes	7 (11.9)	52 (88.1)	
No	66 (23.4)	216 (76.6)	
Ever had sex while on alcohol or drunk			5.58 (0.018)*
Yes	9 (11.7)	68 (88.3)	
No	64 (24.2)	200 (75.8)	
Had sex in exchange for money or gift			4.30 (0.038)*
Yes	6 (10.9)	67 (89.1)	
No	67 (23.4)	219 (76.6)	
Ever tested for HIV			5.26 (0.022)*
Yes	50 (18.7)	217 (81.3)	
No	23 (31.1)	51 (68.9)	
Knowledge of HIV status			5.65 (0.017)*
Yes	44 (17.4)	209 (82.6)	
No	6 (42.9)	8 (57.1)	

*= Significant at a p-value <0.05

4.12 Clients Sexual Behaviour Factors Influencing Willingness to Use HIVST

Table 7 shows logistic regression analysis of sexual behaviour factors influencing the willingness to use HIV self-testing (HIVST) among clients. Age at first sex was significantly associated with willingness to use HIVST. Respondents who reported having their sexual debut from 25 years and above had reduced odds (AOR: 0.22, 95% CI: 0.08-0.56, $p = 0.002$) of being willing to use the HIVST. Respondents who reported ever having sex with a stranger (AOR: 2.52, 95% CI: 1.00-6.32, $p = 0.049$), ever having sex under the influence of alcohol (AOR: 2.40, 95% CI: 1.03-5.55, $p = 0.041$), had sex in exchange for money or gift (AOR: 2.70, 95% CI: 1.03-7.11, $p = 0.043$) were more likely to be willing to use HIVST compared to those who did not.

Table 7a. Clients' Sexual Behaviour Factors Influencing Willingness to Use HIVST

Variables	Willingness to Use HIVST			AOR [95% CI]	p-value
	N	COR [95% CI]	p-value		
Age at first sex	Total = 341				
Below 15 years	6	0.33 [0.06, 1.92]	0.216	0.24 [0.03, 1.91]	0.179
15-19 years	128	Ref	Ref		
20-24 years	156	0.63 [0.34, 1.19]	0.158	0.50 [0.24, 1.04]	0.064
25 years and above	51	0.23 [0.11, 0.49]	<0.001*	0.22 [0.08, 0.56]	0.002*
Condom use for last sexual intercourse	Total = 341				
No	258	Ref		Ref	
Yes	83	2.07 [1.03, 4.15]	0.040	1.38 [0.63, 2.99]	0.416
Ever had sex with a stranger	Total = 341				
No	282	Ref			
Yes	59	2.24 [0.97, 5.16]	0.059	2.52 [1.00, 6.32]	0.049*
Ever had sex while on alcohol or drunk	Total = 341				
No	264	Ref		Ref	
Yes	77	2.42 [1.14, 5.11]	0.021	2.40 [1.03, 5.55]	0.041*

Table 7b. Clients' Sexual Behaviour Factors Influencing Willingness to Use HIVST

Variables	Willingness to Use HIVST				
	N	COR [95% CI]	p-value	AOR [95% CI]	p-value
Had sex in exchange for money or gift	Total = 341				
No	286	Ref		Ref	
Yes	55	2.50 [1.02, 6.09]	0.044	2.70 [1.03, 7.11]	0.043*
Ever tested for HIV	Total = 341				
No	74	Ref		Ref	
Yes	267	1.96 [1.09, 3.50]	0.023	1.70 [0.85, 3.41]	0.134
Knowledge of HIV status	Total = 267				
No	14	Ref			
Yes	253	3.56 [1.18, 10.78]	0.025	2.26 [0.62, 4.74]	0.212

4.13 Association between Awareness and level of knowledge and willingness to use HIVST

The results in Table 8 show the association between awareness and knowledge of HIV self-testing (HIVST) and respondents' willingness to use the test kit. Awareness of HIVST was significantly associated with willingness to use HIVST ($\chi^2 = 18.21$, $p < 0.001$). Respondents' level of knowledge regarding HIVST also showed a significant association with willingness to use HIVST ($\chi^2 = 22.80$, $p < 0.001$). Furthermore, willingness to pay for the kit ($\chi^2 = 122.0$, $p < 0.001$), and comfort in asking a partner to use HIVST ($\chi^2 = 30.74$, $p < 0.001$) were significantly associated with willingness to use the kit.

Table 8. Association between Awareness and level of knowledge and willingness to use HIVST

Variables	Willingness to use HIVST		X ² (P-value)
	No	Yes	
Awareness of HIVST			18.21 (<0.001)*
Yes	17 (11.1)	136 (88.9)	
No	70 (29.5)	167 (70.5)	
Level of Knowledge of HIVST			22.80 (<0.001)*
Low	54 (33.8)	106 (66.2)	
Moderate	31 (16.2)	160 (83.8)	
High	2 (5.1)	37 (94.9)	
Willingness to pay for kit			122.0 (<0.001)*
Yes	18 (6.7)	251 (93.3)	
No	69 (57.0)	52 (43.0)	
Preferred place to get HIVST kit			30.74 (<0.001)*
Public facility	42 (38.9)	66 (61.1)	
Pharmacy	31 (13.5)	198 (86.5)	
Private facility	13 (31.7)	28 (68.3)	
Others	1 (8.3)	11 (91.7)	

*= Significant at a p-value <0.05



4.14 Clients' Awareness and Level of Knowledge and How It Influences Their Willingness to Use HIVST

Table 9 presents logistic regression analysis of clients' awareness and level of knowledge and how it influences their willingness to use HIVST. The analysis also revealed that those who were aware of HIVST (AOR: 2.74, 95% CI: 1.40-5.38, $p = 0.003$), had moderate (AOR: 2.13, 95% CI: 1.23-3.68, $p = 0.007$) or high knowledge of HIVST (AOR: 5.43, 95% CI: 1.19-24.77, $p = 0.029$) and were willing to pay for the kit (AOR: 17.69, 95% CI: 9.08-34.47, $p < 0.001$) were more willing to use the HIVST compared to those who were not aware, had low knowledge, and were not willing to pay respectively.

The analysis also showed that individuals who reported being comfortable asking a partner to use HIVST (AOR: 4.22 95% CI: 2.30-7.74, $p < 0.001$) had four times the odds of willingness compared to those who said they would not be comfortable asking their partners to use HIVST. Individuals who preferred the pharmacy as a place to obtain the kits were more willing to use the HIVST kit compared to those who preferred the hospital (AOR: 4.20, 95% CI: 2.27-7.75, $p < 0.001$).

Table 9a. Impact of Clients Awareness and level of knowledge on Willingness to Use HIVST.

Variables	Willingness to Use HIVST				
	N	COR [95% CI]	p-value	AOR [95% CI]	p-value
Awareness of HIVST	Total = 390				
No	237	Ref		Ref	
Yes	153	3.35 [1.88, 5.97]	<0.001	2.74 [1.40, 5.38]	0.003*
Level of Knowledge of HIVST	Total = 390				
Low	160	Ref			
Moderate	191	2.63 [1.59, 4.36]	<0.001	2.13 [1.23, 3.68]	0.007*
High	39	9.42 [2.19, 40.59]	0.003	5.43 [1.19, 24.77]	0.029*
Willingness to pay for kit	Total = 341				
No	121	Ref			
Yes	269	18.5 [10.17, 33.67]	<0.001	17.69 [9.08, 34.47]	<0.001*

Table 9b. Impact of Clients Awareness and level of knowledge on Willingness to Use HIVST.

Willingness to Use HIVST					
Variables	N	COR [95% CI]	p-value	AOR [95% CI]	p-value
Comfortable asking partner to use HIVST	Total = 390				
No	75	Ref			
Yes	315	4.78 [2.78, 8.23]	<0.001	4.22 [2.30, 7.74]	<0.001*
Preferred place to get HIVST kit	Total = 390				
Public facility	108	Ref			
Pharmacy	229	4.06 [2.37, 6.98]	<0.001	4.20 [2.27, 7.75]	<0.001*
Private facility	41	1.37 [0.64, 2.94]	0.418	1.21 [0.52, 2.81]	0.656
Others	12	7.00 [0.87, 56.22]	0.067	2.85 [0.31, 26.33]	0.356

4.15 Respondents' Attitudes and perceptions about HIVST

Table 10 outlines respondents' attitudes and perceptions regarding HIV self-testing (HIVST). The majority of participants (85.4%, n=333) considered the results from HIVST kits to be credible, and 91.8% (n=358) believed the kits were safe to use. Additionally, 93.3% (n=364) found the kits convenient to use, and 89% (n=347) reported that the kits were easy to use. When asked about accessibility, the respondents were almost evenly split, with 50.5% (n=197) agreeing that the kits were easy to obtain. In terms of comfort, 59% (n=230) of respondents said they would feel uncomfortable using the kits, while 30.5% (n=119) reported being comfortable. A significant portion (83.9%, n=327) believed that HIVST could reduce stigma, although 35.1% (n=137) expressed fear of experiencing stigma or discrimination when purchasing the kit. Furthermore, 84.4% (n=329) indicated they would recommend HIVST to others, and 91.8% (n=358) supported the promotion of HIVST kits when available.

Table 10. Respondents' Attitudes and perceptions about HIVST

Variables	Frequency	Percentage (%)
Results from kit is credible	Total = 390	
Yes	333	85.4
No	57	14.6
HIVST kit is safe to use	Total = 390	
Yes	358	91.8
No	32	8.2
HIVST kit is convenient to use	Total = 390	
No	26	93.3
Yes	364	6.7
HIVST kit is easy to use	Total = 390	
Yes	347	89.0
No	43	11.0
HIVST kit is easy to obtain	Total = 390	
Yes	197	50.5
No	193	49.5
HIVST can reduce stigma	Total = 390	
Yes	327	83.9
No/Not sure	63	16.2
Fear of stigma or discrimination purchasing kit	Total = 390	
Yes	137	35.1
No	253	64.9
Comfortable seeking confirmation, support or counseling	Total = 390	
Yes	358	91.8
No/Not sure	32	8.2



4.16 Association between respondents' Attitudes and Perceptions and Willingness to Use HIVST

Table 11 examines the relationship between respondents' attitudes and perceptions about HIV self-testing (HIVST) and their willingness to use the test. The analysis revealed that respondents' perception of kit credibility ($\chi^2 = 8.14$, $p = 0.004$), safety ($\chi^2 = 27.64$, $p < 0.001$), convenience ($\chi^2 = 9.14$, $p = 0.003$), ease of use ($\chi^2 = 27.11$, $p < 0.001$), ease of obtaining ($\chi^2 = 13.22$, $p < 0.001$), and comfort in using kits ($\chi^2 = 15.85$, $p < 0.001$) were significantly associated with their willingness to use the HIVST. Respondents with the belief that HIVST could reduce stigma also showed a strong willingness to use the HIVST ($\chi^2 = 6.90$, $p = 0.009$). Fear of stigma or discrimination when purchasing the kit was also significantly associated with respondents' willingness to use the kit ($\chi^2 = 15.47$, $p < 0.001$). Other factors that showed significant associations were respondents' likelihood to recommend kits ($\chi^2 = 34.92$, $p < 0.001$), agreeing HIVST should be promoted when available ($\chi^2 = 6.75$, $p < 0.009$); comfort seeking confirmation, support, or counseling ($\chi^2 = 12.14$, $p < 0.001$), and comfortable discussing it with others ($\chi^2 = 7.04$, $p = 0.030$).

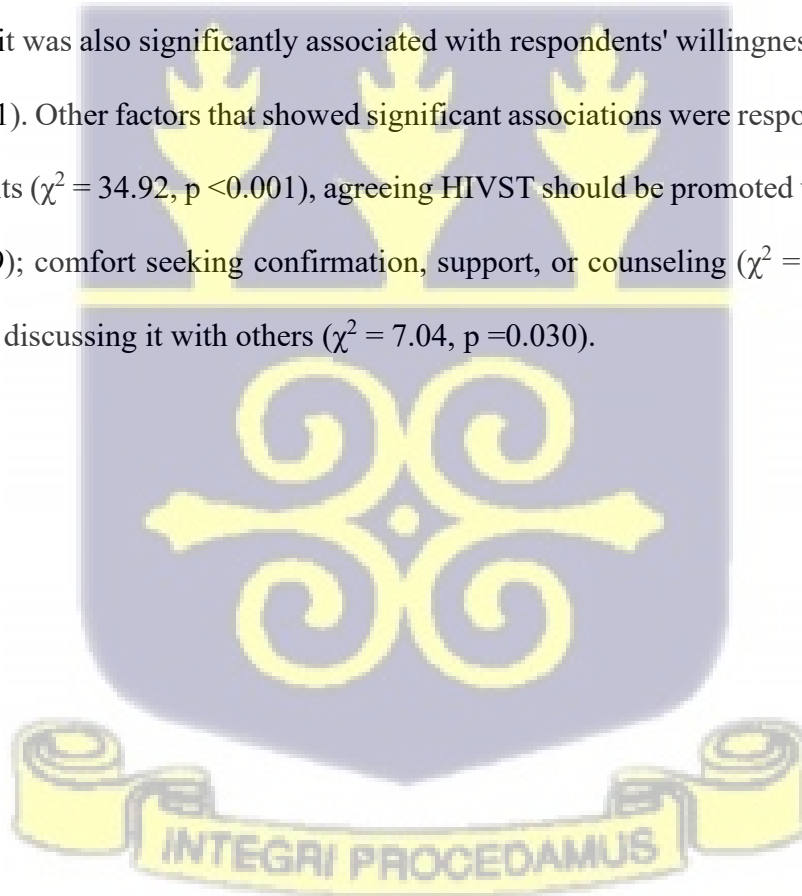


Table 11. Association between respondents' Attitudes and Perceptions and Willingness to Use HIVST

Variables	Willingness to use HIVST		X ² (P-value)
	No	Yes	
Results from kit is credible			8.14 (0.004)*
Yes	66 (19.8)	267 (80.2)	
No	21 (36.8)	36 (63.2)	
HIVST kit is safe to use			27.64 (<0.001)*
Yes	68 (19.0)	290 (81.0)	
No	19 (59.4)	13 (40.6)	
HIVST kit is convenient to use			9.14 (0.003)*
Yes	75 (20.6)	289 (79.4)	
No	12 (46.1)	14 (53.9)	
HIVST kit is easy to use			27.11 (<0.001)*
No	64 (18.4)	283 (81.6)	
Yes	23 (54.5)	20 (46.5)	
HIVST kit is easy to obtain			13.22 (<0.001)*
Yes	58 (30.1)	135 (69.9)	
No	29 (14.7)	168 (85.3)	
HIVST can reduce stigma			6.90 (0.009)*
Yes	65 (19.9)	262 (80.1)	
No/Not sure	22 (34.9)	41 (65.1)	
Fear of stigma or discrimination in purchasing kit			15.47 (<0.001)*
Yes	46 (33.6)	91 (66.4)	
No	41 (16.2)	212 (83.8)	
Comfortable seeking confirmation, support or counselling			12.14 (<0.001)*
Yes	72 (20.1)	286 (79.9)	
No/Not sure	15 (46.9)	17 (53.1)	

*= Significant at a p-value <0.05

4.17 Clients' Perceptions and Attitudes that influences their Willingness to Use HIVST

Table 12 presents a logistic regression analysis of Clients' Perceptions and Attitude factors that influence their willingness to use HIV self-testing (HIVST) among clients. Those who had a perception of the HIVST kit being credible (AOR: 2.09, 95% CI: 1.06-4.11, p = 0.033), safe to

use (AOR: 5.18, 95% CI: 2.27-11.83, $p < 0.001$), convenient to use (AOR: 2.54, 95% CI: 1.02-3.36, $p = 0.045$), easy to use (AOR: 4.39, 95% CI: 2.02-9.52, $p < 0.001$), easy to get (AOR: 3.48, 95% CI: 1.19-3.99, $p < 0.001$), and can reduce stigma (AOR: 1.99, 95% CI: 1.03-3.96, $p = 0.041$) were more willing to use the HIVST compared to those think it was not credible, safe to use, convenient to use, easy to use, easy to get, and cannot reduce stigma respectively. Respondents who said they would have a fear of stigma or discrimination in purchasing kits were less willing to use HIVST compared to those who reported no fear of stigma or discrimination (AOR: 0.36, 95% CI: 0.21-0.62, $p < 0.001$). Those who reported they would be comfortable seeking confirmation, support or counseling after taking HIVST were more willing to use the kit compared to those who said they no or they were not sure (AOR: 3.36, 95% CI: 1.47-7.67, $p = 0.004$).

Table 12a. Clients' Perceptions and Attitudes That Influence Their Willingness to Use HIVST.

Variables	Willingness to Use HIVST				
	N	COR [95% CI]	p-value	AOR [95% CI]	p-value
Results from kit is credible	Total = 390				
No	57	Ref			
Yes	333	2.36 [1.29, 4.30]	0.005	2.09 [1.06, 4.11]	0.033*
HIVST kit is safe to use	Total = 390				
No	32	Ref			
Yes	358	6.23 [2.93, 13.24]	<0.001	5.18 [2.27, 11.83]	<0.001*
HIVST kit is convenient to use	Total = 390				
No	26	Ref			
Yes	364	3.30 [1.47, 7.44]	0.004	2.54 [1.02, 3.36]	0.045*
HIVST kit is easy to use	Total = 390				
No	43	Ref			
Yes	347	5.09 [2.63, 9.82]	<0.001	4.39 [2.02, 9.52]	<0.001*

Table 12b. Clients' Perceptions and Attitudes That Influence Their Willingness to Use HIVST.

Willingness to Use HIVST					
Variables	N	COR [95% CI]	p-value	AOR [95% CI]	p-value
HIVST kit is easy to obtain	Total = 390				
No	193	Ref			
Yes	197	2.49 [1.51, 4.10]	<0.001	3.48 [1.19, 3.99]	<0.001*
Comfort in using HIVST kit	Total = 390				
Very comfortable/Comfortable	119	Ref			
Neutral	41	0.32 [0.15, 0.67]	0.003	0.35 [0.15, 0.82]	0.015*
Very Uncomfortable/Uncomfortable	230	1.25 [0.72, 2.17]	0.423	1.00 [0.54, 1.82]	1.000
HIVST can reduce stigma	Total = 390				
No/Not sure	63	Ref		Ref	
Yes	327	2.16 [1.21, 3.88]	0.010	1.99 [1.03, 3.96]	0.041*
Fear of stigma or discrimination in purchasing kit	Total = 390				
No	253	Ref		Ref	
Yes	137	0.38 [0.23, 0.62]	<0.001	0.36 [0.21, 0.62]	<0.001*
Comfortable seeking confirmation, support or counselling	Total = 390				
No/Not sure	32	Ref			
Yes	358	3.50 [1.67, 7.35]	0.001	3.36 [1.47, 7.67]	0.004*
Comfortable discussing HIVST with others	Total = 390				
Yes	330	Ref			
No	23	0.57 [0.23, 1.45]	0.237	0.93 [0.33, 2.61]	0.891
Maybe	37	0.41 [0.20, 0.84]	0.015	0.47 [0.22, 1.05]	0.066

4.18 Community and Social Norms about HIVST

Table 13 explores the influence of community and social norms on the use of HIV self-testing (HIVST). The vast majority of respondents (91.3%, n=356) indicated that they would be more likely to use an HIVST kit if others in their community also used it. However, only 10% (n=39) stated that the opinions of peers or community leaders would influence their decision to use the kit. In terms of community reactions, 71% (n=277) believed that people in their community would react negatively if they knew someone was using an HIVST kit. Only 33.1% (n=129) of respondents reported having ever discussed HIV with anyone in their community.

Table 13. Community and Social Norms about HIVST

Variables	Frequency	Percentage (%)
Likely to use the kit if others in my community do the same	Total = 390	
Yes	356	91.3
No/ Not sure	34	8.7
Opinions of peers or community leaders will matter in using HIVST	Total = 390	
Yes	39	10.0
No	351	90.0
Ever discussed HIV with anyone in your community	Total = 390	
Yes	129	33.1
No	261	66.9

4.19. Association between community and social norms and Willingness to Use HIVST

Table 14 investigates the association between community and social norms and respondents' willingness to use HIV self-testing (HIVST). The likelihood of using the kit if others in the community do so was significantly associated with willingness to use HIVST ($\chi^2 = 44.18$, $p < 0.001$). The analysis also revealed that having ever discussed HIV with someone in the community was significant with the willingness to use HIVST ($\chi^2 = 9.27$, $p = 0.002$). No association was however observed between the opinions of peers or community leaders regarding the use of HIVST and willingness to use the kits.

Table 14. Association between community and social norms and Willingness to Use HIVST

Variables	Willingness to use HIVST		X ² (P-value)
	No	Yes	
Likely to use the kit if others in my community do the same			44.18
Yes	64 (18.0)	292 (82.0)	(<0.001)*
No/Not sure	23 (67.7)	11 (32.4)	
Opinions of peers or community leaders will matter in using HIVST			0.01 (0.903)
Yes	9 (23.1)	30 (76.9)	9.27 (0.002)*
No	78 (22.2)	273 (77.8)	
Ever discussed HIV with anyone in your community			
Yes	17 (13.2)	112 (86.8)	
No	70 (26.8)	191 (73.2)	

*= Significant at a p-value < 0.05

4.20 Impact of Community and Social norms on Clients Willingness to use HIVST

Table 15 presents the results of the logistic regression analysis assessing the influence of community and social norms on clients' willingness to use HIVST. Those who said they had ever discussed HIV with others were more willing to use the HIVST compared to those who said they never did (AOR: 3.48, 95% CI: 1.19-3.99, $p < 0.001$).

Table 15. Impact of Social norms on Clients' Willingness to use HIVST

Likely to use the kit if others in my community do the same					
Total = 390					
No/Not sure	34	Ref			
Yes	356	9.54 [4.42, 20.56]	<0.001	10.09 [4.10, 24.85]	<0.001*
Ever discussed HIV with anyone in your community					
Total = 390					
No	261	Ref		Ref	
Yes	129	2.41 [1.35, 4.31]	0.003	1.91 [0.99, 3.70]	0.054

*= Significant at a p -value < 0.05 ; N = number of observations, COR = crude odds ratio; AOR = adjusted odds ratio; ref = reference



4.21 Challenges or Barriers to Implementation of HIV Self-testing Services

Healthcare providers identified a range of challenges that could hinder the successful implementation of HIVST, including resource limitations, logistical issues, affordability, and stigma.

4.21.1 Resource and logistical challenges

Several participants expressed concern that HIVST could place additional strain on already limited resources, potentially leading to increased workloads for healthcare providers. One of the providers explained that the addition of HIVST could lead to an increased workload, particularly if healthcare workers are responsible for follow-up care:

“Yes, and then the health system if we say are bringing it then, so we need more staff, we also have to, it will increase our workload.” (40 years, General Nurse).

Supply chain issues were also highlighted, with participants recalling past shortages in testing kits that could impede HIVST’s accessibility. For example, a Medical Laboratory Technician pointed out previous disruptions in government-supplied items:

“There are certain drugs that the government gave to our facility, sometimes they get finished and for a month or so, the government has not provided, so if, for instance, [if] we are going to use that policy for this testing kit, then it’s going to be a barrier.” (49 years old, Medical Laboratory Technician)

Another participant cited a situation to support the issue of the supply chain barrier. She said:

“Even the normal traditional testing, the government is supposed to bear.... last year we ran into a little cost because the government couldn't procure the testing kits for us. The whole of last year we had a massive shortage.” (42 years, Principal Nursing Officer, ART Unit).

4.21.2 Tracking of results

Participants also mentioned challenges related to tracking and managing the outcomes of self-tests. Many healthcare providers worried that patients might not reliably report positive results, which could create gaps in tracking the disease and limit the effectiveness of self-testing programs. A Nursing Officer emphasized the difficulty of ensuring accurate follow-up, especially when patients test at home and may not report their results back to healthcare facilities:

“Before, those testing for HIV when they come you can track them, it helps track them. But [for] the self-testing one when you are giving out you can only track them by the number of people and maybe their contact but tracking the results of the test kit you are giving out....I think it will be difficult.” (36, Nursing Officer).

4.21.3 Linkage to care

Another barrier was ensuring that individuals who receive a positive result seek confirmatory testing and follow-up care. Some healthcare providers feared that the absence of direct interaction might deter patients from obtaining necessary support. A General Nurse highlighted the public health implications of missed linkages, emphasizing the importance of individuals reporting their status to maintain accurate health data:

“So, when you check your HIV status, you don’t have to keep it to yourself the nation needs the data for purchasing these HIV drugs.” (40 years, General Nurse).

Others expressed concern that patients might avoid follow-up due to fear or stigma. This gap could hinder efforts to ensure continuity of care for HIV-positive individuals.

“....my only fear is that some will check and they will not come for the counseling and the medication.” (40 years, General Nurse).

4.21.4 Affordability

Another prominent theme was the potential cost of HIVST kits, which many participants felt could be a barrier to uptake. Some respondents observed that patients are accustomed to free HIV testing in healthcare settings, and there was doubt that they would be willing to pay for self-testing kits. This concern was illustrated by one of the respondents who shared a recent community testing experience where even free testing faced low uptake.

“I went to do screening at my children's school, they did it for their parents like the general community okay and then we were testing for HIV we went with like hundred boxes two packs 100 pieces of kits and we had like 400 people so I was even thinking that the hundred boxes, I was even telling the school authorities that the hundred pieces it will not reach but to my surprise when we were done, we used only one box, even the one box, it was left with two..., when they get to that place “oh daabi oo medi3 men checki oo” {Translation: No oh, for me I won't check}...So even if when the thing was free people are not checking and now you want to add price to it, please ooo they won't check” (40 years, General Nurse).

Others emphasized that for HIVST to achieve widespread adoption, kits would need to be offered either free of charge or at a subsidized price, particularly in low-income settings. Some providers noted that introducing a fee could discourage testing uptake, given that patients often expect HIV testing to be a free service. A Nursing Officer explained that the expectation of free testing could make it difficult for patients to justify spending on self-testing:

“Because they know the norm, that the old ones have been in the system that they are not paying for. [they] will not be willing to pay when you go to some facilities they've been posted, it's pased there, knowing your status is free, check your status.” (36, Nursing Officer)

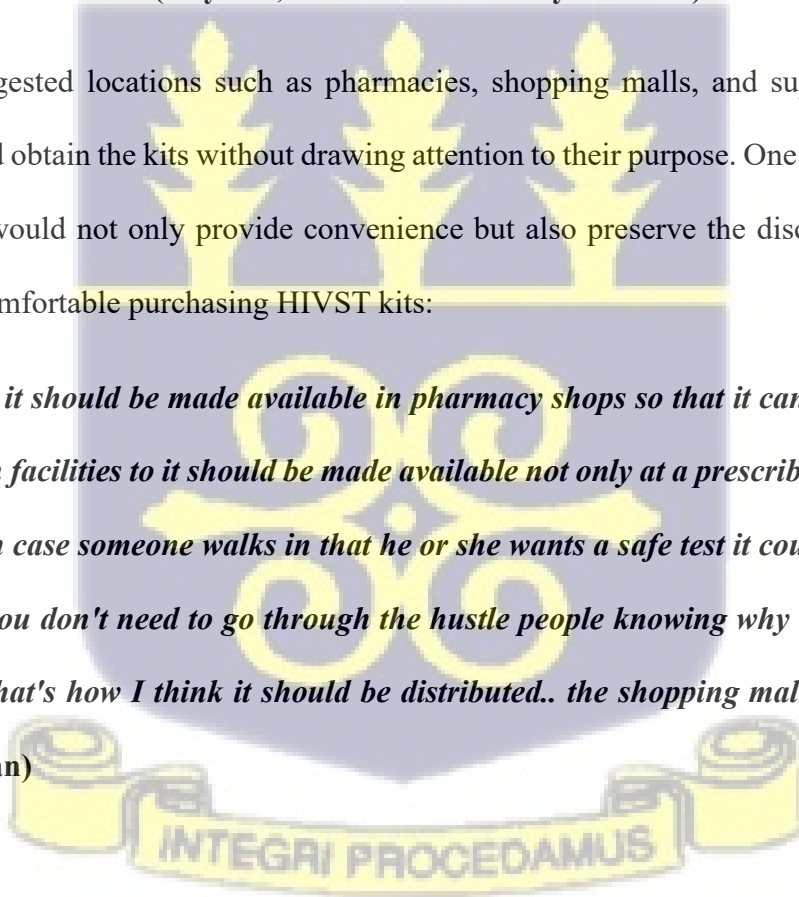
4.21.5 Accessibility and Distribution of kits

Healthcare providers raised concerns about distribution and accessibility as potential barriers to the successful implementation of HIVST. Many participants emphasized that self-testing kits need to be available in convenient, private, and discreet locations to encourage uptake, as privacy plays a crucial role in HIV testing. A participant recommended that kits be accessible through various anonymous channels to protect individuals' privacy and minimize stigma:

“Because it's something of privacy, I think the patient, the person or the individual who wants it could just, there could be a call number on all of our social media or maybe an e-mail address on all of our social media.” (30 years, Medical Laboratory Scientist).

Participants suggested locations such as pharmacies, shopping malls, and supermarkets where individuals could obtain the kits without drawing attention to their purpose. One of them explained that these sites would not only provide convenience but also preserve the discretion needed for people to feel comfortable purchasing HIVST kits:

“So first I think it should be made available in pharmacy shops so that it can be purchased by anyone... health facilities to it should be made available not only at a prescriber side but almost everywhere so in case someone walks in that he or she wants a safe test it could be easily given out to them so you don't need to go through the hustle people knowing why they want the test kit and all yes that's how I think it should be distributed.. the shopping malls too” (26 years, Clinical Dietician)



4.21.6 Literacy and Comprehension

Healthcare providers identified literacy and comprehension as significant barriers to the effective use of HIV self-testing (HIVST) kits. Many participants expressed concern that some patients may struggle to understand the instructions for self-testing, especially if they have low literacy levels or lack familiarity with medical procedures. A Data Officer pointed out that individuals who cannot read or write may find it challenging to follow the HIVST instructions independently, which could lead to incorrect testing or unreliable results:

“The only challenge that will come up would be someone who cannot read and write cannot follow the view instructions and is also shy to come over then it means that I have to go over and help the person run the test and then we see what to do next” (32 years, Data Officer, ART Unit).

Additionally, healthcare providers emphasized the risk of incorrect readings due to misunderstandings of the testing process, which could compromise the accuracy of results and limit the effectiveness of HIVST. A Principal Nursing Officer highlighted that even minor misinterpretations could lead to significant errors in the results:

“So depending on the literacy or the knowledge base of the client and how you were able to interpret it, they might not get the reading right.” (42 years, Principal Nursing Officer, ART Unit).

4.21.7 Healthcare worker motivation

Healthcare providers expressed concerns about how the introduction of HIV self-testing (HIVST) might impact the motivation and morale of healthcare workers, particularly those involved in HIV counseling and testing. Some participants worried that if patients increasingly use self-testing kits,

it could reduce the demand for traditional testing services, potentially decreasing the interactions counselors have with clients and, in turn, affecting any incentives tied to their involvement in HIV counseling. A Medical Laboratory Technician highlighted the potential impact on healthcare workers' motivation if self-testing reduces the need for direct counseling:

“Well, the first thing that comes to mind is looks like the people in charge of the counseling, there are benefits that they may not have again because the client will not come to them, so if there is any financial support, it may not be given again because it is now self so that person walks in there, pick it and go. So, I’m talking about motivation” (49 years old, Medical Laboratory Technician).



CHAPTER FIVE

DISCUSSION

5.0 Background Characteristics

This study aimed to determine the knowledge and willingness to use HIV Self-testing among healthcare providers and their patients in La-Nkwantanang, Madina. The background characteristics observed in this study align with broader trends reported in Ghana and similar Sub-Saharan Africa contexts. The distribution of participants' sex, religion, and ethnicity, is consistent with demographic patterns in studies conducted in Ghana (Adei et al, 2022; Ketor et al., 2024; GSS, 2022) and Sub-Saharan African (SSA) (Gumede & Sibiya, 2018). The sex distribution for example which showed a predominance of female respondents is consistent with studies where women are more engaged in healthcare practices (Gumede & Sibiya, 2018; Thompson et al., 2016). This participation could be attributed to societal roles that emphasize women's involvement in family health and reproductive care (Craymah et al., 2017).

The religious composition, with Christianity being the predominant, reflects the national religious demographics of Ghana, where approximately 71% of the population identifies as Christians (GSS, 2021, GSS, 2022). Religion can significantly shape health behaviors, as evidenced by Ketor, et al., 2024, who found that religious beliefs often influence an individual's attitudes toward medical practices. The predominance of Christian respondents could suggest a community more receptive to health initiatives aligned with religious teachings that emphasize care and well-being.

The ethnic composition, dominated by the Akan group, aligns with the demographic data from the 2021 Ghana Population and Housing Census (GSS, 2021). The representation of different ethnic groups suggests that health communication strategies should be culturally tailored to resonate with varied beliefs and practices.

5.1 Level of Knowledge and Awareness among Clients/Patients about HIV Self-Testing

In this study, 39.2% of the participants were aware of HIVST. The awareness observed in this study is higher compared to those reported by other researchers in other low and middle-income countries such as 11% in Gambia (Soe et al., 2023), 14.8 reported for 21 SSA countries, 19% in Kenya (Olakunde et al., 2023), 24.8% in Peru, and 27.9% in Mexico (Elloregea et al., 2022). The higher awareness of HIVST observed in this study compared to other countries may be attributed to Ghana's targeted HIV prevention strategies, urbanized healthcare accessibility, and effective dissemination of HIVST. Unlike regions with lower awareness, Ghana's relatively robust healthcare infrastructure, particularly in urban settings like La-Nkwantanang, facilitates greater exposure to HIVST campaigns. Another possible reason for the higher awareness could be the presence of HIV clinics within both facilities studied, which actively promote HIVST and provide counseling services. Additionally, differences in socio-cultural norms, with urban Ghana showing more progressive discourse around HIV prevention, and methodological variations in study populations likely contributed to the observed disparities. These findings highlight major gaps in the scale and scope of campaigns or interventions aimed at raising HIVST awareness. They also highlight the need for context-specific, evidence-based ways to raise HIVST awareness in low- and middle-income countries, where structural, cultural, and healthcare system barriers frequently limit the effectiveness of generic approaches (Oleribe et al., 2019)

The analysis revealed that 49% of participants exhibited moderate knowledge about HIVST, 41% had low knowledge, and 10% of the participants, demonstrated high knowledge about HIVST. The proportion of participants with high knowledge in this study is significantly lower compared to the 41.9% found by Babatunde et al., (2022), and 40.0% observed by Daniel et al., (2024). These disparities may be attributed to differences in study populations, as Babatunde et al.'s research

focused on students, who may have had more exposure to health education in academic settings. Daniel et al.'s study also included healthcare providers, who are expected to have a higher baseline knowledge of health-related topics, including HIV self-testing, due to their professional training and expertise.

The high proportion of low knowledge observed in this study shows that most participants had limited knowledge about the HIVST despite its promotion as a user-friendly diagnostic tool. The moderate knowledge level could also be attributed to exposure to surface-level awareness campaigns that emphasize the existence of HIVST without adequately detailing its usage, benefits, and limitations. This indicates gaps in educational content, cultural barriers to discussing sexual health openly, and limited peer influence, which has been shown to significantly boost behaviour adoption (Kinaro et al., 2019; Sánchez et al., 2023). The relationship between knowledge and awareness is essential in shaping the perceptions and willingness to embrace HIV treatment.

5.3 Willingness of Clients/Patients to Use HIV Self-testing Services

More than two-thirds of the respondents in this study were willing to use HIVST services if it became widely available. The finding in this study aligns with studies in other countries. For instance, a study by Olakunde (2023) in Kenya reported similar willingness, with over 75% of participants indicating their willingness to use HIVST. A similar result was found by Jardim et al (2022) in Brazil (75.4%). A study by Ashburn et al. (2020) found the willingness to use HIV self-test kits was 65% in Cote d'Ivoire and 69% in Tanzania. In contrast to the findings of this study, other research has reported significantly lower proportions of willingness to use HIVST. For instance, Elloregea et al.'s (2022) documented willingness rates of 43.7% in Brazil, 36.3% in Mexico, and 32.1% in Peru. Similarly, Vara et al (2020) also reported even lower proportion of willingness in their study.

However, the proportion observed in this study is slightly lower than the 88% reported by Laxmeshwar et al., (2024) in India. The variations in these studies may be attributed to contextual factors such as population characteristics, accessibility of HIVST kits, or variations in public health messaging and interventions. The willingness to use HIVST may reflect the participant's desire for privacy, convenience, and autonomy in testing, which are key determinants of self-testing. This could also be explained by the preference for obtaining kits from pharmacies over public health facilities.

5.4 Sociodemographic characteristics influencing Willingness to Use HIVST

The analysis revealed that age, level of education, and income were significantly associated with willingness to use HIVST in the future. Respondents aged 45 years and above exhibited a significantly lower willingness to use HIVST compared to younger ones. This finding aligns with studies that have shown age-related variations in the adoption of different types of health technology. For example, a systematic review by Bertolazzi et al. (2024) showed that older adults often show less interest in adopting newer health interventions, possibly due to entrenched traditional practices or skepticism about modern healthcare solutions. In contrast, younger age groups are more inclined towards HIVST, as seen in studies by Indravudh et al., (2020), who attributed this trend to increased health awareness and exposure to digital information among younger populations. This study's findings also correlate with studies that show youth are very open to self-testing since it provides greater autonomy and control over the HIV testing process, including the place and time of testing and disclosure of results. (Indravudh et al., 2017; Mokgatle et al., 2018).

This study found that willingness to use HIVST increased with an increasing level of education. Participants with basic education, secondary, vocational, or technical education, and tertiary education were more willing to use HIVST compared to those with no formal education. This finding is consistent with the findings of Indravudh et al., (2020), which found HIVST use to be prevalent among women who had completed primary, secondary, or higher education compared to those with no formal education. Individuals with more education tend to have better health literacy and are more receptive to innovative health practices (Elloregea et al., 2022). The marked increase in willingness among those with any level of formal education compared to no formal education suggests that education plays a pivotal role in shaping attitudes toward HIVST. Individuals with no formal education may face barriers related to limited understanding and misconceptions about self-testing which may affect their willingness to use HIVST (Elorreaga et al., 2022; Olakunde et al., 2022).

Income was another significant factor, with participants earning between 1600-2000 Ghana cedis showing a higher willingness to use HIVST compared to those earning less. This finding is consistent with Elloreaga et al (2022) and Indravudh et al. (2020) who observed that higher income levels often correlate with greater access to health resources and the ability to prioritize preventive health measures. Lower-income individuals may face financial constraints that deter them from considering HIVST (Elloreaga et al., 2022; Oleribe et al., 2019). This emphasizes the need for affordable or subsidized testing options to promote equitable access.

This study however did not find any association between the sex of the clients and their willingness to use HIVST as reported by Olakunde et al (2023). The lack of association between sex and willingness in this study could be due to differences in the study populations and contexts. This study was conducted among a diverse group of clients/patients in Ghana, who may have varying

levels of risk-perception and motivations for HIV testing. In contrast, Olakunde et al (2023) focused specifically on high-risk young adults in Kenya, a population where gender-related dynamics, such as differences in risky behaviour, access to resources, and cultural norms, may play a more prominent role in influencing willingness to test.

5.5 Association between Clients Sexual Behaviour Characteristics and Willingness to Use HIVST

This study found age at sexual debut and engaging in high-risk sexual behaviors to be associated with willingness to use HIVST. Respondents who reported having their sexual debut from 25 years and above had reduced odds of being willing to use the HIVST compared to those between 15-19 years.

The finding above contrasts with findings by (Nibret Eskezia et al., 2023), who reported individuals who delay sexual initiation often adopt more conservative health practices. The possible reason for this finding may be attributed to the fact older adults may be more educated about HIV issues, have higher exposure to HIV testing services, and have more autonomy in decision-making than youths (Nibret Eskezia et al., 2023). Conversely, the finding in this study could be possibly due to a higher perceived risk of exposure and proactive health behaviors among those aged 15-19 years (ref).

This finding is consistent with the results of Vara et al (2020) who found participants aged 19 years and above were less likely to accept the HIVST compared to those who were younger.

Engaging in high-risk sexual behaviour, such as having sex with a stranger or under the influence of alcohol showed an increased willingness to use HIVST. This finding is supported by Bekele & Fekadu, (2020) found that individuals with riskier sexual practices are often more aware of their

vulnerability to HIV and thus more inclined to seek self-testing as a preventive measure. This is in line with studies that have shown perceived risk or susceptibility to be associated with willingness to test for HIV (Choko et al., 2011; Ebuenyi et al., 2019).

5.6 Association between Clients Awareness and Level of Knowledge and Willingness to use HIVST

Awareness and level of knowledge were significant factors that influenced clients' willingness to use HIVST. Clients who were aware of HIVST and had moderate or high knowledge of HIVST were more likely to express willingness to use the HIVST compared to those who lacked aware or had low knowledge levels. This finding aligns with prior research indicating that awareness and knowledge are critical determinants of HIVST uptake and its effectiveness as a self-care intervention for HIV prevention and diagnosis (Nibret Eskezia et al., 2023). The observed relationship may be explained by the role of awareness and knowledge in reducing misconceptions about HIVST, increasing confidence in its use, and fostering trust in its accuracy and reliability (Elorreaga et al., 2022; Olakunde et al., 2022). Also, informed individuals are more likely to perceive HIVST as a convenient and empowering option, enhancing their willingness to adopt it (Indravudh et al., 2017; Mokgatle et al., 2018). These results underscore the importance of educational campaigns to increase awareness and knowledge as a means to promote HIVST uptake.

5.7 Client's Perception and Attitudes that Influence their Willingness to Use HIVST

Perceptions about the credibility, safety, convenience, and ease of use of HIVST kits were associated with willingness to use them. Respondents who believed the kits to be safe and easy to use were more willing to use them in the future. This the findings of Brown et al 2016) who believe the accuracy of HIVST was a strong motivator to use it, as individuals who perceive the kits as

reliable are more inclined to use them. The findings also align previous research demonstrating that trust in product safety and user-friendly can significantly influence health decisions (Firoozzare et al., 2024). The perception that HIVST could reduce stigma was also significantly associated with willingness to use HIVST. This is consistent with the findings of Ky-Zerbo et al., (2021) and Bogart et al., (2021) who found that privacy-related benefits reduce the fear of judgment associated with clinic-based testing.

Clients who feared stigma or discrimination in purchasing HIVST kits were less willing to use them, a barrier also identified by the European Center for Disease Prevention and Control (ECDC, 2023), which noted stigma as a major deterrent to HIV-related health services. This finding is further supported by the preference for obtaining HIVST kits from pharmacies over public health facilities as seen in this study. This highlights the importance of convenience and perceived anonymity in reducing stigma-related barriers (Mphande et al., 2021). Pharmacies are often viewed as more discreet and accessible distribution points which are less judgmental spaces (Mphande et al., 2021).

5.8 Impact of Community and Social Norms on Clients' Willingness to Use HIVST

Community discussions about HIV were associated with a higher willingness to use HIVST. This aligns with the findings of Cislighi and Heise (2018) that social norms and communal health dialogues encourage open attitudes toward health practices. The role of social influence in promoting self-testing behaviours emphasize the need for community-based education and peer support in HIV prevention strategies.

5.9 Challenges or Barriers to Implementation of HIVST

The successful implementation of HIV self-testing (HIVST) services faces several barriers, as identified in this study. These challenges span resource and logistical issues, tracking of results, linkage to care, affordability, accessibility, literacy, and healthcare worker motivations.

5.9.1 Resource and Logistical challenges

Healthcare providers expressed concerns about resource limitation and logistical barriers, including increased workload and supply chain issues. Similar concerns have been documented in other low-resource settings, where the healthcare system struggles to accommodate new interventions without compromising existing services (Oleribe et al., 2019). Supply chain disruptions, as noted by participants, could limit the consistent availability of testing kits, confirming reports from other regions where shortages of HIV-related supplies have undermined service delivery ((Muyingo et al., 2022; Oleribe et al., 2019). Strengthening procurement systems and ensuring sustainable funding are essential to mitigate these challenges.

5.9.2 Tracking of Results and Linkage to care

The absence of direct interaction with HIVST poses challenges for follow-up, particularly when individuals fail to report positive results (Bogart et al., 2021; Njau et al., 2019). This finding aligns with previous studies emphasizing the importance of robust mechanisms for reporting and follow-up to prevent loss of care (Njau et al., 2019; Pai et al., 2021). Not reporting positive results creates a gap in the continuum of care. Strategies such as integrating digital reporting systems, and community-based follow-up programs could improve tracking and linkage to care.

5.9.3 Affordability

The potential cost of HIVST kits emerged as a significant barrier to its implementation. Similar studies have been reported in other low-income settings, where cost considerations significantly influence health service uptake (Dinglasan et al., 2022). Offering HIVST kits for free or charge or subsidized rates could enhance accessibility, particularly in marginalized populations. Subsidization models, supported by governments or international donors, have effectively increased the adoption of health interventions in resource-constrained settings (Aizobu et al., 2023).

5.9.4 Accessibility and Distribution

Both clients and healthcare providers emphasize the preference for obtaining HIVST from pharmacies. Pharmacies and other community-based outlets provide discreet options that reduce stigma, as observed in similar studies from the Philippines (Dinglasan et al., 2022;) and the United States of America (Crawford et al., 2016). Public health facilities, though trusted for their quality, may not offer the privacy required for HIV testing. Expanding distribution channels to include pharmacies, supermarkets, and online platforms could increase access and address privacy concerns, ensuring that individuals feel comfortable obtaining kits.

5.9.5 Literacy and Comprehension

The identification of low literacy levels as a barrier to implementation in this study adds to the literature suggesting that such individuals may struggle to follow instructions independently. This challenge highlights the need for simplified instructions and user-friendly designs to accommodate varying literacy levels. Research has shown that pictorial and instructional videos can significantly improve comprehension and accuracy (Tarchi et al., 2021). Furthermore, community-based

education and support programs could provide additional assistance to users who require guidance, thereby enhancing the reliability of self-testing outcomes.

5.9.6 Healthcare Worker Motivation

The potential impact of HIVST on healthcare worker motivation was another concern, with participants fearing that reduced client interactions could lead to a decline in incentives tied to counseling. This emphasizes the importance of maintaining a balance between traditional testing services and HIVST to sustain the role of healthcare workers in the continuum of care. Strategies such as redefining counselor responsibilities to incorporate HIVST support and training could aid in addressing these issues while keeping healthcare staff interested and motivated. Addressing these barriers is crucial in optimizing HIVST uptake and ensuring its integration into healthcare systems.

5.10 Strengths and limitations of the study

This study has several strengths and limitations worth considering. One major strength of this study is its mixed method designs, which combined quantitative surveys and qualitative in-depth interviews. This allows for a comprehensive understanding of knowledge, attitudes, and barriers to HIV self-testing (HIVST). This study's focus on La-Nkwantanang Madina Municipality, a diverse urban and peri-urban area, ensures contextual relevance to similar settings in sub-Saharan Africa. Also, the inclusion of both healthcare providers and clients offered a multidimensional perspective, enriching the findings with actionable insights. Moreover, the study identified key barriers to implementation, providing a roadmap for addressing them.

However, the study's cross sectional design limits causal inferences because the observed associations may not reflect direct-cause-and-effect interactions. Furthermore, the use of self-reported data increases the potential of social desirability bias, and responses may not fully

translate into actual behaviours due to the hypothetical nature of the scenarios presented. While convenience and purposive sampling may be useful, they may limit the generalizability of findings, especially in rural or less networked communities. The urban focus also limits the conclusions' application to more rural environments, where healthcare availability and cultural norms differ significantly. Despite these limitations, the study's strong methodology and contextual insights make it an important addition to HIVST research and policy formulation.



CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

This study provides insight into the knowledge, attitudes, and willingness of clients and healthcare providers regarding HIVST in the La-Nkwantanang Madina Municipality. The findings reveal moderate levels of awareness and knowledge about HIVST among participants, with notable gaps in comprehensive understanding of the innovation. Despite these gaps, willingness to use HIVST was high, driven by preferences for privacy, convenience, and autonomy. Factors such as age, education level, income, age at first sexual debut, engaging in high-risk sexual behaviours, awareness, level of knowledge, attitudes, perceptions, and social norms significantly influenced willingness to use HIVST. Stigma, cost, and literacy were limitations highlighted by clients as potential barriers to HIVST uptake.

Health providers identified logistical challenges, resource constraints, and the potential impact of follow-up care and healthcare worker motivation as critical barriers to HIVST implementation. These findings provide a foundation for designing context-specific interventions to enhance HIVST uptake and implementation.

6.2 Recommendations

Based on the findings of this study, the following targeted recommendations are proposed to improve knowledge, awareness, and uptake of HIV self-testing (HIVST) among clients in La-Nkwantanang Madina Municipality and similar urban SSA settings.

1. Strengthening Awareness and Knowledge

The Ghana Health Service (GHS), in collaboration with the National AIDS Control Programme (NACP) and municipal health directorates, should intensify HIVST-focused health education campaigns using culturally sensitive messaging disseminated through community forums, churches, mosques, schools, and workplaces. Facility-based counseling sessions should integrate HIVST education into routine HIV clinics to ensure that patients not only know about the kits but also understand how to use them correctly, interpret results, and seek follow-up services. Peer educators, youth ambassadors, and civil society organizations (CSOs) should also be engaged to enhance awareness among young people, who were found to be more willing to adopt HIVST.

2. Improving Access and Distribution

To improve access, the Ministry of Health (MoH) and GHS should expand HIVST kit distribution beyond public health facilities to include pharmacies, licensed chemical shops, supermarkets, and regulated online platforms. The Food and Drugs Authority (FDA) and private distributors should be engaged to ensure the availability of approved, high-quality kits in urban and peri-urban areas. In addition, local assemblies and private sector actors could introduce discreet vending machines and pharmacy pick-up points, particularly in busy urban settings, to reduce stigma and increase confidentiality in obtaining HIVST kits.

3. Ensuring Affordability and Equity

Government, development partners, and donor agencies should implement a subsidy or tiered pricing model to ensure affordability of HIVST kits, particularly for low-income populations who reported financial barriers to use. Free HIVST kits should be distributed in high-prevalence communities and among key populations through targeted programmes supported by NGOs and CSOs. This will help to ensure equity and prevent cost from becoming a barrier to uptake.

4. Enhancing Linkage to Care and Support Systems

The NACP, in collaboration with digital health partners and telecommunications companies, should develop confidential reporting and referral platforms using SMS, WhatsApp, or USSD codes to link individuals who self-test to confirmatory testing and treatment. Training programmes should also be organized for healthcare workers to shift their roles from solely providing HIV tests to facilitating HIVST, providing counseling, and ensuring psychosocial support. Furthermore, community health workers (CHWs) should be tasked with tracing and supporting individuals who self-test positive, thereby strengthening follow-up and linkage to care.

5. Addressing Literacy and Comprehension Barriers

Manufacturers and distributors of HIVST kits, working with GHS and CSOs, should adapt kit instructions into simplified pictorial and local-language versions to accommodate low-literacy populations. These should be complemented with audio-visual guides accessible via mobile phones and community centers. Health facilities and community outreach programmes should also conduct demonstration sessions where individuals can learn safe and accurate HIVST use under guided instruction.

6. Tackling Stigma and Social Barriers

Community leaders, faith-based organizations, and CSOs should normalize HIVST by integrating it into community dialogues, health forums, and religious gatherings. Testimonies from early adopters and role models should be shared to counter stigma and increase acceptance. Religious and cultural leaders should be empowered to promote HIVST as a responsible and preventive health behavior aligned with moral and cultural values. Pharmacies and chemical shops should be

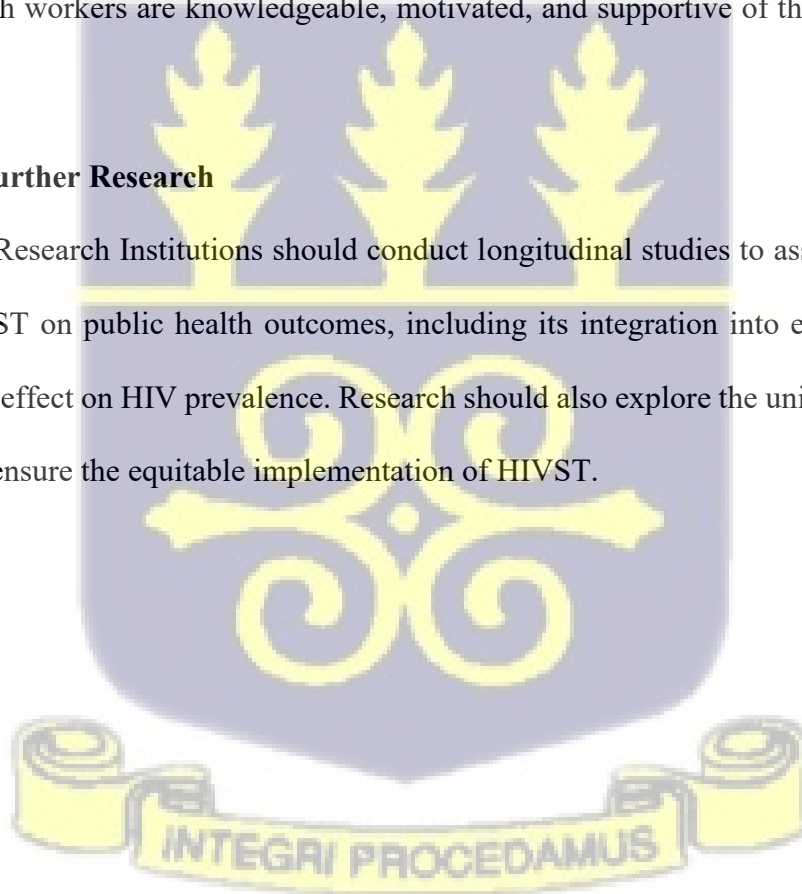
positioned as primary distribution hubs, as they are viewed as trusted, less stigmatizing outlets compared to public health facilities.

7. Policy and Health System Strengthening

At the policy level, the MoH and NACP should formally integrate HIVST into Ghana's National HIV Testing Algorithm with clear operational guidelines for confirmatory testing and referral pathways. Supply chain systems should be strengthened by the GHS and partners to ensure consistent availability of HIVST kits, avoiding shortages that undermine public trust. Furthermore, pre-service and in-service training curricula for healthcare providers should include HIVST to ensure that health workers are knowledgeable, motivated, and supportive of the scale-up of self-testing services

8. Conduct Further Research

Academic and Research Institutions should conduct longitudinal studies to assess the long-term impact of HIVST on public health outcomes, including its integration into existing healthcare services and its effect on HIV prevalence. Research should also explore the unique needs of rural populations to ensure the equitable implementation of HIVST.



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PARTICIPANT INFORMATION SHEET – HEALTHCARE USERS

Principal Investigator: Leticia Sekyiwaa Nkrumah

Institution: School of Public Health, University of Ghana

Project Title: KNOWLEDGE AND WILLINGNESS TO USE HIV SELF-TESTING AMONG HEALTHCARE SERVICE PROVIDERS AND THEIR CLIENTS IN LA-NKWANTANANG, MADINA.

Introduction: Hi, my name is (NAME) I am a Research Assistant, and I am working with the Principal Investigator Leticia Sekyiwaa Nkrumah

Background and Purpose of the Research: Globally, 39 million people were living with HIV at the end of 2022 and remains a significant global public health challenge, with Ghana being one of the countries bearing a substantial burden of the disease. Despite significant strides in HIV programs worldwide, a substantial number of individuals living with HIV remain unaware of their status. This study is being conducted to understand the knowledge and willingness of healthcare providers and their clients to adopt HIV self-testing (HIVST), particularly in the specific context of La-Nkwantanang, Madina where prevalence is 6.6% (Ghana's HIV Fact Sheet, 2019). By participating in this research, you will contribute valuable insights to the development of targeted interventions and policies, ultimately improving HIV testing services and reducing undiagnosed HIV infections in the community.

Nature of Research: This study seeks to determine knowledge and willingness to utilize HIV self-testing among healthcare providers and their clients in La-Nkwantanang, Madina. The research will involve interviewing healthcare service providers and the clients they render services to gather information about their level of knowledge on HIV self-testing and also to find out their willingness to use HIV self-testing as well as their perceptions, barriers, and challenges associated with HIV self-testing.

Participants Involvement: If you agree to participate in this study, you will be asked to complete a structured questionnaire that will take approximately 20 minutes. The questionnaire will inquire information on your sociodemographic (sex, age, religion, level of education, tribe, income, and marital status). The second part will assess your level of knowledge of HIVST, the third part will assess your sexual behaviour, the fourth part will assess your willingness and awareness of HIVST, and the final part will assess your Attitudes and Perceptions about HIVST.

Benefits: There will be no direct benefit to participating in this study. However, the information gained may be useful in the future. The findings of this study can enhance the current and future reproductive health delivery systems.

Risk: There are no known risks associated with participating in this study. However, some people may find questions on sexual behaviour to be sensitive. Efforts will be made to minimize any potential discomfort, and all COVID-19 Guidelines and standard practices will be adhered to during the study.

Compensation: The study participants will not receive money or any form of compensation for their participation. They will be appreciated verbally by thanking them post-interview.

Confidentiality: All information provided by participants will be kept strictly confidential. Your identity will not be disclosed in any reports or publications resulting from this study.

Rights of the Participant: You have the right to withdraw from this study at any time without giving a reason. You also have the right to ask for clarification about any of the information that you have been given.

Outcome and Feedback: Data collected will be analyzed for research purposes, and findings may be disseminated in academic journals or presentations. However, individual participants will not receive feedback on their specific responses. If you have any questions or concerns, please do not hesitate to contact the researcher.

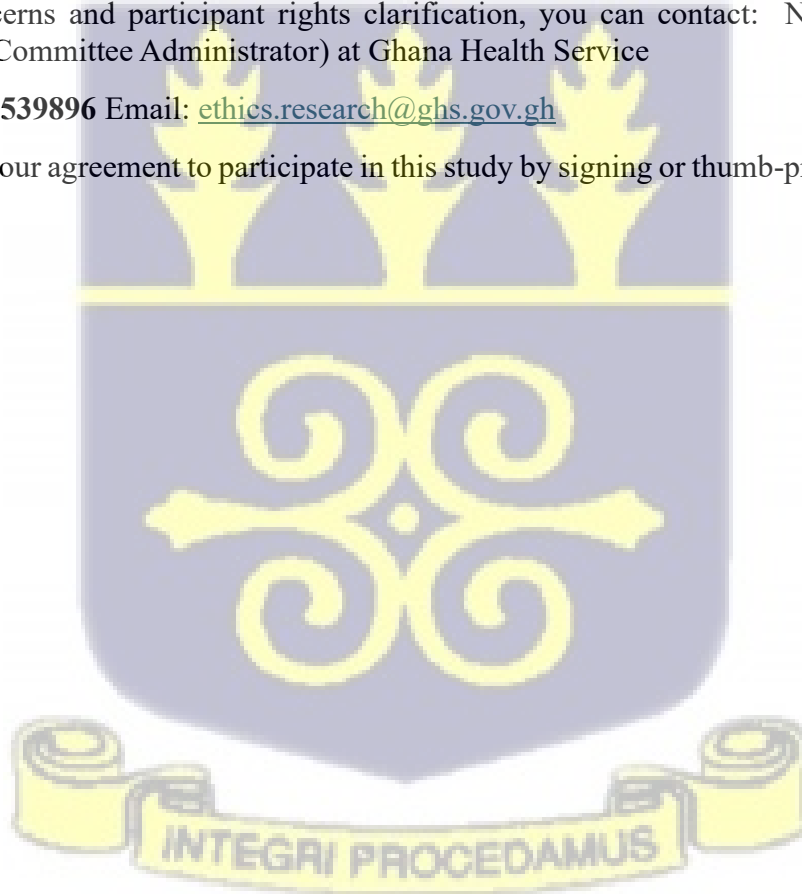
Contacts for Additional Information: You can contact me if you need further information regarding this research.

Name: Leticia Sekyiwaa Nkrumah Contact: 0248526074 Email: leticiayeboah50@gmail.com

For ethical concerns and participant rights clarification, you can contact: Nana Abena Apatu (Ethics Review Committee Administrator) at Ghana Health Service

Telephone: 0503539896 Email: ethics.research@ghs.gov.gh

Please indicate your agreement to participate in this study by signing or thumb-printing the consent form provided.



APPENDIX I: QUESTIONNAIRE

QUESTIONNAIRE

KNOWLEDGE AND WILLINGNESS TO USE HIV SELF-TESTING AMONG HEALTH FACILITY CLIENTS IN LA-NKWANTANANG, MADINA

Participant ID.....

Research Assistant.....

Questions	Responses	Remarks
A: Socio-demographic characteristics		
A1. What is your current age?	 (years)	
A2. Gender	1. Male 2. Female	
A3. Marital status	1. Married 2. Unmarried	
A4. What is the highest level of education you have completed?	1. No formal Education 2. Primary (Basic Education) 3. SHS)/Vocational 4. Tertiary	
A5. What is your religion	1. Christian 2. Muslim 3. Africa Traditional	
A6. Occupation	1. Unemployed 2. Government employee 3. Private employee 4. Self-employed	
A7. Which ethnic group do you belong to?	1. Akan 2. Ga-Adangbe 3. Ewe 4. Mole-Dagbani 5. Grusi 6. Gurma 7. Mande Others..... specify	
A8. Average Monthly income in Ghana cedis		

A9. How many people currently live in your household, including yourself? (Hint: A household refers to people who usually live together and share food from the same cooking pot, whether related or not).		
B. Sexual Behaviours		
B1. Have you ever had sex?	1. Yes No	Skip if the person is married
B2. How old were you when you first had sex?	3. years	
B3. How many people or partners have you had sex with in the past one year?	One Two 4. More than two	
B4. Did you use condom during your last sexual intercourse?	1. Yes No	
B5. Have you ever had a sexually transmitted disease in the past?	1. Yes 3. No	
B6. Have you ever had sex with a stranger?	1. Yes 2. No	
B7. Have you ever had sex while on alcohol or drunk?	1. Yes 2. No	

B8. Have you ever had sex in exchange for money or a gift?	1. Yes 2. No	
B9. Have you ever tested for HIV?	1. Yes 2. No	
B10.if yes to the above, When was your most recent HIV test	Less than a month 1-2 months 3 months or more 4. One year or more.	
B11. Do you know your HIV status?	1. Yes 2. No	
C. Willingness and Awareness of HIVST		
C1. Have you ever heard of HIV self-test?	1. Yes 2. No	
C2. If yes, where did you hear it from	1. Social media 2. TV/Radio 3. Friend 4. Health worker 5. Church/mosque 6. Internet Others specify	
C2A. If no, provide the WHO definition of HIVST and continue	HIVST is defined as: “a process whereby someone collects his or her specimen (oral fluid or blood) and then performs an HIV test and interprets the result, often in a private setting, either alone or with someone he or she trusts	
C3. Will you be willing to use the HIVST if it is available?	1. Yes 2. No	

C3A. If yes, what would be some possible reasons to use the HIV self-test	Multiple responses ☐ Privacy ☐ Reduced stigma, ☐ Convenience ☐ Accessibility ☐ Psychological benefits - Others (specify)	
C3B. if no, what would be some possible reasons to not use the HIV self-test?	Multiple responses ☐ Stigma, ☐ Fear of results, ☐ mistrust in accuracy ☐ cost ☐ availability - Others (specify)	
C4. Are you willing to pay money to buy a self-test kit should it be available to the general public?	1. Yes 2. No	
C4A. If yes, how much are you willing to pay for it?		
C5. Would you be comfortable asking your sexual partner(s) to use an HIV self-test before you had sex?	1. Yes 2. No	
C6. Where would you prefer to go and collect an HIV self-test kit?	1. Public facility 2. Pharmacy 3. Private facility 4. Others (specify).....	
C7. Which group of people do you think will be more willing to use this kit?	1. Males 2. Females 3. Teenagers	

D. Level of Knowledge on HIVST		
D1. It is legal to use HIV self-test kits in Ghana	1. Yes 2. No 3. Not sure	
D2. HIVST kits are available in pharmacies and chemical shops	1. Yes 2. No 5. Not sure	
D3. HIVST is done using fluid from the mouth	1. Yes 2. No 4. Not sure	
D4. HIVST is done using blood	1. Yes 2. No 5. Not sure	
D5. A person can perform the HIVST on herself/himself	1. Yes 2. No 5. Not sure	
D6. It takes 20–40 minutes to get results from the HIVST	1. Yes 2. No 5. Not sure	
D7. The HIVST test can be negative if the HIV infection is less than three months	1. Yes 2. No 8. Not sure	
D8. A single reactive self-test result does not provide an HIV-positive diagnosis.	1. True 2. False 4. Don't know	
D9. A nonreactive HIVST result does not require further confirmatory tests except for when PrEP is to be initiated.	1. Yes 2. No 2. Not sure	

D10. A person needs to be counseled by an HIV counselor before and after taking the HIV self-test.	1. Yes 2. No 2. Not sure	
E. Attitudes and Perceptions		
E1. Do you think the results from the HIVST kit is credible?	1. Yes 2. No	
E2. Do you think the HIVST is safe to use?	1. Yes 2. No	
E3. Do you think the HIVST is convenient to use	1. Yes 2. No	
E4. Do you think the HIVST is easy to use	1. Yes 2. No	
E5. How easy do you think it is to obtain an HIVST kit in your area?	1. Not easy 2. Easy 3. Very Easy	
E6. How comfortable would you feel using an HIV self-test on your own?	1. Very comfortable 2. Comfortable 3. Neutral 4. Uncomfortable 5. Very uncomfortable	
E7. Do you fear experiencing stigma or discrimination in purchasing HIVST?	1. Yes 2. No	
E8. Do you think HIV self-testing can reduce the stigma associated with HIV testing?	1. Yes 2. No 3. Unsure	
E9. Would you trust the results of an HIV self-test as much as a test conducted by a healthcare professional?	1. Yes 2. No	

E10. How likely are you to recommend HIV self-testing to friends or family members?	1. Very likely 2. Likely 3. Neutral 4. Unlikely 5. Very unlikely	
E11. What is your main concern about using HIV self-tests?	Multiple responses (tick as many that are applicable) 1. Accuracy of the results 2. Privacy and confidentiality 3. Cost of the tests 4. Ease of use 5. Lack of immediate professional support 6. No concerns 7. Others, specify	
E12. Do you think HIV self-testing should be more widely promoted and available?	1. Yes 2. No	
E13. Would the availability of HIV self-tests affect your willingness to get tested for HIV?	1. Yes 2. No 3. Unsure	
E14. In your opinion, what is the best way to educate people about HIV self-testing?	Tick as many as are applicable ☐ Healthcare provider consultations ☐ Public awareness campaigns ☐ Online resources and tutorials ☐ Community workshops ☐ Educational materials in clinics ☐ Other (please specify): _____	

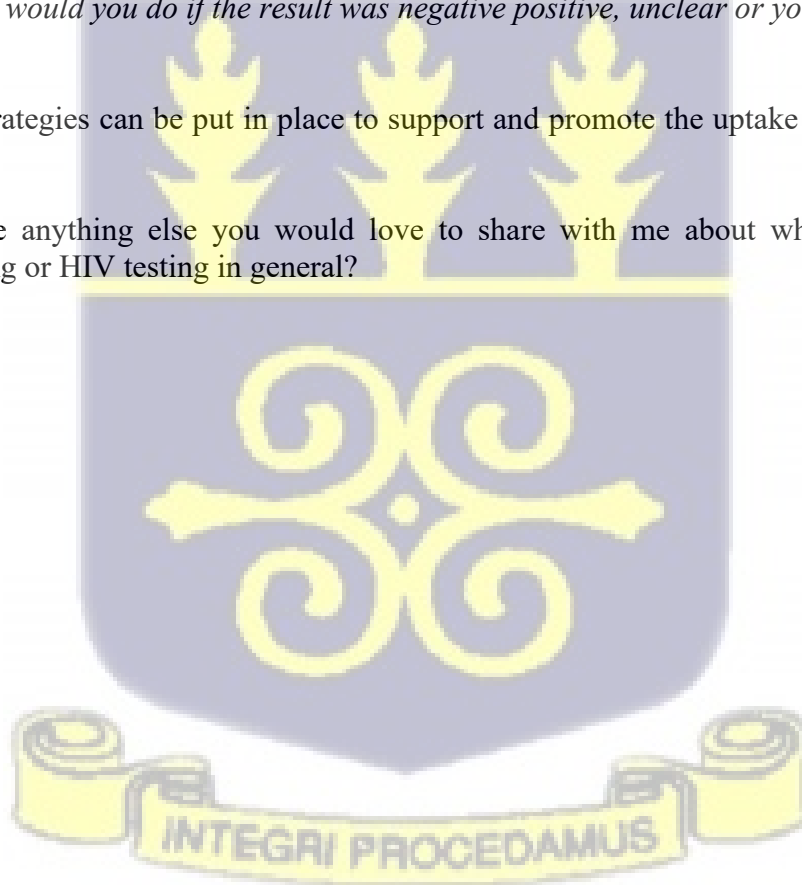
E15. Would you feel comfortable seeking confirmation, support, and counseling in the hospital after using an HIV self-testing kit?	1. Yes 2. No 3. Not sure	
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IN-DEPTH INTERVIEW QUESTIONNAIRE

KNOWLEDGE AND WILLINGNESS TO USE HIV SELF-TESTING AMONG HEALTHCARE SERVICE PROVIDERS IN LA-NKWANTANANG, MADINA

1. Can you please tell me about your age, your current role, years of experience in healthcare, and the specific area of healthcare service you are involved in?
2. How long have you been working as a healthcare service provider in this facility?
3. What is your experience with HIV testing and counseling services in your current role?
4. What are the current HIV testing services available in Ghana and in your facility? *Probe what is the perception and level of acceptance and use of the existing services by Clients or patients.*
5. Have you heard about HIV self-testing before? If yes please share with me what you know or have heard about HIVST and HIVST procedures. **Probe** *where they heard it from, their thoughts about HIVST*
6. What are your views about HIVST? (What do you believe are the advantages and disadvantages of HIV self-testing compared to traditional HIV testing methods?) **Probe** *for comparison between current routine HIV testing and HIVST.*
7. Are you willing to incorporate HIV self-testing into your healthcare services? Why or why not?
8. What factors would influence your willingness to offer HIV self-testing to your patients?
9. Do you think your patients would prefer HIV self-testing over traditional methods? Why or why not?
10. How do you think HIV self-testing could impact the overall HIV testing rates in your community?
11. When made available, where and how do you think HIVST kits should be accessed and distributed to patients? **Probe** *for location i.e. facilities, vendors, peers, clinic, pharmacy, mobile clinics, and community centers. Probe for reasons for the selected point of dissemination. Probe for person to disseminate.*
12. What challenges will hinder the incorporation of HIV self-testing into your healthcare services?

13. Are there any specific challenges or barriers you think might prevent patients from using HIV self-testing?
14. What would be the possible challenges associated with using and distributing HIV self-test kits?
15. How do you think issues such as cost, accessibility, and stigma might affect the implementation of HIV self-testing?
16. What measures do you think could be taken to address these challenges and barriers?
17. Do you think clients or patients would be willing to pay for the Kit? How much would they be willing to pay for it and why? **Probe** *what would motivate them to pay.*
18. What are your concerns about HIVST? **Probe** *Greater potential for inaccurate results, psychological danger when decoupling testing and counseling, Greater difficulty ensuring referral to treatment and care, Potential unethical use of HIV self-testing, Self-testing as justification for unprotected sex, Concern for safe disposal of biohazard materials)*
19. What are your perceptions/opinions on test accuracy? **Probe** *How would you perceive the results, what would you do if the result was negative positive, unclear or you are uncertain?*
20. What strategies can be put in place to support and promote the uptake of HIVST among clients?
21. . Is there anything else you would love to share with me about what we have been discussing or HIV testing in general?



PARTICIPANT INFORMATION SHEET -HEALTHCARE PROVIDERS

Principal Investigator: Leticia Sekyiwa Nkrumah

Institution: School of Public Health, University of Ghana

Project Title: KNOWLEDGE AND WILLINGNESS TO USE HIV SELF-TESTING AMONG HEALTHCARE SERVICE PROVIDERS AND THEIR CLIENTS IN LA-NKWANTANANG, MADINA.

Introduction: Hi, my name is (NAME) I am a Research Assistant, and I am working with the Principal Investigator Leticia Sekyiwa Nkrumah

Background and Purpose of the Research: Globally, 39 million people were living with HIV at the end of 2022 and remains a significant global public health challenge, with Ghana being one of the countries bearing a substantial burden of the disease. Despite significant strides in HIV programs worldwide, a substantial number of individuals living with HIV remain unaware of their status. This study is being conducted to understand the knowledge and willingness of healthcare providers and their clients to adopt HIV self-testing (HIVST), particularly in the specific context of La-Nkwantanang, Madina where prevalence is 6.6%. By participating in this research, you will contribute valuable insights to the development of targeted interventions and policies, ultimately improving HIV testing services and reducing undiagnosed HIV infections in the community.

Nature of Research: This study seeks to determine knowledge and willingness to utilize HIV self-testing among healthcare providers and their clients in La-Nkwantanang, Madina. The research will involve interviewing healthcare service providers to gather information about their knowledge of HIV self-testing and their willingness to use and incorporate HIV self-testing into their healthcare services as well as their perceptions, barriers, and challenges about HIV self-testing.

Participants Involvement: If you agree to participate in this study, you will be engaged in a recorded interview which will not last for more than 40 minutes. This will be done in person and at a private place.

Benefits: There will be no direct benefit to participating in this study. However, the information gained may be useful in the future. The findings of this study can enhance the current and future reproductive health delivery systems.

Risk: There are no known risks associated with participating in this study. However, efforts will be made to minimize any potential discomfort, and all COVID-19 Guidelines and standard practices will be adhered to during the study.

Compensation: Participants will receive some form of remuneration for their time.

Confidentiality: All information provided by participants will be kept strictly confidential. Your identity will not be disclosed in any reports or publications resulting from this study.

Rights of the Participant: You have the right to withdraw from this study at any time without giving a reason. You also have the right to ask for clarification about any of the information that you have been given.

Outcome and Feedback: Data collected will be analyzed for research purposes, and findings may be disseminated in academic journals or presentations. However, individual participants will not receive feedback on their specific responses. If you have any questions or concerns, please do not hesitate to contact the researcher.

Contacts for Additional Information: You can contact me if you need further information regarding this research.

Name: Leticia Sekyiwaa Nkrumah Contact: 0248526074 Email: leticiayeboah50@gmail.com

For ethical concerns and participant rights clarification, you can contact: Nana Abena Apatu (Ethics Review Committee Administrator) at Ghana Health Service

Telephone: **0503539896** Email: ethics.research@ghs.gov.gh

Please indicate your agreement to participate in this study by signing or thumb-printing the consent form provided.



CONSENT FORM

STUDY TITLE: Knowledge and willingness to use HIV Self-testing among healthcare service providers and their clients in La-Nkwantanang Madina.

PARTICIPANTS' STATEMENT

I acknowledge that I have read or have had the purpose and contents of the Participants' Information Sheet read and all questions satisfactorily explained to me in a language I understand (English/Akan). I fully understand the contents and any potential consequences as well as my right to change my mind (i.e. withdraw from the research) even after I have signed this form.

I voluntarily agree to be part of this research.

Name of Participant.....

Participants' SignatureOR Thumb Print.....

Date:.....

INTERPRETERS' STATEMENT

I interpreted the purpose and contents of the Participants' Information Sheet to the afore named participant to the best of my ability in the (English/Akan) language to his proper understanding.

All questions, appropriate clarifications sort by the participant and answers were also duly interpreted to his/her satisfaction.

Name of Interpreter.....

Signature of Interpreter OR Thumb Print

Date:.....

Contact Details.....

STATEMENT OF WITNESS

I was present when the purpose and contents of the Participant Information Sheet was read and explained satisfactorily to the participant in the language he/she understood (English/Akan)

I confirm that he/she was given the opportunity to ask questions/seek clarifications and same were duly answered to his/her satisfaction before voluntarily agreeing to be part of the research.

Name:.....

Signature..... OR Thumb Print

Date:.....

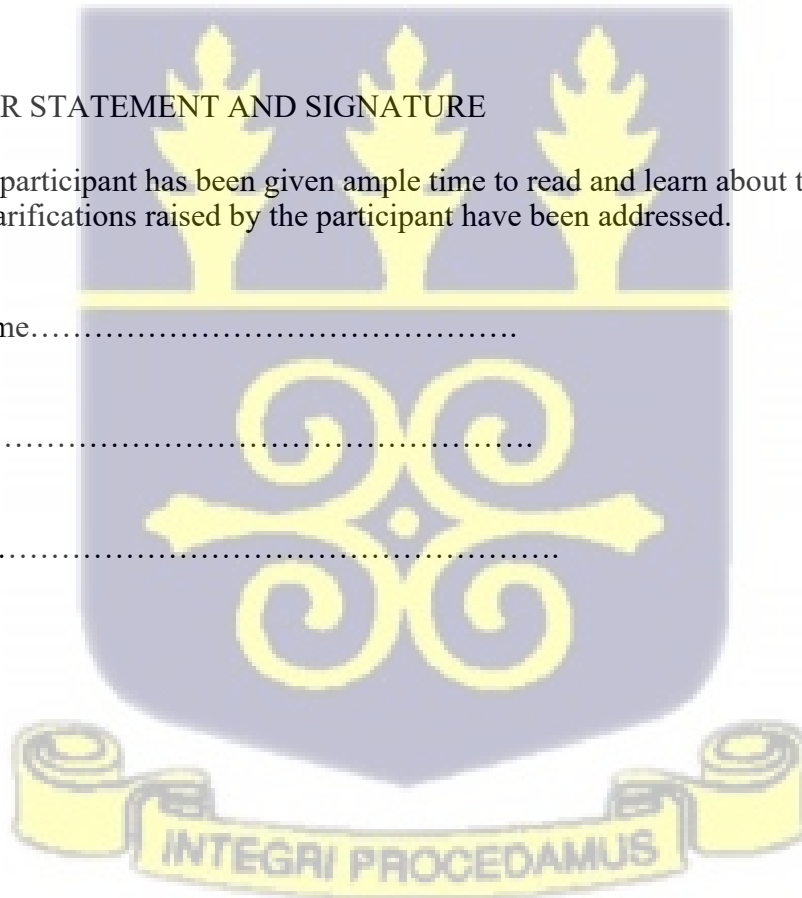
INVESTIGATOR STATEMENT AND SIGNATURE

I certify that the participant has been given ample time to read and learn about the study. All questions and clarifications raised by the participant have been addressed.

Researcher's name.....

Signature

Date.....





UNIVERSITY OF GHANA
DEPARTMENT OF POPULATION, FAMILY
AND REPRODUCTIVE HEALTH
SCHOOL OF PUBLIC HEALTH

Ref No.:

5th June, 2024

The Health Director
Madina Polyclinic
Rawlings Circle, Accra.

Dear Sir/Madam,

LETTER OF INTRODUCTION
LETICIA SEKIWAA NKUMAH - 11366343

I write to introduce to you **Leticia Sekiwaa Nkrumah**, an MPH Student with the Department of Population, Family and Reproductive Health, School of Public Health, University of Ghana, Legon.

As part of her academic requirement, she is undertaking a research on the topic **“Knowledge and Willingness to Use HIV Self-testing among Healthcare Service Providers and their Clients in La-Nkwantanang Madina.”**

She would need assistance in your facility to enable her to carry out her research work successfully.

We would be grateful if he is accorded all the necessary assistance.

Thank you.

Yours faithfully,

Prof Richmond Aryeetey
(Head of Department)



COLLEGE OF HEALTH SCIENCES

P.O. Box LG 13, Legon, Accra, Ghana.

· **Telephone:** +233 (0)28 910 9021/22

· **Email:** pfrh@ug.edu.gh

· **Website:** www.publichealth.ug.edu.gh

*In case of reply the
number and date of this
Letter should be quoted*



My Ref: GHS/RDD/ERC/Admin/App/24/396
Your Ref. No.

Leticia Sekyiwa Nkrumah
Adenta SSNIT Flat, Block 34
Vanilla Street
Accra

Research & Development Division
Ghana Health Service
P. O. Box MB 190
Accra
Digital Address: GA-050-3303
Mob: +233-50-3539896
Tel: +233-302-960628
Email: ethics_research@ghs.gov.gh
25th July, 2024

The Ghana Health Service Ethics Review Committee has reviewed and given approval for implementation of your Study Protocol.

GHS-ERC Number	GHS-ERC: 046/07/24
Study Title	Knowledge and Willingness to Use HIV Self-Testing among Healthcare Service Providers and their Clients in La-Nkwantanang Madina
Approval Date	25 th July, 2024
Expiry Date	24 th July, 2025
GHS-ERC Decision	Approved

This approval requires the following from the Principal Investigator

- Submission of a yearly progress report of the study to the Ethics Review Committee (ERC)
- Renewal of ethical approval if the study lasts for more than 12 months,
- Reporting of all serious adverse events related to this study to the ERC within three days verbally seven days in writing.
- Submission of a final report after completion of the study
- Informing ERC if study cannot be implemented or is discontinued and reasons why
- Informing the ERC and your sponsor (where applicable) before any publication of the research finding

You are kindly advised to adhere to the national guidelines or protocols on the prevention of COVID -19

Please note that any modification of the study without ERC approval of the amendment is invalid.

The ERC may observe or cause to be observed procedures and records of the study during and implementation.

Kindly quote the protocol identification number in all future correspondence in relation to this approved protocol

SIGNED.....

Mr. Kofi Wellington
(GHS ERC Chairperson)

Cc: Mr. Kofi Wellington, Research & Development Division, Ghana Health Service, Accra