FACTORS ASSOCIATED WITH UPTAKE OF ANTICOAGULATION SERVICE AT MOI TEACHING AND REFERRAL HOSPITAL, ELDORET, KENYA

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DECLARATION AND APPROVAL

Declaration by Candidate:

This thesis is my original work and has not been presented for a degree in any other university or any other award.

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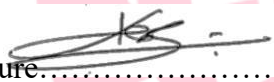
Date…… May **9th, 2025**……

Approval by Supervisors

This thesis has been submitted with our approval as University Supervisors.



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ABSTRACT

Background: Anticoagulants are essential for preventing and treating thromboembolism; however, uptake of anticoagulation services remains low in developing countries, such as Kenya. Despite recognizing their importance, many patients fail to adhere, and the underlying reasons remain unclear.

Objectives: This study identified patient- and institution-related factors influencing the uptake of anticoagulation services at Moi Teaching and Referral Hospital (MTRH), Kenya, focusing on knowledge, adherence, satisfaction, attitudes, service quality, and accessibility.

Methods: A cross-sectional study was conducted at MTRH among 282 adult patients (≥18 years) on anticoagulation therapy for at least three months, selected from a pool of over 4,500 using consecutive sampling. Data were collected through a pre-tested, researcher-administered semi-structured questionnaire. Quantitative data were analyzed descriptively, while qualitative data were analyzed thematically.

Results: While nearly 70% of participants could identify their anticoagulant, fewer than half understood how diet, drug interactions, or missed doses could impact their treatment. Only one-third maintained therapeutic INR levels. Approximately 40% reported missing doses or irregular clinic visits, with many expressing confusion about their follow-up schedules. Providers cited a lack of structured patient education, limited time, and a scarcity of tools to reinforce counseling. Despite these gaps, patient satisfaction and trust in providers remained high.

Conclusion: Key factors affecting anticoagulation uptake at MTRH include knowledge gaps, gender and education disparities, and challenges in medication adherence. Strengthening patient education, improving awareness of INR monitoring, and integrating structured counseling could significantly enhance service uptake and treatment outcomes in resource-limited settings.

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ACRONYMS AND ABBREVIATIONS

AF: Atrial Fibrillation

aPTT: Activated Partial Thromboplastin Time

DOACs: Direct Oral Anticoagulants

DVT: Deep Vein Thrombosis

INR: International Normalized Ratio

LMWH: Low Molecular Weight Heparins

MTRH: Moi Teaching and Referral Hospital

NOACs: Non–Non-Vitamin K Oral Anticoagulants

PE: Pulmonary Embolism

PT: Prothrombin Time

UFH: Unfractionated Heparin

VKA: Vitamin K Antagonists

VTE: Venous Thromboembolism

DEFINITION OF TERMS

Atrial Fibrillation (AF) A heart rhythm disorder characterized by irregular and often rapid heartbeats, increasing the risk of stroke due to clot formation.

Anticoagulation The process of preventing blood clot formation using medications such as warfarin or direct oral anticoagulants (DOACs) to reduce the risk of thromboembolic events.

Bleeding Complications Potential adverse effects of anticoagulation therapy, ranging from minor bleeding (bruising, gum bleeding) to major bleeding (gastrointestinal or intracranial hemorrhage).

Direct Oral Anticoagulants (DOACs) A newer class of anticoagulants (e.g., apixaban, rivaroxaban) that do not require frequent INR monitoring and have fewer dietary interactions.

Deep Vein Thrombosis (DVT) A blood clot that forms in a deep vein, usually in the legs, which can lead to serious complications such as a pulmonary embolism if untreated.

International Normalized Ratio (INR) A standardized measure of blood clotting time used to monitor patients on warfarin therapy, ensuring clotting remains within a therapeutic range, and in this study,

it was used to assess anticoagulation control among participants at MTRH.

Low Molecular Weight Heparins (LMWH) A type of anticoagulant (e.g., enoxaparin, dalteparin) that helps prevent and treat blood clots. LMWH has more predictable effects than unfractionated heparin and does not require regular monitoring.

Patient Education Structured efforts to inform patients about their condition, medication use, risks, and necessary monitoring to enhance adherence and safety.

Pulmonary Embolism (PE) A life-threatening condition where a blood clot travels to the lungs, causing blockage and reduced oxygen supply.

Therapeutic Range The target INR level for patients on warfarin, typically between 2.0 and 3.0, balancing the risk of clotting and bleeding.

Thromboembolic Events Conditions caused by blood clots obstructing blood vessels, including deep vein thrombosis (DVT), pulmonary embolism (PE), and stroke.

Valvular Heart Disease (VHD) A condition affecting heart valves, which may require anticoagulation, especially in cases involving mechanical valve replacement.

Vitamin K Antagonist (VKA) A class of anticoagulants, including warfarin, that work by inhibiting vitamin K-dependent clotting factors.

CHAPTER 1: INTRODUCTION

1.1 Background

This chapter presents the study's objectives and outlines its purpose. It includes the background of the study, a declaration of the problem, the purpose of the study, justification, implications of the study, limitations, and assumptions made. The purpose of the study, along with its general and specific objectives and corresponding hypotheses, has been highlighted.

1.2 Background of the Study

In the recent past, oral anticoagulation therapy choices have expanded through the use of new direct oral anticoagulants. The use of anticoagulants is steadily rising alongside the increasing cases of atrial fibrillation (AF). AF is the most contracted heart disease, affecting close to 33 million individuals globally, and represents one-third of ischemic stroke incidence (Lippi et al., 2021). Anticoagulation therapy has been widely used to manage patients with thromboembolism, and mechanical heart valves with Vitamin K Antagonists (VKA) such as warfarin being the most widely prescribed anticoagulant globally (Hohnloser et al., 2019).

According to Tadesse et al. (2022a), thrombosis is the pathological formation of a clot that is caused by inappropriately activated hemostasis with the absence of a bleeding event. In the management of venous thromboembolism, the adequacy and effectiveness of primary prophylaxis in terms of duration, dose, type, and inhibition of adverse complications must be considered (Tadesse et al., 2022). Treatment with anticoagulants may be administered

throughout an individual's life, depending on the indication. As such, over-anticoagulation may lead to excessive bleeding, while undertreatment could result in thromboembolic complications. Despite these challenges, anticoagulants such as warfarin remain widely used, necessitating the need for continuous monitoring.

Over the last decade, direct oral anticoagulants (DOACs) have become the preferred oral anticoagulants compared to vitamin K antagonists (VKAs). DOACs have shown similar effectiveness to VKAs in preventing strokes secondary to atrial fibrillation (Bai et al., 2018). With DOACs, the need for regular anticoagulation monitoring has been reduced due to their simplified dosage and few known food and drug interactions (Chaplin, 2022). This has led to increased use of DOACs and reduced use of warfarin for patients with cardiac and VTE indications.

When using anticoagulant (warfarin) therapy, the level of anticoagulation is determined through the international normalized ratio (INR). A patient's longitudinal anticoagulation regulation is defined by either the percentage of INRs that fall within the therapeutic range (PTR) or by the use of the proportion of time spent in the therapeutic range (TTR), interpolatingINR outcomes for the time between the actual measurements (Mouton et al., 2021).

Some studies have reported that individuals in sub–Saharan Africa have poor anticoagulation control, as highlighted by measurements of their PTR or TTR. In a study conducted in South Africa, three large trials showed mean TTRs of 55%, 58%, and 46% (Singeret al., 2013; Connolly et al., 2008; Wallentin et al., 2010). The mean TTR found in an atrial fibrillation registry including African countries stood at 33% compared to 62% in

19 western European countries, whereas that for the rheumatic disease registry done in the majority of African countries showed a PTR of 28% (Oldgren et al., 2014; Mouton et al., 2021). These findings suggest poor anticoagulation control in sub-Saharan Africa, underscoring the need for further investigation into the factors that influence the uptake of anticoagulants.

Anticoagulation medications remain of substantial risk, requiring complex monitoring and dosing to put the effects under control and optimize therapy. In Kenya, the VKAs like warfarin are widely prescribed (Nyamu et al., 2017). Despite being effective, theiruse in Kenya has resulted in highly variable and unpredictable effects on coagulation, characterized by a substantial risk of both over- and under-treatment (Ageno et al., 2012). Few studies have shown that locally, anticoagulation control is inadequate, often due to suboptimal usage of anticoagulants and inaccessibility to clinical guidelines, which contributes to the situation (Nyamu et al., 2017). Factors such as poor knowledge of anticoagulation and socioeconomic factors, combined with inadequate warfarin dosing methods, are considered to play a significant role in the suppression of anticoagulation uptake (Mariita et al., 2016).However, independent predictors among patients have not been sought; thus, avoidance of disabling and fatal complications is almost impossible.

Evidence has shown that the effective use of anticoagulation control services leads to a significant reduction in the risks associated with thromboembolic complications. However, there is a lack of evidence on the role of patients in the use of anticoagulation therapies, aside from their clinical and sociodemographic characteristics (Medlinskiene et al., 2021). Patient participation in medication use is critical and a positive indicator of excellent quality care; therefore, decisions regarding the use of oral anticoagulants, such as warfarin

or DOACs, should be based on patient preferences in addition to clinical indications. The involvement of patients with heart conditions in decision-making has been minimal (Medlinskiene et al., 2018).

Available evidence indicates that physicians dominate the prescribing process, with patients having limited opportunities to express their preferences for available therapies. Therefore, further evidence is required to establish patients' views and experiences regarding the uptake of anticoagulation and the existing barriers to its use. The discovery of these factors could be crucial for delivering more patient-centered care to patients and result in the increased uptake of anticoagulants, especiallyin Kenya. The authors conducted a study at Moi Teaching and Referral Hospital (MTRH), a large hospital in Eldoret, Kenya. MTRH has specialists for many conditions and provides INR monitoring for patients on blood thinners. This study will therefore aim to identify the factors that influence the uptake of anticoagulation services at the anticoagulation clinic at MTRH in Eldoret, Kenya.

1.3 Statement of the Problem

Anticoagulation prevents and treats venous thromboembolism and helps avoid intracardiac thrombosis caused by dysrhythmias or structural heart diseases. Atrial fibrillation has been identified as the most common cardiac arrhythmia affecting millions worldwide and is responsible for most stroke cases (Medlinskiene et al., 2021). Heart conditions like AF are associated with an increased risk of stroke, higher cardiovascular morbidity and mortality, and significant healthcare costs.

Medical conditions that require anticoagulation significantly contribute to global mortality and morbidity rates. However, these conditions are often unrecognized and undertreated in

middle- and low-income countries, including those in Sub-Saharan Africa. (Semakula et al., 2021). The incidence of deep venous thrombosis varies between 2.4% and 9.6% among postoperative patients, with 380 to 448 per 100,000 births annually among women in Sub-Saharan Africa (Danwang et al., 2017; Semakula et al., 2021). Most hospitalized patients are at substantial risk of venous thromboembolism (VTE).

Despite this, a study reviewing over 1500 hospitalized patients in sub-Saharan Africa found that 50.4% of them were at risk for VTE, and only 51.5% received recommended prophylaxis (Kingue et al., 2014). Patients diagnosed with pulmonary embolism have recorded mortality rates ranging from 40% to 69.5%, which is alarmingly high (Danwang et al., 2017).

Anticoagulants such as vitamin K antagonists have been used for many years and are considered the primary anticoagulation therapy option. The recent inclusion of DOACs has expanded the choices for treating VTE and preventing stroke in AF. Despite their effectiveness and availability, the use of anticoagulants remains low while the prevalence of cardiovascular disease continues to rise.

In Kenya, the uptake of anticoagulation services has not been sufficiently studied, and there is a significant gap in available literature and understanding of the reasons behind the suboptimal use of these services. Atrial fibrillation is a major risk factor for both ischemic stroke and VTE, with inadequate anticoagulation management contributing to these risks. The high prevalence of VTE and the subpar quality of anticoagulation services further increase these health risks across sub-Saharan Africa, highlighting the need for research on anticoagulant use in Kenya. Therefore, this study aims to determine why there is low

uptake of anticoagulation services despite evidence of their effectiveness in treating and preventing VTE, which is a high-risk factor for stroke. The study also seeks to add to the existing literature on improving anticoagulation uptake.

1.4 Purpose of the Study

1.4.1 Research Questions

1. What patient-related factors influence the uptake of anticoagulation therapy among patients at MTRH?
2. What institutional factors affect the utilization of anticoagulation services at MTRH?
3. How does patient knowledge and awareness impact anticoagulation therapy uptake at MTRH?
4. What are the levels of adherence to anticoagulation therapy, and how consistently are patients monitored at MTRH?
5. How satisfied are clients with various aspects of anticoagulation services at MTRH, including provider communication, accessibility, wait times, and medication availability?

1.3.2 General Objective

The main purpose of the research was to assess the factors associated with the uptake of anticoagulation services at MTRH in Eldoret, Kenya.

1.4.3 Specific Objectives

The specific objectives were:

1. To determine patient-related factors influencing the uptake of anticoagulation therapy

among patients seeking anticoagulation care from the MTRH anticoagulation clinic.

2. To assess institutional factors influencing the uptake of anticoagulation therapy at MTRH.
3. To assess the knowledge of anticoagulation among clients seeking anticoagulation services in MTRH.
4. To evaluate adherence and monitoring to anticoagulation therapy among clients seeking anticoagulation services in MTRH.
5. To assess satisfaction towards anticoagulation services among clients seeking anticoagulation services in MTRH.

1.5 Hypotheses

H01: Patient-associated factors do not affect the uptake of anticoagulation services in MTRH.

H02: The patients with more than 50% knowledge on anticoagulants will not exceed 50% of the sample population.

H03: There is no adherence to anticoagulation therapy and INR monitoring among patients at MTRH

H04: There is no significant level of satisfaction, nor are there any attitudes among patients toward anticoagulation services provided at the MTRH anticoagulation clinic.

1.6 Justification of the Study

Anticoagulation therapy remains the primary option for treating and preventing thromboembolism. Anticoagulants such as vitamin K-dependent drugs and DOACs are regularly used to manage thromboembolic events and their complications in patients with

AF, deep vein thrombosis, pulmonary embolism, and valvular heart diseases (Tadesse et al., 2022b). However, the use of vitamin K-dependent drugs like warfarin requires constant monitoring because of their unpredictable pharmacokinetics and pharmacodynamics. It is also well established that patients in sub-Saharan Africa generally have poor anticoagulation control, indicating significant room for improvement across the region (Mouton et al., 2021). This study aims to contribute knowledge that will help enhance the use of anticoagulation therapy in this setting.

Venous thromboembolism ranks as the third most common cardiovascular disorder, with an incidence of 1 to 2 cases per 1,000 people in the general population (Obayo et al., 2022). VTE is linked to high mortality, frequent recurrence, and substantial healthcare expenses. The risks associated with thromboembolism, especially stroke, can be decreased through anticoagulation therapy (Medlinskiene et al., 2021).

The use of VKA and DOAC therapies has become more effective in controlling and preventing AF-related stroke. DOACs have greatly reduced the need for regular coagulation monitoring and are known for simpler dosing regimens and minimal adverse interactions (Medlinskiene et al., 2021). Despite these clinical benefits, the adoption of anticoagulant therapies remains very low in Africa and Kenya. There is limited data on the factors influencing the low uptake of anticoagulation services, despite its proven clinical importance. This highlights the need for this study to fill that knowledge gap.

According to the Pan African Society of Cardiology report on cardiac arrhythmia, the availability of VKAs across African regions ranged from 71.4% in Central Africa to 100% in Northern Africa. In contrast, the availability of DOACs ranged from 28.6% in Central

Africa to 66.7% in Northern Africa (Noubiap & Kamtchum-Tatuene, 2022; Bonny et al., 2019). This indicates that even though DOACs are prescribed more often, their availability in Africa remains low, which impacts their adoption by patients.

1.8 Significance of the Study

This study offers important insights into factors affecting anticoagulation therapy uptake at MTRH, providing valuable information for policymakers, healthcare providers, and researchers. The findings will help improve anticoagulation services, boost patient education, and guide healthcare policies for better VTE and stroke prevention strategies. Additionally, this study will support the development of targeted interventions to increase anticoagulation uptake and adherence.

1.9 Scope of the Study

The study focuses on patients receiving anticoagulation care at the MTRH anticoagulation clinic. It examines patient-related and institutional factors influencing therapy uptake, with data gathered from patient records, interviews, and healthcare provider insights. The study period spans one year, targeting individuals on warfarin and DOACs. This research is limited to MTRH and may not be applicable to other healthcare settings.

1.10 Statistical Analysis

Data was analyzed using both descriptive and inferential statistics. Chi-square tests evaluated associations between categorical variables, while logistic regression determined predictors of anticoagulation therapy uptake. A p-value of <0.05 was deemed statistically significant. The analysis also included odds ratios to quantify the strength of associations and multivariate analysis to adjust for potential confounders.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter focused on the literature review of the study, which was based on the study objectives. The chapter highlighted literature on oral anticoagulants used in clinical settings, the prevalence of anticoagulation services, anticoagulation knowledge, INR monitoring, and the theoretical framework.

2.2 Oral Anticoagulants Use in Clinical Settings

Millions of people use anticoagulation services daily for atrial fibrillation or venous thromboembolism (Barnes et al., 2016). Oral anticoagulants are reported to be highly effective at preventing thrombosis across various clinical indications (Barnes & Kline-Rogers, 2015). The most commonly used anticoagulant is warfarin, with over 60 years on the market compared to newer anticoagulants (Davies & Geleit, 2014). According to Davies and Geleit (2014), between 500,000 and 1 million people in the United Kingdom are estimated to use oral anticoagulants.

Common anticoagulants include unfractionated heparin (UFH), VKAs like warfarin, and LMWHs (Ho et al., 2020). Newly available oral anticoagulants, such as direct oral anticoagulants that do not require INR monitoring, have entered the medical field. Heparins and warfarin are known to be high-risk drugs with a narrow therapeutic index, requiring constant monitoring during use (Cohen et al., 2021). UFH is an anticoagulant; in addition to treating and preventing thromboembolism, it can also be used to prevent excessive coagulation during procedures like cardiac surgery, dialysis, and extracorporeal

circulation, among other indications (Warnock, 2019). Its clinical uses include off-label indications such as patients presenting with acute coronary syndromes. UFH works by binding to several proteins, but its binding to antithrombin is the most significant, as it causes a surface change that inactivates thrombin (Warnock, 2019). Monitoring its therapeutic effect involves measuring activated clotting time and stimulated partial thromboplastin time, both of which are prolonged when therapeutic heparin levels are reached (Warnock, 2019).

Low molecular weight heparins (LMWH) are a new class of anticoagulants derived from UFH (Hirsh, 1998). Their advantages over UFH have increased their use in various thromboembolic conditions. LMWHs are produced from UFH through enzymatic or chemical depolymerization, resulting in fragments that are approximately one-third the size of heparin (Hirsh, 1998). These fragments differ in anticoagulant activity and molecular size. Compared to UFH, LMWHs have a limited ability to catalyze thrombin inactivation because their small fragments cannot bind to thrombin; however, they retain the ability to inactivate factor Xa (Hirsh, 1998). Moreover, LMWHs exhibit reduced nonspecific binding to plasma proteins, which improves the predictability of dose-response relationships. They are cleared via the renal route, with their biological half-life increasing in individuals with renal impairment. Their anticoagulant effect is mediated through activation of antithrombin, a process supported by a unique pentasaccharide sequence present in LMWH molecules. Clinical trials have demonstrated that LMWHs are effective and safe for treating venous thrombosis.

VKAs remain the primary anticoagulants for the prevention and treatment of thromboembolism (Tadesse et al., 2022). The VKAs are used for the treatment and

prevention ofthromboembolism alongside complications in individuals with AF, deep venous thromboembolism, and valvular heart disease (Nyamu et al., 2020). Oral anticoagulation with VKAs such as warfarin requires constant INR monitoring (de Padua Mansur et al., 2012). Warfarin therapy is made difficult by its unpredictable and dynamic characteristics, enhanced by the several drug and food interactions. The drug also has a narrow therapeutic index characterized by potentially life-threatening complications due to elevated INRs or subtherapeutic INRs (Ebrahim et al., 2018). The mean individual patient spends in the therapeuticrange represents the effectiveness and quality of warfarin's anticoagulation control (Alghadeer et al., 2020). The time spent in the TTR is equal to the time a patient's INR is contained within the desired treatment range, and it is applied as an indicator of anticoagulation control.

2.3 Prevalence of Anticoagulation Services

Several studies have scrutinized anticoagulant use for several clinical indications. Warfarin has been the only anticoagulant available and in use till the introduction of DOACs (Chen et al., 2021). The rise of new treatment choices has brought about a substitute to warfarin, which is avoided for some patients due to the complications involved. The DOACs have greater effectiveness and security compared with warfarin, which has been the only option for oral anticoagulation for over 50 years (Ho et al., 2020). Despite this, the usage of anticoagulation services remains unknown, and the risks involved with warfarinled to the introduction of anticoagulation clinics to monitor and manage patients and reduce bleeding events (Larsen et al., 2016; Wan et al., 2018).

According to Moulson et al. (2017) and the World Health Organization (2019), the rates of DOAC prescribing have increased and correspond to those of warfarin in 2016. In the

United Kingdom, oral anticoagulation is common, with estimates of prescriptions being between 500,000 and 1 million individuals (Davies & Geleit, 2014). Prescription data for anticoagulantsin primary care in England between 2014 to 2019 showed an increase from 9% to 74% for DOACs, while that of warfarin decreased (Ho et al., 2020). A study conducted by Koziel et al. (2021) showed an anticoagulation prescription increase for non-Vitamin K antagonist oral anticoagulants in Asia from 29.2% to 60.8%, in North America from 49.0% to 73.9%, in Europefrom 53.4% to 75.8%, and in Latin America from 55.7% to 71.1%. The same study indicated a decrease in the usage of vitamin K antagonists (warfarin) across the four regions. A study conducted in Kenya showed that long-term warfarin therapy among Kenyans was for lean or overweight middle-aged people who are diagnosed with venous or cardioembolic conditions (Nyamu et al., 2020). However, some studies assess the prevalence of anticoagulant usage in Kenya, with several of them focusing on the factors affecting the quality use of anticoagulants.

Despite the introduction of DOACs and anticoagulation clinics across the globe, the uptake of anticoagulants remains low. In a study conducted in the US, it was established that there was a lower occurrence of anticoagulation among non-white groups and women, thus raising issues of inequities in quality care (Chen et al., 2021). Additionally, the study argued that the inferior anticoagulant use among residents who have limited life expectancy points to theidea that terminal deprescribing is rampant among several health facilities (Chen et al., 2021).

Factors such as polypharmacy, age, ethnicity, and BMI are determinants of low uptake of anticoagulants, especially when comparing DOAC use versus warfarin. For purposes of ensuringthe increased prevalence of the services, solutions should be directed towards

ensuring that such disparities among healthcare centers and in communities are addressed.

Despite the overall increased adherence and uptake of oral anticoagulants, some studies have established poor uptake. According to Yogasundaram et al. (2022), a third of qualified patientswho have nonvalvular AF are not prescribed oral anticoagulant therapy, especially in hospitals and emergency departments. Variations in adherence or ones that are low have led patients to have higher mortality, particularly with warfarin. Based on this, several risk factors, which range from the location of diagnosis can be used to recognize patients at risk of oral anticoagulant nonadherence orpoor uptake. Some studies have argued that the poor usage of oral anticoagulants can be addressed through the prescription of direct oral anticoagulants instead of warfarin (Yogasundaram et al., 2022). However, this does not address the social factors and other elements that may be the reasons behind the poor uptake of oral anticoagulants despite increased prescription.

The benefits of oral anticoagulants are well-documented across various studies. However, despite the benefits, the general uptake of direct oral anticoagulants has been comparatively low andsluggish in England (Medlinskiene et al., 2021). The average uptake was reported to be 16.5% in 2015 and was characterized by a level of mysterious variation across different health sectors in England, varying from 4-70% of all oral anticoagulants prescriptions (SAFI, 2017). For DOACs, the identified barriers were affordability by health systems or patients, safety concerns, and the lack of experience or knowledge on anticoagulation by the prescribers (Salmasi et al., 2020). Some researchers identified patient clinical characteristics, scientific literature, national guidelines, peer prescribing practice, practice characteristics, and perceivedbenefits over existing warfarin therapy as other factors that influence oral anticoagulant prescribing decisions (Brais et al., 2017;

Tanislay et al., 2018; Murphy et al., 2018). All these factors are synonymous with the health practitioners' or prescribers' roles in the low uptake of anticoagulation services, necessitating the need to determine the patient's role in the uptake of oral anticoagulants, including the new DOACs.

2.3.1 Anticoagulation Knowledge

Studies have shown a positive relationship between good anticoagulation control and patientknowledge of anticoagulants (Iqbal, 2017). Despite these revelations, there lack of a clear strategy on how patients' knowledge of anticoagulants is affected before and after the clinical intervention. A study conducted by Iqbal (2017) showed that patient education is the best prevention measure against the adverse effects of warfarin. Evidence of little knowledge among patients on their anticoagulation therapies has been reported in several studies. In one study conducted in the United States, 37% of patients assessed were found to have good knowledge of anticoagulation, while the rest had poor knowledge (Davis et al., 2005). In Malaysia, 382 patients were subjected to a qualitative study where 48% of the patients were established to have limited knowledge of the warfarin therapy they were prescribed (Tang et al., 2003). A similar study in Malaysia reported that 44.2% of patients interviewed knew anticoagulants even after being subjected to nurse education (Yahaya et al., 2009). In Kenya, Mariita et al. (2016) argued that more than 75% of the study participants obtained from Kenyatta National Hospital in Nairobi had poor knowledgeof oral anticoagulation services.

Patient knowledge of anticoagulation services is low, and it is linked to several factors such as lack of education and socioeconomic status among individuals, among other issues.

Some studies have linked the age of patients to be directly proportional to anticoagulation familiarity, with the elderly having a greater chance of not comprehending what oral anticoagulants are due to reduced cognitive function (Iqbal, 2017). The understanding level of older patients who are experiencing thromboembolic events is low due to the higher education level needed to understand the complications related to some anticoagulants, such as warfarin.

Kagansky et al. (2004) conducted a study among 1500 geriatric patients, where it was establishedthat there was a higher danger of bleeding for individuals on warfarin therapy characterized by insufficient education. The study found that 61% of patients who indicated that they lacked education spent 20% of their time in the therapeutic range. Therefore, the level of education among patients directly affects the quality of anticoagulation and results in adverse effects and outcomes.

The general practice of anticoagulation among various hospitals and medical facilities affects patient knowledge of anticoagulants. Several authors have shown that anticoagulation managed by pharmacists is significant to individuals through refining their knowledge of anticoagulants (Iqbal, 2017). Clinical pharmacists have been found to help patients attain therapeutic goals using expertise and knowledge on the pathophysiology of blood clotting and thecritical knowledge on drug interactions that they transfer to patients (Iqbal, 2017). In the US, Bond et al. (2004) showed that pharmacist anticoagulation management resulted in positive health outcomes such as reduced hospital stays and reduced bleeding when compared to hospitals that lacked pharmacist-led anticoagulation management. According to Elewa et al. (2016), pharmacist-assisted anticoagulation led to superior TTR at 81.8% compared to normal doctor-based clinics at 69.8%. The implication

here was that pharmacist-assisted anticoagulation clinics were characterized by good education of their patients, leading to high knowledge of anticoagulants.

Patient involvement in medication directly relates to patient knowledge of the medications. According to Medlinskiene et al. (2021), the participation of individuals in making decisions about their medication not only elevates their knowledge levels but also indicates attainment of good quality care, and better prescription initiatives, such as initiation of warfarin or DOAC, should be centered on the preferences of the patient. For a patient to make such decisions, they must be educated and have the necessary knowledge on oral anticoagulants.However, the available evidence suggests that decisions in consultations at the anticoagulation clinics are most often made by experts, while the patient is subjected to few opportunities of making decisions due to their poor knowledge of anticoagulation therapies (Medlinskiene et al., 2018; Medlinskiene et al., 2021). Across various health institutions, patients are not given the fullinformation, and the assortment of information is determined by the physicians' protocols and views, which often leads to favoring of organizational practices, taking advantage of patients' lack of knowledge. In a study done by Choi et al. (2014), it was established that patients who wereinitiated on warfarin were not offered information about DOACs, thus limiting their use.

Therefore, a patient's knowledge of oral anticoagulants is a significant factor in increasing the uptake of medications since it will help in understanding patients' views and experiences, thusexpounding on the barriers to oral anticoagulant use.

In conclusion, anticoagulation control is effectively achieved when the patient's knowledge is available. However, studies have shown that patient education is critical to ensuring that

knowledge of anticoagulation services is guaranteed among users and even medical practitioners. However, it is not clear whether a patient's knowledge of anticoagulation services is afactor that influences the uptake of the therapy among patients in Kenya. Therefore, there is a needto fill these study gaps and establish the role patient knowledge plays in the uptake of anticoagulation services.

2.4 Conceptual Framework

The conceptual framework for this study is based on the Health Belief Model (HBM), which explains health behaviors in terms of perceived susceptibility, severity, benefits, barriers, cues to action, and self-efficacy (Rosenstock, 1974).

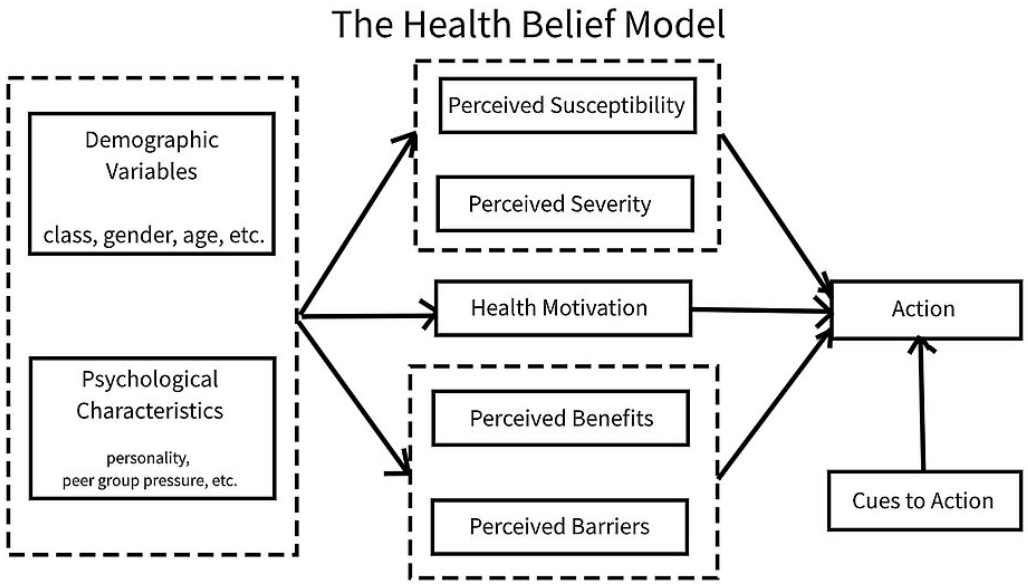

Figure 1: Conceptual framework based on the Health Belief Model (HBM)

This framework suggests that improved patient knowledge on anticoagulation, effective INR monitoring, and accessibility of services contribute to better adherence and reduced complications. Stakeholder engagement, including healthcare providers and policymakers, is essential for enhancing anticoagulation service delivery.

2.5 INR Monitoring

INR is the most favored test for individuals who are on VKAs such as warfarin (Shikdar et al., 2018). The INR is used to monitor the bleeding risk or the status of coagulation of the patient. Individuals on oral anticoagulation are medically required to monitor their INR for purposes of adjusting vitamin K antagonist doses since the INR varies among patients. The INR ratio is determined using the prothrombin time (PT), which is derived as a ratio of the patient's PTto a control PT standardized for the potency of the thromboplastin reagent described by the WHO using the formula: *INR = patient PT / Control PT.*

The PT, time in seconds, is determined by the duration the plasma takes to form a clot at the availability of optimal concentration of tissue thromboplastin and calcium through the activationof coagulation using the extrinsic pathway. The INR value takes no dimensions and can range from a score of 2.0 to 3.0 (Rudasill et al., 2019). Optimizations of the patient's INR TTR can be ahard task since a narrow therapeutic range can be observed in VKAs and can easily be influencedby patients' characteristics, diet, drug interactions, and other comorbid conditions. Therefore, patients are adequately checked every 3-4 weeks or even less at the anticoagulation clinics or in an in-home setting. The regularity of INR monitoring can be applied as a quality measure of anticoagulation. This is because, in ensuring an individual sustains INR in the TTR constantly, monitoring isinevitable since many factors, such as comorbidities and diet, can alter warfarin pharmacokinetics. The presence of frequent monitoring will indicate the patient's uptake and adherence to the anticoagulation therapy. However, if the frequency is low, then it will indicate that the uptake of the anticoagulation services is poor.

2.6 Theoretical Framework

In the recent past, the science of implementation has gained popularity within healthcare systems and research. The need to translate research findings into routine practice within the medical field has gained traction, and more emphasis is being placed on such practices (Bauer &Kirchner, 2020). According to Eccles et al. (2012), implementation science is the methodical study of approaches needed to encourage the orderly uptake of research discoveries and other evidence-based practices into regular actions aimed at improving efficiency and quality of healthcare. Currently, a varied number of scientific works explore the maintenance and applicationof evidence-based interventions and establish why such interventions fail or succeed within complex healthcare environments (Nilsen, 2020). Five theoretical frameworks or approaches have been identified and are being used in implementation science: determinant frameworks, process models, implementation theories, classic theories, and evaluation outlines, as shown in Figure 2.

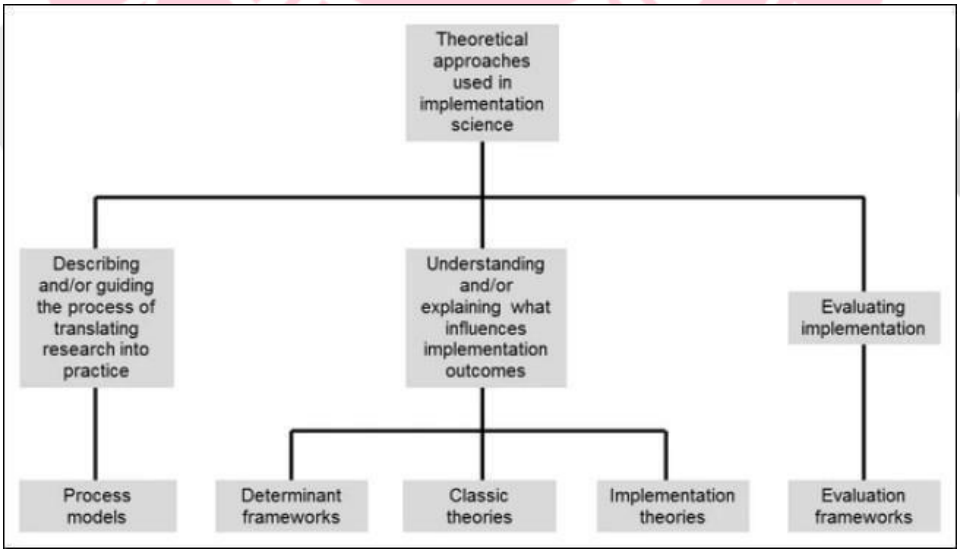

Figure 2: Theoretical frameworks applied in Implementation Science (Nilsen, 2020)

The implementation theories were developed to comprehend and elucidate the implementation of inventions (Nilsen, 2020). On the other hand, the classic theories are considered those theories that were developed to provide an explanation of the transformation mechanism and offer the process through which the change occurs. The diffusion of innovation theory, fronted by Rogers (1962), focuses on the dissemination of innovations and is defined as the process through which an invention is communicated through given media over time within a social setup (Miller, 2015). The theory suggests four focal elements that affect the process: innovation (new practice/idea), communication channels (transfer of information, e.g., through mass media), time (timeused to learn about the innovation), and social system (set of interrelated units) (Miller, 2015). The role of intermediary actors in achieving the implementation and successful adoption of the innovationhas been emphasized through the theory. The determinant frameworks present the determinants that act as enablers or barriers that affect the approval of the innovation (Medlinskiene, 2021). The determinant frameworks aim at improving health outcomes, cost-effectiveness, and enhancing user experiences through the implementation of coordinated and planned actions (Greenhalgh et al., 2004). The main determinants, according to Nilsen (2015), that can be addressed in the frameworks of the science of implementation are based on the features of innovation, end user, adopter, strategy, and context to facilitate implementation. Even though the results of the frameworks were unspecific to medications, in this case, oral anticoagulants, exploration of the determinants could help identify factors affecting the uptake of anticoagulation services among patients in MTRH. The wide-ranging determinants in the milieu of uptake of anticoagulation services would be the features of new medication (oral anticoagulants), organizations and

clinicians (MTRH) (adopters), the implementation process (strategy), and patients (end users).

CHAPTER 3: METHODOLOGY

3.1 Introduction

This chapter highlighted the research methods used in the research. The chapterincluded details on the research design, location of the study, target population, sampling, data,and ethical considerations. The sampling section contains the sample size determination methods and the sampling procedures.

3.2 Research Design

The study adopted a cross-sectional study design to achieve its objectives, recruited participants, and collected data. In this design, the investigator measured the exposures and outcomes simultaneously (Setia, 2016). The contributors in the cross-sectional study design were nominated and recruited based on the inclusion and exclusion criteria that had been set forthe study (Setia, 2016). Using this study design, the researcher believed that the study would be able to collect data from a large pool of sample population and at a single point in time, hence saving on time given the limited time available for data collection. This allowed the research to effectively implement the methodology and assess the exposure and outcomes of the study after participant recruitment.

3.3 Location of Study

The study was done at MTRH in Eldoret, Kenya. The hospital is the second largestreferral hospital in the country and primarily serves the Western part of Kenya as a primary referral facility. MTRH is a multispecialty health facility with a 1000-bed capacity. The study was done specifically in the anticoagulation clinic, which falls under the cardiology department

of the hospital. The clinic is staffed with clinical pharmacists, pharmaceutical technologists, and clinical officers who are responsible for providing anticoagulant INR monitoring services to patients. MTRH, being a public hospital with a structured anticoagulation monitoring service, provided the closest to the ideal opportunity for the research to achieve its objective. The clinic currently has more than 2500 active patients on follow-up and more than 4500 who have ever been enrolled. The study approval was obtained from the National Commission for Science, Technology & Innovation (NACOSTI), the hospital's Institutional Research Ethics Committee (IREC), and that of Amref Interntional University.

3.4 Target Population

The target population for the research was more than 950 active patients from 4,500 ever enrolled in the anticoagulation clinic who had an indication for anticoagulation therapy and attended follow-up visits at the anticoagulation clinic in MTRH. The inactive patients were not included in the study or followed up due to the lack of communication between the patients and the hospital. Some of the inactive patients were reported not to respond to any efforts of contact. Reaching these patients was beyond the scope of the study and the researcher.

3.4.1 Inclusion Criteria

The target population comprised male and female patients enrolled in the anticoagulation clinic who were aged ≥18 years for inclusion to align with legal consent requirements and patient autonomy in managing healthcare and had access to a phone for easy communication with the researcher and follow-up questionswhen they were not at the clinic. The patients were on anticoagulation therapy for more than 3 months and had been

followed up between the periods of January 2024 to April 2024. Thepatients also received at least more than 2 INR readings for those on therapies that require INR monitoring. This ensured that the patients were aware and knowledgeable of INR.

3.4.2 Exclusion Criteria

Patients who had no records of anticoagulation therapy and were aged below 18 were excluded as they require parental or guardian consent for medical decisions. The assumption was that patients below 18 years were legally not bound to make their own decisions and would need input from their caregivers. Patients who were not on anticoagulants and received less than two INR readings were not included in the study.

3.5 Sampling

The study made use of the consecutive sampling method. The consecutive samplingmethod is known to be one of the best nonprobability sampling approaches, which controls sampling bias since it contains all the existing subjects (Thewes et al., 2018). Within medical settings, the method gave insights into the participants who qualified to participate (who met the inclusion criteria) and allowed the use of clinical information. The sampling technique also gives information on the number of individuals who are willing to participate in the study, making it possible to calculate the accurate response rate (Thewes et al., 2018). Therefore, the study's research recruited patients at the point of meeting and after they had ticked all the boxes in the inclusion criteria. Through this technique, the target population of 950 was considered until the researcher attained the required sample size. The samples were selected based on their easy availability during the period of research. This meant that the researcher would be in control of the recruitment process, allowing endorsement of the interventions, thus promoting credibility. Recruitment was

done on-site at the clinic for 3 months, and only after the patients had given voluntary written consent to participate in the research.

3.5.1 Sample Size

Based on the target population of 950 active patients who have been enrolled at the clinic for follow-up, the sample size of the research was determined using Slovin's formula at a 95% confidence level (Ellen, 2020). The formula allowed the researcher to model the population with accuracy by giving an idea of the size of the sample. The formula iswritten as:

$$n = \frac{N}{1 + \mathrm{N}e^2}$$

Where n = required sample size
N = Total population
e = margin of error

Therefore,

$$n = \frac{950}{1 + 950(0.05)^2}$$

$$\mathrm{n} = 281.5$$

The research, therefore, included a total of 282 patients who were interviewed by the researcher.

3.5.2 Patient Identification

The 282 patients were recruited for the study by the researcher. Before being engaged,they were presented with an introduction letter that explained what the research was about and outlined the research objectives. It also outlined what patient participation in the study entailed. The introduction letter was attached with the written consent (Appendix 2), which

the researcher expected the participants to sign before accepting to contribute to the study. They were asked to give their contact information for further communication. All data collection and participation inthe study took place after informed written consent was obtained.

3.6 Data collection

The data for the study were collected through a pre-tested researcher-administered questionnaire using a direct in-person interview with the patients at the site. The questionnaire was a semi-structured one that contained questions related to the study objectives. The use of a semi-structured questionnaire helped to reduce the number of unanswered questions, avoided ambiguity, discouraged incomplete responses, and was used with patients who had visual problems (Evans & Lewis, 2018). In efforts to eliminate bias, leading questions were avoided. The question design was simple and avoided the use of jargon to eliminate literacy and data collection setbacks. The questionnaire was divided into 6 parts that collected patient demographics, factors to assess uptake of anticoagulants, patient knowledge on anticoagulation therapy, adherence, INR monitoring, and level of satisfaction and attitude amongpatients. No personal information was collected from the patients, and all the collected data was used for research purposes only.

3.6.1 Reliability Testing of the Data Collection Tool

The reliability of the questionnaire was assessed through the use of the test-retest reliability method. This is a method used to measure reliability by administering the same test twice within a given duration to some participants (Torkian et al., 2020). The scores obtained from the two tests will be correlated to test for stability. The research recruited 10 patients through convenience sampling, and they were asked to complete the questionnaire twice

then their responses were subjected to analysis to test their reliability. The data collected was kept secure through the use of password-protected files, and all hard copies were kept under key and accessed by only the authorized research team.

3.7 Data Analysis

The collected data was put through qualitative and quantitative analysis using RStudio. Both quantitative and qualitative data collected were compiled, edited then coded. The data was described, then the inference of the data was drawn, and the data was interpreted. The variables in objective one, which are patient and institutional factors, were analyzed using descriptive methods and also in percentages, mean, and mode. For objectives two, three, and four, which are knowledge, adherence monitoring, and satisfaction, descriptive methods mean, mode, and measure of association, were used.

Qualitative data were collected through semi-structured interviews with a subset of patients and healthcare providers to capture in-depth perspectives on anticoagulation services. Key themes emerging from these interviews included perceived accessibility challenges, gaps in patient education, and suggestions for service improvement.

Statistical tests used to derive P-values included chi-square tests for categorical variables and t-tests for continuous variables, with significance set at $p<0.05$. These tests were applied to assess relationships between patient demographics, knowledge levels, and adherence.

Stratified analysis by demographic variable to identify satisfaction variations among specific groups and descriptive statistics for overall satisfaction were done. The study also did a comparative analysis across different aspects of services (waiting time,

communication), and regression analysis explored factors influencing overall satisfaction.

Missing and incomplete data were handled through the deletion method, whereby the interviews with missing variables were left out of the final data. Descriptive statistics were applied in explaining the primary feature of the study participants and gave the incidences of all the questions. The categorical variables were analyzed and described using frequencies and percentages, while the continuous variables were analyzed and presented using standard deviation and mean. The analyzed data was presented using graphs, charts, and tables.

3.8 Ethical Considerations

Endorsement to conduct the research was obtained from the National Commission for Science, Technology & Innovation (NACOSTI) under license number NACOSTI/P/23/28686, the AMREF Ethics and Scientific Review Committee, and the Moi University/MTRH Institutional Research and Ethics Committee (IREC) under approval number 0004626. An approval letter was also sought from AMREF University, which was presented to the MTRH ethical committee. Well-versed written consent was also drawn from the participants before participation in the study. Data collected was subjected to scrutiny and handled with confidentiality, and only subjected to academic use. There were no patient identifiers put on the questionnaires, and the obtained phone numbers were only stored at the MTRH anticoagulation clinic records department and retrieved when needed by the researcher. Respect for the patients was assured, and there were no direct or indirect risks associated with participating in the study.

3.9 Community Engagement Plan

The target population for the research was more than 950 active patients from 4,500 ever enrolled in the anticoagulation clinic who had an indication for anticoagulation therapy and attended follow-up visits at the anticoagulation clinic in MTRH. The target population comprised male and female patients who were aged ≥18 years and had access to a phone for easy communication with the researcher and follow-up questions when they were not at the clinic. The patients were on anticoagulation therapy for more than 3 months and had been followed up between the period January 2024 to April 2024. The patients also received at least more than 2 INR readings. Patients who had no records of anticoagulation therapy and were aged below 18 were excluded. The assumption was that patients below 18 years were legally not bound to make their own decisions and needed input from their carers. Patients who were not on anticoagulants and had received less than two INR readings were also not included in the study.

Engagement Purpose

i. To educate the participants on the purpose of the project.
ii. To collect data from the participants upon giving consent.

Engagement process

The researcher sought an audience with the project stakeholders to inform them about the project and get their input about the project. This was achieved through holding meetings with the management of the Moi Teaching and Referral Hospital and the community health volunteers where the project was conducted. In the meeting, the stakeholders were informed about the project and its goals of the project. They were allowed to give their input and opinions on the project. During the meetings, the abstract of the project was

provided to the stakeholders and explained by the researcher. The study participants were also briefed and educated about the project. Their role and benefits were well outlined, and the need to work with them to accomplish the project goals was explained. Engagement with the participants was done on-site since it was expected that they would be coming from various locations within Kenya. A long-term partnership was created with the MTRH and the government of Kenya to help in implementing the findings of the project. The management of the MTRH was expected to play a significant role in facilitating the easy collection of data.

Once the participants were recruited on-site, they were expected to read the project introduction and later give consent to participate. Upon successful recruitment, data was only collected using the prepared and authorized questionnaire. If any changes were made, the laid-down procedures were followed, and all the stakeholders were informed.

Tools for Engaging Stakeholders and Communication

The tools for engaging stakeholders were through emails, meetings, and phone calls. These tools were used to inform, consult, and involve everyone in the project based on the proposal. The stakeholders were also engaged through written reports, oral presentations, and even poster presentations. The researcher was available through the contacts provided to address any feedback that arose from the stakeholders' engagement.

Evaluation

The success of the project and engagement were shown through the actual collection of data from the participants using the questionnaire.

Study Limitations and Mitigation Measures

The study was limited to patients attending the anticoagulation clinic at Moi Teaching and Referral Hospital in Eldoret, Kenya. The patients selected had appointments at the clinic within the last 1 month. The study targeted 282 patients who visited the anticoagulation clinic. The limitation of the study to the clinic makes the study a clinic-based one thus, the findings may have limited generalizability.

Plan for Communicating Findings of the Study

The findings of the study will be significant to the Kenyan Government, MTRH, and the patients. The MTRH was involved throughout the process and was updated on the progress of the project. The findings of the study were communicated through presentations and publications. A progress presentation was done at the faculty level to help show the progress of accomplishing the project. Presentations were done at relevant academic conferences. It is the expectation that a meeting will be arranged between the researcher and government officials, where a presentation of the study findings will be conducted. It is expected that the research will be able to publish four research papers communicating the research findings in authentic journals. A thesis will also be placed in the AMREF University's archive, where it will be accessed digitally and in print.

Management and Organization of the Study

Team Members and Their Roles

Table 1: Team Members and their roles

Member	**Role**
Samuel Nyanje	Principal investigator (Training of research assistants, data collection, and overseeing data collection)
Prof. Peter Nyasulu	Co-investigator/Supervisor (Conceptualization of the proposal)
Dr. Kefa Bosire	Co-investigator/Supervisor (Conceptualization of the proposal)
Dr. Imran Manji	Co-investigator (MTRH) (overseeing/ supervising data collection)

CHAPTER 4: RESULTS

4.1 Introduction

The previous chapters have outlined the background, objectives, and methodology of this research. This chapter serves as the core of the study, presenting the findings obtained through the implemented research methods. The data collected was analyzed and interpreted to address the research objectives and provide insights into the research questions to assess the factors associated with the uptake of anticoagulation services at Moi Teaching and Referral Hospital (MTRH) in Eldoret, Kenya. The study focused on patient demographics, knowledge about anticoagulation, adherence to therapy, and patient satisfaction with the services provided at MTRH. The results are presented in a clear and organized manner, accompanied by relevant visual aids such as tables, charts, and graphs to enhance understanding. Following the presentation of results, a discussion will ensue, where the findings will be critically analyzed, compared with existing literature, and interpreted in the context of the study's objectives and the broader field of study.

4.2 Presentation of Results

4.2.1 Factors Associated with Uptake of Anticoagulation Services

4.2.1.1 Patient and Institutional Associated Factors.

Patient Demographics and Background

The demographic characteristics of the study participants provide an overview of the population accessing anticoagulation services at MTRH. Key variables such as age, gender, and education level were analyzed to understand the distribution of patients. A summary of these characteristics is presented in Table 2, which outlines the frequency and percentage distribution of each demographic factor. Additionally, Figure 3 visually represents the age

and gender distribution, highlighting key trends among the study population.

Table 2: Demographics of individuals seeking anticoagulation services at MTRH in Eldoret, Kenya.

Category	**Count (%)**	**P-value**
Gender		
Female	205 (71.67%)	P<0.001
Male	81 (28.33%)	
Age Bracket		
20-29 years	54 (18.75%)	P<0.04
30-39 years	77 (26.74%)	
40-49 years	68 (23.61%)	
Above 50 years	86 (29.86%)	
Education Level		
High School	12 (4.17%)	P<0.001
Primary School	29 (10.07%)	
No Formal Education	78 (27.08%)	
Tertiary/College	83 (28.82%)	

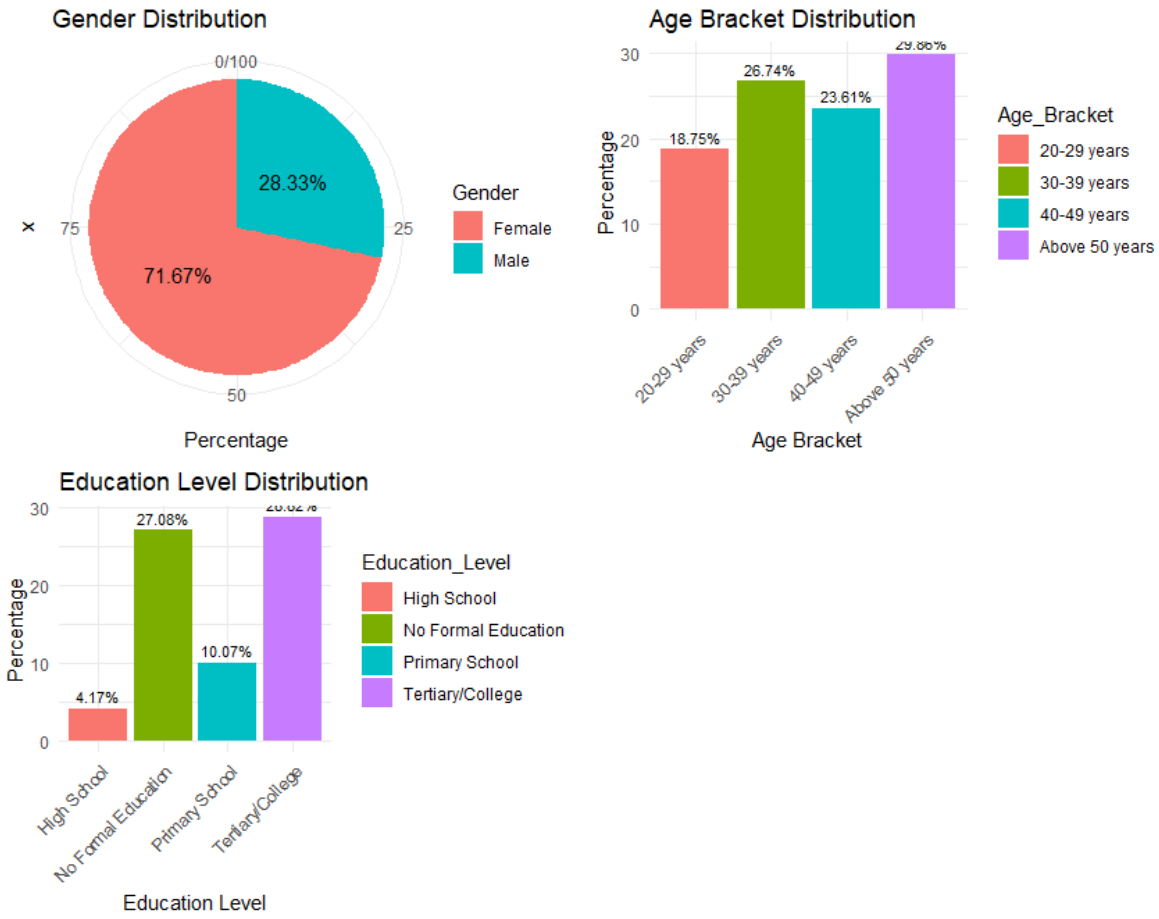

Figure 3: Demographic characteristics distribution

4.2.1.2 Knowledge of Anticoagulation.

The study assessed participants' knowledge of anticoagulation, focusing on their understanding of medication use, indications, side effects, dietary interactions, and the importance of monitoring. Knowledge levels were categorized based on self-reported ratings and objective assessment scores. Tables 3 and 4 present a detailed breakdown of knowledge levels across different demographic groups.

Table 3: Knowledge levels across different demographic groups

Group	Very Poor (%)	Poor (%)	Fair (%)	Good (%)	Very Good (%)	p-value
Gender						
Female	0 (0%)	8 (3.90 %)	34 (16.59%)	50 (24.51%)	98 (47.80%)	P>0. 05
Male	1 (1.23%)	3 (3.70 %)	11 (13.58%)	24 (29.63%)	39 (48.15%)	
Education Level						
High school education	0 (0%)	4 (4.76 %)	13 (15.48%)	21 (25.00%)	44 (52.38%)	P<0. 05
I am not educated	0 (0%)	4 (5.13 %)	21 (26.92%)	21 (26.92%)	27 (34.62%)	
Primary School	0 (0%)	0 (0%)	1 (3.45%)	6 (20.69%)	20 (68.97%)	
University Education	1 (1.20%)	3 (3.61 %)	10 (12.05%)	24 (28.92%)	42 (50.60%)	
Age Bracket						
20-29	0 (0%)	1 (1.47 %)	9 (13.24%)	17 (25.00%)	21 (40.38%)	P>0. 05
30-39	1 (1.49%)	4 (5.97 %)	6 (8.96%)	16 (23.88%)	47 (70.15%)	
40-49	0 (0%)	3 (4.41 %)	11 (16.18%)	15 (22.06%)	34 (50.00%)	
Above 50	0 (0%)	3 (3.49 %)	18 (20.93%)	26 (30.23%)	35 (44.44%)	

Table 4: Understanding of the indications for anticoagulation

Category	Response	p-value
Indications for Anticoagulation		
Those who have a blood clot or to are a blood clot from forming	260(0.8966)	P<0.001
Those who have hypertension (high blood pressure)	1(0.0034)	
Purpose of the INR Test		
That is used to monitor anticoagulation medicine like warfarin therapy	247(0.8517)	P<0.001
That is seldom done while on warfarin	31(0.1069)	
INR Value Impact		
He will be drowsy and fatigued from the medication	232(0.8)	P<0.001
He will be at risk of bleeding	37(0.1276)	
Risks of INR Value		
He will be at an increased risk of developing a blood clot	240(0.8276)	P<0.001
He will be at an increased risk of bleeding	39(0.1345)	
When to Seek Help		
When I experience nose bleeds that cannot be controlled	239(0.8241)	P<0.001
When I bleed in my gums while brushing my teeth	46(0.1586)	
Who to Inform		
A doctor prescribing medication, A dentist who is set to do a tooth extraction, or A doctor stopping medication	167(0.5759)	P<0.001
A dentist who is set to do a tooth extraction	29(0.1)	
Identifying Medication		
Color, Marking on the tablet	251(0.8655)	
Interactions with Warfarin		
Medication, Alcohol, food, and Herbal supplements	159(0.5483)	
Preferred Time for Medication		
During lunchtime	1(0.0034)	
Missed Dose Protocol		

Just skip the dose	158(0.5448)	P<0.001
Inform the health care specialist at the anticoagulation clinic when going for INR	42(0.1448)	

4.2.1.3 Adherence and Monitoring to Anticoagulation Therapy.

The study examined adherence and monitoring practices among participants on anticoagulation therapy, evaluating factors such as medication uptake, missed doses, dose adjustments, and clinic follow-ups. Table 5 shows the behaviors and attitudes toward medication uptake and adherence among respondents, summarizing adherence patterns across different participant groups. Additionally, Table 6 highlights adherence to INR monitoring, anticoagulation medication, and engagement with healthcare providers. Table 7 also provides an understanding of dosing from preparation to administration, including missed doses, excess doses, and modifications to warfarin therapy.

Table 5: Behaviors and attitudes toward medication uptake and adherence among respondents.

Questions	**Options**	**Count (Percentage)**
Uncertainty about behavior towards medication uptake.	I do not know.	27 (9.31%)
	In the last month	92 (31.72%)
	In the last month, 1-2 months ago	3 (1.03%)
	More than 2 months ago	159 (54.83%)
Memory of medication intake frequency.	I do not remember	22 (7.59%)
	Once a day	1 (0.34%)
	Twice a day	260 (89.66%)
Experience of missing a dose.	No	37 (12.76%)
	Yes	226 (77.93%)
Response to missing a dose.	Call the healthcare provider	33 (11.38%)

	Call the healthcare provider. Take the next scheduled dose	12 (4.14%)
	Discontinue the scheduled dose	23 (7.93%)
	Double up on the next dose	6 (2.07%)
	Take the next scheduled dose	213 (73.45%)
Experience of side effects.	No	27 (9.31%)
	Yes	185 (63.79%)
Trust in healthcare provider information.	No	25 (8.62%)
	Yes	256 (88.28%)
Taking medication without a prescription.	No	27 (9.31%)
	Yes	251 (86.55%)
Confidence in taking medication as prescribed.	No	18 (6.21%)
	Yes	221 (76.21%)
Belief in medication effectiveness.	No	22 (7.59%)
	Yes	254 (87.59%)
Belief in medication necessity.	No	27 (9.31%)
	Yes	257 (88.62%)
Discussion about medication use with a healthcare provider.	No	19 (6.55%)
	Yes	262 (90.34%)
Stopping medication without informing the healthcare provider.	No	21 (7.24%)
	Yes	267 (92.07%)
The perception of managing medication is challenging.	Difficult	27 (9.31%)
	Not difficult	32 (11.03%)
	Very Difficult	206 (71.03%)
Taking medication prescribed for someone else.	I do not know	34 (11.72%)
	No	2 (0.69%)
	Yes	246 (84.83%)

Table 6: Adherence to INR, anticoagulation medication, and healthcare providers.

Variable	Summary	Count (Percentage)
Anticoagulation medication		
	Those who have a blood clot or to prevent a blood clot from forming: 28 (100%)	28 (100%)
	Those who have a blood clot or are a blood clot from forming, those who have hypertension: 260 (100%)	260 (100%)
	Those who have hypertension (high blood pressure): 1 (100%)	1 (100%)
INR blood test		
	That is seldom done while on warfarin: 31 (100%)	31 (100%)
	That is used to determine if you need warfarin: 7 (100%)	7 (100%)
	That is used to monitor anticoagulation medicine like warfarin therapy: 247 (100%)	247 (100%)
INR above range		
	He will be at risk of bleeding: 37 (100%)	37 (100%)
	He will be drowsy and fatigued from the medication: 232 (100%)	232 (100%)
	He will be drowsy and fatigued from the medication, He will be at risk of bleeding: 16 (100%)	16 (100%)
INR below range		
	He will be at an increased risk of bleeding: 39 (100%)	39 (100%)
	He will be at an increased risk of developing a blood clot: 8 (100%)	8 (100%)
	He will be at an increased risk of developing a blood clot, He may develop a skin rash: 240 (100%)	240 (100%)
Attend the emergency Clinic.		
	When I bleed in my gums during brushing of my teeth: 46 (100%)	46 (100%)
	When I experience nose bleeds that cannot be controlled: 239 (100%)	239 (100%)

	When I have an increased appetite: 3 (100%)	3 (100%)
HCP to Inform		
	A dentist who is set to do a tooth extraction: 29 (100%)	29 (100%)
	A dentist who is set to do a tooth extraction, A doctor stopping medication: 12 (100%)	12 (100%)
	A doctor prescribing medication: 18 (100%)	18 (100%)
	A doctor prescribing medication, A dentist that is set to do a tooth extraction: 37 (100%)	37 (100%)
	A pharmacist giving over-the-counter prescription, A doctor prescribing medication, A dentist that is set to do a tooth extraction, A doctor stopping medication: 167 (100%)	167 (100%)

Table 7: Understanding of dosing from the point of preparation to administration, including missed doses, excess doses, to warfarin modification.

Category	**Response**	**Count (Percentage)**
Preparation of Medication	Health care professional	47 (26.1%)
	Myself	3 (1.7%)
	I, a healthcare professional	1 (0.6%)
	Myself, Relative	1 (0.6%)
	Relative	8 (4.4%)
Missed Doses	No	48 (26.7%)
	Yes	216 (120%)
Excess Doses	No	49 (27.2%)
	Yes	238 (132.2%)
Difficulty Modifying Warfarin Dose	No	49 (27.2%)
	Yes	227 (126.1%)
Moments When Dose Was Not Changed	No	50 (27.8%)
	Yes	227 (126.1%)
Consumption of Leafy Green Vegetables	I am not sure	49 (27.2%)
	I do not take any	108 (60%)
	No	2 (1.1%)
	Yes	21 (11.7%)

4.2.1.4 Satisfaction Towards Anticoagulation Services.

The study examined participants' satisfaction with anticoagulation services, including their experiences with medication access, clinic visits, and overall service delivery. The table presents insights into patient satisfaction levels, highlighting factors such as waiting times, provider communication, and ease of obtaining medication. Additionally, the table captures participants' perceptions of the quality of care received and any challenges faced during their clinic visits.

Table 8: Satisfaction levels towards anticoagulation services both on an individual basis and facility basis.

Question	Response	Count (Percentage)
Results communicated	I am given immediately after/during the clinic visit	19 (6.55%)
		271 (93.45%)
Prefer to receive the INR results	During the visit one on one with the physician	18 (6.21%)
	During the visit one on one with the physician, by phone	1 (0.34%)
		271 (93.45%)
The clinic offers counseling.	No	30 (10.34%)
	Yes	257 (88.62%)
		3 (1.03%)
satisfied with the current anticoagulation services	I am not satisfied	22 (7.59%)
	I am satisfied	3 (1.03%)
	I am very satisfied	199 (68.62%)
	I do not know	6 (2.07%)
Satisfied with the counseling	I am not satisfied	24 (8.28%)
	I am satisfied	3 (1.03%)

	I am very satisfied	190 (65.52%)
	I do not know	7 (2.41%)
Changes should be made to service delivery at the anticoagulation clinic	I am not sure	49 (16.90%)
	No	20 (6.90%)
	Yes	208 (71.72%)
		13 (4.48%)

CHAPTER 5: DISCUSSIONS

5.1 Introduction

This chapter delves into the results and subsequent discussion derived from the comprehensive analysis of the data collected in the study. This section aims to present the findings related to the research objectives outlined in the study, focusing on factors associated with the uptake of anticoagulation services at MTRH in Eldoret, Kenya. The introduction sets the stage for a detailed exploration of the results obtained from the study of 286 participants, providing insights into demographics, knowledge levels, medication adherence, and other key aspects related to anticoagulation services.

5.2 Discussion of the Results

5.2.1 Factors Associated with Uptake of Anticoagulation Services

5.2.1.1 Patient and Institutional Associated Factors.

Patient Demographics and Background

The study findings provide crucial insights into the demographics of individuals seeking anticoagulation services at MTRH in Eldoret, Kenya. The notable gender disparity, where females constituted 71.67% of the study population, aligns with previous research indicating that women are more likely to seek healthcare services compared to men (Ochieng et al., 2021; Deloitte, 2024). This may be due to a combination of factors such as increased health-seeking behavior among women, greater engagement with routine medical care, and a higher prevalence of certain conditions requiring anticoagulation, such as atrial fibrillation secondary to rheumatic heart disease, which is more common among women in sub-Saharan Africa (Keates et al., 2017).

The age distribution of respondents further reinforces existing literature indicating that older adults are at higher risk for cardiovascular diseases and venous thromboembolism, necessitating anticoagulation therapy (Lip et al., 2018). The predominance of individuals above 50 years (29.86%) in the study supports the understanding that age is a significant determinant of anticoagulation therapy needs. However, the relatively lower representation of younger individuals (20–29 years at 18.75%) may be attributed to a lower prevalence of conditions such as atrial fibrillation and deep vein thrombosis in this demographic, as well as a potential lack of awareness regarding the need for anticoagulation therapy (Stern et al., 2021).

The variation in education levels among respondents, with 28.82% having tertiary education and 27.08% having no formal education, suggests diverse levels of health literacy, which could influence anticoagulation adherence and outcomes. Studies have demonstrated that individuals with higher education levels are more likely to understand and adhere to complex medication regimens (Xu et al., 2020). Conversely, low literacy levels may contribute to poor adherence and suboptimal anticoagulation control, increasing the risk of adverse events.

Geographical accessibility remains a significant barrier to anticoagulation service utilization, as evidenced by respondents living farther from MTRH reporting challenges in accessing care. This finding is consistent with prior studies that identify distance as a key determinant of healthcare utilization, particularly for chronic disease management in low-resource settings (Pillay-van Wyk et al., 2013). Decentralizing anticoagulation services

through community-based clinics could mitigate these barriers and enhance service uptake.

The overwhelming preference for MTRH as the primary facility for anticoagulation services (93.7%) over the specialized Anticoagulation Clinic (6.3%) highlights a critical gap in awareness and service utilization. While MTRH likely benefits from broader recognition, superior infrastructure, and comprehensive service provision, the limited use of the Anticoagulation Clinic suggests that targeted outreach and education efforts are needed to inform patients of the specialized care available. This aligns with the diffusion of innovation theory, which emphasizes the role of communication channels in the adoption of new healthcare services (Rogers, 2003).

While this study provides valuable insights, several limitations must be acknowledged. First, the study was conducted at a single institution, MTRH, which may not fully represent the experiences of patients seeking anticoagulation services at other healthcare facilities in Kenya. Additionally, self-reported data on access barriers and healthcare-seeking behaviors may be subject to recall bias. Future research incorporating a broader sample from multiple institutions and using objective measures of healthcare utilization would enhance the generalizability of the findings.

Another limitation is the cross-sectional nature of the study, which captures patient demographics and behaviors at a single point in time. Longitudinal studies would provide a more comprehensive understanding of trends in anticoagulation service uptake, adherence patterns, and long-term outcomes. Furthermore, factors such as socioeconomic status and cultural beliefs, which may influence healthcare-seeking behavior and adherence, were not extensively explored in this study and warrant further investigation.

5.2.1.2 Knowledge of Anticoagulation.

Knowledge Levels Across Demographics

The findings indicate a variation in knowledge levels across different demographic groups, with females demonstrating slightly higher self-reported confidence in their knowledge of anticoagulation therapy. This trend aligns with previous studies suggesting that women tend to be more engaged in healthcare-seeking behaviors and health-related education (Keates et al., 2017). However, the self-reported nature of knowledge assessment could introduce bias, as confidence does not always equate to actual understanding. These findings suggest that targeted education strategies should consider gender-specific approaches to optimize knowledge dissemination. Education level significantly influenced knowledge perception, with university-educated respondents reporting a higher level of understanding. This is consistent with literature indicating that individuals with higher education levels generally exhibit better health literacy, adherence to medication, and understanding of medical instructions (Wang et al., 2023). The findings reinforce the need for tailored patient education programs, particularly for those with lower formal education, to bridge the knowledge gap and enhance anticoagulation management.

Understanding of Anticoagulation Indications and Monitoring

The majority of respondents correctly identified anticoagulation therapy as a treatment for blood clots or as a preventive measure. However, the misconception that hypertension necessitates anticoagulation therapy highlights a critical gap in patient education. Similar misconceptions have been observed in other studies, emphasizing the need for structured educational interventions to correct misunderstandings and improve patient comprehension

of anticoagulation indications (Nielsen et al., 2020).

Knowledge of INR testing was generally high, with most respondents recognizing its role in monitoring anticoagulation therapy. However, a notable proportion of participants were unaware of the necessity for regular INR testing while on warfarin. This knowledge gap may stem from inconsistencies in patient-provider communication or insufficient emphasis on INR monitoring during patient consultations. The determinant framework underscores the role of patient education in influencing treatment adherence and health outcomes (Medlinskiene, 2021). Enhancing awareness of INR monitoring through structured counseling sessions and educational materials could improve adherence and patient safety.

Awareness of Risks and When to Seek Help

While many respondents were aware of potential side effects associated with anticoagulation therapy, there was a concerning gap in recognizing the risk of bleeding. Studies have shown that inadequate knowledge about medication risks can lead to poor adherence and increased adverse events (Pizetta et al., 2024). This underscores the importance of integrating risk education into routine patient counseling, ensuring that patients are equipped with knowledge about when to seek medical attention in case of complications.

Medication Management and Interactions

The study findings highlight a reasonable level of awareness regarding medication identification, but a lack of comprehensive understanding of warfarin interactions and optimal medication timing. Given that warfarin has a narrow therapeutic index and is

susceptible to dietary and drug interactions, these gaps in knowledge pose a significant risk to effective anticoagulation management. Previous research has demonstrated that patients with a better understanding of drug interactions are more likely to maintain stable INR levels and experience fewer complications (Rudasill et al., 2019). Addressing this through interactive patient education sessions, medication counseling, and digital health tools could enhance patient adherence and outcomes.

Overall Knowledge Scores

The mean knowledge scores suggest a generally good understanding of anticoagulation therapy, yet the variability in scores indicates the need for targeted educational interventions. The findings align with the conceptual framework, which emphasizes that patient knowledge, access to education, and the implementation of structured interventions are key determinants of successful anticoagulation therapy adoption from an implementation science perspective, the study supports the role of educational frameworks in improving patient engagement and adherence to anticoagulation therapy. The Diffusion of Innovation Theory by Rogers (1962) suggests that the adoption of new medical knowledge is influenced by communication channels, patient engagement, and systematic implementation efforts. Integrating structured patient education within anticoagulation clinics can facilitate knowledge diffusion, ultimately enhancing treatment outcomes.

Several limitations should be acknowledged. First, the study relied on self-reported knowledge assessments, which may introduce response bias. Objective knowledge assessments could provide a more accurate measure of patient understanding. Second, the study was conducted at MTRH in Eldoret, Kenya, which may limit the generalizability of

the findings to other healthcare settings with different demographic and socioeconomic contexts. Future studies should explore knowledge levels across multiple healthcare facilities to enhance external validity.

5.2.1.3 Adherence and Monitoring to Anticoagulation Therapy.

Medication Uptake and Adherence

The study revealed varied behaviors and attitudes toward medication uptake and adherence. A significant proportion of respondents expressed uncertainty about their adherence, suggesting a possible lack of awareness regarding their medication regimen. Notably, 77.93% of respondents reported missing at least one dose of their anticoagulation therapy, a finding that aligns with previous studies indicating that adherence to long-term medication regimens is often suboptimal, particularly in resource-limited settings (Moges et al., 2024). According to the Health Belief Model, adherence is influenced by perceived susceptibility, severity, benefits, and barriers (Rosenstock, 1974). The high rate of missed doses may stem from barriers such as forgetfulness, perceived lack of immediate consequences, or limited understanding of medication importance.

Frequency and Memory of Medication Intake

Most respondents reported taking their medication twice daily, which is consistent with prescribed anticoagulation therapy regimens. However, a small percentage (7.59%) could not recall their medication frequency, indicating possible cognitive or memory-related challenges. These findings mirror those of previous studies that suggest older age, lower health literacy, and polypharmacy contribute to forgetfulness and medication non-adherence (Jia et al., 2022). Structured reminders, patient education, and adherence-support

interventions could mitigate these barriers.

Responses to Missing Doses

Most respondents stated they would take the next scheduled dose if they missed one, which aligns with standard clinical guidelines. However, a notable 11.38% reported that they would call their healthcare provider, while 7.93% would discontinue the scheduled dose altogether. These varied responses indicate potential gaps in patient education regarding appropriate actions after missing a dose, highlighting the need for clear and consistent provider communication to reduce medication errors and enhance adherence.

Side Effects and Trust in Healthcare Providers

A significant proportion of respondents reported experiencing medication side effects, which could negatively impact adherence. Despite this, the majority expressed trust in healthcare providers, consistent with studies showing that strong patient-provider relationships can enhance medication adherence (Mamaghani et al., 2024). Trust in providers suggests an opportunity to implement counseling strategies that address concerns about side effects while reinforcing the necessity of continued therapy.

Medication Management and Challenges

Many respondents found managing their medication challenging, which is consistent with previous research indicating that complex regimens, frequent dose adjustments, and dietary restrictions can hinder adherence (Moges et al., 2024). Given the narrow therapeutic index of warfarin, structured patient education and medication management support, such as digital reminders or caregiver involvement, could enhance adherence and therapeutic

outcomes.

Beliefs and Trust in Medication

The majority of respondents expressed confidence in their medication's effectiveness and necessity. However, a small percentage exhibited skepticism regarding healthcare provider recommendations or the need for anticoagulation therapy. This finding aligns with studies highlighting that patients who perceive their condition as non-severe or who have misconceptions about anticoagulation therapy are less likely to adhere (Fuchs et al., 2025). Addressing these beliefs through patient-centered counseling and shared decision-making approaches could improve adherence rates.

INR Tests and Monitoring

Most respondents correctly identified the purpose of INR testing, yet a significant number believed these tests were infrequent or served alternative purposes. These misconceptions align with previous findings indicating that inadequate knowledge of INR monitoring contributes to suboptimal anticoagulation control (Rashid et al., 2019). Enhancing patient education on the necessity of regular INR testing is essential to ensuring safe and effective anticoagulation management.

Clinical Experiences and Reporting

Many respondents reported experiencing side effects such as bleeding gums and nosebleeds, underscoring the importance of educating patients on recognizing and responding to adverse drug reactions. Encouragingly, most respondents indicated they would inform multiple healthcare providers about their warfarin use, supporting the role of

coordinated care in anticoagulation management. Prior studies suggest that structured reporting mechanisms improve patient safety and treatment outcomes (Makowski, 2022).

Preparation of Medication and Blood Draw Methods

A reliance on healthcare professionals for medication preparation and INR testing was observed, reflecting a dependence on clinical support for anticoagulation management. While this ensures professional oversight, it may also indicate a need for increased patient empowerment and self-management strategies, particularly for individuals in remote or resource-limited settings (Alvarez et al., 2018).

Location of INR Checks and Leafy Green Consumption

Most respondents attended MTRH for INR checks, suggesting centralized anticoagulation management. While centralized care can ensure quality control, it may present accessibility challenges for some patients. Additionally, varied consumption of leafy greens, known to impact warfarin efficacy, highlights the need for personalized dietary counseling to maintain stable INR levels (Makowski, 2022).

Overall Adherence

The adherence rate of 67.01% indicates a moderate level of adherence to warfarin therapy. However, the high percentage of missed doses and challenges in modifying warfarin doses based on clinic instructions suggest the need for improved adherence strategies. Studies indicate that interventions such as patient education, simplified dosing schedules, and adherence aids significantly improve anticoagulation therapy outcomes (Marcolino et al., 2023). Reliability testing using Cronbach's alpha demonstrated acceptable internal

consistency (>0.7), confirming the reliability of the adherence-related questions used in this study. Adherence and monitoring to anticoagulation therapy are constrained by two primary limitations: the reliance on self-reported adherence, which introduces potential bias due to recall inaccuracies and social desirability, and its single-site location at MTRH in Eldoret, Kenya, which restricts generalizability to other healthcare contexts and patient demographics. Future research should prioritize objective adherence measures, such as electronic pill counts or pharmacy refill data, and expand study populations to encompass diverse settings, thereby enhancing the external validity and applicability of findings.

5.2.1.4 Satisfaction Towards Anticoagulation Services.

Timing of Medication and Clinic Visit Experience

The streamlined process of medication dispensing, where 93.45% of respondents reported receiving their medication immediately after or during their clinic visit, likely enhances adherence by eliminating potential delays in obtaining prescribed anticoagulation therapy. This finding aligns with previous studies indicating that integrating medication dispensing within clinical visits improves adherence and patient satisfaction (Tsige et al., 2024). Additionally, the physician's one-on-one visit was identified as the primary point of medication discussion by the same percentage of respondents, reinforcing the importance of direct patient-provider interactions in ensuring treatment adherence. According to the Health Belief Model by Rosenstock (1974), perceived benefits and provider reinforcement play a key role in shaping adherence behaviors. The findings suggest that structured interactions during clinic visits serve as critical touchpoints for reinforcing medication adherence.

Ease of Modifying Warfarin Dose

A notable 88.62% of respondents found it easy to modify their warfarin dose based on clinic instructions, indicating strong confidence in their ability to adjust medication regimens as directed. This result is consistent with previous studies highlighting that clear provider instructions and ongoing patient education facilitate better adherence to warfarin dosing schedules (Park & Jang, 2021). The conceptual framework of self-efficacy by Bandura (1997) supports this finding, as patients who feel capable of making necessary medication adjustments are more likely to adhere to prescribed regimens. However, a small proportion of patients may still experience difficulties, which underscores the need for additional counseling and simplified dosing instructions.

Satisfaction with Information and Time Spent with Healthcare Professionals

The high levels of satisfaction with warfarin-related information (68.62%) and time spent with healthcare professionals (65.52%) suggest that patient-provider interactions are generally positive. This is in line with studies demonstrating that patient satisfaction with healthcare provider communication is a strong predictor of medication adherence (Świątoniowska-Lonc et al., 2020). Furthermore, the Communication Accommodation Theory (Giles, 2016) suggests that effective communication tailored to patient needs improves comprehension and adherence. While these findings are encouraging, they also highlight the need to address the concerns of the minority who reported lower satisfaction, potentially through enhanced patient education initiatives or increased consultation time for patients requiring additional guidance.

Adherence to Warfarin Medication Instructions

The adherence rate of 71.72% is comparable to previous findings in anticoagulation studies, which report adherence rates ranging from 60% to 80% in various settings (Marcolino et al., 2023). While this is a positive indication of patient engagement in their treatment, the 16.90% of respondents who were unsure about their adherence and the 6.90% who reported non-adherence highlight persistent challenges. These gaps may stem from factors such as forgetfulness, misunderstanding of dosing instructions, or lack of perceived necessity, as described in the Medication Adherence Model (Ingersoll & Cohen, 2008). Interventions such as reminder systems, tailored counseling, and patient-centered education could be beneficial in addressing these gaps**.**

CHAPTER 6: SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

This chapter serves as the culmination of the research study, providing a comprehensive overview of the findings, conclusions drawn from the data analysis, and recommendations for future actions. This section aims to summarize the key points discussed in the previous chapters, draw conclusive insights from the results, and propose actionable recommendations based on the study's outcomes.

6.2 Summary

The study revealed several significant patterns and insights regarding the uptake of anticoagulation services at MTRH in Eldoret, Kenya. A notable gender disparity was observed, with females constituting the majority of individuals seeking these services. Age-wise, older participants, specifically those above 50 years, were most represented, suggesting a greater need or awareness of anticoagulation services among this age group. In contrast, the youngest age bracket, 20-29 years, was the least represented, possibly indicating lower awareness or prevalence of conditions requiring anticoagulation in this demographic.

Education levels also played a role in the study's findings. Participants with tertiary education or no formal education were notably represented, underscoring a diverse patient population with varied health literacy levels. Despite the specialized Anticoagulation Clinic being available, a vast majority preferred MTRH for anticoagulation services, suggesting it might be more accessible or trusted by the community.

Regarding knowledge about anticoagulation, there was a generally good understanding of its indications. However, gender and education level influence knowledge perception. Misconceptions persisted, particularly concerning the use of anticoagulation for hypertension and the frequency of INR tests. Furthermore, there were gaps in knowledge regarding potential risks and medication management, indicating a need for clearer patient education.

Medication adherence was a mixed picture. While many reported adhering to the prescribed dosing frequency, a significant number had missed doses, pointing to potential adherence challenges. Despite experiencing side effects, trust in healthcare providers remained high. However, managing medication was perceived as challenging by many respondents, highlighting the need for support and education in this area.

Satisfaction with anticoagulation services was generally high, with most respondents finding the medication dispensing process during clinic visits streamlined and the one-on-one physician visits informative. Additionally, most felt confident in modifying their warfarin dose based on clinic instructions. However, the study identified areas for improvement, including targeted educational interventions and support to address knowledge gaps, challenges in adherence, and optimize patient outcomes.

6.3 Conclusions

In conclusion, the study provided valuable insights into the factors influencing the uptake of anticoagulation services at MTRH in Eldoret, Kenya. A significant gender disparity was

observed, with females and older individuals being more represented among service seekers. Education levels varied among participants, highlighting the need for targeted health education campaigns. MTRH emerged as the preferred facility for anticoagulation services over the specialized Anticoagulation Clinic, suggesting potential accessibility or trust issues that need addressing.

Knowledge about anticoagulation was generally good, but there were notable misconceptions and gaps, particularly concerning medication indications, monitoring, and potential risks. This underscores the importance of targeted educational interventions to address these knowledge gaps and dispel misconceptions.

Adherence to anticoagulation therapy was moderate, with a substantial number of respondents reporting missed doses and challenges in medication management. Despite these challenges, there was a high level of trust in healthcare providers, indicating a strong foundation for improving medication management through patient education and support.

Overall satisfaction with anticoagulation services was high, with patients finding the medication dispensing process streamlined and valuing the one-on-one interactions with healthcare professionals. However, there are areas for improvement, such as addressing adherence issues, enhancing patient education, and promoting the specialized services of the Anticoagulation Clinic to ensure equitable access to care and optimize treatment outcomes.

6.4 Recommendations

Based on the findings and results of the study on factors associated with the uptake of

anticoagulation services at MTRH in Eldoret, Kenya, the following recommendations are suggested:

1. **Targeted Health Education Campaigns**: Given the diverse educational backgrounds and varying levels of health literacy among respondents, there's a need for targeted health education campaigns. These campaigns should focus on raising awareness about anticoagulation, its indications, potential risks, medication management, and adherence strategies. Tailored materials should be developed for different demographic groups to address their specific needs and knowledge gaps.

2. **Promotion of Specialized Services**: To ensure equitable access to care and leverage the specialized services offered at the Anticoagulation Clinic, efforts should be made to raise awareness and promote this facility. Healthcare providers can actively refer patients to this clinic when appropriate and educate them about its benefits and services.

3. **Improved Patient Education on Monitoring**: Enhancing patient education on the importance of regular monitoring, including INR tests, is crucial. Patients should be informed about the frequency and purpose of these tests to ensure optimal medication management and safety.

4. **Adherence Support Programs**: Considering the moderate adherence level and high percentage of missed doses, adherence support programs should be developed. These programs can include reminders, counseling sessions, and follow-ups to help patients stay on track with their medication regimen.

5. **Enhanced Medication Management Support**: Given the perceived challenges in managing medication reported by respondents, healthcare providers should offer support and tools to help patients manage their medication effectively. This can include pill organizers, educational materials, and counseling on medication interactions and timing.

6. **Strengthening Patient-Provider Relationships**: Building on the strong trust between patients and healthcare providers can enhance medication management and adherence. Encouraging open communication, providing clear guidance on missed doses, and addressing any concerns or misconceptions patients may have can further strengthen this relationship.

7. **Dietary Counseling**: With varied leafy green consumption reported among respondents, dietary counseling should be offered to educate patients on how certain foods can impact warfarin efficacy and INR levels. This will empower patients to make informed dietary choices and better manage their anticoagulation therapy.

8. **Streamlined Medication Dispensing**: Given the high satisfaction with the timing of medication dispensing during clinic visits and the reported importance of immediate access to medication in adherence, healthcare facilities should continue to ensure a streamlined process for medication dispensing. However, additional strategies should be implemented to support patients who experience occasional delays or stock-outs, ensuring consistency in medication availability and reducing missed doses.

9. **Continued Monitoring and Evaluation**: Regular monitoring and evaluation of adherence levels, knowledge, and patient satisfaction should be conducted to track progress and identify areas for continuous improvement. Feedback from patients should be actively sought and incorporated into service delivery to ensure it meets their needs and expectations.

5.5 Suggestions for Further Research

Based on the findings and recommendations from the current study, several areas warrant further research to deepen our understanding and enhance the delivery of anticoagulation services. Here are some suggestions for further research:

1. **Gender Disparity in Healthcare-Seeking Behavior**: Investigate the underlying factors contributing to the significant gender disparity observed in the uptake of anticoagulation services. Understanding gender-specific healthcare-seeking behaviors and barriers can help tailor interventions to better serve both male and female populations.

2. **Age-related Differences in Anticoagulation Needs**: Conduct a longitudinal study focusing on age-related changes in cardiovascular risks and anticoagulation needs. This can provide insights into the evolving needs of different age groups and inform targeted education and outreach efforts.

3. **Effectiveness of Health Education Campaigns**: Evaluate the impact of targeted health education campaigns on improving knowledge, adherence, and outcomes among patients receiving anticoagulation therapy. This can help identify the most

effective educational strategies and materials for different demographic groups.

4. **Role of Health Literacy in Anticoagulation Management**: Explore the relationship between health literacy levels and medication adherence, knowledge, and outcomes among patients receiving anticoagulation therapy. This can inform the development of tailored interventions to improve health literacy and support patients in managing their medication effectively.

5. **Impact of Specialized Anticoagulation Clinics**: Assess the effectiveness of specialized anticoagulation clinics in improving patient outcomes, satisfaction, and adherence compared to general healthcare settings. This can provide evidence to support the expansion and promotion of specialized services.

6. **Patient-Provider Communication and Trust**: Investigate the factors influencing patient-provider communication, trust, and their impact on medication adherence and outcomes. Understanding the dynamics of this relationship can help identify strategies to enhance communication and trust, leading to better patient engagement and adherence.

7. **Dietary Patterns and Warfarin Efficacy**: Conduct a study to explore the relationship between dietary patterns, including leafy green consumption, and warfarin efficacy and INR levels. This can help inform dietary counseling strategies and support patients in making informed dietary choices.

8. **Technological Interventions for Adherence**: Evaluate the effectiveness of technological interventions, such as mobile health apps, text message reminders,

and telehealth consultations, in improving medication adherence and outcomes among patients receiving anticoagulation therapy.

9. **Long-term Outcomes and Quality of Life**: Investigate the long-term outcomes, quality of life, and healthcare utilization patterns among patients receiving anticoagulation therapy. Understanding the broader impact of anticoagulation therapy on patients' lives can help guide treatment decisions and support services.

10. **Comparative Studies with Other Healthcare Facilities**: Conduct comparative studies with other healthcare facilities offering anticoagulation services to identify best practices, challenges, and opportunities for improvement. This can provide valuable insights into the factors contributing to variations in service uptake and outcomes across different settings.

By addressing these research gaps, future studies can contribute to the development of evidence-based interventions, policies, and strategies to enhance the delivery of anticoagulation services, improve patient outcomes, and ensure equitable access to care.

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APPENDICES

Appendix 1: Participants Questionnaire

Dear Participant,

The purpose of this study is purely academic with a general objective of determining the factors affecting the low uptake of anticoagulation services at the MTRH Anticoagulation clinic. You have been choosen to be a part of this research because you attend the anticoagulation clinic at MTRH. The outcomes of the research will be critical in informing policy that will seek to improve patient care and achieve quality outcomes. At no point in the questionnaire, you will be asked to provide any personal information but you are required to provide written consent to show voluntary acceptance to participate in the study. As mentioned, participation is unpaid and you can withdraw any time when you wish to. You will be asked to provide answers to a series of questions in this guide with utmost honesty. Any information you provide will be handled confidentially.

SECTION 1: DEMOGRAPHIC INFO

1. What is your gender

   M ☐

   F ☐

2. In which age bracket do you belong?

   20-29 ☐

   30-39 ☐

   40-49 ☐

   Above 50 ☐

3. What is your education level?

University ☐

Education ☐

Tertiary/College ☐

High school education ☐

Primary School ☐

I am not Educated ☐

4. When did you start using your anticoagulation medication?

- ☐ Less than 6 months ago
- ☐ 6 months – 1 year ago
- ☐ 1-5 years ago
- ☐ More than 5 years ago

SECTION 2: ANTICOAGULATION SERVICES KNOWLEDGE TEST

The questions that follow are multiple-choice questions and you will need to tick the one thatyou think is correct.

1. How can you rate your knowledge of the anticoagulation medication you taking e.g. Warfarin?

- ☐ Very poor
- ☐ Poor
- ☐ Fair
- ☐ Good
- ☐ Very good

2. What is your indication for anticoagulation?

- ☐ Deep vein thrombosis
- ☐ Pulmonary embolism

- Thrombophilia
- Congestive heart failure
- Valvular heart disease
- Atrial fibrillation
- Stroke
- Prosthetic valve
- Other (specify)_____

3. Type of anticoagulant

TYPE OF ANTICOAGULANT	**DOSE**	**FREQUENCY**	**DURATION**

4. Anticoagulation medicine such as warfarin can be used to treat people:

- That have a blood clot or to prevent a blood clot from forming
- That have hypertension (high blood pressure)
- With diabetes
- With severe wounds

5. The INR test is a test of the blood:

- That is used to monitor anticoagulation medicine like warfarin therapy

- That is seldomly done while on warfarin
- That is used to check the amount of vitamins in the blood.
- That is used to determine if you need warfarin

6. what will happen to a you with an INR value that is above his or her target INR range?
   - He will be drowsy and fatigued from the medication
   - He will be at risk of bleeding
   - He will experience warfarin side effects.
7. What will happen to a patient with an INR value that is below the target INR range?
   - He will be at an increased risk of bleeding
   - He will be at an increased risk of developing a blood clot
   - He may develop a skin rash
   - He will experience side effects from the medication
8. While you taking your medication e.g. warfarin, when do you think you should attend theemergency clinic or department?
   - When small bruises form with mild trauma
   - When I have an increased appetite
   - When I experience nose bleeds that cannot be controlled
   - When I bleed in my gums during brushing of my teeth.
9. Who should you inform that or should be informed that you are taking warfarin or anyanticoagulant? (You can select more than one option).
   - A pharmacist giving over-the-counter prescription
   - A doctor prescribing medication

- A dentist that is set to do a tooth extraction
- A doctor stopping medication

10. How can you distinguish the different strengths of warfarin tablets that you have?

- Shape
- Color
- Size
- Marking on the tablet

11. What interferes with how warfarin works? (You can select more than one option).

- Exercise
- Medication
- Alcohol and food
- Vitamins
- Herbal supplements

12. When should you take your medication (warfarin)?

- During lunchtime
- In the morning before taking breakfast
- When I remember.
- At the same time every day and most probably at 5 pm

13. If you forget to take your dose, what is the best thing to do? (Select more than one option)

- Take a double dose the following day
- Just skip the dose
- Takes it as soon as you remember on the same day
- Inform the health care specialist at the anticoagulation clinic when

going for INR.

SECTION 3: FACTORS AFFECTING UPTAKE OF ANTICOAGULANTS

1. When was your last visit to the anticoagulation clinic?

- In the last month
- 1-2 months ago
- More than 2 months ago
- I do not know.
- Personal behavior toward medication uptake

2. How often do you take your medication?

- Once a day
- Twice a day
- Thrice a day
- I do not remember

3. do you forget to take your medication sometimes?

- Yes
- No

4. When you miss your dose, what do you usually do?

- Call the healthcare provider
- Double up on the next dose
- Take the next scheduled dose
- Discontinue the scheduled dose

5. When you travel, do you carry your medication or even forget?

- Yes
- No

6. When you feel better, do you stop taking your medication?

- Yes
- No

7. Have you ever felt any inconvenience in taking your medications?

- Yes
- No

8. Do you have any financial difficulty in acquiring your anticoagulants?

- Yes
- No

If yes, when do you buy your medication?

- Daily
- Weekly
- Monthly
- When I have money

9. Have you experienced any side effects when using warfarin or any other anticoagulant?

- Yes
- No

10. Does the side effects deter you from continuing your treatment?

- Yes
- No

11. Do you like the hospital environment or the practitioners?

- Yes
- No

12. Do you trust the nurse or doctors who attend to you at the clinic?

- Yes
- No

13. How difficult is it to access the clinic from your home?

- Not difficult
- Difficult
- Very Difficult

14. From your religious perspective, do you think the medicines are helping you?

- Yes
- No
- I do not know

SECTION 4: WARFARIN ADHERENCE TOOL

1. What is your current dose of warfarin? _____

2. Who does the preparation of your medication? (select more than one option)

    - Myself

- Relative
- Health care professional

3. Have you ever missed your dose in the past?
   - Yes
   - No

   If yes, how many doses did you miss?
   - 1 dose
   - doses
   - or more doses
   - I do not remember
4. Have you ever taken your dose in excess?
   - Yes
   - No

   If yes, how many extra doses did you take
   - 1 dose
   - doses
   - or more doses
   - I do not remember.
5. Is it difficult for you to modify the warfarin dose based on the instructions given by theclinic?
   - Yes
   - No
6. Are there moments when you did not change the dose as instructed?

□ Yes

□ No

If yes, what was the reason?_

_____

7. Does your consumption of leafy green vegetables (Mboga za Kienyeji) vary?

□ Yes

□ No

□ I do not take any

□ I am not sure

SECTION 5: SATISFACTION AND ATTITUDES TOWARDS ANTICOAGULATIONSERVICES

1. Where do you usually go to have your INR checked?

□ Anticoagulation Clinic MTRH

□ Family doctor

□ A community health center

□ At home

2. Usually, how is your blood drawn for the INR test?

□ From my fingertips

□ From my arm

3. How are the results communicated to you/?

□ I am given immediately after/during the clinic visit

□ By a telephone call
□ Through email

- ☐ Other_

4. How would you prefer to receive the INR results and any new dosing instructions?

   - ☐ During the one-on-one visit one one with the physician
   - ☐ By email
   - ☐ By phone
   - ☐ Other_

5. Does the clinic offer counseling during your visits?

   - ☐ No
   - ☐ Yes

6. How satisfied are you with the current anticoagulation services given?

   - ☐ I am satisfied
   - ☐ I am not satisfied
   - ☐ I am very satisfied
   - ☐ I do not know

7. How satisfied are you with the counseling you receive?

   - ☐ I am satisfied
   - ☐ I am not satisfied
   - ☐ I am very satisfied
   - ☐ I do not know

8. Do you think changes should be made to service delivery at the anticoagulation clinic?

   - ☐ Yes
   - ☐ No

I am not sure

If yes, what should change?

_____

_____

9. Can you rate your agreement with the statement below? You can rank them using 1 to5.

Statement	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
The physician/pharmacist spent adequate time. Discussing my needs					
Since attending the clinic, I feel more knowledgeable about my anticoagulation. Therapy					
The clinic provides us with important learning materials					

The clinic needs to improve its services to encourage more usage					

10. Did the pharmacist give you any new information

    - ☐ No
    - ☐ Yes

11. Do you think the anticoagulation clinic has changed your perspective on patient care?

    - ☐ Yes
    - ☐ No
    - ☐ I am not sure

12. Is there anything that you do not like about the anticoagulation clinic?

_____

_____

SECTION 6: DETERMINATION OF THE RATE OF MONITORING INR

Kindly indicate the date the INR test was done and the value obtained. (NOTE: If you are unableto remember, indicate you cannot remember.)

INR Reading	**Date**	**INR Value**
Reading 2		
3		
4		

5		
6		
7		
8		
9		

10		
11		
12		
13		
14		
15		

2. In the table below, indicate any disease that you may have that might affect INR.

Disease	**Tick appropriately**	**Duration of disease**
Hypertension		
Diabetes		
Thyroid dysfunction		
Cancer		
Liver dysfunction		
Renal dysfunction		

Other (please specify below)		

Appendix 2: Amref University Ethics Approval

amref health africa

Amref Health Africa in Kenya

REF: AMREF – ESRC P1441/2023 **August 8, 2023**

Samuel Nyanje
Amref International University
P.O Box 27691-00506
Nairobi, Kenya
Tel: +254720668747
Email: nyanje.k@gmail.com

Dear Samuel Nyanje,

RESEARCH PROTOCOL: PATIENT ASSOCIATED FACTORS THAT AFFECT UPTAKE OF ANTICOAGULATION SERVICES AT MOI TEACHING AND REFERRAL HOSPITAL ELDORET KENYA

Thank you for submitting your protocol to the Amref Ethics and Scientific Review Committee (ESRC).

This is to inform you that the ESRC has reviewed and approved your protocol. Your application approval number is ESRC P1441/2023. The approval period is from August 8, 2023, to August 7, 2024, and is subject to compliance with the following requirements:

a) Only approved documents (including informed consents, study instruments, advertising materials, material transfer agreements, etc.) will be used.
b) All changes including (amendments, deviations, violations, etc.) are submitted for review and approval by Amref ESRC before implementation.
c) Death and life-threatening problems and serious adverse events (SAEs) or unexpected adverse events whether related or unrelated to the study must be reported to the Amref ESRC within 72 hours of notification.
d) Any changes, anticipated or otherwise that may increase the risks or affect safety or welfare of study participants and others or affect the integrity of the research must be reported to Amref ESRC within 72 hours.
e) Clearance for export of biological specimen must be obtained from the relevant government authorities for each batch of shipment/export.
f) Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal.
g) In case of late renewal, the Amref ESRC shall not be held responsible for any serious adverse events (SAEs) that may occur as a result of research activities that were carried out after the expiry of approval.
h) Submission of an executive summary report within 90 days upon completion of the study to the Amref ESRC.
i) All government regulations for prevention and control of the spread of COVID-19 including social distancing, provision of personal protective equipment for participants and research assistants should be adhered to during data collection. All research assistants should be monitored for COVID 19 symptoms and referred for testing in case they present with symptoms.

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology and Innovation (NACOSTI) https://research-portal.nacosti.go.ke and also obtain other clearances needed.

Please do not hesitate to contact the ESRC Secretariat (esrc.kenya@amref.org) for any clarification or query.

Yours sincerely,

Prof. Mohamed Karama
Chair, Amref ESRC
CC: Samuel Muhula, Senior Manager, Learning and Impact Amref Health Africa.

Appendix 3: MTRH Approval

An ISO 9001:2015 Certified Hospital

MOI TEACHING AND REFERRAL HOSPITAL

Telephone: (+254)-0532033471/2/3/4
Fax: 0532061749
Email: ceo@mtrh.go.ke/ceosoffice@mtrh.go.ke

NANDI ROAD
P.O. BOX 3-30100
ELDORET,KENYA

Ref: ELD/MTRH/R&P/10/2/V.2/2010

29th January, 2024

Mr. Samuel Khacheso Nyanje,
Moi University,
School of Public Health,
P.O. Box 4606-30100,
ELDORET-KENYA.

FACTORS ASSOCIATED WITH UPTAKE OF ANTICOAGULATION SERVICE AT MOI TEACHING AND REFERRAL HOSPITAL ELDORET KENYA

You have been authorised to conduct research within the jurisdiction of Moi Teaching and Referral Hospital (MTRH) and its satellites sites. You are required to strictly adhere to the regulations stated below in order to safeguard the safety and well-being of staff, patients and study participants seen at MTRH.

1. The study shall be under Moi Teaching and Referral Hospital regulation.
2. A copy of MTRH/MU-IREC approval shall be a prerequisite to conducting the study.
3. Studies intending to export human bio-specimens must provide a permit from MOH at the recommendation of NACOSTI for each shipment.
4. No data collection will be allowed without an approved consent form(s) to participants unless waiver of written consent has been granted by MTRH/MU-IREC.
5. Take note that **data** collected must be treated with due confidentiality and anonymity.

The continued permission to conduct research shall only be sustained subject to fulfilling all the requirements stated above.

The approval period is **29th January, 2024 – 28th January, 2025.**

29/01/2024

DR. PHILIP K. KIRWA
Ag. CHIEF EXECUTIVE OFFICER

CHIEF EXECUTIVE OFFICER
29 JAN 2024
MOI TEACHING & REFERRAL HOSPITAL

c.c. - Ag. Senior Director, Clinical Services
- Director, Nursing Services
- HOD, HRISM

All correspondences should be addressed to the Chief Executive Officer
Visit our Website: www.mtrh.go.ke
TO BE A GLOBAL LEADER IN THE PROVISION OF EXCEPTIONAL MULTI-SPECIALTY HEALTH CARE, TRAINING AND RESEARCH

MTRH/MU-INSTITUTIONAL RESEARCH AND ETHICS COMMITTEE (IREC)

MOI TEACHING AND REFERRAL HOSPITAL
P.O. BOX 3
ELDORET
Tel: 33471//2/3

MOI UNIVERSITY
COLLEGE OF HEALTH SCIENCES
P.O. BOX 4606
ELDORET
Tel: 33471/2/3

Reference: IREC/661/2023
Approval Number: 0004626

25th January, 2024

Mr. Samuel Khacheso Nyanje,
Moi University,
School of Public Health,
P.O. Box 4606-30100,
ELDORET-KENYA.

Dear Mr. Nyanje,

FACTORS ASSOCIATED WITH UPTAKE OF ANTICOAGULATION SERVICE AT MOI TEACHING AND REFERRAL HOSPITAL ELDORET KENYA

This is to inform you that ***MTRH/MU-IREC*** has reviewed and approved the above referenced research proposal. Your application approval number is ***FAN: 0004626 .****The* approval period is **25th January, 2024- 24th January, 2024.**
This approval is subject to compliance with the following requirements;

i. Only approved documents including (informed consents, study instruments, Material Transfer Agreements (MTA) will be used.
ii. All changes including (amendments, deviations, and violations) are submitted for review and approval by ***MTRH/MU-IREC***.
iii. Death and life threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to ***MTRH/MU-IREC*** within 72 hours of notification.
iv. Any changes, anticipated or otherwise that may increase the risks or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to ***MTRH/MU-IREC*** within 72 hours.
v. Clearance for export of biological specimens must be obtained from ***MOH at the recommendation of NACOSTI*** for each batch of shipment.
vi. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal.
vii. Submission of an executive summary report within 90 days upon completion of the study to ***MTRH/ MU-IREC.***

Prior to commencing your study; you will be required to obtain a research license from the National Commission for Science, Technology and Innovation (NACOSTI) https://oris.nacosti.go.ke and other relevant clearances from study sites including a written approval from the CEO-MTRH which is mandatory for studies to be undertaken within the jurisdiction of Moi Teaching & Referral Hospital (MTRH) and its satellites sites.

INSTITUTIONAL RESEARCH & ETHICS COMMITTEE
25 JAN 2024
APPROVED
P. O. Box 4606 - 30100 ELDORET

Sincerely,

PROF. E. WERE
CHAIRMAN
INSTITUTIONAL RESEARCH AND ETHICS COMMITTEE

cc CEO - MTRH Dean - SOP Dean - SOM
Principal - CHS Dean - SON Dean - SOD

Appendix 5: NACOSTI Permit

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **576180**

Date of Issue: **24/August/2023**

RESEARCH LICENSE

This is to Certify that Mr.. SAMUEL Khacheso NYANJE of Amref International University, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Uasin-Gishu on the topic: PATIENT ASSOCIATED FACTORS THAT AFFECT UPTAKE OF ANTICOAGULATION SERVICES AT MOI TEACHING AND REFERRAL HOSPITAL ELDORET KENYA for the period ending : 24/August/2024.

License No: **NACOSTI/P/23/28686**

576180

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.

See overleaf for conditions

Appendix 6: Similarity Report

Samuel Nyanje

FACTORS ASSOCIATED WITH UPTAKE OF ANTICOAGULATION SERVICE AT MOI TEACHING AND REFERRAL HOSPITAL ELDO...

Proposals
MPH Proposals
Amref International University (AMIU)

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