

ADDIS ABABA UNIVERSITY SCHOOL OF COMMERCE

DEPARTMENT OF MARKETING MANAGEMENT

DETERMINANTS OF PATIENTS' INTENTION TO ADOPT TELEPHARMACY SERVICES IN PUBLIC HOSPITALS IN ADDIS ABABA, ETHIOPIA

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THESIS SUBMITTED TO THE DEPARTMENT OF MARKETING MANAGEMENT IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF ARTS DEGREE IN MARKETING MANAGEMENT

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APRIL 2026

ADDIS ABABA, ETHIOPIA

Acknowledgement

First and for most I would like to express my deepest gratitude to almighty Allah for giving me the strength and determination to complete this thesis and I would like to thank my advisor Dr.Temesgen for his valuable guidance and continues support throughout the preparation of this thesis his professional advice and direction greatly contribute for the successful completion of this research.

My heartfelt appreciation goes to my family for their endless love and encouragement and support throughout my academic journey .i would like to thank the selected public hospital respondent and all the individuals who participated in this study by providing the necessary information

Finally I would like to extend my sincere appreciation to my friends and everyone who directly or indirectly supported me during the preparation of this thesis

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LIST OF ABBREVIATIONS AND ACRONYMS

APA	American Pharmacists Association
DOI	Diffusion of Innovation
EHR	Electronic Health Record
FMoH	Federal Ministry of Health
HSTP	Health Sector Transformation Plan
ICT	Information and Communication Technology
IT	Information Technology
MA	Master of Arts
PU	Perceived Usefulness
PEOU	Perceived Ease of Use
TAM	Technology Acceptance Model
UTAUT	Unified Theory of Acceptance and Use of Technology
WHO	World Health Organization

Abstract

This study explored the factors influencing patients' intentions to adopt telepharmacy services in selected public hospitals in Addis Ababa, Ethiopia. The study is conducted in three major public hospitals. The research utilized descriptive and explanatory design. Quantitative approach was used to collect data from 384 randomly chosen patients in the selected hospital. Data collection involved structured self-administered questionnaire that utilized a five-point Likert scale. The analysis both descriptive and inferential statistical techniques in SPSS 27. The results revealed a strong positive correlation between perceived usefulness and the intention to adopt telepharmacy services ($r = 0.585$, $p = 0.000$), indicating that increased perceptions of usefulness enhance adoption intentions. But, perceived ease of use shows a significant negative correlation ($r = -0.607$, $p = 0.000$) showing that difficulties in navigating telepharmacy services deter adoption. Perceived cost also show strong positive correlation with adoption intentions ($r = 0.592$, $p = 0.000$), implying that cost-effectiveness influences patients' willingness to adopt these services. Trust in telepharmacy is positively correlated with adoption intentions ($r = 0.649$, $p = 0.000$), but, perceived privacy is negatively correlated with adoption intentions ($r = -0.614$, $p = 0.000$), indicating that privacy concerns may hinder adoption. The regression model indicates that the predictors collectively explain approximately 59.6% of the variability in adoption intention ($R^2 = 0.596$, $F = 104.726$, $p = 0.000$). Among the predictors, trust in telepharmacy services is the most influential (beta = 0.235, $p = 0.000$), indicating that higher trust levels results in greater adoption intention. Perceived cost (beta = 0.196, $p = 0.000$) and perceived usefulness (beta = 0.152, $p = 0.001$) also have positive impact on adoption. But, perceived privacy (beta = -0.233, $p = 0.000$) and perceived ease of use shows a negative relationship with adoption intentions (beta = -0.157, $p = 0.001$) showing that concerns in the privacy issue and ease of use challenge the adoption intention. To enhance the adoption of telepharmacy services, healthcare providers should prioritize the implementation of strong privacy protection measures and design user-friendly interfaces.

***Keywords**: telepharmacy services, adoption, perceived use, perceived ease of use, trust, perceived cost, privac*

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The integration of information and communication technologies (ICTs) into healthcare delivery has transformed how health services are accessed and delivered globally. Telepharmacy is one of these innovations. It has become a key component of telemedicine and enabled the remote delivery of pharmaceutical services, including medication counselling, prescription verification, drug therapy monitoring and patient education, via digital platforms (WHO, 2022).

To provide remote medication management and consultations, Telepharmacy represents a transformative approach to pharmaceutical care delivery, utilizing digital technologies and telecommunications (Andanalusia *et al.*, 2025). This innovation was accelerated by the COVID-19 pandemic as it has very important role of technology-enabled healthcare services in maintaining continuity of care (Alfian *et al.*, 2025). Telepharmacy includes diverse services ranging from medication dispensing and delivery to remote consultation with licensed pharmacists and this enables patients to access pharmaceutical expertise regardless of geographic or temporal constraints (Alanzi *et al.*, 2024).

The advancement of telepharmacy services has significantly transformed pharmaceutical service delivery, especially in regions with limited healthcare access (Andanalusia *et al.*, 2025), and modern pharmaceutical services are increasingly offered via internet platforms. Evidences show that identification of determinants influencing behavioral intentions toward telepharmacy is essential for developing sustainable digital pharmaceutical services (Sulistyaningrum *et al.*, 2024). The application of telepharmacy is both a hope and a challenge for pharmacists and healthcare systems.

Despite its documented advantages, telepharmacy adoption remains inconsistent. This mainly common in low- and middle-income countries (WHO, 2022). Understanding patient adoption of healthcare technologies requires strong theoretical frameworks. The Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of

Technology (UTAUT) are the most widely applied frameworks in healthcare technology research to predict user behavior (AlQudah *et al.*, 2021) and these models emphasize that perceived usefulness and perceived ease of use are fundamental determinants of technology adoption intention (Mika & Sikirica, 2024).

Perceived usefulness describes the degree to which individuals believe a technology will enhance their task performance. Perceived ease of use show the extent to which individuals perceive a technology to be effortless as core constructs influencing behavioral intention (Valencia-Arias *et al.*, 2025). Extended versions of TAM and UTAUT have incorporated additional constructs. These include trust, perceived cost, social influence and facilitating conditions to provide more detailed understanding of technology adoption (Lee *et al.*, 2025). These theoretical extensions are important in explaining technology adoption patterns across diverse populations and healthcare settings (Fauzi *et al.*, 2025).

Perceived usefulness was consistently reported in previous researches as a key driver of technology adoption in healthcare contexts. Research across multiple healthcare technology applications shows that when users perceive that the technologies gives tangible benefits and efficiency improvements, their adoption intentions significantly increase (Yao *et al.*, 2025). In telemedicine and remote healthcare service adoption, perceived usefulness has shown strong positive effects on patients' behavioral intention to use services. This frequently serve as a mediating variable between other factors and adoption intention (Zhao *et al.*, 2025).

Perceived ease of use equally influences adoption decisions, as technologies perceived as complex or difficult to operate face significant adoption barriers (Yao *et al.*, 2025); the relationship between ease of use and adoption is often mediated through perceived usefulness, where users who find systems easier to use develop stronger beliefs about their usefulness (Hoonsopon *et al.*, 2025). In Ethiopian healthcare contexts, perceived ease of use has been identified as a significant predictor of digital health adoption implying how technologies must be designed to suit local user capabilities and contexts (Arega & Sharma, 2024).

Trust and privacy concerns represent psychological factors with profound influence on technology adoption in healthcare. Patient trust in healthcare providers, the digital platform and the security of personal health information significantly influences

intentions to adopt telemedicine and remote healthcare services (Ouimet *et al.*, 2020). Privacy concerns, significantly shape adoption decisions, with individuals balancing perceived benefits against perceived risks to data confidentiality and personal health information protection (He & Wang, 2025); In healthcare contexts, where sensitive personal information is exchanged, trust is very important factor (Bahari *et al.*, 2024).

Perceived cost and affordability represent key practical considerations influencing technology adoption (Lam *et al.*, 2026). Financial barriers including both direct costs of services and indirect costs (equipment, internet access) significantly influence adoption decisions, especially among lower-income populations (Alfian *et al.*, 2025); In developing country contexts, affordability is the strongest predictor of adoption intention, stronger than perceived usefulness or ease of use (Lam *et al.*, 2026).

In low- and middle-income countries, including Ethiopia, telepharmacy adoption faces several challenges with healthcare professional shortages and geographic barriers (Andanalusia *et al.*, 2025). Infrastructural limitations, such as unreliable internet connectivity, insufficient ICT systems and a lack of digital health infrastructure, impede effective adoption; organizational barriers, including limited managerial support, inadequate training programs and the absence of standardized operational guidelines are the main challenges affecting adoption (Assefa *et al.*, 2022; Tsegaye & Tadesse, 2022).

Ethiopia has showed significant commitment to digital health strengthening. The national governance and institutional leadership derived digital transformation between 2016 and 2025 (Biru *et al.*, 2025). In Ethiopia, digital health is increasingly emphasized within national health sector transformation efforts. However, telepharmacy remains underutilized in public hospitals in Addis Ababa. Research has extensively examined healthcare provider and organizational perspectives on telemedicine and eHealth adoption. But, the patient perspective, especially regarding pharmaceutical services is not studied in developing country contexts (Alanzi *et al.*, 2024). Even though, patients' intentions to use telepharmacy services is key determinant of service sustainability, few studies have investigated patient behavioral intentions toward telepharmacy. This is especially common in resource-limited settings where both technological and contextual barriers exist (Alfian *et al.*, 2025).

Public hospitals in Addis Ababa represent key service delivery points where significant patient volumes could benefit from improved pharmaceutical access through

telepharmacy (Bekele *et al.*, 2024). In Ethiopia, where geographical challenges, healthcare professional shortages and infrastructure limitations are common, telepharmacy can extend pharmaceutical services to patients who face barriers to accessing in-person pharmacy consultations (Biru *et al.*, 2025). However, successful implementation requires detailed understanding of the multiple factors influencing patient adoption decisions across technological, psychological, organizational and contextual aspects.

1.2 Statement of the Problem

The healthcare system of Ethiopia continues to face significant challenges in pharmaceutical service delivery and the fact that a doctor-to-patient ratio of 0.003 and limited distribution of healthcare professionals across the country, has caused many patients especially in rural and underserved areas experience barriers to accessing quality pharmaceutical care (Chereka *et al.*, 2024). Even within urban centres like Addis Ababa, public hospital pharmacies face challenges. This include long patient waiting times, limited consultation opportunities with pharmacists and difficulty in providing patient-centered medication management services (Bekele *et al.*, 2024). These structural limitations create opportunities for technology-enabled pharmaceutical services such as telepharmacy.

Telepharmacy improve access to pharmaceutical services, reduce medication errors and enhance operational efficiency (Bates *et al.*, 2018; Aloma *et al.*, 2021); despite the promising potential of telepharmacy services and the increasing adoption of digital health technologies in Ethiopia, the actual implementation and scaling of pharmaceutical care through remote technologies is limited (Biru *et al.*, 2025). Public hospitals in Addis Ababa, its adoption remains limited, with conventional face-to-face service delivery which contributes to long patient waiting times, increased workload for healthcare professionals and restricted access to timely medication.

Evidence from telemedicine adoption studies in Africa and Asia confirms that multiple factors operating at individual, technological and organizational levels influence adoption intentions (Yao *et al.*, 2025). Additionally, studies consistently show that privacy concerns and perceived risks to data security significantly influence adoption (He & Wang, 2025). In the Ethiopian context, research has documented healthcare provider attitudes toward

telemedicine, digital literacy levels and organizational readiness barriers (Bekele *et al.*, 2024; Chereka *et al.*, 2024; Kasaye *et al.*, 2024); However, these studies have primarily focused on healthcare provider perspectives rather than patient intentions to use services.

Therefore, this study aims to address these key gaps by investigating the determinants of patients' intentions to adopt telepharmacy services in public hospitals in Addis Ababa, Ethiopia. The study applies the Technology Acceptance Model framework that incorporate context-specific variables including perceived cost and trust/privacy concerns. This research will provide empirical evidence regarding the relative importance of multiple factors in shaping patient adoption intentions toward telepharmacy. The identification of key determinants will enable healthcare administrators and policymakers to design telepharmacy services that address the concerns and preferences of the patient populations they serve.

1.3 Research Questions

1. How does perceived usefulness influence patients' intention to adopt telepharmacy services in public hospitals in Addis Ababa?
2. How does perceived ease of use affect patients' intention to adopt telepharmacy services in public hospitals in Addis Ababa?
3. What is the effect of perceived cost on patients' intention to adopt telepharmacy services in public hospitals in Addis Ababa?
4. How does trust in telepharmacy services affect patients' intention to adopt these services in public hospitals?
5. To what extent does the perception of privacy regarding telepharmacy services influence patients' intention to adopt these services in public hospitals?

1.4 Objectives of the Study

1.4.1 General Objective

To assess the determinants of patients' intention to adopt telepharmacy services in public hospitals in Addis Ababa, Ethiopia.

1.4.2 Specific Objectives

1. To examine the effect of perceived usefulness on patients' intention to adopt telepharmacy services in public hospitals.
2. To assess the effect of perceived ease of use on patients' intention to adopt telepharmacy services.
3. To determine the effect of perceived cost on patients' intention to adopt telepharmacy services in public hospitals.
4. To examine the effect of trust in telepharmacy services on patients' intention to adopt these services.
5. To evaluate the effect of perceived privacy of telepharmacy services on patients' intention to adopt these services in public hospitals.

1.5 Significance of the Study

The significance of this study extends across various stakeholders in the healthcare ecosystem; for healthcare providers, including pharmacists and hospital administrators, the findings of this study will give understandings about the factors that influence patients' intentions to adopt telepharmacy services. Patients also benefit from this study; it helps them to make informed decisions about their healthcare options; increased awareness of the benefits and ease of use of telepharmacy services can lead to higher adoption rates resulting in greater accessibility to medications and healthcare advice.

For policymakers, the findings will provide key information to guide the development of regulations and policies related to telepharmacy in Ethiopia. Understanding the perception patients and concerns regarding these services will help policy makers create more supportive environment for their implementation. This can lead to improved access to medication and healthcare services in underserved areas. The academic and research community will also find this study relevant because it will contributes to the growing body of knowledge on telehealth and telepharmacy. The findings can serve as basis for further research in related fields and it will encourage more studies that explore the impact of technology on healthcare delivery. In addition, this research may inspire future studies that assess the long-term effects of telepharmacy adoption on health outcomes and patient satisfaction.

Technology developers and companies involved in creating telepharmacy platforms will benefit from this study as they can understand the specific needs and concerns of patients; they will use this information guide the design and functionality of telepharmacy systems to make it user-friendly, secure and aligned with patient expectations. This can lead to the development of more effective and widely accepted telepharmacy solutions. It also encourages innovation in healthcare technology.

1.6 Scope of the Study

1.6.1 Conceptual Scope

This study focuses on key concepts related to the adoption of telepharmacy services. It includes perceived usefulness, perceived ease of use, perceived cost, trust and perceived privacy. These constructs are grounded in established theories of technology acceptance and behavioral intention, such as the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT) which are widely used in healthcare technology adoption research (Davis, 1989; Venkatesh *et al.*, 2003; FMoH, 2021). The research investigated how these factors interact and influence patients' intentions to utilize telepharmacy services.

1.6.2 Geographical Scope

The study was geographically confined to selected public hospitals in Addis Ababa, Ethiopia. This area was purposively selected for its high concentration of public hospitals, relatively advanced ICT infrastructure. It also includes a diverse population with varying levels of access to healthcare and technology making it ideal for this study. This geographical focus align with HSTP II priorities that emphasize urban public hospitals as strategic entry points for scaling up digital health innovations before national expansion (FMoH, 2021).

1.6.3 Methodological Scope

Methodologically, the study has employed mixed design that include both descriptive and explanatory research design with quantitative research approach. A survey was

administered to a representative sample of patients in public hospitals to quantitatively assess their perceptions and intentions regarding telepharmacy services.

1.7 Operational Definitions of Key Terms

Telepharmacy Services: The provision of pharmaceutical care including medication counselling, prescription verification, drug therapy management and medication therapy monitoring through telecommunications technology and digital platforms without face-to-face interaction between patient and pharmacist (Andanalusia *et al.*, 2025).

Perceived Usefulness: The degree to which patients believe that using telepharmacy services would improve their ability to manage medications, access pharmaceutical expertise and achieve better health outcomes (Mika & Sikirica, 2024).

Perceived Ease of Use: The extent to which patients believe that using telepharmacy services would be effortless; including ease of technology navigation, understanding of processes and minimal complexity in accessing and using the service (Mika & Sikirica, 2024).

Perceived Cost: Patient perception of the financial burden associated with telepharmacy services. This includes direct costs (service fees), indirect costs (internet data, devices) and comparative affordability relative to in-person pharmacy consultation (Lam *et al.*, 2026).

Trust: The degree to which patients have confidence in the reliability, competence and integrity of the telepharmacy service provider. It is a belief that the pharmacist will provide safe, accurate and appropriate pharmaceutical care online (Bahari *et al.*, 2024).

Perceived Privacy: Patient perception that their personal health information and sensitive medication-related data will be protected from unauthorized access and maintained confidentially during the use of telepharmacy services (He & Wang, 2025).

Behavioral Intention to Adopt: The patient's stated willingness and plan to use telepharmacy services for obtaining pharmaceutical care in the future (Lee *et al.*, 2025).

1.8 Organization of the Study

The study was organized into five chapters. Chapter One presents the introduction, including background, problem statement, objectives, research questions, significance and scope. Chapter Two reviews the relevant theoretical and empirical literature. Chapter Three describes the research methodology. Chapter Four presents the data analysis and results. Chapter Five discusses the findings, conclusions and recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter provides a literature review on the theoretical frameworks, conceptual constructs and empirical evidence relevant to technology adoption in healthcare settings. Specifically, it addresses five key independent variables (perceived usefulness, perceived ease of use, perceived cost, trust and perceived privacy) and their relationships with behavioral intention of patients to adopt telepharmacy services. The chapter is organized into four main sections: conceptual review, theoretical review and empirical review and the conceptual framework and hypothesis developed for this study.

2.2 Concept and Definitions

2.2.1 Concept of Telepharmacy

Telepharmacy refers to the provision of pharmaceutical care services via telecommunications and information technologies, enabling pharmacists and other healthcare professionals to deliver services remotely. These services include prescription review and verification, medication dispensing supervision, patient counseling, drug therapy monitoring and the provision of drug information. Telepharmacy is considered a key component of telemedicine and digital health strategies to improve healthcare accessibility, efficiency and quality, particularly in settings with limited pharmaceutical workforces or geographic barriers (WHO, 2022).

Telepharmacy is an online platform used to provide pharmaceutical services in the modern era. It represents a subset of telemedicine in which pharmacies use telecommunication technology to provide patient care (Sulistyaningrum *et al.*, 2023a). The concept of telepharmacy has evolved significantly, particularly during the COVID-19 pandemic. During this time healthcare systems worldwide were forced to rapidly transition to remote service delivery models. Telepharmacy can improve pharmaceutical care service delivery by reducing medication errors, improving access to health professionals and facilities in remote and rural areas and minimizing adverse drug events (Tegegne *et al.*, 2023).

Components and models of telepharmacy service delivery vary considerably across different healthcare contexts; including teleconsultation, telecoaching, teledermatology, televisit, mobile applications and social media platforms (Jahromi & Ayatollahi, 2022). In public hospitals, telepharmacy represents an innovative model that can provide a metropolitan hospital area with virtual pharmacy services. A virtual clinical pharmacy service model showd high utilization, with 535 medication reviews conducted for 225 patients and identification of 151 medication-related issues during a nine-week period (Chambers *et al.*, 2023). The global context of telepharmacy implementation shows considerable variation across countries; In resource-constrained settings like many African countries, telepharmacy addresses key gaps in pharmaceutical care access caused by geographic, economic and infrastructural challenges (Cen *et al.*, 2022).

Adoption of telepharmacy can also be analyzed as an internal marketing challenge. Hospital management must influence employees' attitudes and engagement through training, communication and incentives to ensure successful service diffusion (Kotler & Keller, 2016).

2.2.2 Patients' Intention to Adopt Technology

Behavioral intention refers to an individual's willingness or readiness to perform a specific behavior. In healthcare settings, patients' behavioral intention is essential for understanding whether they will actually adopt new technologies once they are implemented (Vaidhyam & Huang, 2023).

Intention to use technology significantly predicts actual usage behavior and understanding the factors that drive this intention is important for healthcare organizations planning to implement telepharmacy services (Thanthrige *et al.*, 2024). Patient acceptance and

adoption of digital health technologies directly influence the success or failure of implementation efforts in healthcare systems; research has consistently shown that patients' behavioral intention to use a technology is determined by multiple factors including perceived usefulness, perceived ease of use, social influences and facilitating conditions (Vegi & Lind, 2025).

2.3 Theoretical Review

2.3.1 Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM), developed by Davis (1989), is one of the most widely used theories to explain users' acceptance of information systems. TAM states that perceived usefulness (the extent to which a person believes that using a technology enhances job performance) and perceived ease of use (the extent to which a person believes that using a technology requires minimal effort) directly influence attitudes toward technology adoption behavior.

In telepharmacy context, perceived usefulness refers to healthcare professionals' belief that telepharmacy enhances job performance, improves patient safety and increases service efficiency and perceived ease of use relates to the degree to which telepharmacy systems are free of effort and easy to learn. Empirical studies consistently show that perceived usefulness is a stronger predictor of adoption than perceived ease of use in healthcare settings (Davis, 1989; Venkatesh & Davis, 2000).

Numerous studies have applied TAM to examine healthcare technology adoption, with TAM constructs consistently showing significant relationships with intention to use various health technologies. For telepharmacy, perceived usefulness and perceived ease of use directly shape patients' intentions to use the telepharmacy service (Sulistyaningrum *et al.*, 2023b).

2.3.2 Unified Theory of Acceptance and Use of Technology (UTAUT)

The Unified Theory of Acceptance and Use of Technology was developed by Venkatesh and colleagues in 2003 as an integration of eight previous technology adoption models and it provides a more comprehensive framework for understanding technology

acceptance (Thanthrige *et al.*, 2024). UTAUT extends TAM by incorporating additional variables and considering moderating effects of user characteristics.

The Unified Theory of Acceptance and Use of Technology (UTAUT) integrate multiple models of technology acceptance. It identifies four core determinants of technology adoption (Venkatesh *et al.*, 2003) include performance expectancy (similar to perceived usefulness in TAM), effort expectancy (similar to perceived ease of use), social influence (the extent to which important others believe the individual should use the technology) and facilitating conditions (the degree to which organizational and technical infrastructure exists to support use of the technology). Behavioral intention and use behavior are the primary outcomes in UTAUT, with behavioral intention directly predicting use behavior and facilitating conditions having a direct effect on use behavior independent of behavioral intention (Kelkay *et al.*, 2024).

The application of UTAUT in healthcare technology adoption has proven highly successful, extending it with health-specific variables such as trust and perceived risk has showd strong predictive power for understanding healthcare technology adoption (Thanthrige *et al.*, 2024). In developing countries, extended versions of UTAUT that incorporate variables such as perceived privacy and perceived cost have been found particularly relevant (Alsahli *et al.*, 2024).

2.3.3 Diffusion of Innovation (DOI) Theory

Diffusion of Innovations (DOI) Theory, formulated by Rogers (2003), explains how new ideas and technologies spread through social systems over time and according to DOI theory, five attributes relative advantage, compatibility, complexity, trial ability and observability influence the rate at which innovations are adopted. Relative advantage refers to the degree to which an innovation is perceived as better than its predecessor; compatibility describes how well the innovation aligns with existing values and practices; complexity concerns the perceived difficulty of understanding and using the innovation; trialability is the extent to which the innovation can be experimented with on a limited basis; and observability pertains to the visibility of the innovation's benefits to others.

Telepharmacy has relative advantage over traditional in-person pharmacy visits in terms of accessibility and convenience. But, it may have lower compatibility with established healthcare practices in many settings. The complexity of telepharmacy systems varies depending on the platform design and user technical skills. And trialability and

observability depend on the extent to which patients have opportunities to learn about and see others using the services successfully (Sulistyaningrum *et al.*, 2023b).

2.4 Empirical Review

2.4.1 Empirical Studies on Perceived Usefulness and Intention

Extensive evidence shows the strong positive relationship between perceived usefulness and patients' intention to adopt healthcare technologies. A meta-analysis of health technology adoption studies found that perceived usefulness is one of the most significant predictors of behavioral intention across diverse technology types and healthcare contexts (Thanthrige *et al.*, 2024). Studies conducted in both developed and developing countries have revealed that; when patients perceive a health technology as providing clear benefits to their healthcare experience or health outcomes, they show much stronger intention to adopt it (Vegi & Lind, 2025).

In developing countries, perceived usefulness has been identified as important factor in telemedicine adoption among health professionals and patients. Studies specifically examining telepharmacy adoption have found that perceived usefulness - the belief that using the service will enable faster medication access, reduce travel time and costs and improve medication adherence - significantly predicts behavioral intention (Sulistyaningrum *et al.*, 2023b). Research in developing countries like Bangladesh and Pakistan has shown that when patients understand the practical benefits of digital health services, adoption rates increase. This implies the importance of effective communication about service benefits (Aji & Ramadani, 2024).

2.4.2 Empirical Studies on Perceived Ease of Use and Intention

The relationship between perceived ease of use and behavioral intention has been consistently showed across numerous studies of healthcare technology adoption. Evidence shows that the effect of ease of use on behavioral intention sometimes operates directly and sometimes operates indirectly through perceived usefulness; studies in healthcare and digital health services have identified specific factors that influence patients' perception of ease of use, include user interface design, length of the registration process, clarity of instructions and availability of technical support (Park *et al.*, 2023).

In telepharmacy services, patients with higher digital literacy perceive these services as easier to use, however, older patients and those with lower education levels may perceive greater difficulty (Jokisch *et al.*, 2022). Research in developing countries has showed the importance of designing telepharmacy systems with user-friendly interfaces and providing training to help patients understand how to access and use these services (Gonalves *et al.*, 2023).

2.4.3 Empirical Studies on Perceived Cost and Intention

Cost-related barriers to digital health adoption represent a significant challenge in developing countries where patients often have limited financial resources. Research has identified multiple ways that perceived cost influences adoption. Direct financial costs such as application fees and medication pricing and indirect costs such as internet data charges and time investment and opportunity costs of using this service instead of alternative healthcare delivery methods (Tsai *et al.*, 2019). studies found that when patients perceive digital health services as more expensive than traditional alternatives, adoption rates decline (Osareme *et al.*, 2023).

Financial accessibility in public healthcare settings is important; many patients using public hospital services have limited incomes and must carefully consider healthcare costs. In Ethiopia and other low-income countries, the affordability of telepharmacy services relative to traditional in-person pharmacy visits influences patient adoption decisions. Some research indicate that subsidizing telepharmacy services or ensuring that prices are comparable to in-person services may be necessary to achieve high adoption rates in resource-constrained public health settings (Farha *et al.*, 2023).

2.4.4 Empirical Studies on Trust, Privacy and Intention

The role of trust in e-health adoption has been extensively documented. Trust is key factor influencing patient willingness to use digital health services. Research has identified that trust operates as both a direct predictor of behavioral intention and as a mediator of other relationships in the adoption process (Liu *et al.*, 2024). Trust in healthcare providers, trust in the technology platform itself and trust that personal data will be protected are all important dimensions of trust that influence adoption (Sun *et al.*, 2023).

Privacy concerns and their impact on patient behaviour represent another important area of empirical research. Concerns about data security, unauthorized access to personal health information reduce their willingness to adopt digital health services (Li *et al.*, 2023). in developing countries, privacy concerns may be particularly important due to weaker regulatory protections and less established data security infrastructure (Alhur, 2024). However, research also show that when healthcare organization communicate their privacy protection measures clearly (Akritidi *et al.*, 2022).

2.4.5 Research Gap

While substantial research exists on technology adoption in healthcare generally and on telemedicine/telehealth specifically, there exists research gaps regarding telepharmacy adoption specifically in public hospitals in Ethiopia. Most research on telepharmacy adoption has been conducted in developed countries or in private healthcare settings, while the specific context of public hospitals in developing countries like Ethiopia has received limited research attention (Cen *et al.*, 2022).

Few researches in Ethiopia have assessed healthcare professionals' attitudes toward telemedicine show moderate acceptance, with 53.42% of health professionals holding positive attitudes toward telemedicine services (Chereka *et al.*, 2024). Others show digital health literacy among Ethiopian health professionals has shown moderate levels, with 56.0% showing high digital health literacy during the COVID-19 pandemic (Kasaye *et al.*, 2024); other study also assessed barriers to technology adoption in Ethiopian healthcare facilities include lack of digital literacy, technical knowledge, inadequate infrastructure including computers and reliable power supply, poor training quality and lack of follow-up support (Bekele *et al.*, 2024).

Even though above research has extensively examined healthcare provider and organizational perspectives on telemedicine and eHealth adoption, the patient perspective, especially regarding pharmaceutical services are overlooked and not studied so far.

2.5 Conceptual Framework

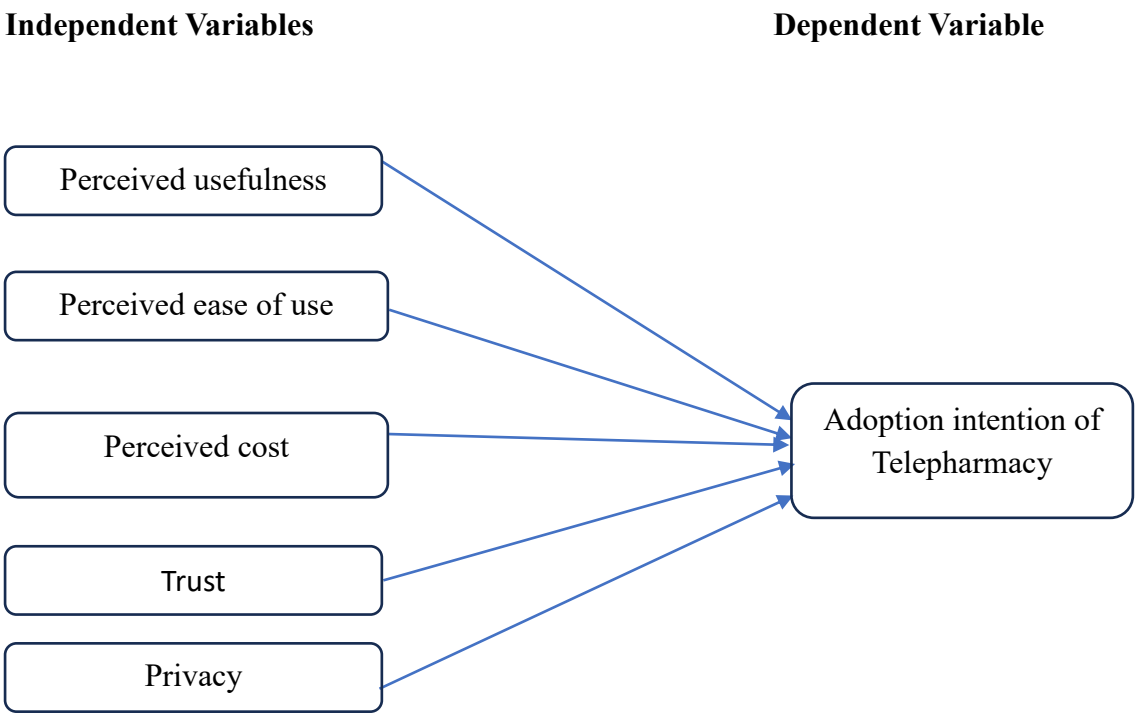


Figure 1: Conceptual Framework Adapted from (Tsai et al., 2019, Akritidi et al., 2022, Park et al., 2023).

2.6 Hypothesis

H_1a: Perceived usefulness significantly influences patients' intention to adopt telepharmacy services in public hospitals.

H_1b: Perceived ease of use has a positive effect on patients' intention to adopt telepharmacy services in public hospitals.

H_1c: Perceived cost negatively impacts patients' intention to adopt telepharmacy services in public hospitals.

H_1d: Trust in telepharmacy services positively affects patients' intention to adopt these services in public hospitals.

H_1e: The perception of privacy regarding telepharmacy services significantly enhances patients' intention to adopt these services in public hospitals.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the research methodology that was used in this study. It describes the research design, study area, target population, sample size and sampling techniques, data sources, data collection instruments, methods of data analysis, validity and reliability and ethical considerations. Methodological choices are guided by the study objectives and the theoretical frameworks.

3.2 Study Area

The study was conducted in selected public hospitals in Addis Ababa, Ethiopia. Addis Ababa was chosen because it hosts a large number of public hospitals, serves a diverse patient population. It also serves as a central hub for implementing digital health initiatives. In addition, public hospitals in the city are prioritized under the Health Sector Transformation Plan II (HSTP II) for piloting and scaling up digital health innovations, including telepharmacy services (FMoH, 2021).

3.3 Research Design and Approach

The study adopted a descriptive and explanatory research design. The descriptive design was used to describe the intention of patients to adopt telepharmacy. It helps to understand the trends in the data to collect the perception of the respondents. On the other hand, the explanatory design was used to examine relationships among the independent (perceived uselfulness, ease of use, cost, trust and privacy) and dependent variables (intention of telepharmacy adoption). This design helped to general the results to the total population using inferential analysis.

This study employed a quantitative research approach. The quantitative approach enables objective measurement of variables and statistical testing of relationships between independent and dependent variables. This approach is appropriate for technology adoption studies grounded in models such as the Technology Acceptance Model (TAM)

and the Unified Theory of Acceptance and Use of Technology (UTAUT) (Davis, 1989; Venkatesh *et al.*, 2003).

3.4 Target Population

The study's target population includes all patients admitted in the 3 public hospitals in Addis Ababa. This study employed purposive sampling to select Tikur Anbessa Specialized Hospital, Saint Paul's Hospital Millennium Medical College and Menelik II Specialized Hospital. These hospitals are selected because they are among the largest and leading public referral hospitals in Addis Ababa, serving a high and diverse patient population. As top and teaching hospitals with relatively better digital health infrastructure and exposure to telehealth initiatives, they provide an appropriate context for assessing patients' intention to adopt telepharmacy services.

3.5 Sample Size Determination

Since the total number of patients in the selected hospitals is infinite the study has employed Cochran's (1977) sample size determination formula. Using a confidence level of 95% and a margin of error of 5%, the following parameters have been applied:

Confidence Level (Z): 1.96

Estimated Proportion (p): 0.5 (to ensure maximum variability)

Margin of Error (e): 0.05

$$n = \frac{(Z\alpha/2)2\ p\ (1-p)}{e^2}$$

$$n = \frac{(1.96)2 * 0.5(1-0.5)}{(0.05)^2} = 384$$

Accordingly, a total of 384 users were be selected. The total sample to each of the selected public hospital was disproportionally be allocated. Accordingly, a total of 128 patients were selected from each hospital.

3.6 Sampling Technique

A multistage sampling approach was used. Initially, public hospitals in Addis Ababa were purposively selected based on service volume and importance to telepharmacy efforts. Next, the patients in these hospitals were randomly selected. This method gives each patient equal chance of being included and avoiding bias.

3.7 Types and Sources of Data

This study relied primarily on primary data sources, which are considered most appropriate for achieving the research objectives. The primary data were collected using survey questionnaire administered to patients of the selected public hospitals.

3.8 Data Collection Instruments

The primary data for this study were collected using structured, self-administered questionnaire. A five-point Likert Scale Questionnaire was used to collect the data. The questionnaire have different sections including the demographic sections, predictor variables section and dependent variable section. The respondents were asked to express their agreement for each item through the options ranging from strongly disagree to strongly agree. This helped to easily capture the perception of the patients about their intention to adopt tele pharmacy and associated determining factors. The questionnaire was developed through a thorough review of the tele pharmacy and technology adoption literature. It was grounded in the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT).

3.9 Methods of Data Analysis

Completed questionnaires were entered into Statistical Package for Social Sciences (SPSS), version 27. Both descriptive and inferential analysis were used analyse the data; descriptive statistics were used to summarize and describe the characteristics of respondents and the main study variables. These include frequencies and percentages,

mean and standard deviation. Inferential statistical techniques such as correlation and multiple linear regression were used to examine the strength and direction of relationships between independent variables and tele pharmacy adoption. Multiple regression analysis was conducted to assess the combined and individual effects of technological, organizational and individual factors on intention of tele pharmacy adoption. All statistical tests were conducted at a 95% confidence level ($P<0.05$) considered statistically significant.

The econometric model is specified as:

$$INT = \beta_0 + \beta_1 PU + \beta_2 PEOU + \beta_3 PC + \beta_4 TR + \beta_5 PP + \varepsilon$$

Where:

INT= Patients' intention to adopt telepharmacy services

PU= Perceived usefulness

$PEOU$= Perceived ease of use

PC= Perceived cost

TR= Trust

PP= Perceived privacy

β_0= Intercept (constant term)

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$= Regression coefficients of the independent variables

ε= Error term

The model assumes a linear relationship between the independent variables and patients' intention; Each coefficient (β) represents the expected change in patients' intention to

adopt telepharmacy services for a one-unit change in the corresponding independent variable, holding other variables constant.

3.10 Validity and Reliability

3.10.1 Validity

Validity refers to the extent to which the research instrument accurately measures what it is intended to measure.

Content validity was ensured by developing the questionnaire based on an extensive review of relevant literature and established technology adoption models, particularly the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT). In addition, the questionnaire was reviewed by subject matter experts especially by research supervisor.

In addition, pilot test was conducted on 5% of the respondents to test the clarity and relevance of the questionnaire. Following the findings of the pilot test wordings, sentence structure or other corrections were made to add the clarity and validity of the items.

3.10.2 Reliability

Reliability refers to the consistency and stability of the measurement instrument. The questionnaire's internal consistency was assessed using Cronbach's alpha. A Cronbach's alpha value of 0.70 or higher will be considered acceptable, indicating that the items measuring each construct are sufficiently correlated and reliable. This study was also used Cronbach's alpha to test the reliability of the items and the value of 0.7 and above was considered acceptable. Accordingly, the Cronbach's alpha results for this study are provided in the table below:

Table 1: Reliability test

Variables	**Reliability Statistics**	
	Cronbach's Alpha	N of Items
Perceived Usefulness	0.885	5

Perceived Ease of Use	0.796	5
Perceived Cost	0.782	5
Trust in Telepharmacy Services	0.859	5
Perceived Privacy	0.881	4
Intention to Adopt Telepharmacy Services	0.843	5

3.11 Ethical Considerations

This study will be conducted in accordance with research ethics. Permission will be asked from the respondents to include them in the survey. The respondents will be informed of a confidentiality statement, the purpose of this study. Information provided by participants and respondents will not be used for any other purpose. And they will be given the write to withdraw from the study at any time without any consequence.

Chapter Four

Results and Discussion

4.1. Introduction

This chapter presents and discusses the analysis results of the data collected from the selected respondents selected from the public hospitals in Addis Ababa. The chapter starts with describing the respondents' demographic information, then it presents the descriptive analysis results of the data and then it proceeds to the inferential statistics including the correlation and regression results. Finally the chapter discuss the current findings comparing and contrasting with previous researches in the related topic. A total of 384 questionnaires were distributed from which 361 were completed and returned resulting in the response rate of 94%. This high response rate ensures the reliability of the analysis results.

4.2. Demographic Information of the Respondents

The survey results show that 25.8% of the respondents are in the 26 to 35 years of age group, those in respondents who are in the 36 to 45 years age group represents 25.5% of the respondents, 22.2% fall within the 46 to 55 years range and 13.6% are aged 56 and above. Regarding gender, male and female respondents are represented with nearly equal percentage, 49.3% of participants were male and 50.7% were female.

Majority, 52.9%, are married. Single respondents make up 21.6% of the sample, divorced individuals account for 13.6% and, 11.9% of the respondents are widowed. The education level of the participants shows that 8.3% have completed primary school, 11.6% have finished secondary school. About 16.9% hold a diploma and 40.2% have attained an undergraduate degree. A total of 23% of respondents have pursued postgraduate education. This educational background shows that the respondents are likely to have better understanding of healthcare services and may be more receptive to adopting innovative solutions like telepharmacy.

The data shows varied patterns of how often respondents visit the hospital ; approximately 8.3% of the participants are visiting for the first time. In contrast, 24.9% visit the hospital 1-2 times per year, 33.8% report visiting 3-6 times a year. Additionally, 24.7% of respondents visit monthly and another 8.3% visit on a weekly basis showing that many respondents are regular users of healthcare services. This may influence their perception and intention to adopt telepharmacy. The duration of healthcare service usage among participants show that about 19.4% have been using healthcare services for less than one year. The largest group with 27.4%, has utilized healthcare services for 3-5 years, 26.9% have been using these services for 1-3 years and 26.3% have been engaged with healthcare services for more than five years. This varying range of experiences shows that respondents have varying degrees of familiarity and comfort with healthcare services, which may impact their willingness to adopt telepharmacy solutions.

Table 2: Demographic Information

		Frequency	Percent
Age range	18-25 years	47	13
	26-35 years	93	25.8
	36-45 years	92	25.5
	46-55 years	80	22.2
	56 and above	49	13.6
Gender	Male	178	49.3
	Female	183	50.7
Marital status	Single	78	21.6
	Married	191	52.9
	Divorced	49	13.6
	Widowed	43	11.9
Education level	Primary school	30	8.3
	Secondary school	42	11.6

	Diploma	61	16.9
	Undergraduate	145	40.2
	Postgraduate	83	23
Education level	Primary school	30	8.3
	Secondary school	42	11.6
	Diploma	61	16.9
	Undergraduate	145	40.2
	Postgraduate	83	23
How often do you visit this hospital?	First time	30	8.3
	1-2 times/year	90	24.9
	3-6 times/year	122	33.8
	Monthly	89	24.7
	Weekly	30	8.3
How long have you been using healthcare services?	Less than 1 year	70	19.4
	1-3 years	97	26.9
	3-5 years	99	27.4
	More than years	95	26.3
	Total	361	100

4.3. Descriptive Analysis

4.3.1. Perceived Usefulness

The survey results show that respondents have positive perception about telepharmacy services toward their effectiveness and convenience. When asked whether using telepharmacy services would help manage medications more effectively, a combined total of 83.4% of respondents (agreed = 46%, strongly agreed =37.4%); only 5.8% expressed disagreement (strongly disagreeing = 1.9%, disagreeing =3.9%. The mean response also

shows that majority believe telepharmacy can enhance their medication management (mean = 4.13, SD = 0.893). Similarly, a total of 86.4% of respondents agreed that telepharmacy services would save them time in obtaining medications and pharmacy consultations (mean = 4.13, SD = 0.769). This high level of agreement indicates that participants see telepharmacy as a time-efficient solution for their pharmaceutical needs.

Respondents (89.8%) also expressed confidence that telepharmacy would improve the quality of pharmaceutical care they receive (mean = 4.26, SD = 0.738) indicating the strong belief in the quality enhancement that telepharmacy can provide. also, the majority (91.4%) of the respondents indicated that using telepharmacy services would enable them to access pharmacy services more conveniently (mean = 4.26, SD = 0.705). Regarding the provision of useful information about medications through telepharmacy services, 88.1% of respondents agreed or strongly agreed (mean = 4.21, SD = 0.796); indicates that participants value the informational support that telepharmacy can offer.

Table 3: Perceived use

		Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	SD
Using telepharmacy services would help me manage my medications more effectively.	N	7	14	39	166	135	4.13	0.893
	%	1.9	3.9	10.8	46	37.4		
Telepharmacy services would save me time in obtaining medications and pharmacy consultations.	N	5	6	38	200	112	4.13	0.769
	%	1.4	1.7	10.5	55.4	31		
Telepharmacy would improve the quality of pharmaceutical care I receive.	N	2	8	27	180	144	4.26	0.738
	%	0.6	2.2	7.5	49.9	39.9		
Using telepharmacy services would enable me to access pharmacy services more conveniently.	N	0	12	19	194	136	4.26	0.705
	%	0	3.3	5.3	53.7	37.7		
Telepharmacy services would	N	3	13	27	180	138	4.21	0.796

provide me with useful information about my medications.	%	0.8	3.6	7.5	49.9	38.2		

4.3.2. Perceived Ease of Use

In contrast to the perception of the perceived use, the results regarding the perceived ease of use of telepharmacy services indicate disagreement among respondents. A total of 70.6% of respondents (Strongly disagreeing = 31.3%, disagree = 39.3%) disagreed when asked whether learning how to use telepharmacy services would be easy (mean = 2.1, SD = 1.004). Only 10% generally agreed showing that many respondents feel worried about the ease of learning to use these services, 76.4% of respondents indicating they would find it difficult to navigate the system (mean = 1.96, SD = 0.917). This high percentage of disagreement indicates concerns about the user-friendliness of the telepharmacy interface. This may discourage potential users from utilizing these services.

Respondents also expressed doubts about the straightforwardness of obtaining medications through telepharmacy; 79.8% of participants disagreed with the statement that the process would be straightforward (mean = 1.95, SD = 0.885). This indicates the perception that the telepharmacy process may be complicated or unclear, which can contribute to the hesitance in adopting these services. Similarly, when asked about the ease of interacting with pharmacists through telepharmacy services, 78.4% of respondents expressed lack of confidence in the communication aspect of telepharmacy. However, 36.6% of the respondents believe that they will gradually become skilled at using telepharmacy services, (mean = 2.70, SD = 1.377). This shows that though the respondents worry that the about the ease of use of the telepharmacy they hope to become friendly through time.

Table 4: Perceived ease of use

		Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	SD
Learning how to use	N	113	142	70	28	8	2.1	1.004

telepharmacy services would be easy for me.	%	31.3	39.3	19.4	7.8	2.2		
I would find it easy to navigate the telepharmacy platform or application.	N	125	151	64	15	6	1.96	0.917
	%	34.6	41.8	17.7	4.2	1.7		
The process of obtaining medications through telepharmacy would be straightforward.	N	118	170	54	12	7	1.95	0.885
	%	32.7	47.1	15	3.3	1.9		
I would find it easy to interact with the pharmacist through telepharmacy services.	N	120	163	56	15	7	1.96	0.911
	%	33.2	45.2	15.5	4.2	1.9		
It would be easy for me to become skilled at using telepharmacy services.	N	91	100	38	92	40	2.7	1.377
	%	25.2	27.7	10.5	25.5	11.1		

4.3.3. Perceived Cost

Majority of the respondents believe that the cost of using telepharmacy services would be affordable (78.6%) but 6.3% have worries that the service may be costly (mean = 4.02, SD = 0.87); the respondents are optimistic about the affordability of telepharmacy and this increases its adoption. Compared to in-person pharmacy visits 79.8% of respondents believe that telepharmacy services would cost less (mean = 4.10, SD = 0.836). This indicates that participants perceive telepharmacy as a cost-effective alternative to conventional pharmacy visits.

In addition, 81.4% of respondents indicated they would be willing to pay for telepharmacy services given the convenience provided (mean = 4.03, SD = 0.819) showing strong willingness to invest in telepharmacy services. Also 80.9% of participants

believe that telepharmacy would help them save money on transportation costs to the pharmacy (mean = 4.08, SD = 0.806), with only 3.6% disagreed. Regarding the transparency and fairness of the pricing structure for telepharmacy services, 82.5% of respondents (mean = 4.06, SD = 0.743) believe in the integrity of the pricing model associated with telepharmacy. This is essential for building trust among users.

Table 5: Perceived cost

		Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	SD
The cost of using telepharmacy services would be affordable for me.	N	3	20	54	172	112	4.02	0.87
	%	0.8	5.5	15	47.6	31		
Telepharmacy services would cost less than traditional in-person pharmacy visits.	N	3	11	59	163	125	4.1	0.836
	%	0.8	3	16.3	45.2	34.6		
I would be willing to pay for telepharmacy services given the convenience provided.	N	6	9	52	194	100	4.03	0.819
	%	1.7	2.5	14.4	53.7	27.7		
Telepharmacy would help me save money on transportation costs to the pharmacy.	N	3	10	56	179	113	4.08	0.806
	%	0.8	2.8	15.5	49.6	31.3		
The pricing structure of telepharmacy services would be transparent and fair.	N	0	13	50	200	98	4.06	0.743
	%	0	3.6	13.9	55.4	27.1		

4.3.4. Trust in Telepharmacy Services

Respondents show generally positive perception concerning trust; majority of respondents (76.4%) expressed that they would trust the pharmacists providing services through telepharmacy as agreeing or strongly agreeing (mean = 3.96, SD= 0.977) with 9.4% disagreement indicating high level of trust. This is key for the successful adoption of telepharmacy.

The reliability and dependability of telepharmacy services was also confirmed by 78.4% of respondents (mean = 3.99, SD = 0.879). this indicates that participants perceive telepharmacy as a trustworthy option for obtaining pharmaceutical care. Respondents also expressed confidence in the honesty and accuracy of information provided through the hospital's telepharmacy platform. A total of 84.8% agreeing or strongly agreeing (mean =4.16, SD= 0.784) with only 3.6% disagreement.

In addition, a total of 82.8% of participants indicated that they would trust the quality of medications dispensed through telepharmacy (mean = 4.13, SD = 0.799). Confidence in medication quality is essential for patients considering telepharmacy as good option for their healthcare needs. Also, 83.1% of respondents have strong belief in the competence of pharmacists providing telepharmacy systems (mean = 4.17, SD = 0.815), they feel assured in the capabilities and professionalism of pharmacists operating within the telepharmacy framework.

Table 6: Trust

		Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	SD
I would trust the pharmacists providing services through telepharmacy.	N	9	25	51	164	112	3.96	0.977
	%	2.5	6.9	14.1	45.4	31		
I believe	N	6	16	56	179	104	3.99	0.87

telepharmacy services would be reliable and dependable.	%	1.7	4.4	15.5	49.6	28.8		9
The hospital's telepharmacy platform would provide honest and accurate information.	N	2	11	42	180	126	4.16	0.784
	%	0.6	3	11.6	49.9	34.9		
I would trust the quality of medications dispensed through telepharmacy.	N	1	14	46	175	125	4.13	0.799
	%	0.3	3.9	12.7	48.5	34.6		
I would feel confident in the competence of pharmacists using telepharmacy systems.	N	1	14	46	161	139	4.17	0.815
	%	0.3	3.9	12.7	44.6	38.5		

4.3.5. Perceived Privacy

The privacy issues is key area where the respondents show concerns as respondents when asked whether their personal health information would be kept private through telepharmacy services 71% of participants expressed disagreement (mean = 2.1, SD = 0.938). It means many individuals feel their sensitive information may be at risk. Respondents also suspect the adequacy of the hospital's protection of their medication history data as a total of 81.7% disagreed with the statement (mean = 1.83, SD = 0.923) showing concerns about the hospital's ability to safeguard important medication information.

Regarding the security of sharing medical information through telepharmacy, 83.7% of respondents expressed disagreement, (mean = 1.88, SD = 0.812). Again, 81.5% of the repondents didn’t believe in the presence of strong security measures on the telepharmacy

platform to prevent unauthorized access (mean = 1.85, SD = 0.863). Only 4.8% agreed, revealing the lack of comfort among patients and the pervasive concern regarding the effectiveness of security protocols in place. This may affect the willingness of patients to adopt telepharmacy services.

Table 7: Perceived Privacy

		Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	SD
My personal health information would be kept private through telepharmacy services.	N	102	154	79	19	7	2.1	0.938
	%	28.3	42.7	21.9	5.3	1.9		
The hospital would adequately protect my medication history data.	N	155	140	44	16	6	1.83	0.923
	%	42.9	38.8	12.2	4.4	1.7		
I would feel secure sharing my medical information through telepharmacy.	N	123	179	42	15	2	1.88	0.812
	%	34.1	49.6	11.6	4.2	0.6		
The telepharmacy platform would have strong security measures to prevent unauthorized access.	N	141	153	51	12	4	1.85	0.863
	%	39.1	42.4	14.1	3.3	1.1		

4.3.6. Intention to Adopt Telepharmacy Services

Regardless their worries about ease of use and privacy of the telepharamacy services, respondents showed high level of adoption intention for this service when it becomes available. A total of 80.3% of the respondents expressed agreement (mean = 4.19, SD = 0.925) showing considerable enthusiasm and readiness among patients to adopt telepharmacy. In addition, 79.7% of respondents reported willingness to recommend

telepharmacy services to other patients (mean = 4.07, SD = 0.938) which shows that respondents not only believe in the value of telepharmacy for themselves but also feel confident enough to recommend these services to their peers.

When considering whether they would make telepharmacy their primary method of obtaining medications, 81.4% of participants agreed (mean = 4.15, SD = 0.862). This reflects strong willingness to shift towards telepharmacy as a primary means of accessing medications. It is already mentioned that respondents have concerns about the ease of use and privacy protection. However, they expressed determination to use telepharmacy services despite any initial challenges as summed total of 82.3% agreeing (mean = 4.17, SD = 0.81) showing their resilience and commitment to overcoming potential barriers in adopting telepharmacy.

Respondents were also asked about whether they consider telepharmacy services a viable option for managing their pharmaceutical needs and a total of 82.5% of respondents agreed (mean = 4.15, SD = 0.877); the agreement indicates the perception of telepharmacy as a legitimate and beneficial approach to pharmaceutical care.

Table 8: Adoption intention

		Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	SD
I plan to adopt telepharmacy services when they become available at this hospital.	N	5	15	51	125	165	4.19	0.925
	%	1.4	4.2	14.1	34.6	45.7		
I would recommend telepharmacy services to other patients.	N	7	19	47	155	133	4.07	0.938
	%	1.9	5.3	13	42.9	36.8		
I am willing to make	N	6	7	54	155	139	4.15	0.86

telepharmacy my primary method of obtaining medications.	%	1.7	1.9	15	42.9	38.5		2
I am determined to use telepharmacy services despite any initial challenges.	N	2	9	53	157	140	4.17	0.81
	%	0.6	2.5	14.7	43.5	38.8		
I consider telepharmacy services as a viable option for managing my pharmaceutical needs.	N	4	16	43	156	142	4.15	0.877
	%	1.1	4.4	11.9	43.2	39.3		

4.4. Inferential Analysis

4.4.1 Correlation Analysis

The correlation results show that there is strong positive correlation between perceived usefulness and the intention to adopt telepharmacy services ($r = 0.585$, $p = 0.000$). As patients perceive telepharmacy services to be more useful, their intention to adopt these services increases. On the other hand, perceived ease of use shows significant negative correlation with the intention to adopt telepharmacy services ($r = -0.607$, $p = 0.000$); this implies that difficulties in navigating or utilizing telepharmacy services may deter patients from adopting them; the negative relationship shows that if patients find the services complex or challenging to use, their intention to adopt will decrease indicating the importance of user-friendly interfaces and support system.

Perceived cost also shows strong positive correlation with the intention to adopt telepharmacy services ($r = 0.592$, $p = 0.000$) showing that if patients perceive telepharmacy services as cost-effective, they are more intention to adopt them. Trust in telepharmacy services is another critical factor positively correlated with the intention to adopt ($r = 0.649$, $p = 0.000$). Higher level of trust in the telepharmacy system correlates

with greater intention to adopt these services. This indicates the necessity of building trust through transparent practices, reliable services and effective communication to encourage patient engagement with telepharmacy. Regarding perceived privacy, it is negatively correlated with the intention to adopt telepharmacy services ($r = -0.614$, $p = 0.000$) indicating that concerns about the privacy of personal health information may hinder intentions of patients to adopt telepharmacy. Addressing privacy concerns and ensuring strong data protection measures are important for increase confidence and encouraging the adoption of telepharmacy services.

Table 9: Correlation results

		Intention to Adopt Telepharmacy Services	Perceived Usefulness	Perceived Ease of Use	Perceived Cost	Trust in Telepharmacy Services	Perceived Privacy
Intention to Adopt Telepharmacy Services	Pearson Correlation	--					
Perceived Usefulness	Pearson Correlation	.585**	--				
	Sig. (2-tailed)	.000					
Perceived Ease of Use	Pearson Correlation	-.607**	-.548**	--			
	Sig. (2-tailed)	.000	.000				
Perceived Cost	Pearson Correlation	.592**	.462**	-.551**	--		
	Sig. (2-tailed)	.000	.000	.000			
Trust in Telepharmacy Services	Pearson Correlation	.649**	.588**	-.540**	.575**	--	
	Sig. (2-tailed)	.000	.000	.000	.000		
Perceived Privacy	Pearson Correlation	-.614**	-.505**	.562**	-.446**	-.544**	--

	Sig. (2-tailed)	.000	.000	.000	.000	.000	
	N	361	361	361	361	361	361

**. Correlation is significant at the 0.01 level (2-tailed).

4.4.2 Regression Analysis

4.4.2.1 Model Assumptions Test

Normality of the Error Term Distribution

Linear regression requires data to be normally distributed. For this study data normality was tested using histogram and the histogram presented below shows that the data is equally distributed without significant skew in both sides.

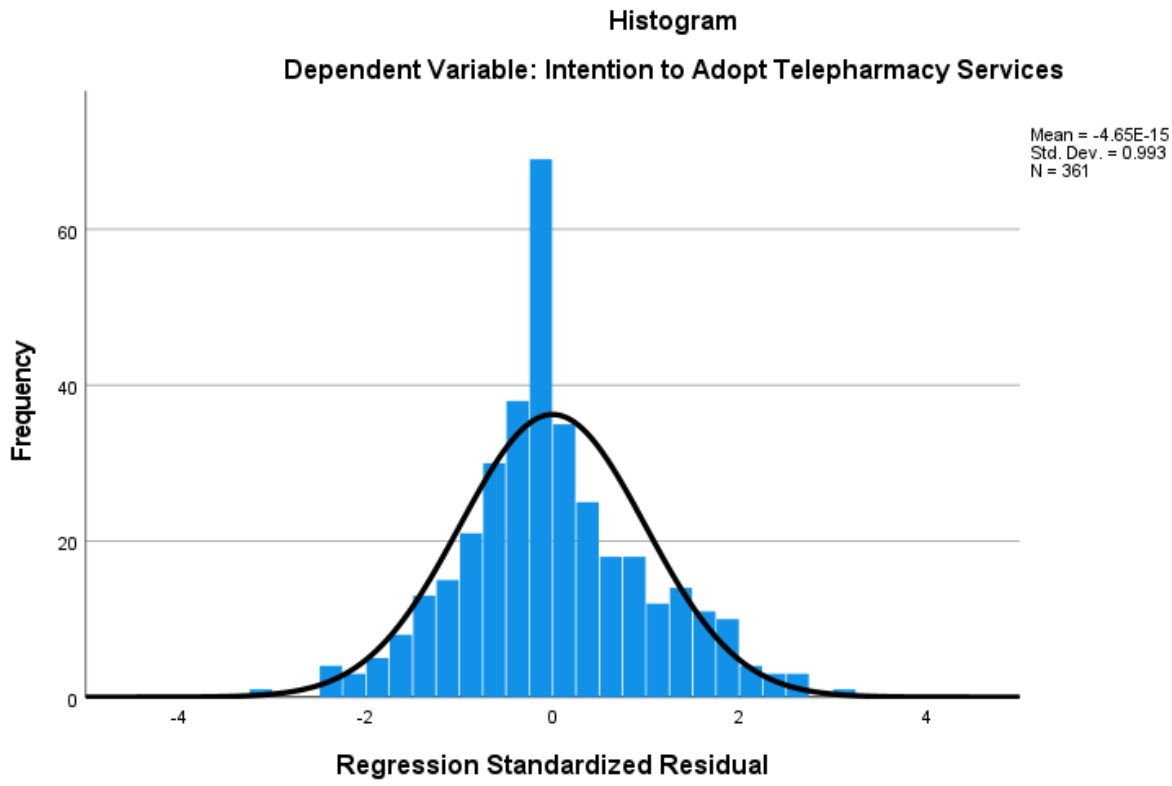


Figure 2: Histogram for Normality Test

Multicollinearity

Another assumption of multiple linear regression is that independent variables shouldn't be multicollinear. For this study multicollinearity was tested using variance inflation factor (VIF) in SPSS 27, which values less than 5 and the tolerance value should be less 1 considered not multicollinear. Accordingly, no multicollinearity problem was detected in the current data. Tolerance values were less than 1 and VIF values were around 1.00 and less than 2.1, indicating no multicollinearity.

Table 10: Multicollinearity test results

Model	Collinearity Statistics	
	Tolerance	**VIF**
Perceived Usefulness	.560	1.785
Perceived Ease of Use	.520	1.924
Perceived Cost	.582	1.719
Trust in Telepharmacy Services	.492	2.034
Perceived Privacy	.584	1.713

Heteroscedasticity

Multiple linear regression assumes that the variance of the error terms (residuals) should be constant (homoscedastic) across all levels of the independent variables. i.e., it shouldn't be heteroscedastic which indicates non constant distribution of the residuals. The Heteroscedastic assumption can easily be checked using scatterplots or residual plots. The scatter plots of standardized residuals versus the fitted values for the regression models were visually inspected for this study in figure 3. showing that the data has no heteroscedasticity problem.

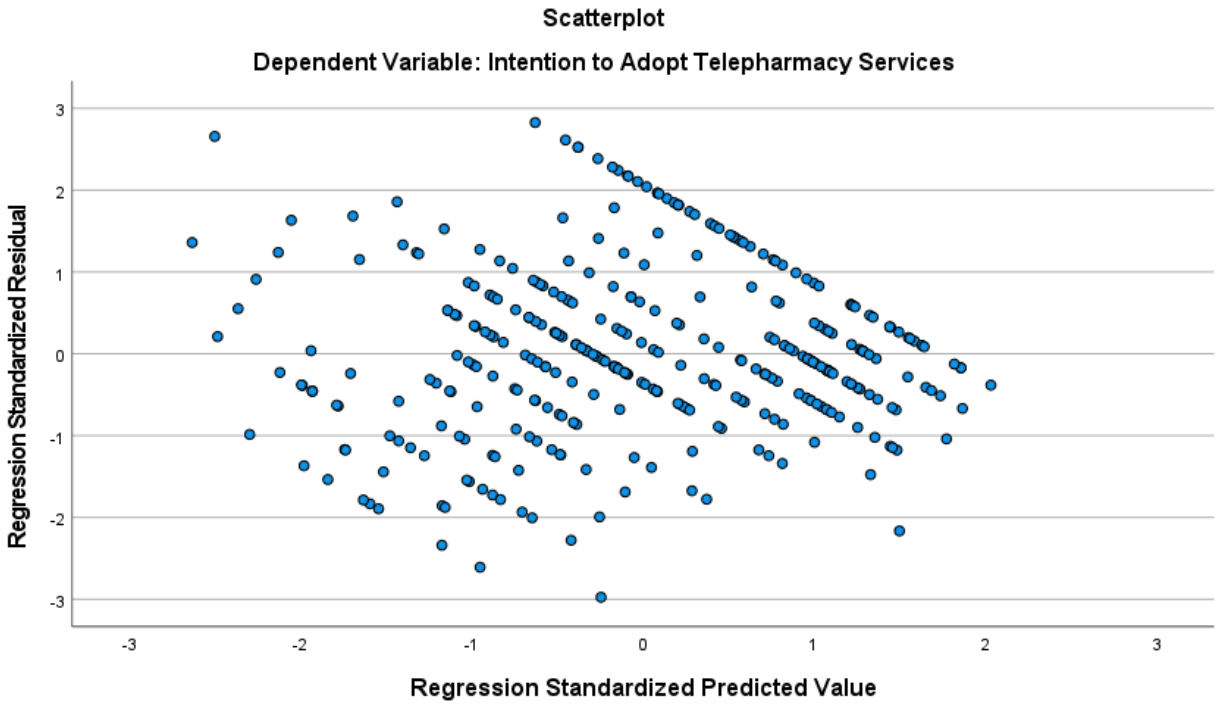


Figure 3: Scatter plot test for Heteroscedastic

Auto-correlation

Autocorrelation occurs when the dependent variable at time t is related to its value at the previous time period. Durbin-Watson is the common test used to detect autocorrelation with value of 2 indicates no autocorrelation, while values 0-2 indicate positive autocorrelation and values 2-4 indicate negative autocorrelation. The acceptable range for no autocorrelation is 1.5<DW<2.5. the Durbin-Watson value in this study is 1.579, which falls in the acceptable range. there is no significant autocorrelation in the residuals, which is favorable for the validity of the regression analysis.

4.4.2.2 Model Results

The regression model results indicates that the predictors collectively explain high effect on the intention to adopt telepharmacy services, with an R^2 value of 0.596. This means that approximately 59.6% of the variability in the intention to adopt telepharmacy can be attributed to these five predictors. The ANOVA results reinforce the significance of the regression model (F= 104.726, p= 0.000) indicates that the model is statistically significant.

Table 11: Regression Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.772[a]	.596	.590	.41216	1.579

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	88.954	5	17.791	104.726	.000[b]
	Residual	60.307	355	.170		
	Total	149.261	360			

The coefficients analysis shows that among the predictors, Trust in telepharmacy services is the most influential predictor of adoption intention (beta = 0.235, p = 0.000). This indicates that higher levels of trust in the telepharmacy system are associated with greater intention to adopt these services. Perceived cost also shows significant positive impact on adoption intentions (beta = 0.196, p = 0.000). This positive impact indicates that if patients perceive telepharmacy services as affordable, their intention to adopt them increases. Perceived usefulness is another important predictor (beta = 0.152, p = 0.001) that positively impact the adoption intention. When patients find telepharmacy services to be beneficial and effective for managing their medications, they are more likely to adopt these services.

On the other hand, perceived privacy has negative impact on adoption intentions (beta = -0.233, p = 0.000). this indicates that concerns about the security of personal health information may deter patients from adopting telepharmacy services. Perceived ease of

use shows negative relationship with adoption intentions (beta = -0.157, p = 0.001) which indicates that difficulties in navigating or utilizing telepharmacy services may hinder patients' intentions to adopt them.

Table 12: Regression coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	2.021	.378		5.348	.000
	Perceived Usefulness	.204	.060	.152	3.370	.001
	Perceived Ease of Use	-.145	.043	-.157	-3.353	.001
	Perceived Cost	.233	.052	.196	4.435	.000
	Trust in Telepharmacy Services	.267	.055	.235	4.885	.000
	Perceived Privacy	-.238	.045	-.233	-5.287	.000

4.5 Discussion

The current findings from the Addis Ababa telepharmacy study shows patients' belief in telepharmacy's effectiveness for medication management. Respondents have strong belief in the effectiveness and convenience of telepharmacy services; the high levels of agreement regarding time savings and the quality of care indicate that telepharmacy is seen as beneficial alternative to traditional pharmacy services, which can significantly influence patients' willingness to adopt these services. This agrees with previous research examining telemedicine acceptance in a Peruvian population found that perceived ease of use had positive and significant effect on perceived usefulness. This derives adoption intentions (Ludeña-Poma *et al.*, 2024). Similarly, study on eye care telemedicine adoption

revealed that perceived usefulness found as significant predictor of intention to use healthcare technology (Tsatsos *et al.*, 2024)ow, however, the current findings show that even more emphasis on usefulness compared to other contexts. In a healthcare professional adoption study in Taiwan, perceived usefulness also served as significant predictor alongside ease of use and social influence (Kung *et al.*, 2024), though the strength of the relationship is high in the current study (Revilla & Prado, 2024).

This study found contradicting results when examining perceived ease of use. Respondents have worried that the platform may not be friendly to them to use. This has negatively affected their intention to use the telepharmacy service. Majority of the respondents expressed doubts about the simplicity of learning to use these services, indicating potential barrier to adoption. Previous study in the ophthalmic telemedicine study conducted in Greece during the COVID-19 pandemic, perceived ease of use did not exhibit significant predictive relationship with use intentions. This indicates that when perceived usefulness is strong, ease of use concerns may not completely prevent adoption (Tsatsos *et al.*, 2024). On the other hand, in the Peruvian telemedicine study, perceived ease of use showed positive and significant effect on perceived usefulness, creating a pathway through which improved interface design could indirectly enhance adoption (Ludeña-Poma *et al.*, 2024). But this study found significant negative correlation between perceived ease of use and adoption intentions, which agrees more closely with research from Taiwan (Kung *et al.*, 2024), where this construct remained important but secondary to usefulness. This shows that in the areas with limited technology familiarity, interface complexity may constitute more barrier than in highly connected regions. The current finding shows that though the patients recognize the usefulness of the telepharmacy, thy cannot entirely disregard interface design (Sekandi *et al.*, 2023).

The findings on perceived cost shows generally positive perception among respondents regarding the affordability of telepharmacy services. Many participants view telepharmacy as a cost-effective alternative to traditional pharmacy visits. The belief that telepharmacy can save money on medication costs and also on transportation expenses reduce financial barriers to healthcare access. A study of telemedicine adoption across rural and remote areas of Bangladesh identified that cost determines the adoption of the

service (Zobair *et al.*, 2021). Also, research on telemedicine adoption in Pakistan revealed that traveling cost represents the most significant negative influence on adoption intention; patients in areas requiring substantial travel more motivated to adopt remote healthcare services (Zhang & Zaman, 2020). However, the Indonesian telemedicine study presents a contrasting finding: price value did not show significant effect on behavioral intention to use telemedicine (Alviani *et al.*, 2023) which may show differences in healthcare pricing structures, patient income levels, or the relative importance of cost compared to other factors. Curent findings show that emphasizing tangible cost savings in promotional efforts could enhance adoption rates, especially important in public hospital settings where patient affordability is a primary concern (Zhang & Zaman, 2020).

The findings regarding trust in telepharmacy services reveal positive perception among respondents. This is important for the successful adoption of these services. The high levels of trust in pharmacists and the reliability of telepharmacy indicate that patients feel confident in the integrity and competence of the services provided, which is essential for patients to feel comfortable engaging with telepharmacy, as it directly impacts their willingness to rely on these services for their healthcare needs. The finding aligns with research showing that trust as prerequisite for healthcare technology adoption. study from Jordan revealed that trust in government and social medi awareness significantly influenced adoption intentions (Al-Ghazo *et al.*, 2024). Other study also found that trust in technology significantly impact adoption (Trkman *et al.*, 2022).

The findings on perceived privacy shows that majority expressed doubts about the adequacy of privacy measures. This indicates that many individuals feel their sensitive information may be at risk. This lack of confidence in privacy protections can create barriers to the adoption of telepharmacy services, as patients are unlikely to engage with system they do not trust to safeguard their data. This findings agrees with comparative finding comes from research on telemedicine adoption in rural Illinois, where privacy protection was significant barrier across all demographic groups examined (Crowe *et al.*, 2024). However, research on telemedicine adoption in Indonesi found that privacy concerns did not show statistically significant effect on behavioral intention (Alviani *et*

al., 2023). On the other hand, study integrating privacy concerns into the Technology Acceptance Model framework revealed that privacy concerns had significant negative impact on behavioral engagement with telemedicine (Dass *et al.*, 2024). The strong negative correlation between privacy concerns and adoption intentions in the current study shows that patients may intellectually recognize telepharmacy's benefits but emotionally hesitating due to dat protection worries. This findings differs from some developed-country findings where privacy concerns, though significant, do not entirely prevent adoption (Crowe *et al.*, 2024). The implication is that in emerging economies with historical data security vulnerabilities, privacy concerns may have more adoption barrier requiring proactive institutional responses (Mustikawati *et al.*, 2024).

Chapter five

Summary, Conclusion and Recommendations

5.1 Summary

This study assessed key determinants of patients intention to adopt telepharmacy using quantitative method. Perceived use of the telepharmacy, perceived ease of use, perceived cost, trust, privacy are the predictor variables examined based on the theoretical and empirical foundations.

Accordingly, respondents show strong positive perceptions regarding telepharmacy's usefulness. A total of 83% agreed that telepharmacy would help manage medications more effectively (mean = 4.13) with 86.4% believing it would save time (mean = 4.13) and nearly 90% expressed confidence that it would improve pharmaceutical care quality (mean = 4.26) and 91.4% valued its convenience (mean = 4.26). In addition, 88.1% appreciated the medication information it would provide (mean = 4.21). The inferential analysis revealed strong positive correlation between perceived usefulness and adoption intention ($r = 0.585$, $p = 0.000$) with perceived usefulness found as significant predictor of adoption (beta = 0.155, $p = 0.000$). This indicates that patients viewing telepharmacy as beneficial and effective are more likely to adopt it.

However, respondents expressed significant concerns about ease of use. 71% disagreed that learning telepharmacy would be easy (mean = 2.1) and 76.4% found navigation difficult (mean = 1.96). similarly, 79.8% believed the medication-obtaining process would be complicated (mean = 1.95) and 78.4% lacked confidence in pharmacist interaction, however, 36.6% believed to be gradually becoming skilled with the system (mean = 2.70). The perceived ease of use showed significant negative correlation with adoption intention ($r = -0.607$, $p = 0.000$) and regression analysis confirming it as a predictor (beta = 0.164, $p = 0.000$). This indicates that user-friendly interfaces and adequate support system are key for mitigating these concerns.

On the other hand, respondents showed positive views about telepharmacy affordability, as 78.6% believed costs would be reasonable (mean = 4.02), 79.8% perceived

telepharmacy as cheaper than in-person visits (mean = 4.10). Strong willingness to pay was evident as 81.4% willing to invest in the service given its convenience (mean = 4.03) and 80.9% recognized potential transportation cost saving (mean = 4.08); in addition, 82.5% trusted the fairness of the pricing structure (mean = 4.06). Perceived cost show strong positive correlation with adoption intention (r = 0.592, p = 0.000), regression analysis showing it significantly predicted adoption (bet = 0.174, p = 0.000), these findings indicate that cost-effectiveness perceptions strongly influence adoption likelihood.

Also, respondents show generally strong trust in telepharmacy services; approximately 76.4% trusted the dispensing pharmacists (mean = 3.96). total of 78.4% perceived the services as reliable and dependable (mean = 3.99). majority of 84.8% believed in the honesty and accuracy of information provided (mean = 4.16) and 82.8% expressed confidence in medication quality (mean = 4.13). In addition, 83.1% trusted pharmacist competence (mean = 4.17). Trust in telepharmacy services showed the strongest positive correlation with adoption intention observed in this study (r = 0.649, p = 0.000). This regression analysis identifying it as the most important predictor after privacy concerns (bet = 0.200, p = 0.000). Building trust through transparent practices and reliable service delivery is essential for encouraging adoption.

Privacy is the primary concern among respondents; about 71% expressed disagreement that personal health information would remain private (mean = 2.1) and 81.7% doubted the hospital's ability to protect medication history dat (mean = 1.83). Regarding information security, 83.7% worried about the safety of sharing medical information (mean = 1.88) and 81.5% lacked confidence in security measures preventing unauthorized access (mean = 1.85). Perceived privacy concerns also shows strong negative correlation with adoption intention (r = -0.614, p = 0.000). Privacy and data protection issues are barrier to adoption indicating strong need for strong security measures and transparent data protection policies.

Despite concerns about ease of use and privacy, respondents expressed high adoption intention (80.3%) (mean = 4.19) and 79.7% would recommend it to others (mean = 4.07). Also, 81.4% indicated they would make telepharmacy their primary medication-

obtaining method (mean = 4.15) and 82.3% showed commitment to using it despite potential barriers (mean = 4.17). In addition, 82.5% viewed telepharmacy as viable option for pharmaceutical care (mean = 4.15), regression analysis revealed that perceived privacy concerns as the strongest predictor of adoption intention (bet = 0.296, p = 0.000), indicating that addressing privacy concerns would significantly enhance patient willingness to adopt telepharmacy services.

5.2 Conclusion

The strong positive perception of telepharmacy's usefulness shows that patients recognize significant value in this technology. It should be noted that perceived usefulnes is powerful driver of adoption. When patients believe service will genuinely improve their healthcare outcomes and save time, they are more likely to adopt it which indicates the importance for healthcare providers and telepharmacy platform developer to clearly communicate and demonstrate the tangible benefits of their services. Despite the high intention to adopt telepharmacy,, the significant concerns about ease of use indicate the gap between desire and usability. Technical complexity can be barrier to adoption, even when users perceive high value in service. This show that developers must prioritize user-friendly interface design and provide strong training and support system. However, the positive view on affordability and cost-effectiveness reveal that price perception significantly influence adoption intention; when services are positioned as cost-effective alternatives to traditional care like savings on transportation and consultation fees patients are more willing to adopt them. This indicates that transparent pricing structure and clear communication about cost advantage relative to conventional method are essential strategies for promoting widespread adoption.

The strong trust respondents placed in telepharmacy services, especially regarding pharmacist competence and medication quality show that trust is fundamental to technology adoption in healthcare. This indicates that building trust through reliable service delivery, transparency and competence of healthcare professional is perhaps more important than technological sophistication. Patients are willing to adopt services when they feel confident in the people behind the technology and believe their care will be of high quality. The high concern about the privacy protection, especially on data protection

measures can severely undermine adoption intention. This indicates that healthcare organization must prioritize strong data security measures and transparent communication about how patient information is protected. Simply having good security is insufficient patients must feel assured and informed about privacy protection for adoption to succeed.

5.3 Recommendations

Based on the findings discussed above, the following recommendations are proposed:

- The majority of respondents recognized that telepharmacy would help manage medications more effectively and believed it would save time. Therefore: Healthcare organizations should prioritize marketing campaigns that emphasize the time-saving and medication management benefits of telepharmacy services.
- Despite high perceived usefulness, many of the respondents disagreed that learning to use telepharmacy would be easy and found platform navigation difficult. Therefore, developers must invest in user-friendly interface design with simplified workflows and intuitive navigation that is accompanied with training programs, including step-by-step video tutorials, live chat support for new users to build confidence and overcome initial usability barriers.
- The majority believed telepharmacy services would be affordable and cheaper than in-person visits. Therefore, healthcare organizations should try to provide the service with the price that meet the patient's expectation. Also, the pricing structures should be transparent and competitive to maintain patient confidence in affordability claims.
- Respondents showed high trust on the telephrmacy service; therefore, organizations should ensure this trust demonstrated in practice through emphasizing the professional credentials and experience of their telepharmacy pharmacists through staff profiles, certifications and patient testimonials.
- This study found the privacy issue the most critical barrier as majority of the respondents expressing concerns about personal health information protection and the security measures. Therefore, healthcare organizations must implement strong cybersecurity protocols and make privacy protection a visible priority. They should provide transparent, easy-to-understand explanations of data

encryption methods, who has access to patient information, regulatory compliance and conduct regular security audits with publicly shared results to build trust and address widespread privacy concerns.

- Regardless the worries about ease of use and privacy, majority of the respondents expressed high adoption intention, organizations should launch telepharmacy services with confidence that patient motivation is strong. However, the implementation efforts should focus on resolving the privacy concerns and the ease-of-use issues.

5.4 Future line of work

Future researches, longitudinal studies tracking actual usage patterns over time to determine whether the high behavioral intentions translate into sustained adoption rates as users gain familiarity with telepharmacy platforms. In addition, qualitative research exploring the psychological mechanisms behind willingness of patients to overlook privacy concerns despite their prevalence could provide deeper understanding about the decision-making processes in healthcare technology adoption; and also, comparative studies across different geographic regions, age groups and socioeconomic statuses would help identify population-specific factors that influence telepharmacy adoption and allow for the development of targeted implementation strategies.

References

Aji, P. T., & Ramadani, L. (2024). Patients acceptance of telemedicine technology: The influence of user behavior and socio-cultural dimensions. Journal of Information System Engineering and Business Intelligence.

Akritidi, D., Gallos, P., Koufi, V., & Malamateniou, F. (2022). Using an extended technology acceptance model to evaluate digital health services. International Conference on Informatics, Management and Technology in Healthcare.

Alanzi, T. M., Alanzi, N., Saadah, A., Almulhim, N. A., Almulhem, J., Alshahrani, R., Farraj, R. A., Ghadeer, F. A., Habib, H., Alqahtani, S., Allehyani, R., Alamoudi, L., & Gasem, S. (2024). Telepharmacy and remote medication management: An empirical study from patients perspectives. Nutrition and Health.

Alfian, S. D., Khoiry, Q. A., Griselda, M., Pradipta, I. S., Nursiswati, N., & Abdulah, R. (2025). Willingness of patients with chronic diseases to use telepharmacy services in bandung city, west java, indonesia. Scientific Reports.

Alhur, A. (2024). Understanding the perspectives of hail city population on the confidentiality and privacy of digital health and medical information. Cureus.

AlQudah, A. A., AlEmran, M., & Shaalan, K. (2021). Technology acceptance in healthcare: A systematic review. Multidisciplinary Digital Publishing Institute.

Alqurashi, H., Alqarni, A., & Alqarni, H. (2020). Factors influencing healthcare professionals' acceptance of telemedicine services: A systematic review. Journal of Medical System, 44(7), 1–10. https://doi.org/10.1007/s10916-020-01580-0

Alsahli, S., Hor, S., & Lam, M. K. (2024). Physicians acceptance and adoption of mobile health applications during the COVID-19 pandemic in saudi arabia: Extending the unified theory of acceptance and use of technology model. Health Information Management : Journal of the Health Information Management Association of Australia.

Andanalusia, M., Arimbawa, I. W. A., Mayada, S., & Bimantika, F. M. (2025). A a systematic review factors influencing patient utilization of telepharmacy services. Journal of Computer Science and Informatics Engineering (J-Cosine).

Arega, A., & Sharma, D. P. (2024). Enhancing healthcare information system in ethiopian hospitals: Exploring challenges and prospects of a cloud-based model for smart and sustainable information services. None.

Assefa, T., Berhanu, D. and Fikadu, T. (2022). Barriers to digital health adoption in Ethiopia: Evidence from public hospitals. Ethiopian Journal of Health Informatics, 6(1), 45–58.

Bahari, G., Mutambik, I., Almuqrin, A., & Alharbi, Z. H. (2024). Trust: How it affects the use of telemedicine in improving access to assistive technology to enhance healthcare services. Risk Management and Healthcare Policy.

Bates, D. W., Landman, A. and Larson, E. (2018). Health IT and patient safety: Building safer system for better care. BMJ Quality & Safety, 27(3), 165–172.

Bekele, T., Gezie, L., Willems, H., Metzger, J., Abere, B., Seyoum, B., Abraham, L., Wendrad, N., Meressa, S., Desta, B., & Bogale, T. (2024). Barriers and facilitators of the electronic medical record adoption among healthcare providers in addis ababa, ethiopia. Digital Health.

Biru, A., Denboba, W., Birhan, D., Gebeyehu, A., Melkamu, G., Kersie, T., & Kaba, O. (2025). Strengthening digital health local capacity: Driving forces and milestones in ethiopia. Oxford Open Digital Health.

Cen, Z. F., Tang, P. K., Hu, H., Cavaco, A., Zeng, L., Lei, S. L., & Ung, C. O. L. (2022). Systematic literature review of adopting eHealth in pharmaceutical care during COVID-19 pandemic: Recommendations for strengthening pharmacy services. BMJ.

Chambers, B., Allan, J., Webster, E., Packer, A., & Nott, S. (2023). Feasibility and acceptability of a virtual clinical pharmacy service for elective orthopaedic inpatients in an australian metropolitan hospital. Wiley.

Chereka, A. A., Mekonnen, G. B., Yirsaw, A. N., Mengistie, B. A., Getachew, E., Lakew, G., Shibabaw, A. A., & Kitil, G. W. (2024). Attitudes towards telemedicine services and associated factors among health professionals in ethiopia: A systematic review and meta-analysis. BMC Health Services Research.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use and user acceptance of information technology. MIS Quarterly, 13(3), 319–340. https://doi.org/10.2307/249008

Farha, R. A., Alzoubi, K. H., Assab, M. A., Awwad, O., Gharaibeh, L., Mukattash, T. L., & Halboup, A. (2023). Perception and willingness to use telepharmacy among the general population in jordan. Dove Medical Press.

Fauzi, R., Permanasari, A. E., & Fauziati, S. (2025). Exploring the future research agenda for health applications adoption: A systematic literature review. International Journal of Advanced Computer Science and Applications.

Gonalves, R. L., Pagano, A. S., Reis, Z. S. N., Brackstone, K., Lopes, T. C. P., Cordeiro, S. A., Nunes, J. M., Afagbedzi, S. K., Head, M., Meira, W., Batchelor, J., & Ribeiro, A. L. P. (2023). Usability of telehealth system for noncommunicable diseases in primary care from the COVID-19 pandemic onward: Systematic review. JMIR Publications.

Griewing, S., Knitza, J., Gremke, N., Wallwiener, M., Wagner, U., Lingenfelder, M., & Kuhn, S. (2024). Awareness and intention-to-use of digital health applications, artificial intelligence and blockchain technology in breast cancer care. Frontiers in Medicine.

He, J., & Wang, B. (2025). Unlocking online healthcare platform adoption: Decoding the key of CSR through mixed methods integration of technology acceptance model mechanisms and privacy barriers. Digital Health.

Hoonsopon, D., Ketkaew, C., Puriwat, W., Viriyasitavat, W., & Tripopsakul, S. (2025). The impact of self-efficacy on telemedicine adoption in emerging country. HighTech and Innovation Journal.

Jahromi, M. E., & Ayatollahi, H. (2022). Utilization of telehealth to manage the covid-19 pandemic in low- and middle-income countries: A scoping review. Oxford University Press.

Jokisch, M., Schmidt, L. I., & Doh, M. (2022). Acceptance of digital health services among older adults: Findings on perceived usefulness, self-efficacy, privacy concerns, ICT knowledge and support seeking. Frontiers in Public Health.

Kasaye, M. D., Kebede, N., Kalayou, M. H., Kebede, S. D., & Molla, A. (2024). Digital health literacy and associated factors among health professionals during the outbreak of corona virus pandemic in ethiopia: A systematic review and meta-analysis. Digital Health.

Kelkay, J. M., Wubneh, H. D., Beri, H. M., Tefera, A. M., Molla, R. A., & Negatu, A. A. (2024). Adoption of telepharmacy among pharmacists, physicians and nurses at hawassa city public hospitals, ethiopia. Public Library of Science.

Kim, S. J., & Eom, J. (2025). Applying the technology acceptance model to predict digital therapeutics use in south korea: The roles of digital literacy, online information trust and privacy concern. Digital Health.

Kotler, P., & Keller, K. L. (2016). Marketing management (15th ed.). Pearson Education.

Lam, N. T., Tuan, P. V., & Van, K. H. (2026). Factors influencing intention to use home healthcare service in vietnam: A study using the TAM approach. Edelweiss Applied Science and Technology.

Lee, A. T., Ramasamy, R. K., & Subbarao, A. (2025). Understanding psychosocial barriers to healthcare technology adoption: A review of TAM and UTAUT frameworks. None.

Li, S., Li, R., Zhu, B., Zhang, B., Li, J., Liu, F., & Wei, Y. (2023). Research on user”s highly sensitive privacy disclosure intention in home intelligent health service system: A perspective from trust enhancement mechanism. Digital Health.

Liu, C., Wang, J., Chen, R., & Zhou, W. (2024). Exploring the influence of chinese online patient trust on telemedicine behavior: Insights into perceived risk and behavior intention. Frontiers in Public Health.

Mika, M., & Sikirica, N. (2024). The evolution and applications of the technology acceptance model. Modern Civil Engineering.

Osareme, J., Amlogu, A. M., Nneka, C. N., Waka, A., Ogugua, J., Ekpenyong, A., Udoh, A., Kpokiri, E., Bates, I., Azuh, B., Olasehinde, N., Win, A., Hedima, E., Okoro, R., Plantado, A., Guzman, H. D., Mariano, J., Salvan, M., Benosa, C., … Bair, B. (2023). Evaluation of telepharmacy services in community pharmacies in abuja, nigeria. None.

Ouimet, A. G., Wagner, G., Raymond, L., & Par, G. (2020). Investigating patients intention to continue using teleconsultation to anticipate postcrisis momentum: Survey study (preprint).

Park, Y., Tak, Y. W., Kim, I., Lee, H., Lee, J. B., Lee, J. W., & Lee, Y. (2023). User experience and extended technology acceptance model in commercial health care app usage among patients with cancer: Mixed methods study. Journal of Medical Internet Research.

Rababa, B. W., Ali, A., & Mohammad, A. M. (2025). Understanding mobile banking adoption via the technology acceptance model: Evidence from jordan. Banks and Bank System.

Rogers, E. M. (2003). Diffusion of innovations (5th ed.). Free Press.

Sulistyaningrum, I. H., Pribadi, P., & Sari, S. (2023a). Adaptation and validation of the telepharmacy service adoption behavior questionnaire during the COVID-19 pandemic crisis. Institute of Advanced Engineering and Science (IAES).

Sulistyaningrum, I. H., Pribadi, P., & Sari, S. (2023b). Exploring consumer intentions to adopt telepharmacy services and development strategic recommendations: Three theoretical approaches. Pensoft Publishers.

Sun, Z., Zang, G., Wang, Z., Ge, S., Liu, W., & Wang, K. (2023). Determining factors affecting the user"s intention to disclose privacy in online health communities: A dual-calculus model. Frontiers in Public Health.

Tadesse, A., Mengistu, D., & Woldie, M. (2020). Barriers and facilitators to the adoption of eHealth in Ethiopia: A qualitative study. BMC Medical I. Barriers and facilitators to the adoption of eHealth in Ethiopia: A qualitative study. BMC Medical I

Tegegne, M. D., Wubante, S. M., Melaku, M. S., Mengiste, N. D., Fentahun, A., Zemene, W., Zeleke, T., Walle, A. D., Lakew, G. T., Tareke, Y. T., Abdi, M. S., Alemayehu, H. M., Girma, E. M., Tilahun, G. G., Demsash, A. W., & Dessie, H. S. (2023). Tele-pharmacy perception, knowledge and associated factors among pharmacy students in northwest ethiopia: An input for implementers. BioMed Central.

Thanthrige, A., Lu, B., Sako, Z., & Wickramasinghe, N. (2024). Determinants of health care technology adoption using an integrated unified theory of acceptance and use of technology and task technology fit model: Systematic review and meta-analysis. Journal of Medical Internet Research.

Tsai, J., Cheng, M.-J., Tsai, H.-H., Hung, S., & Chen, Y.-L. (2019). Acceptance and resistance of telehealth: The perspective of dual-factor concepts in technology adoption. International Journal of Information Management.

Tsegaye, B. and Tadesse, H. (2022). Digital health adoption in Ethiopia: Status, barriers and opportunities. Ethiopian Journal of Health Informatics, 5(2), 67–81.

Vaidhyam, S. A. K., & Huang, K.-T. (2023). Social determinants of health and patients technology acceptance of telehealth during the COVID-19 pandemic: Pilot survey. JMIR Human Factors.

Valencia-Arias, A., Gallegos, A., Rodrguez-Correa, P., Arica, P. S. J., Huertas, L. D. C. L. R., & Valencia, J. (2025). Factors influencing telemedicine adoption in emerging economies. Telemedicine Journal and e-Health.

Vegi, L., & Lind, M. (2025). Predictive analysis of patients telemedicine adoption in the nashville metropolitan area an application of UTAUT model. Journal of Information System Applied Research and Analytics.

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. MIS Quarterly, 27(3), 425–478.

Wuisan, D. S. S., Wikan, I. B., Ugut, G., Pokkali, K. C., & Nabila, E. A. (2025). Determinants of continuous usage intention in the MySiloam mobile health application. International Conference on Communications and Information Technology.

Yao, L., Li, Q., Li, Q., Wang, T., Peng, S., Fu, X., Wang, W., Yu, C., Zhou, L., & Chen, M. (2025). Factors influencing the adoption of telemedicine services among middle-aged and older patients with chronic conditions in rural china: A multicentre cross-sectional study. BMC Health Services Research.

Zhao, J., Li, B., Sun, J., Zeng, X., & Zheng, J. (2025). Determinants of chronic disease patients" intention to use internet diagnosis and treatment services: Based on the UTAUT2 model. Frontiers Digit. Health.

QUESTIONNAIRE

Introduction

Dear Respondent,

Thank you for taking the time to participate in this important research study. This questionnaire aims to assess Determinants of Patients' Intention to Adopt Telepharmacy Services in Public Hospitals in Addis Ababa, Ethiopia. Your honest and thoughtful responses are very important to the success of this research. Please note that all responses are CONFIDENTIAL and will be used SOLELY for research purposes.

The questionnaire will take approximately 15-20 minutes to complete.

Section A: Demographic Information

Instructions: Please provide the following information about yourself:

No.	Item	Response
1	What is your age range?	☐ 18-25 ☐ 26-35 ☐ 36-45 ☐ 46-55 ☐ 56+
2	What is your gender?	☐ Male ☐ Female
3	What is your marital status?	☐ Single ☐ Married ☐ Divorced ☐ Widowed
4	What is your highest level of education?	☐ Primary ☐ Secondary ☐ Diploma ☐ Undergraduate ☐ Postgraduate
5	What is your occupation?	☐ Student ☐ Employed ☐ Self-employed ☐ Retired ☐ Other
6	How often do you visit this hospital?	☐ First time ☐ 1-2 times/year ☐ 3-6 times/year ☐ Monthly ☐ Weekly
7	How long have you been using healthcare services?	☐ Less than 1 year ☐ 1-3 years ☐ 3-5 years ☐ More than 5 years

Section B: Determinants of Patients Intention to Adopt Telepharmacy Services

Instruction: For each statement below, please indicate your level of agreement using the following

5-point Likert Scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree

Perceived Usefulness (PU)

S.No.	Item	1	2	3	4	5
1	Using telepharmacy services would help me manage my medications more effectively.					
2	Telepharmacy services would save me time in obtaining medications and pharmacy consultations.					
3	Telepharmacy would improve the quality of pharmaceutical care I receive.					
4	Using telepharmacy services would enable me to access pharmacy services more conveniently.					
5	Telepharmacy services would provide me with useful information about my medications.					

Perceived Ease of Use (PEOU)

S.No.	Item	1	2	3	4	5
1	Learning how to use telepharmacy services would be easy for me.					
2	I would find it easy to navigate the telepharmacy platform or application.					
3	The process of obtaining medications through telepharmacy would be straightforward.					
4	I would find it easy to interact with the					

	pharmacist through telepharmacy services.					
5	It would be easy for me to become skilled at using telepharmacy services.					

Perceived Cost (PC)

S.No.	Item	1	2	3	4	5
1	The cost of using telepharmacy services would be affordable for me.					
2	Telepharmacy services would cost less than traditional in-person pharmacy visits.					
3	I would be willing to pay for telepharmacy services given the convenience provided.					
4	Telepharmacy would help me save money on transportation costs to the pharmacy.					
5	The pricing structure of telepharmacy services would be transparent and fair.					

Trust in Telepharmacy Services (TR)

S.No.	Item	1	2	3	4	5
1	I would trust the pharmacists providing services through telepharmacy.					
2	I believe telepharmacy services would be reliable and dependable.					
3	The hospital's telepharmacy platform would provide honest and accurate information.					
4	I would trust the quality of medications dispensed through telepharmacy.					
5	I would feel confident in the competence of pharmacists using telepharmacy system.					

Perceived Privacy (PR)

S.No.	Item	1	2	3	4	5
1	My personal health information would be kept private through telepharmacy services.					
2	The hospital would adequately protect my medication history data.					
3	I would feel secure sharing my medical information through telepharmacy.					
4	The telepharmacy platform would have strong security measures to prevent unauthorized access.					

Section C: Dependent Variable

Intention to Adopt Telepharmacy Services (IA)

S.No.	Item	1	2	3	4	5
1	I plan to adopt telepharmacy services when they become available at this hospital.					
2	I would recommend telepharmacy services to other patients.					
3	I am willing to make telepharmacy my primary method of obtaining medications.					
4	I am determined to use telepharmacy services despite any initial challenges.					
5	I consider telepharmacy services as a viable option for managing my pharmaceutical needs.					

This questionnaire is adapted from research (Griewing *et al.*, 2024; Kim & Eom, 2025; Rababa *et al.*, 2025; Wuisan *et al.*, 2025)