ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES
SCHOOL OF INFORMATION SCIENCE
AND
SCHOOL OF PUBLIC HEALTH

THE USE OF MOBILE PHONE FOR HIV/AIDS PATIENTS CLINICAL ATTENDANCE AND FOLLOW-UP IN ART PROVIDING HOSPITALS IN ADDIS ABABA, ETHIOPIA

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A Thesis Submitted to the School of Graduate Studies of Addis Ababa University in Partial Fulfillment of the Requirements for the Degree of Master of Science in Health Informatics

By

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Name and signature of Members of the Examining Board

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_____	Examiner,	_____	_____

Declaration

I declare that the thesis is my original work and has not been presented for a degree in any other university.

_____

Date

This thesis has been submitted for examination with my approval as university advisor.

_____

Advisor

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Abbreviation

AIDS	Acquired Immune Deficiency Syndrome
ART	Antiretroviral therapy
ARV	Antiretroviral
EFY	Ethiopian Fiscal Year
ETC	Ethiopia Telecommunication Corporation
HAART	Highly active antiretroviral therapy
HIV	Human immune deficiency virus
ICT	Information communication technology
ITU	International Telecommunications Union
IDI	Information Development Index
JHU	Johns Hopkins university
MDG	Millennium Development Goals
NGO	Nongovernmental organization
OR	Odd ratio
PLWHA	People living with HIV/AIDS
PTO	Public telecommunication operator
RCT	Randomized controlled trials
RNA	Ribonucleic acid
SD	Standard division
SMS	Short message services
WHO	World health organization

Abstract

Background: *HIV/AIDS is a lifelong disease and the treatment and follow-up of PLWHA over time requires daily administration of antiretroviral drugs as well as monitoring of clinical progression and lab results to prevent multi-drug resistance. Mobile phone technology has a potential to address many health challenges facing resource-poor countries including the barriers HIV patients encounter when accessing ART. The magnitude of mobile phone utilization and factors affecting utilization of mobile phone among patients attending ART clinic for health-care services particularly in management of HIV/AIDS patient clinical attendance, follow up and adherence is not well assessed in Ethiopia and Addis Ababa.*

Objective of the study: *The overall objective of this study was to assess utilization of mobile phone and factors affecting utilization of mobile phone for HIV patients' clinical attendance and follow up at public hospitals in Addis Ababa*

Methodology: *A cross sectional study employing both quantitative and qualitative methods was utilized. And structured questionnaires and in depth interview were used to collect data. Epi info16 and SPSS statistical software package were used for data entry and analysis respectively. Descriptive statistics using frequency and summary statistic were used to describe the respondents. And logistic analysis for the quantitative study and content analysis for qualitative study were used to analyze data.*

Result: *A total of 422 patients were participated in the study. Of those 85.5% had access to mobile phones, about 48.3% have no information about the service provided in ART, 37.4% were receive calls and 23.0% were had history of calls to adherence supporter. The utilization rate of mobile phone was 46.8% for all respondents. Miss appointment date [OR, 7.51 (95% CI 3.58, 15.77)], know about the service providing [OR, 9.25 (95%CI 4.89, 17.47)] and current adherence status [OR, 3.35 (95%CI 1.28, 8.80)] were found significant association with mobile phone utilization.*

Conclusion: *Our study shows that information about the availability of the service; adherence status and missed appointment date were the major predictors of mobile phone utilization for patient clinical attendance and follow up. We recommend that the system should be integrated with the general ART service and responsible bodies should allocate budget for mobile phone service and motivate adherence supporters.*

CHAPTER ONE
INTRODUCTION

1.1. Background

The HIV/AIDS pandemic is one of the most serious threats to global health, and has the highest prevalence in developing countries. About 68% (22.5 million) of the approximately 33 million people living with HIV/AIDS (PLWHA) reside in sub-Saharan Africa where HIV/AIDS is the leading cause of death. In Ethiopia there were an estimated 1,116,216 people living with HIV in 2009, of which 336,160 were eligible for antiretroviral therapy. It is a chronic illness, requiring patient empowerment to enhance adherence to treatment regimes if it is to be managed effectively (1, 2).

The most important factor for sustainable treatment of HIV/AIDS for individuals and programs globally is consistent use of highly active antiretroviral therapy (HAART). It is a lifelong disease and the treatment and follow-up of PLWHA over time requires daily administration of antiretroviral drugs as well as monitoring of clinical progression and lab results. It has become increasingly important to follow patient's adherence to the treatment to prevent multi-drug resistance, as ensuring adherence will delay emergence of resistant strains of the virus (3, 4).

Nowadays, the use of modern technology in health care is exploding and various technological tools are supposed to make health care more effective and secure, to provide appropriate information, and to make it available on a just-in-time basis. Patient security, quality of care, and accessibility to health care are supposed to be improved through the use of technology of various kinds and Information Communication Technology (ICT) is supposed to facilitate decision-making by supporting health care personnel particularly in treating and managing HIV/AIDS patient (5, 6).

Advances in the technologies that underlie mobile phones are enabling technologies to become better, faster, and less expensive and convergence of increasing computing power, personalization, and mobility is yielding a profound shift in the evolution of information technologies. Because of mobile phones support a variety of technical functions, most basically voice and short message services (SMS or text messages) enabling two-way

communication in real time or near-real time. (7). Nowadays, the access to mobile phone is rapidly increasing globally. By the end of 2009, there were an estimated 4.6 billion mobile cellular subscriptions; 3.2 billion of which in the developing world. Thus, with an estimated mobile cellular penetration rate of 56.8 per 100 inhabitants in the developing world (8, 9) and the use of mobile computing and communication technologies in health care and public health is rapidly expanding. This technology has a potential to address the many health challenges facing resource-poor countries including the barriers HIV patients encounter when accessing ART. So, mobile phone communications can substantially improve clinical management of HIV patients in resource-limited settings (8, 10).

1.2. Statement of the problem

In the current era of enhanced access to antiretroviral treatment (ART) globally, the number of people on ART in low and middle income countries by the end of 2008 has crossed the 4 million mark, with an increase of 1 million from the end of 2007. However, one of the greatest challenges associated with the management of HIV is suboptimal adherence to antiretroviral therapy. Good adherence to ART is beneficial to patients, as it minimizes treatment failure and prolongs survival. This is because poor adherence gives rise to the potential for development of drug-resistant strains, necessitating administration of expensive second-line therapy, and the possibility of transmission of drug-resistant HIV by non-adherent patients (11, 12).

Studies have shown that missed clinic visits are a significant risk factor for virologic failure and occurrence of AIDS-defining illness or death. Regular clinic attendance for medication refills is necessary to achieve good clinical outcomes. HIV-infected patients who miss clinic visits may also miss taking their antiretroviral medications. Patients who are poorly adherents to physician visits are less likely to receive HAART in the first place, are more likely to develop an infection with resistance to HAART, and are less likely to achieve HIV suppression (12, 13).

Ethiopia has begun to scale up its National AIDS control program, providing first-line ART free of cost since 2005 (14). Simultaneously, the telecommunications network in the country has been highly expanding, the current total connected subscribers of mobile

telephone are 4,051,703 and this excelled the fixed lines by 902,955 (15). So, the use of mobile phones in the country has increasing rapidly along with falling costs and increased access. Studies done in developing countries showed strategic use of mobile telephony can enhance the efficiency, effectiveness and durability of ARV programmers, particularly in resource-limited settings(16).

The use of mobile phone service among patients attending health care facilities is increasing from time to time in Ethiopia. However, the magnitude of mobile phone utilization and factors affecting utilization of mobile phone among patients attending ART clinic for health-care services particularly in management of HIV/AIDS patient clinical attendance, follow up and adherence is not well assessed in Ethiopia and Addis Ababa.

The overall aim of assessing mobile phone utilization status and utilization factors is to ensure that the health system particularly ART clinics use Information Communication Technologies as an imperative tool that will assist in the realization of its goals and objectives, to ensure that implementation of mobile phone in ART clinics is driven by the needs of the community and based on the context of the country.

There is therefore a need for assessing utilization status and factors which can affect the use, development and success of mobile phone applications in ART clinics for patient follow up and clinical attendance based on our setup and context to support the realization of improving patient's adherence towards ART.

1.3. Rational of the study

Despite the growing popularity of the mobile technologies as a health information resource, little research has been conducted on the feasibility of using the mobile technologies as a health promotion strategy with HIV/AIDS management particularly in patient treatment adherence to ART and like clinical attendance and follow up. Accordingly, consideration of confidentiality issues will be of the utmost importance in any strategy to use cell phones in healthcare. Preferring to talk with clinic staff in person and issues regarding stigma or confidentiality were important barriers identified by patients (17).

Therefore, assessing the use of mobile technology for improving HIV /AIDS patient clinical attendance and follow-up will help policy makers to design and implement appropriate communication technologies and enhance the communication link between patients and healthcare providers, good opportunities to enhance patient understanding of medication regimen, to identify potential obstacles to taking medication and trusting relationship between patients and health care providers, and ultimately to prevent virologic break through.

Thus, this study is aimed to assess utilization of mobile phone technology among PLWHA on clinical attendance and follow-up at ART providing health facilities in Addis Ababa. Furthermore, the study will have significance input for future implementation of mobile technology communication at national, regional and health facility level.

1.4. Research questions

The research will be attempted to answer the following key questions:

- What is the magnitude of mobile phone technology utilization in ART patients follow up and clinical attendance?
- What are the factors that affect utilization of mobile phone technology for patient and adherence supporters on antiretroviral treatment?
- What are the patient's adherence supporters and ART focal persons perceived attitude towards the use of mobile phone technology?

1.5. Objectives of the study

1.5.1. General objective

The general objective of this study is to assess utilization of mobile phone for HIV/AIDS patient clinical attendance and follow-up at ART providing public hospitals in Addis Ababa

1.5.2. Specific objectives

- To assess the magnitude of mobile phone utilization for patient clinical attendance and follow-up in antiretroviral therapy (ART) unit.
- To identify factors affecting utilization of mobile technology for patient clinical attendance and follow-up in antiretroviral therapy (ART) unit
- To assess the attitude of patients, adherence supporters and ART focal person towards the use of mobile technology in ART unit

1.6. Scope and limitation of the study

1.6.1. Scope of the study

This study is limited in assessing the magnitude of mobile phone technology utilization for HIV/AIDS patients' clinical attendance and follow among PLWHA in public hospitals in Addis Ababa and to determine factors affecting its use. However this study is not intended to evaluate the effect or the influence of mobile phone on clinical appointment and follow up.

1.6.2. Limitation of the study

- The use of cross sectional design has limited the degree of cause and effect associations among variables of interest.
- This study is limited to public hospitals which limited comparison of the scenario in private and nongovernmental facilities.
- Lack of prior studies conducted in local context limits comparability of the study

CHAPTER TWO
LITERATURE REVIEW

The human immune-deficiency virus (HIV): disease of the immune system caused by infection with the retroviral HIV, which destroy some type of white blood cells and is transmitted through blood or bodily secretion such as semen. HIV has created an enormous challenge worldwide. Since recognition of the disease, HIV has infected close to 71 million people, and more than 30 million have died due to acquired immune deficiency syndrome (AIDS). More than 66% of the 40 million plus people living with HIV/AIDS (PLWHA) are in Sub-Saharan Africa, where AIDS is the leading cause of death (18).

2.1. Magnitude and impact of HIV/AIDS

The HIV epidemic remains a major global public health problem and challenge, with a total of 33.4 million people living with HIV worldwide. In 2008 alone, 2.7 million people were newly infected with HIV. In sub-Saharan Africa, approximately 22 million people live with HIV/AIDS. At the end of 2009, about 5.25 million people were reported to be receiving antiretroviral therapy in low and middle-income countries and a greatest increase in the absolute number of people receiving treatment reported from about 2.9 million in December 2008 to about 3.9 million in 2009 (10, 18).

Early reports suggested that mortality among PLWHA on ART are typically between about 6 to 12 deaths per 100 person/years, which are substantially better than the pre-ART era. One reason for the higher mortality in Africa is that patients in Africa present late for treatment, typically at 100-150 $\times 10^6$/l CD4 cell count lower than in developed countries (18).

South Africa is estimated to have 5.7 million HIV-positive individuals out of a total population of 48.6 million and has more people living with HIV/AIDS than any other country worldwide in 2008 (19). Similarly, Ethiopia has one of the largest populations of HIV infected people in the world. According to the 2007 Single Point Estimate, with an estimated 1.1 million people living with HIV in 2009, of which 336,160 were eligible for ART There were an estimated 131,145 new HIV infection (57% Female) and 44,751

AIDS-related deaths (57% Female).Prevalence was 1.8% for males and 2.8% for females, and women accounted for 59% of the HIV-positive population and estimated urban and rural prevalence of 7.7% and 0.9% respectively for 2009. (14). ART was started in the country in 2003 and free ART was launched in 2005. In 2009, 93 public hospitals, 47 private hospitals, 12 military hospitals and 292 health centers and 3 nongovernmental organization clinics were providing HIV care and treatment services in all regions of the country (20).

2.2. Loss to follow-up and defaulter from ART

Without treatment, HIV infection is usually fatal within a decade, but with successful long-term treatment of HIV infection, life expectancy is extended by many years or even decades. Prospective study at any United States Department of Veterans Affairs hospital or clinic showed that about 40% of persons with a recent diagnosis of HIV infection did not see a physician in the six months after diagnosis, and more than one-half of the patients were out of care within one year. And also, in a retrospective study from clinics, nearly one-half of the patients entering care had large gaps in care beginning in the first year of treatment (13, 21).

A five years follow up cohort study at the University of Alabama at Birmingham showed that among 543 study participants initiating outpatient care for HIV infection, 60% missed a visit within the first year. The mortality rate was 2.3 deaths per 100 person-years for patients who missed visits, compared with 1.0 death per 100 person-years for those who attended all scheduled appointments during the first year after establishing outpatient treatment even when controlling for baseline $CD4^+$ cell count and antiretroviral receipt within the first year (22).

Study in Uganda showed that about a quarter of subjects eligible for ART did not complete screening and did not initiate on ART. The mortality rate was very high during the pre-treatment period. Almost half of those still alive at the follow-up visit said they had not completed screening because they could not afford the transport costs to come to the clinic.

For many families, the high cost of transport is a major barrier preventing access to ART (23).

Studies conducted in Jimma and south Ethiopia addressed adherence to HAART and identified factors associated with skipping doses for a shorter period. The broader aspects of defaulter, reasons and associated factors were not identified. The rate of self reported adherence in the study based patients who got family support were 2 times more likely to adhere than those who didn't get family support as an independent predictor of overall adherence (dose, time and food). The reasons given for missing drugs were running out of medication/drug, being away from home and being busy with other things (24). Similarly, study done in Jimma, Ethiopia showed that reasons for defaulting were unclear in most cases. Reasons given were loss of hope in medication, lack of food, mental illness, holy water, no money for transport, and other illnesses. Tracing was not successful because of incorrect address on the register in 61.6% of the of the cases (25).

Another study done in Northwest Ethiopia showed the prevalence of non adherence and non readiness to HAART and their determinants among patients attending in antiretroviral clinics. The study showed that17.3% of respondents had less than 95% adherence and 13.9% of the respondents had not been ready to HAART. Medication adverse effects had also statistically significant association with non adherence to antiretroviral therapy (26). Another study done in the South Ethiopia showed that the proportion of participants with good knowledge about adherence, ART benefits and ART eligibility were 68%, 28.2% and 57.7% respectively (27).

2.3. Use of ICT for health

Information and communication technologies (ICT) are being widely used in healthcare management systems. Rapid advancements in ICT in the last decade or so provide solutions to the problems in healthcare management systems. These include a wide spectrum of issues such as patient safety, dietary management, telemedicine, digital imaging, document management etc (28).

Research and development efforts within the healthcare industry and the rapid advancement in ICT over the last two decades have brought about significant advances in the quality of medical services to the patients (28).

The development of ICTs can bring about improvements in health in developing countries in at least three ways:

- as an instrument for continuing education they enable health workers to be informed of and trained in advances in knowledge

- they can improve the delivery of health and disaster management services to poor and remote locations and

- they can increase the transparency and efficiency of governance, which should, in turn, improve the availability and delivery of publicly provided health services

The health sector is highly information-intensive and providing effective health services requires the extensive collection of patient data in analogue and digital forms, which are then processed and disseminated within the same institution or sent to other institutions. The face of public health services is changing as they adopt ICTs. Examples of applications in the health sector include: (29)

- **Electronic health records/electronic medical records EHR/EMR** (often used interchangeably): the use of ICTs to generate, store and share longitudinal real-time electronic records of a patient's healthcare information
- **Telehealth/telemedicine:** the use of ICTs to offer diagnostic and treatment services remotely
- **M-health/mobile health:** the use of mobile devices such as mobile phones for health purposes
- **Decision-support systems (DSS):** the use of online information resources for clinical decision-making
- **E-learning**: the use of ICTs for the education and ongoing training of health professionals and students

- **E-journals**: the use of ICTs to create and publish virtual journals and disseminate them via the Internet or CD/DVD if connectivity is poor (29).

The World Health Organization (WHO) defines the use of ICT for health as e-health and carefully planned introduction of ICT into the health sector should result in improved ways in which data and information are collected, stored, retrieved and shared. ICT has proven to be a powerful tool in supporting more effective delivery of health services and increasing the efficiency of health systems. Study in Peru suggested that health promotion interventions using information and communication technology tools among people living with HIV in resource-constrained settings may be acceptable and feasible, and can build on existing patterns of use (30).

Ethiopia, as part of the International Telecommunications Union's telemedicine project to support the development of a national telemedicine network which aims to initially connect 10 outlying hospitals and the AAU Faculty of Medicine, Telemedicine equipment to facilitate remote diagnostics is installed at each hospital. Telemedicine refers to the delivery of healthcare and sharing of medical knowledge over a distance using telecommunication and information technology been demonstrated to offer a competitive choice for access to healthcare service to the expectation of people, when there is limited access (31).

2.4. Mobile phone and healthcare services

The applications of mobile computing, medical sensor, and communications technologies have paved way for provision of cost-effective e-services in healthcare to the people around the globe. Include the use of cell phones and other communication devices to gather health data, delivery of healthcare information to doctors, researchers, and patients (28).

In collaboration with partners in public health and technology, CDC is working to find innovative ways of exchanging vital information via mobile platforms cell phones and other mobile devices have the potential to revolutionize public health communications. In

the same way, the WHO has indicated that incorporating the use of newer technology, such as telecommunications, in resource-limited settings to enhance healthcare delivery, is a priority (11). Hence, mobile phones offer promise for use in healthcare, particularly in low income settings, given the centrality of their use in everyday life. Living in resource-poor environments is not a barrier to the use of mobile phones. Thus, mobile and computer technology could help achieve targets in the United Nation's Millennium Development Goals (MDGs) regarding diseases such as HIV/AIDS and malaria (12). Study in South Africa showed that Short message services (SMS) can improve service delivery through appointment reminders and improve communication between healthcare workers. It improves diagnosis, prevention, treatment and rehabilitation by supporting adherence to medication, and monitoring illness and medical interventions (32).

2.5. Mobile phone for improving adherence and HIV control

Mobile (cell) phone communication has been suggested as a method to improve delivery of health services particularly in resource-limited settings. Mobile phone communication between health-care workers and patients starting antiretroviral therapy in Kenya improved drug adherence and suppression of plasma HIV-1 RNA load (33). Similarly, a qualitative study in Peru suggested that cell phones in particular may be useful and culturally-relevant as a way to support medication adherence and HIV transmission risk reduction among persons living with HIV. A multisite, randomized controlled trial (RCT) study was conducted in US with 109 ART-naive subjects enrolled in AIDS Clinical Trials indicate that customized, proactive telephone calls have good potential to improve long-term adherence behavior and clinical outcomes (30, 34).

Study conducted in Uganda showed that adherence to clinic appointments was associated with medication adherence in patients with chronic illnesses. Patients who received SMS support had significantly improved ART adherence and rates of viral suppression compared with the control individuals. An innovative trial in Kenya unveiled that reports using mobile-phone text messages helped 12 percent of patients better stay with their treatment, compared with a group that did not have mobile follow-up, therefore the phone messages to

remind HIV patients to take their dose of life-saving medications can give a major boost to drug adherence (35).

2.6. Expansions and development of Ethiopian Telecommunication Corporation

The Ethiopian Telecommunications Corporation (ETC) is the oldest Public Telecommunications Operator (PTO) in Africa. The ETC has served as the sole, government-owned telecom operator in Ethiopia since the introduction of telecommunications in the country around 1894. Telephone (both wire line and wireless), Internet (dialup and broadband), mobile (pre-paid and post-paid), and other value-added services are among the major telecom services provided by the corporation .For the year 2001 Ethiopian Fiscal Year (EFY), ETC generated 5.7 billion birr in revenue and 2.48 billion birr in net profit, and provided services for 902,955 fixed, 4,051,703 mobile, and 74,557 Internet subscribers (36, 37).

By the end of 2007/08, the number of cellular telephone (mobile) subscribers increased nearly five times from the 2004/05 level, reaching 1, 954, 527; the number of broadband customers reached 1 496, up from only 65 in 2002/03; and the dial-up Internet subscribers were 34 110, almost twice the number in 2004/05. Teledensity, excluding mobile phones, has tripled since 2000/01 to reach 1.23 per 100 households in 2007/08. Including mobile phones, teledensity reached 3.88 in 2007/08 from only 0.48 in 2000/01 (15). ETC sends text messages to mobile phone users offering free HIV/AIDS tests ahead of New Year celebrations. The text messages are being sent to all of Ethiopia's 2.5 million mobile users and have been hitting handsets in the capital Addis Ababa and most of the country's major towns (38).

2.7. Factors affecting utilization of mobile phone technology in ART

Different authors identified different issues which can directly or indirectly affect effectiveness of mobile phone implementation. Among the issues Legal and regulatory problems associated with ethical issues such as patient's rights of access, privacy, and confidentiality of patient information, technical problems related to acceptance by the users, interoperability, institutional challenges such as technological compatibility, infrastructure, network coverage, procurement and deployment, cost of implementation,

reimbursement and financial problems are the major challenges in the use of mobile phone and ICTs in the health sector which should be taken under consideration during implementation and utilization of mobile phone technology in an organization (39).

Usability

Technologies intended to be used for health-related purposes should be useable by all types of individuals, including the elderly, people with low literacy, and those with permanent or temporary disability (7).

The 'Real Access' criteria that have been used to identify reasons for both the failure and success of ICT projects consist of the following points: physical access to technology, appropriateness of technology, affordability of technology and technology use, human capacity and training, locally relevant content, applications and services, integration into daily routines , socio-cultural factors, trust in technology, local economic environment, macro environment, legal and regulatory framework, political will and public support (40).

Quality of network

Using a mobile phone depends on whether it can achieve a good connection to a network. However, the quality of network connections vary by geographic region and commercial carrier, and most mobile phone users are familiar with the occasional poor quality of signal access in even the most populous areas.

Language and literacy

Studies conducted in developing countries showed that, use of SMS to disseminate health information and prevention messaging, or direct patients to services better understanding of context and culture to develop effective mobile health in prevention programs strategies for overcoming language and literacy are barriers in low and middle income countries (7).

Cost

Cost must be considered when implementing technology in resource-limited settings. The ongoing costs of airtime and text messages would be a potential burden; however, a recent cost analysis from southern Africa showed that poor adherence to ART costs approximately $85 per individual per month. A randomized control trail study done in Nairobi, Kenya showed significant time and cost are often incurred for patients to

personally attend the clinics. However, the majority of subjects screened reported being comfortable with using cell phones for communicating their health issues (16).

Flexibility: anyhow, anytime, anywhere.

a. Technological developments have introduced a wide variety of new channels over which different forms of contact can take place (i.e. web technology, has introduced e-mail, which in many situations has replaced regular mail, or has opened the possibility of consuming services by means of self-service on a 24x7 basis; moreover, mobile technology makes it possible to consume services irrespective of location); and
b. Many service delivery processes consist of two more interaction sessions between the citizen and the provider (i.e. if the organization is flexible in terms of its service delivery, it will allow the user to choose the channel or location for the interaction processes, and allow him to switch between channels at any preferable time).

Accessibility

a. Citizens should be able to locate the required services (awareness);
b. citizens should be able to identify the channels that they can use to access the service they need;
c. once a service is located and accessed, citizens should be able to consume the information provided by the service;
d. the legal basis of eHealth services stipulates that they must be accessible for all potential citizens; and
e. a pricing policy for services should guarantee that the intended target groups can afford the services.

Quality

a. There are many situations in which a citizen needs more than just one service to deal with a particular situation. In an one-stop shop approach, a single interaction would be able to address all requirements, thus saving the citizen's considerable amount of time;

b. eHealth services are usually regulated by means of strictly defined specifications. Quality can be described as satisfactory if the service is provided in conformance with the relevant specifications
c. in user-centric approach, services must be offered pro-actively. A timely service is a service that is offered at the moment a citizen may need it, even though he may not yet be aware of it
d. quality comes at a price (i.e. faster delivery of a service may involve more costs than delivery at a regular speed)

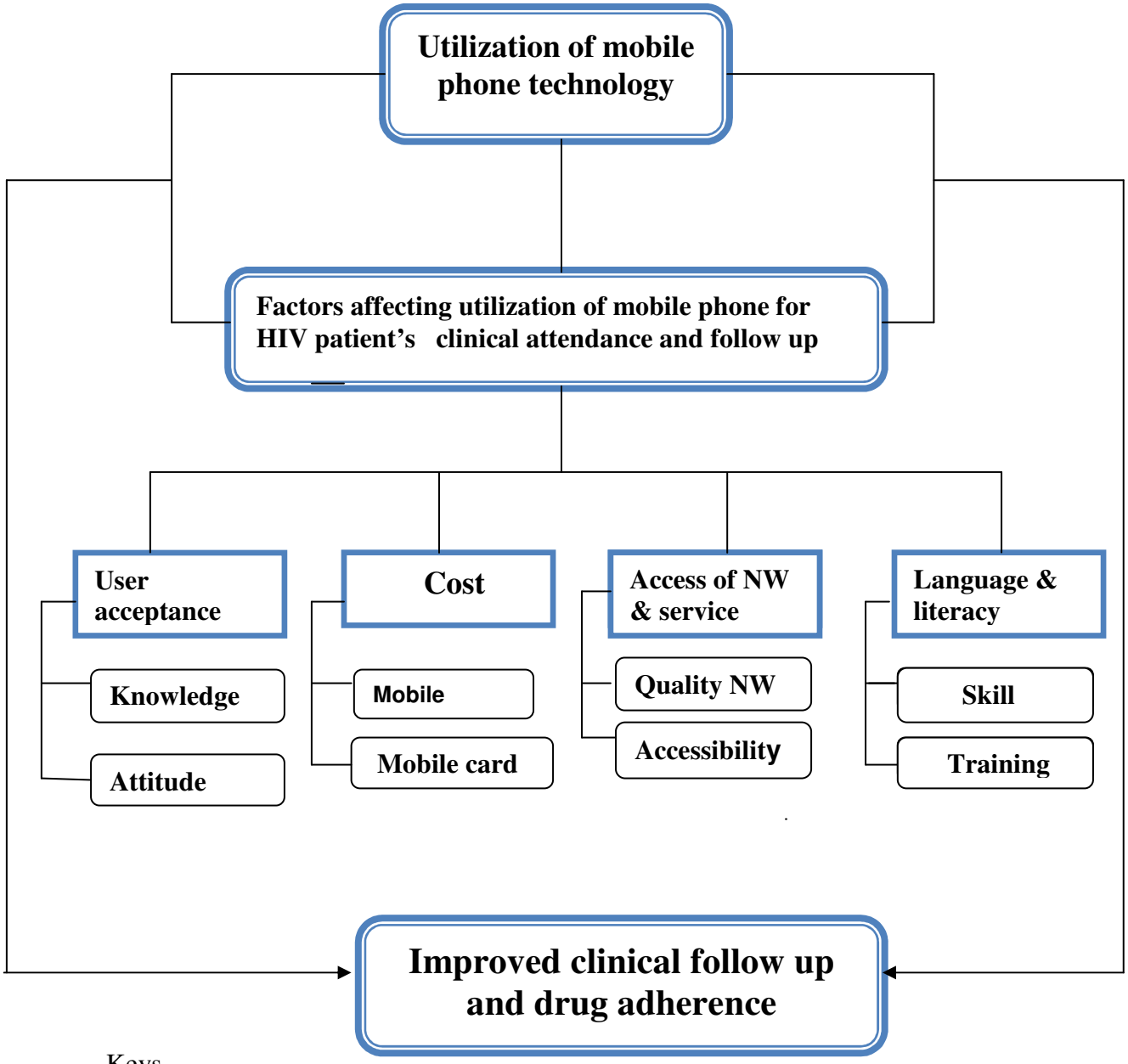
Security

a. A trusted exchange of information depends on an assured security level. If a channel is not secure, or if citizens do not trust its security, the channel will not be used for services that involve sensitive information;
b. Security is not only a technical matter; it is also one of perception. Due to a lack of trust in security matters, relatively large segments of the user population are less inclined to use channels that they do not fully trust, especially when payment is involved (39).

Attitude toward the use of mobile phone for HIV patients clinical follow up

Health promotion interventions using information and communication technology tools among people living with HIV in resource-constrained settings may be acceptable and feasible and can build on existing patterns of use. Most of those interviewed, 74% reported their willingness to use cell phones to receive reminder messages for their HIV medication, either by a pre-recorded voice or by use of short-text messaging. A qualitative study was conducted in Uganda to assess participant impressions of the technologies: explore experiences, perceptions, and acceptability of the IVR calls or SMS; and potential means for improving the number of successful responses. Participant interest and participation rates were high and the most positive feedback from early enrollees in the SMS-protocol and many of them suggested that they would prefer more frequent SMS reminders.

2.8. Conceptual framework



Keys
NW: network
SW: software
HR: human resource

Figure 2.1: conceptual frame work showing factor affecting utilization of mobile phone in ART

CHAPTER THREE
METHODOLOGY

3.1. Study area and period

The study was conducted from April, 2011 to May, 2011 at selected public hospitals in Addis Ababa. Addis Ababa is the capital city of Ethiopia, which is administratively divided into ten sub cities and ninety eight kebeles. It is located at the geographic center of the country (9o 2'N, 38o 22'E) having an altitude ranging between 2054 meters at Akaki in the South to 3112 meters at Entoto Hill North.

Based on the preliminary 2007 census results, Addis Ababa has a total population of 2,738,248, consisting of 1,304,518 men and 1,433,730 women. The city is fully urban, with no rural dwellers within the city's administrative boundaries with an estimated area of 530.14 square kilometers. Addis Ababa is the Federal Capital of Ethiopia having 10 Sub Cities and 99 Kebeles Administrations. Addis Ababa Health Bureau has a decentralized system with 10 sub city heath office. The 10 Sub-city health offices manage the city's health centers and clinics, which are directly answerable to their respective sub-city administrations. In Addis Ababa, there are 12 hospitals and 24 government health centers

In each hospitals ART unit, there are multidisciplinary team comprised of medical doctor, adherence nurse, pharmacist, druggist, data clerks and adherence supporters, involved in day to day care and treatment services. After initiation of HAART, patients are seen, first in two weeks and then every month to review clinical and laboratory data, adherence counseling, monitoring of drug toxicity, treatment outcomes and ARV dispensing. PLWHA, who were trained and assigned by nongovernmental organizations (JHU and WHO) to support the service in the area of adherence counseling, patient education on healthy living and defaulter tracing using mobile phone, are named as expert patient (41).

3.2. Study design

A cross sectional study design that employed by both quantitative and qualitative research approach was conducted in PLWHA who are on ART at selected public Hospitals.

3.3. Study population

3.3.1. Source population

- The source populations for the quantitative study were all PLWHA who are on ART at public hospitals in Addis Ababa.
- The source populations for the qualitative study were all adherence supporters and ART focal person working at public hospitals in Addis Ababa.

3.3.2. Study subject

- Consecutive PLWHA who are on ART and visiting the ART clinics during the study period at selected public hospitals
- All adherence supporters and ART focal person working at selected public hospitals

3.3.3. Sample size determination

The required sample size was calculated based on the standard sample size formula as:

$$n = \frac{(Z\ \alpha/2)2 * (P) * (1-P)}{D^2}$$

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

Where: Z (α /2) = 1.96 for a 95% Confidence Level,

P= percentage of utilization of mobile phone technology in ART unit. Since there was no available previous study on it, p is unknown and is set to **0.5,** and

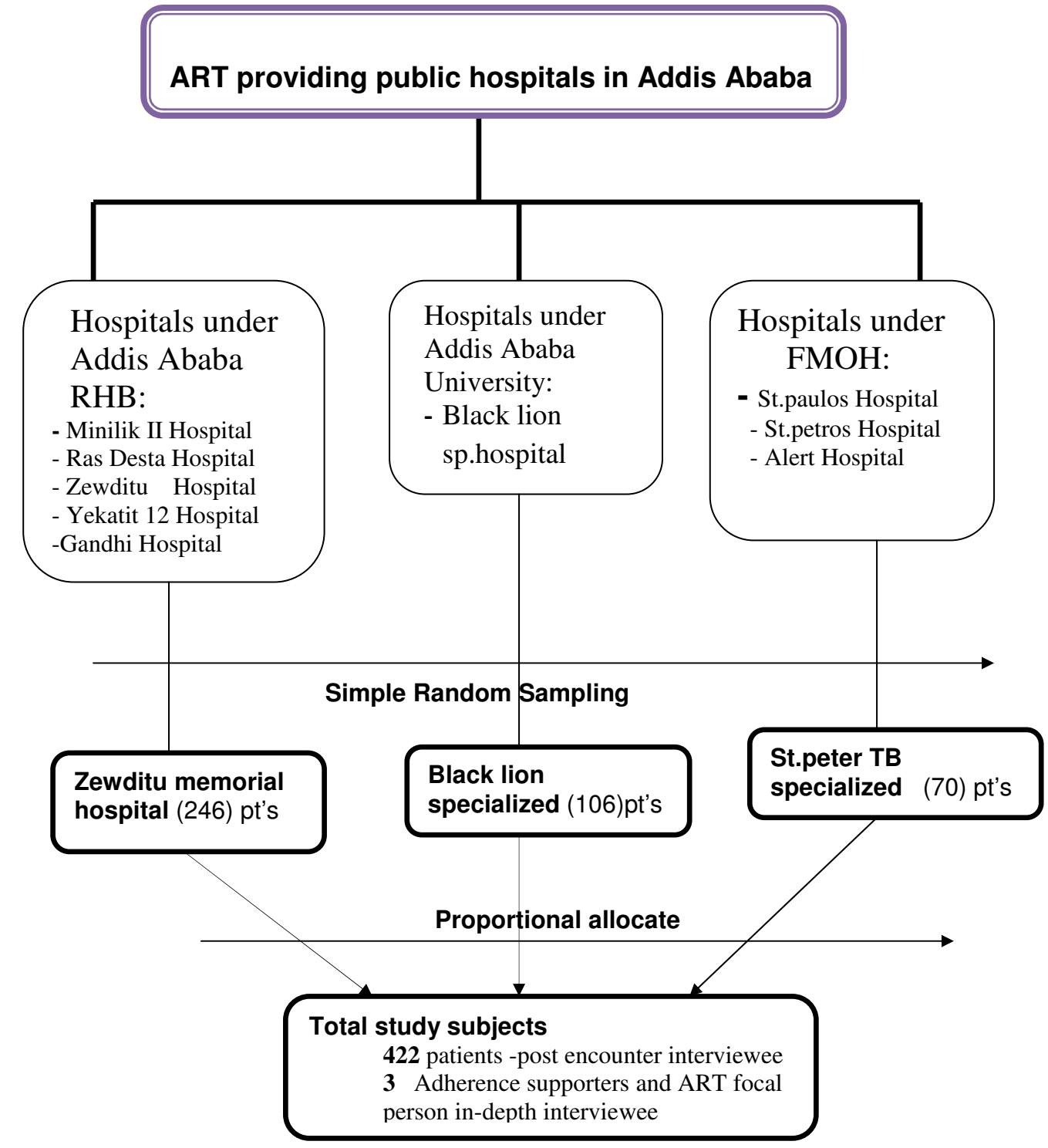
D= the margin of error, which is 0.05 (5%),

The total sample size calculated (with 10% non respondents) was **422.**

3.3.4. Sampling procedure

Sampling procedure for quantitative study included hospitals that found under MOH, Addis Ababa Health bureau and Addis Ababa University. Among them, St Peter from MOH and Zewditu Hospitals from Addis Ababa Health Bureau were selected respectively by using simple random sampling method and Black lion hospital as the only hospitals under Addis Ababa University was included. Proportional allocation of study subject based on number of eligible patient from their respective sampling frame was assigned. Consecutive series of patients who were on ART and visiting ART clinic were enrolled.

A purposive sampling technique was used for the qualitative study (in-depth interview) for each hospital one adherence supporters and ART focal person was enroll in the in-depth interview. A schematic presentation of the sampling procedure it depicted in figure 4.2.



Pt's= patients

Figure 3.2: A schematic presentation of sampling procedure

Inclusion criteria

- Outpatients who are on ART and visiting the ART clinics during the study period.
- Patients 18 years of age & above
- Adherence supporters whose involving contact with patients through mobile phone
- Clinician ART focal person

Exclusion criteria

- Patients below 18 years of age
- Patients who were seriously ill
- Patients on Pre ART treatment
- in-patients

3.4. Data collection procedures and instrument

Data were collected from study subjects, using pre-tested and structured questionnaires. Questionnaires were first developed in English and translated into Amharic and then back to English to ensure validity. Six data collectors who are diploma nurses and one supervisor BSc degree who have an experience working in public hospital were trained and were recruited on the desired data collection techniques and assurance of data quality for two days by the principal investigator.

Initially data collectors were approached daily in the waiting room following the routine clinical encounter and patients included in the structured interview questionnaires were administered for those who have volunteered to respond then once filled out were collected by the data collectors.

In-depth interview of the qualitative study was done face to face by the principal investigator to avoid any misunderstanding. The in-depth interviews were recorded to avoid any loss of information. The principal investigator was agreed with the respondents on their available free time to have enough time for discussion and explore more information.

3.5. Variables

3.5.1. Dependent variable

Utilization of mobile phone technology for HIV/AIDS patient clinical attendance and follow up

3.5.2. Independent variable

Quantitative

Patient characteristics

- Socio-demography (age, sex, marital status, educational status, monthly income)
- mobile phone access (owners)
- clinical appointment and follow up
- current adherence status
- Attitude toward on the use of mobile phone technology for clinical attendance and follow up

Qualitative

Adherence supporter and ART focal person characteristics

- Practical characteristics
- Attitude toward on use of mobile phone on ART

3.6. Operational definitions

Mobile phone technology : a small size, portable devices, low weight and rechargeable, long-life battery power and have wireless cellular communication capability, providing the potential for continuous, interactive communication from any location by phone calls, text and multimedia messaging and also internet access via Wireless Application Protocol (WAP) or mobile broadband internet.

Utilization of mobile phone technology: using mobile phone communication (Either receive call from ART clinic or call to ART clinic) between adherence supporters and patients for clinical attendance, appointment, follow up.

Clinical follow up: clients whose regular attends (visit) clinic amongst ART clients for their ARV medications refill in scheduled appointments

Medication adherence: the extent to which patients take medications as prescribed by their health care providers corresponds with agreed recommendations from a health care provider

- ***Good adherence***: >95% of doses are taken (less than three doses are missed during the month)
- ***Fair adherence:*** 85-94% of the doses are taken (three to nine doses are missed during the month)
- ***Poor adherence:*** <85% of doses are taken (more than nine doses are missed)

Adherence supporter (expert patient): are PLWHA, who were trained and assigned by nongovernmental organizations (JHU and WHO) to support the service in the area of adherence counseling, patient education on healthy living and defaulter tracing by using mobile at health facilities.

3.7. Data processing and analysis

3.7.1. Quantitative

The quantitative data collected were entered to computer and cleaned on daily basis Data entry was done by using Epi Info software and analysis was carried by SPSS16.0 version statistical software. Descriptive statistics like tables and figures were used to present data. Frequencies, measures of central tendency and variation were calculated. The chi-square test was applied to assess the association between dependent and independent variable odds ratio (OR), 95% confidence interval was used to assess strength of the association.

Finally logistic regression was used to assess the simultaneous effect of all independent variables. The general data analysis was carrying out after appropriate data entry task was completed. Any errors identified at this time were corrected after revision of the original data using the code numbers

3.7.2. Qualitative

Analysis of the qualitative data was carried out by coding the data on a daily basis. Then patterns were identified as well as compared and further examined to discover recurrent patterns and saturation of ideas. Then core categories were identified and interpreted.

A total of three adherence supporters (expert patients) were actively engaged on patients' communication activities through mobile phone from each Hospital ART clinic. And three ART focal persons (2 clinical nurses and 1 medical doctor) were included in the in-depth interview. The aim of the interview were to assess current practice of adherence supporters and focal persons and attitude towards on the use of mobile phone for HIV patients follow up in order to support the quantitative data. Tape recorder and note book was used for the interview then it was transcribed into English by the principal investigator. Thematic analysis was used to categorize the major findings. The findings are categorized and discussed.

3.8. Data quality issues

One supervisor and the principal investigator were performing the supervision of data collection procedures on daily basis. They were checking every completed questionnaire and give onsite technical assistance to the data collectors. Anything, which is unclear and ambiguous, was corrected for data collectors on the next day. About 10% of the data were double entered by the clerk and the principal investigator to check consistency in putting data to SPSS.

3.9. Ethical issues

Ethical clearance was obtained from Addis Ababa University institution of review board (IRB), Addis Ababa City Administration Health Bureau and St.peter TB specialized hospital ethical clearance committee. Official letter of cooperation was written to all the respective hospitals Administrations, and permission to conduct the study was secured accordingly. Informed verbal consent from each study participants were sought after clear explanation about the purpose of the study. Anonymity of study subjects was maintained to insure confidentiality of information obtained. Privacy of respondents was also maintained during the interviewed.

3.10. Dissemination of results

Being an academic paper, the output of this research study will be delivered to AAU as partial fulfillment of Msc in health informatics. Furthermore the findings of this research will be disseminated to the concerned bodies like Addis Ababa health bureau, NGOs working on HIV/AIDS, ETC, the facilities where the research will be undertaken and to other relevant bodies. Efforts will be made for the publication of the paper on peer-reviewed journals.

CHAPTER FOUR
RESULTS AND DISCUSSION

4.1. Results

This chapter was depicted the results and findings of both quantitative and qualitative data results from the questionnaire with the support of some interpretation of results.

4.1.1. Quantitative results

A total of 422 eligible PLHVA responded after giving informed verbal consent. Consecutive patients who came to the ART unit for follow-up were invited during study period, all agreed to participate in the study, giving a total response rate of 100%. About, 246 (58.3%) of the respondents were from Zewditu Memorial Hospital, 106 (25.1%) from Black lion specialized Hospital and the smallest number of the participants 70 (16.6%) were from St. Peter TB specialized Hospital.

4.1.1.1. Socio-demographic characteristics

About 383 (90.8%) of the respondent were living in Addis Ababa and 140 (33.2%) were found in the age group of 32-38 years. The median age was 35 years with (IQR=30-40). Two hundred sixty two (62.1%) patients were females and 32.5% and 35.0% of the participants had attended elementary and high school level education. Regarding to ethnic group 36% were Amhara, 29.4% were Oromo. About 60.4% of the participants were Orthodox, followed by protestant (20.4%), Muslim (17.3%). 128 (30.8%) were governmental employed and 42.7% reporting earning from 500-1000 birr per month income and the median monthly income was 700 with (IQR=150-1001).

The majority of the respondents, 90.8% were living in Addis Ababa and 62.1% were females which similar to the according to the 2007 single point estimation show that prevalence was 1.8% for males and 2.8% for females, and women accounted for 59% of the HIV-positive population and estimated urban and rural prevalence of 7.7% and 0.9% respectively for 2009 (18).

The study also shows that majority of the respondents, 33.2% are in the age groups of 32-38.This indicate that HIV infection has a high burden in the productive age group. On the other hand, this result might indicate that a high proportion of PLWHA in this age group were visiting ART treatments unit. The detail of their demographic distribution is depicted in Table 4.1.below

Table 4.1. Socio demographic characteristics of PLWHA attending ART clinics in selected public hospitals in Addis Ababa May, 2011

Variables Patients (n=422)	Frequency	Percentage (%)
Age		
18-24	29	6.9
25-31	114	2.7
32-38	140	33.2
39-44	92	21.8
>44	47	11.1
Median 35 (IQR=30-40)		
Sex		
male	160	37.9
female	262	62.1
Marital status		
Unmarried	140	33.2
Married	179	42.4
Divorced	39	9.2
Widowed	64	15.2
Educational status		
Not educated	18	4.3
Only read and write	66	15.6
Primary education	137	32.5
Secondary education	135	32.0
College/University	66	15.6
Ethnicity		
Amharic	152	36
Oromo	124	29.4
Garage	83	19.7
Tigre	53	12.6
others	10	2.4

Religion		
Muslim	73	17.3
Orthodox	255	60.4
protestant	86	20.4
Catholic	8	1.9
Occupation		
Governmental employee	128	30.8
Unemployed(jobless)	55	13.0
NGO employee	31	7.3
House wife	55	13
Merchant	37	8.8
Daily laborer	32	7.6
student	17	4.0
Privet employee	67	15.9
Permanent address		
Addis Ababa	383	90.8
Out of Addis Ababa	39	9.2
Living with		
Alone	85	20.1
Family	67	15.9
Parents	176	41.7
With his/her children	68	16.1
With related family	12	2.8
With brother/sister	14	3.3

4.1.1.2. Clinical follow up and current adherence status

Regular clinic attendance was defined as the patient visiting the clinic for their refills on the scheduled appointment dates for the entire study period. Missed appointment dates defined patients missing one or more clinic appointments for refills during the study period. A medication adherence assessment was also conducted at the same time on each client who reported at the health facility for their refill of ARTs using a clinic-based pill count.

The study show, 245 (58.1%) respondents have reported taking ART for 25 and above months, out of which 95 (22.5%) were found to take for 19 to 24 months. The median duration of ART treatment was found to be 3 months (IQR= 2-5).

Two hundred and twenty four (53.1%) had to travel a distance of 1-5 km to come to ART clinic for treatment, where the median distance from the clinic of ART treatment was found to be 5 km (IQR= 3-8). One hundred thirty three (31.5%) were patients have spending 6 to 11km.

The adherence status of respondents during the last date of appointment of the study period past one month, the past three days and since the enrollment to ARVs therapy were measured using self report method. As shown in Table 2, according to the recall for the study period day, majority 319 (75.6%) of the participants reportedly taken >95% of their antiretroviral medications (good), whereas, 84 (19.9%) of them took 85-94% of the doses as per the prescribed ARV drugs (Fair) and 19 (4.5%) took <85% of doses are taken (poor) of the past three days duration.

A total of 257 (60.9%) participants never missed a single of their appointment date for coming to take ARV medication and 165 (39.1%) of them reportedly missed at least one appointment date to come ART clinic since their enrolment. The respondents were also asked open ended and structured questions to mention reasons or barriers for missing their appointment date. About 38 (23%) reported being too busy with works or simply forgotten, 22 (13.3%) said being away from home for work (went to other country)

reasons, 21 (12.7%) said having extra days of medication, 15 (9.1%) transportation problem, 16 (9.7%) being too sick/weak at that time and 15 (9.1) said that they went to holly water, hopeless, social problem, lost of his/her related family at that time.

The study indicate that majority, 75% of the respondents reportedly taken >95% of their antiretroviral medication. Those high levels of ART adherence are broadly consistent with the result of studies conducted in south Ethiopia, Yirgalem 74% and Gondar University Teaching Hospital, Northwest Ethipia73 % (27).

Our study demonstrated that about 39.1% respondents missed a single of clinic appointments for refills were less likely to achieve optimal medication adherence. HIV−infected patients who miss clinic visits may also miss taking their antiretroviral medications. It is possible that patients who always attend the clinic on their appointment dates for their refills may be the ones more likely to be motivated to be adherent to their medication regimen. It is clearly depicted in table 4.2 below.

Table 4.2: Clinical follow up and current adherence status characteristics of PLWHA attending ART clinics in selected public hospitals in Addis Ababa, 2011

Variables (n=422)	Frequency	Percentage (%)
Distance from ART clinic (km)		
1-5	224	53.1
6-10	133	31.5
>10	65	15.4
Median 5k.m = IQR (3-8k.m)		
Duration of taking ART(in month)		
3-6	19	4.5
7-12	47	11.1
13-18	16	3.8
19-24	95	22.5
>24	245	58.1
Median 3k.m = IQR (2-5k.m)		
Frequency of appointment date		
Every two weeks	4	0.9
Every month	77	18.2
Every two months	53	12.6
Every three months	283	67.1
Every six months	5	1.2
Missed appointment		
Yes	165	39.1
No	257	60.9
Reason for miss appointment		
Forgotten appointment date	38	23.0
Transport problem	15	9.1
Too busy	38	23.0
At that time was sick	16	9.7
Went to other country for work	22	13.3
Having extra drug	21	12.7
Others	15	9.1
Current adherence status		
Poor	19	4.5
Fair	84	19.9
Good	319	75.6

4.1.1.3. Mobile phone owners and Usage patterns

Regarding mobile phone owners, respondents were asked questions such as if they owned a mobile phone, the number of years of owning a phone or if they had a relative or close friend who owned a mobile phone in the situation where they did not own a phone. On the patterns of phone use, questions asked included whether clients switched off their phones during the day or at night. Accordingly;

Of the 422 participants who completed the questionnaire in the study, 361 (85.5%) had access to mobile phones. out of those 145 (40.2%) were males and 216 (59.8%) females had their own. Of those who had their own phones, 192 (53.2%) had used phones for 1-3 years, were 138 (38.2%) had used phone range 4-6 years while 31 (8.6%) the participants had used more than 6 years.

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Of the 422 participants of 218 (51.7%) knew about the service provided in ART clinic by adherence supporters using mobile phone for patients follow up and tracing while 204 (48.3%) of the respondents did not know about the service providing and 158 (37. 4%) of the respondents had history of receiving a call at least once from adherence supporters in their ART clinic. However, of those who received calls 141 (39.1%) received calls through their own mobile phone while 17 (27.9%) received calls through their relative or friends.

Of those respondents had history of receiving call, 81 (51.3%) received calls once from ART clinic, 56 (35.4%) received calls twice, 17 (10.8%) received call three times and only four respondents received calls four or more times. One hundred twenty (75.9%) received calls due to the reason missed their appointment to remind them and 18 (11.4%) due to stopped taking medication.

Of 422 patients, 97 (23.0%) had history of calls to adherence supporter through mobile phone. Of those respondents 66 (68%) had received calls from ART clinic. Concerning reason for call to ART, 33 (34%) said to ask information about treatment and services, 22 (22.7%) said to get counseling, 19 (19.6%) to ask their date of appointment while the

others said that they got sick after medication and finished their medication (12.4%, and 10.3% respectively).

Our study demonstrated that, about 85.5% respondents had mobile phones. It is important since most of the study population has mobile phones and hence the potential for utilization mobile phone in ART clinic. Out of those the majority 59.8% were female which similar to source of population women accounted for 59% of the HIV-positive population.

More than half of, 51.7% knew about the service provided in ART clinic by adherence supporters. About 37.4%of the respondents had history of receiving calls but only 23.4% had history of calls to ART clinic. This indicates that respondents those who know about the service might be receive call or calls to ART clinic than those who did not. It is clearly depicted in table 4.3 below.

Table 4.3: Mobile phone owners and Usage patterns characteristics of PLWHA attending ART clinics in selected public hospitals in Addis Ababa, May 2011

Variables Patients	Frequency (n=422)	Percentage (%)
Have mobile phone		
Yes	361	85.5
No	61	14.5
Duration having mobile phone		
1-3	192	53.2
4-6	138	38.2
>6	31	8.6
Access through friends or family		
Yes	36	60.0
No	24	40.0
Use reminding tool medication		
Yes	370	87.7
No	52	12.3
Reminding tool do you use		
Alarm (mobile phone)	243	65.5
Family members	34	9.2
Health professionals	1	0.3
Time watch	92	24.9
Know about the service		
Yes	218	51.7
No	204	48.3
Ever received call		
Yes	158	37.4
No	264	62.6
Received a call frequency		
Once	81	51.3
Twice	56	35.4
Three times	17	10.8
Four times and above	4	2.5

4.1.1.4. Patients' perceived attitude towards the use of mobile phone

Patients acknowledged different advantages of using mobile phone for ART clinical attendance and follow up for multiple response questions. Accordingly among 361 patients 93.8% of them acknowledge for patients clinical attendance and follow up , 87.0%, to keep confidentiality, 87.6%, to remind appointment date 86.4% to save time, 85.5% for counseling about ART, 81.8% to minimize transportation and other related cost and 78.8% to change behavior and perception towards regarding ART.

Table4.4: Patients' perceived attitude towards the use of mobile phone at public hospitals in Addis Ababa, May 2011

Variables	Percentage
Time saving	86.4
keeping confidentiality	87.0
Counseling about ART drugs and need for adherence	85.5
Remind appointment date	87.6
For patients clinical attendance ,follow up and tracing	93.8
To change behavior and perception, regarding ART	78.8
Minimize transportation and other related costs	81.8

4.1.1.5. Status of mobile phone utilization among PLWHA attending ART clinics

The magnitude of mobile phone utilization (either receive call from adherence supporter or call to them) among patients who participated in the study was 46.8% (95% CI 42.0, 51.5) in the total study population. Among them more than half 103 (60.9%) were female respondents, and 152 (89.9%) are living Addis Ababa.

Regarding to age, near to half 76 (45.0%) of the respondents are using mobile phone were within the age group of 25-34 years. Religions of respondents 100 (59.2%) were orthodox, 41 (24.3%) Protestant and catholic, 28 (16.6%) were Muslim. Concerning their employment status about 68 (40.2%) respondents are using mobile phone were governmental employed.

Concerning their educational status about 56 (33.1%) were attend elementary 65 (38.5%) were attend secondary school, and 27(16.0%) were college and above. Regarding monthly income, close to half 82 (48.5%) reporting earning from 500-1500 birr per month income. One hundred sixteen (68.6%) of the respondents were miss their appointments date, about 145 (85.8) were know about the service. Concerning current adherence status about 102 (60.4%) were good 67 (39.6%) were fair and poor adherence status are using mobile phone.

Bivariate analysis was done and mobile phone utilization was found to have a statistically significant association with occupational status of respondents, for governmental employee [OR, 1.91 (95% CI 1.13, 3.23)] more likely to utilized mobile phone compared with unemployed and distance from health facility among those who come from a distance of 11km and above [OR, 1.82 (95% CI 1.017, 3.25)] were more likely utilization mobile phone compared to those who come from a distance of less than 5km.

The study also shows that at 95% CI, sex, age, marital status, religion, ethnicity, educational status, monthly income and permanent address were not significantly associated with mobile phone utilization. It is clearly depicted in table 4.5 below.

Table 4.5: Association of utilization of mobile phone to selected socio demographic characteristics PLWHA on ART public Hospitals in Addis Ababa, May, 2011

Variables	Utilization of mobile phone		CrudOR:95%Cl	AjustedOR:95%Cl
	No	yes	N=361	
sex				
male	79 (41.1)	66 (39.1)	1.00	
female	113(58.9)	103(60.9)	1.091 [0.72-1.66]	----------
Age				
18-24	10 (5.2)	10 (5.9)	1.00	
25-34	84 (43.8)	76(45.0)	0.91 [0.36-2.29]	----------
35-44	78 (40.6)	65 (38.5)	0.83 [0.33-2.13]	----------
>44	20 (10.4)	18 (10.7)	0.90 [0.31-2.66]	----------
Marital status				
Married	64 (33.3)	55(32.5)	1.00	1.00
Unmarried	86 (44.8)	76 (45.0)	0.97 [0.61-1.56]	1.02 [0.49-2.06]
Divorced/Widowed	42 (21.9)	38 (22.5)	1.02 [0.59-1.75]	0.66 [0.29-1.52]
Religion				
Orthodox	122(63.5)	100(59.2)	1.00	
Muslim	23 (14.4)	28 (16.6)	1.27 [0.70-2.29]	----------
Protestant/catholic	43 (22.1)	41 (24.3)	1.16 [0.70-1.92]	----------
Ethnicity				
Amhara	70 (36.5)	62 (36.7)	1.00	
Oromo	52 (27.0)	48 (28.4)	1.04 [0.62-1.75]	----------
Others	70 (36.5)	59 (34.9)	0.95 [0.59-1.55]	----------
Educational status				
Not educated	30 (15.6)	21 (12.4)	1.00	1.00
Elementary	62 (32.3)	56 (33.1)	1.29 [0.66-2.51]	1.11 [0.41-3.00]
High school	63 (32.8)	65 (38.5)	1.47 [0.76-2.84]	1.22 [0.46-3.22]
College/above	37 (19.3)	27 (16.0)	1.04 [0.49-2.19]	0.74 [0.19-2.79]

Monthly income				
<500	72 (37.5)	52 (30.8)	1.00	1.00
501-1500	89 (46.4)	82 (48.5)	1.28 [0.80-2.03]	0.52 [0.21-1.28]
>1500	31 (16.1)	27(16.0)	1.56 [0.86-2.85]	0.84 [0.26-2.72]
Permanent address				
Addis Ababa	174 (90.6)	152 (89.9)	1.00	
Out of Addis	18 (9.4)	17 (10.1)	0.93 [0.46-1.86]	----------
Occupation status				
Unemployed	65 (33.9)	40 (23.7)	1.00	1.00
Govn't employed	52 (30.2)	68 (40.2)	**1.90 [1.13-3.23] ***	1.52 [0.55-4.23]
Private employed	69 (35.9)	61 (36.1)	1.44 [0.85-2.42]	1.18 [0.45-3.11]
Distances(km)				
1-5	108 (56.2)	77 (45.6)	1.00	1.00
6-11	57 (29.7)	57 (33.7)	1.40 [0.88-2.03]	0.86 [0.43-1.71]
>11	27 (14.1)	35 (20.7)	**1.82 [1.02-3.25]***	0.78 [0.33-1.85]

*Remark * significant at 95% C*

Bivariate logistic regression analysis shows that with regard to clinical follow up and current adherence status respondents those who did not miss their appointment at [OR,17.8 (95%CI 10.20-31.1)], for those did not know about the service [OR, 15.44 95% CI 9.05-26.3], duration of having mobile phone for more than 6 years [OR, 2.59 (95%CI 1.16, 5.79)] and current adherence status for fair and poor [OR, 9.86 (95%CI 6.09, 19.08)] were significantly associated with mobile phone utilization.

Multivariate logistic analysis was also done for those variables significantly associated with mobile phone utilization to control confounding variables and look for association by using logistic regression, appointment date, know about the service and current adherence status are significant association with mobile phone utilization. Thus, respondents those who miss their appointment date [OR, 7.51 (95% CI 3.58, 15.77)] were likely to use mobile phone compared to who did not miss their appointments date, similarly respondents those who know about the service [OR, 9.25 (95%CI 4.98, 17.47)] were more likely to use compared to who did not know.

Regarding to adherence status respondents those who have fair and poor adherence status [OR, 2.99 (95%CI 1.17, 7.70)] were more likely utilized mobile phone (either received call from Adherence supporter or call to them or both) when it compared to those have good adherence status. It is clearly depicted in table 4.6 below.

Table 4.6: Association of utilization of mobile phone and ART related and current adherence status characteristics among PLWHA on ART in Addis Abba May, 2011

Variables	Utilization of mobile phone		CrudOR:95%Cl	AjustedOR:95%Cl
	No	Yes	N=361	
Duration of having mobile(yrs)				
1-3	106(55.2)	86 (50.9)	1.00	
4-6	76 (39.6)	62 (36.7)	1.01[0.65-1.56]	1.07 [0.54-2.12]
> 6	10 (5.2)	21 (12.4)	**2.59 [1.16-5.79]***	2.62 [0.82-8.33]
Duration on ART (in month)				
<24	80 (41.7)	65 (38.5)	1.00	
25-36	27 (14.1)	35 (20.7)	1.59 [0.88-2.91]	1.13 [0.45-2.85]
37-60	52 (27.1)	51 (30.2)	1.21 [0.73-2.00]	0.64 [0.29-1.39]
>60	33 (17.2)	18 (10.7)	0.24 [0.67-1.30]	0.58 [0.19-1.68]
Frequency of appointment				
Every month	40 (40.8)	25 (14.8)	1.00	
Every two months	25 (13.1)	22 (13.0)	1.41 [0.66-3.01]	1.17 [0.37-3.74]
Every three months	127 (66.1)	122 (72.2)	1.54 [0.88-2.67]	2.08 [0.82-5.33]
Know about service				
yes	54 (28.1)	145 (85.8)	**15.44 [9.05-26.3]***	**9.25 [4.98-17.47]***
No	138 (71.9)	24 (14.2)	1.00	1.00
Miss appointment				
Yes	21 (10.9)	116 (68.6)	**17.8 [10.20-31.1]***	**7.51[3.58-15.77]***
No	171 (89.1)	53 (31.4)	1.00	1.00
Adherence status				
Good	180 (93.8)	102 (60.4)	1.00	1.00
Fair/ Poor	12 (6.2)	67 (39.6)	**9.86 [6.09-19.08] ***	**2.99 [1.17-7.70]***

*Remark * significant at 95% CI*

Respondents who were not using mobile phone application were asked about their reason why they are not used mobile phone in their particular hospital. Accordingly among all respondents who were not using any call to ART clinic 329 (78.0%) of reported that they have no information about the service, 197 (59.9%) reported that they don't know the reason, 147 (44.7%) said don't have their phone number 136 (41.5%) reported that they did not miss their appointment 49 (14.9%) said that the reason afraid of confidentiality 46 (14.0%) said they were living near to health facility and 24 (7.3%) not having mobile phone. It is clearly depicted in table 4.7 below.

Table4.7: Reasons affecting utilization of mobile phone applications in selected Public hospitals of Addis Ababa, May 2011

Variables Patients (n=422)	Frequency	Percentage *
Don't have information	329	78.0
Don't know	197	59.9
Don't have their number	147	44.7
Not miss appointment	136	41.5
Afraid of confidentiality	49	14.9
Don't have mobile phone	46	14.0
Near to health facility	24	7.3

** Percents do not add up to 100% since more than one answer was possible*

4.1.2. Qualitative result

The qualitative study is undergone to assess the practice, attitude towards the use of mobile phone and factors which affect utilization of mobile phone for clinical attendance and follow up among adherence supporters and ART focal person working in the selected public hospitals.

4.1.2.1. In depth interview

Theme 1: Status of utilization and clinical practices

Utilization of mobile phone for HIV patient follow up and tracing was started in all public hospitals included in the study three years ago by John Hopkins University technical supporter TSEHAI project Non (Governmental Organization) for ART providing Hospitals by assigned expert PLWHA who were trained and given mobile phone and monthly mobile card charge to use only for patients follow up and tracing purpose.

The service is given to patients in both ways either calling to patients or received calls from patients. Two adherence supporters in Zewditu memorial Hospital, one in Black Lion teaching specialized Hospital and one in St.Peter TB specialized Hospital had mobile phone for the purpose of ART follow up and tracing.

On average one adherence supporters will contact to 40 to 50 patients for different purposes including reminding appointment date, counseling and for information need but the service is not known by majority of the patients.

Theme 2: Attitude of Adherence supporters and ART focal persons towards mobile phone use

The use and importance of mobile phone for ART follow up and tracing is acknowledged by all adherence supporters and ART focal persons participated in the interview. All recognized the time saving, easiness, and accessibility and cost effectiveness advantages of mobile phone over home based tracing. One ART focal person said

"……We were using home based tracing which was very difficult to get the right address of patient and it was both time and cost consuming……even after getting the address it was difficult to get the patient at home……."

Most of participants also revealed that use of mobile phone for ART follow up is important for patient confidentiality. Patients were worried when an adherence supporter came to their house or called through their residence/home phone because someone from the family member or neighbor may get the chance to know their status without their interest. But now they do have their own number and they can call and receive a call from the adherence supporters at any time and place for any service and information regarding HIV/AIDS in all the three hospitals included in the study.

In general all adherence supporters and ART focal persons had positive attitude towards the use of mobile phone technology for ART patients follow up and tracing and they are happy in the service even though there are problems and challenges associated with the service. One adherence supporter explained the issue saying

"…..We could trace many patients who stopped medication and follow up through mobile phone with little effort……I am happy by the service……."

Another adherence supporter also support the idea saying

"…….From my experience and I am also one of them, I feel that mobile phone has lot of advantages including time saving ,direct contact with patients ,reduce cost for transportation and to express their feeling rather than talk face to face … So it will have paramount importance……..

Factors affecting utilization of mobile phone

It was confirmed from the interview that there are problems which can affect the effective utilization of mobile phone for ART follow up and tracing. Even if many patients are enrolled in the service there are also many patients who do not know about the availability of the service. In addition it is also difficult to reach all patients due to some factors. The major factors explored from the interview are discussed as follows

Awareness about the service among patients

Some patients are unaware about the service provided by the hospitals. There is no effort done by the hospitals to promote and create awareness about the availability and use of the service. Most of the patients who are enrolled in the service are those patients who missed their appointment date and stopped medication and their relatives. Few hospitals have started little activities to promote the service by posting notice paper in the ART clinic one month before the study period.

Budget/sustainably

The mobile phone apparatus and Sime card was provided by JHU/TSEHAI project. The monthly mobile card fee is also covered by JHU. But all the adherence supporters are not satisfied with the amount of mobile card provided. They complained that it is not enough to trace and call to all the patients who missed their appointment and specially those patients who are in bed without relative and need special counseling. On the other hand, inadequate mobile phone apparatus was mentioned as a problem there are five to six adherence supporters working in each hospital but they have only one or two mobile phone.

The ART focal persons are worried about the sustainability of the service because of the budget and less recognition and knowledge of higher officials to mobile phone service to ART service and they recommend that the system should be integrated with the general

ART service and officials should allocate budget for mobile phone service and motivate adherence supporters.

One ART focal person expressed her worry as:-

"….The hospital administrators even do not know the implementation of mobile service for ART in their hospital……and budget for mobile phone is unthinkable by the administrators….."

Network coverage

Network coverage is also mentioned as a factor to trace the patients. There are many patients who are enrolled in the ART service far from Addis Ababa in all the three hospitals. Tracing these patients is difficult due to the poor network coverage.

Fear of Stigma and confidentiality

Some patients do not want to call and receive a call from adherence supporters because of the fear of stigma and confidentiality of their status. Some patients even do not want to give the real mobile number at their start of the ART service. Even those patients who are enrolled in the service want to communicate only with one adherence supporter.
One of the adherence supporters explained

"….most of time patients need to communicate with only one adherence supporter because of fear of privacy and confidentiality……"

4.2. Discussion

The study shows 85.5% of the total respondents have access to mobile phones which was high, that is not surprising given that Africa has the highest rate of mobile phone uptake amongst developing regions with tremendous expansion across all socio-demographic barriers. This finding is almost the same compared to a study done in Kenya on phone usage in healthcare by patients attending the Nairobi clinics which is 89% had access to a phone (17). .However it is better compared to a study done in South India 75% of clinic attends owned mobile phones and rural Uganda which indicated 64% of the participants had access to mobile phones (10, 12).

The magnitude of mobile phone use among patients who participated in the study was found 46.8% (95% CI 42.0, 51.5) in the total study population. Our study also indicates about 37. 4% of the respondents had history of receiving a call at least once from adherence supporters in their ART clinic and only 23% were had history of call to ART clinic. The findings of this study was high compared to a study done before six years in Kenya which indicated 12% of the participants had ever called or been called by health care staff (12, 17). This finding is very low compared to the finding in Malaysia reveled that both the SMS and the mobile phone call reminder rate 59.0% and 59.6% to reduce non attendance for chronic disease patients follow up (42).

The study points out that 68.6% of the study subject missed at least one appointment date were using mobile phone. Missed appointment had a strong significant association with high mobile phone utilization (95% CI 7.51 (3.58-15.77), This indicates that as patients missed their appointment date might be use mobile phone, either receive call from ART clinic or call to ART clinic. It supported qualitative data, most of time makes calls from adherence supporters for those patients who missed their appointment date and stopped taking medication. Consistent with our finding, a study in Uganda showed out of 62 missed visiting 49 patients were returned following mobile phone call (10). In addition, regular phone call reminders to take ARV medications were also reported to improve self-reported adherence among patients in Italy, Puerto Rico, and the United States of America (43).

Distance from health facility and permanent address of the respondents were found no significantly associated with mobile phone utilization. However, qualitative data indicated majority of respondents who were far away from health facility and out of Addis Ababa used mobile phone than patients near to health facility. On the other hand, study done in Southern Ethiopia indicated that adherence among those who came from a distance of less than or equal to 47 Km was about 2.5 times higher than that among those who came from greater than 47 Km (44).

This study also revealed that the respondents' adherence status was significantly associated with mobile phone utilization. Respondents with fair and poor adherence status were more likely to use mobile phone compared to respondents with good current adherence status. Qualitative data also show that patients those who missed their appointment date and stopped taking medication more likely to receive call from ART clinic. But study done in Uganda showed the proportion of clients achieving optimal adherence before and after mobile phone recall was 80.1% and 90.0%, which a significant difference in mean adherence levels before and after mobile phone recall intervention (P = 0.002) (10).
In addition, in a separate randomized trial in the United States, a structured telephone counseling intervention did improve adherence to HAART and there was a trend toward improved clinical outcomes (9).

The study indicates that knowing about the service significantly associated with mobile phone utilization. Respondents those who know about the service more likely to use than those who didn't know the service Out of the total respondents about 49.3% didn't know about the service provided in ART clinic. Thus, only 23% had history of call to ART clinic. It is also supported the qualitative study also indicates that some of the patients are unaware about the service provided by the hospitals. So this indicates that those who know the service might be make calls to ART unit.

According to response with in-depth interview, consideration of confidentiality issues will be of the utmost importance in any strategy to use mobile phones in healthcare. Preferring to talk with clinic staff in person and issues regarding stigma or confidentiality were important barriers. But some patients do not want to call and receive a call from adherence supporters because of the fear of stigma and confidentiality of their status. Nevertheless, study done in Kenya, Nairobi showed about 54% respondents they would be comfortable receiving HIV-related information by telephone, an indication that a level of trust already exists. Other barriers pertained more to logistical issues, rather than health-related concerns. Business and economic biases are also likely to affect patient's mobile phone ownership as well as attitudes and access (17).

In the in depth interview data indicates poor Network coverage is mentioned as a factor to communicate with the patients. But the pilot study in south India revealed that although 75% of patients owned mobile phones, use of the text messaging function was low, possibly because of relatively low literacy rates. Phones were used mostly for conversation (12). Similarly, study in Uganda indicate the majority of respondents preferred being contacted through mobile voice calls rather than through SMS text messages, stating their inability to read text messages because of illiteracy and language barriers (10).

The study shows that some patients even do not want to give the real mobile number at their start of the ART service. However, qualitative study in Peru reveal that 74% interviewed, reported their willingness to use cell phones to receive reminder messages for their HIV medication, either by a pre-recorded voice or by use of short-text messaging **(30)** Furthermore, a recently piloted SMS text reminder to improve adherence to ART among Los Angeles youths was acceptable and showed early benefit on adherence **(9).**

CHAPTER FIVE
CONCLUSSION AND RECOMMENDATION

5.1. Conclusion

The overall objective of this study was to assess utilization of mobile phone and factors affecting utilization of mobile phone for HIV patients' clinical attendance and follow up at public hospitals in Addis Ababa .A total of 422 patients were participated in the study. A cross sectional study employing both quantitative and qualitative methods was using administered questionnaires and depth interview were methodology followed to gather information. The findings of the study shows, about 85.5% have mobile phones, the magnitude utilization among patients was found 46.8% of total respondents, 48.3% have no information about the service provided in ART, 37.4% were receive calls and 23.0% were had history of calls to adherence supporter.

Have no information about the service, don't know the reason, don't have their phone number, not miss their appointment date, afraid of confidentiality and living near to health facility were reasons affecting utilization of mobile phone. However the study is not intended to evaluate the effect or the influence of mobile phone on clinical appointment and follow up in ART unit.

- The majority of the respondents had access to mobile phone, but Patients rarely calls to the ART centre rather they receive calls from the centre. The study showed that mobile phone utilization rate among patients on ART visiting was 46.8 % in the total study population.

- The Attitude of patients and adherence supporters towards utilization of mobile phone for patients clinical attendance, follow up and tracing, and remind appointment date is found relatively good.

- The major predictors found for utilizing mobile phone for patient clinical attendance ,follow up and tracing, and remind appointment date were information about the availability of the service, adherence status and miss appointment date.

5.2. Recommendation

The availability of the mobile phones, the continually expanding network coverage, the comparatively low cost of voice calls and SMS text messaging and the ease of use could have important implication to suggest a timely intervention in order to improve patients attendance, follow up, medication adherence and remind their appointment date.

For the researcher

- Further study should be conducted to determine the influence or effect of mobile phone towards improving HIV patients' clinical attendance and follow up.

For the administrators

- Awareness creation activities to improve patient's attitude and perception and motivation of adherence supporters are important in addition to allocating budget for mobile phone service.

For policy maker

- Federal Ministry of Health should aim at integrating the use mobile phone into their for HIV/AIDS care and treatment programmes to improve patient attendance, follow-up, adherence and remind their appointment date.

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Annex 1: English version of written consent form for patients

Name of the hospital_____

Checked by

Supervisor's signature_____ Date_____

Investigators signature _____ Date_____

How are you? My name is _____. I would like to inform you that you and I would have a short discussion concerning this study. Before we go to our discussion, I will request you to listen carefully to what I am going to read to you about the purpose and general condition of the study and you will tell me know whether you agree or disagree to participate in this study.

Consent form

The purpose of this study is to assess utilization of mobile phone technology for HIV/AIDS patient clinical attendance and follow-up in ART providing health facilities in Addis Ababa. The study might be helpful for program implementers to design and implement appropriate communication technologies and enhance the communication link between patients and healthcare providers.

I am asking you for a little of your time, about 20 - 30 minutes only to help us in this study. The information you give me will be kept confidential and your name and address is not recorded in the interview to protect your confidentiality. You have also the rights to answer or not for the questions which might be inconvenient for you .However, your information is very important to evaluate and improve the program .Again we would like to confirm to you that all your answers are confidential and used for research purpose only .

Are you willing to participate in this study?

Yes, I agree Signature _____ Date _____.

No, I don't agree

Thank you!!

Name_____Signature_____Date_____

Annex 2 : English version of written Questionnaire form

Section I: Socio demographic characteristics of patient questionnaire

No	Questions	Coding Categories	*Code*
101	Sex of respondent	1. Male 2. Female	
102	How old are you?	_____	
103	You current marital status?	1. Unmarried 2. Married 3. Divorced 4. Widowed 5. Separated	
104	What is your religion?	1. Muslim 2. Orthodox 3. Protestant 4. Catholic 5. others ----------	
105	What is your Ethnicity?	1. Amhara 2. Oromo 3. Gurage 4. Tigrai 5. Others specify----------	
106	What is your educational level?	1. Illiterate 2. Read & write 3. Elementary 4. High school 5. Diploma or above	
107	What is your total monthly income (in birr)?	_____	
108	Where is your permanent address?	1. Addis Ababa 2. Out of Addis Ababa	
109	What is your current occupation?	1. Governmental employee 2. Unemployed (Jobless) 3. NGO employee 4. House wife 5. Merchant 6. Daily laborer 7. Student 8. Other specify_____	

110	With whom you are living with?	1. Alone 2. Family 3. Parents 4. With his/her children 5. With related family 6. Other---------	
111	Do you have support from your family?	1. Yes 2. No	
112	If yes, for Q#111 What kind of support you are getting from your family?	1. Emotional/Psychological 2. Physical care and support 3. Financial 4. Counseling 5. Other_____	

Section II: clinical follow up and adherence status

No	Questions	Coding Categories	Code
113	How far is your home from the health facility (clinic) in km?	_____	
114	When did you start receiving ARV treatments? (in months or years)	_____	
115	How often your appointment date?	1. Every two weeks 2. Every month 3. Every two months 4. Every three months 5. If others specify	
116	Have ever miss your appointment date?	1. Yes 2. No	
117	If yes, for Q#117 reason for miss appointment date	1. Forgotten appointment date 2. Transport problem 3. Too busy 4. At that time was sick 5. Went to other country for work 6. Other specify_____	
118		1. Poor	

	Current adherence status during the last month appointment	2. fair 3. good	

Section III: Mobile phone access (owners) and use patterns of patients

No	Questions	Coding Categories	Code
201	Do you have mobile phone?	Yes No ——→skip to Q# 204	
202	If yes, for above question For how long do you have it?	_____years	
203	Is your phone always available with you and switch on?	1. Yes always available and switch on 2. Switch off at day time 3. Switch off at night time 4. Others_____	
204	If No for Q# 201 do you have Access through friends or family members	1. Yes 2. No	
205	Do you use any reminding tool for your medication?	1. Yes 2. No	
206	If yes what reminding tool do you use?	1. Alarm 2. Family members 3. Health professionals 4. Friends 5. Time watch 6. If others specify----------	
207	How often your appointment date?	1. Every week 2. Every two weeks 3. Every month 4. Every three months 5. If other specify	
208	Do you know about the service provided by adherence supporters using mobile phone in ART clinic?	1. Yes *2.* No	
209	If yes how often do you receive a call from adherence supporters?	1. Once in month 2. Some times 3. Rarely 4. Once in three months 5. If other specify	
210	If yes for Q#209 for what purpose?	1. To remind me my appointment date 2. To get counseling 3. To get information about the treatment? 4. Other (specify)	

211	Do you ever call to adherence supporters in your ART clinic?	1. Yes 2. No	
212	If yes for Q#212 for what purpose?	1. To ask my appointment date 2. To get counseling 3. To get information about the treatment? 4. Get sick 5. Other (specify)	
213	If No for Q# 212 what is your reason?	1. I don't miss my appointment date 2. I have no mobile phone 3. I am near to the health facility 4. I am afraid about the confidentiality 5. I don't have their number 6. No Network coverage 7. I don't know 8. I can't manipulate mobile phone 9. Language barrier 10. I don't have the information about the service 11. If other specify_____	

Section IV: Patients' attitude towards the use of mobile phone in ART Clinic

NO	Questions How important do you think is the use of mobile phone for ART follow up regarding to:	Not at all Iimporta nt (1)	Less Iimportant (2)	Uncertain (3)	Important (4)	Extremely Iimportant (5)
301	In time saving					
302	In keeping your confidentiality					
303	To get counseling about ART drugs and need for adherence					
304	To remind your appointment date					
305	For patients clinical attendance ,follow up and tracing					
306	To change your behavior and perception, regarding ART					
307	Minimize transportation and other related costs					

Section VII: In-depth interview guide for ART focal person and adherence supporter

For ART focal person

1. What do you think about mobile phone utilization for ART patients follow up, drug adherence and tracing?
   Probe_____
   _____
   _____.

Budget

2. Where do you get financial support for mobile phone utilization for patients tracing and follow up and training related?
   Probe._____
   _____
   _____.

Infrastructure

3. Do you have software application for mobile phone utilization in your hospital?
   Probe_____
   _____
   _.

Human Resource

4. Do you have the required skilled human resource in utilization of mobile phone for patients follow up and adherence supporting and being trained in providing services?
   Probe
   _____
   _____
   _____.

Utilization factors

5. What do you think are the major challenges or problems in utilizing mobile phone for patients follow up in your hospital ART clinic?
   Probe_____
   _____
   _____.

Any additional comment

……..

Thank you

For adherence supporter

1. What do you think about mobile phone utilization for ART patients follow up, drug adherence and tracing?

   Probe_____

   _____

   _____.

2. How often do you call to patients and how do you memorize appointment date and identify loss to follow up and defaulters?

   Probe_____

   _____

   _____.

3. What major challenges or problems you faced while using mobile phone for patients follow up drug adherence and tracing in your hospital ART clinic?

   Probe_____

   _____

   _____.

Any additional comment

……

……..

Thank you

Annex 3: Amharic version of written consent form

<u>አዲስ አበባ ዩኒቨርስቲ</u>
<u>ድህረ ምረቃ ትምህርት ቤት</u>
<u>ሄልዝ ኢንፎርማቲክስ ዲፓርትመንት</u>

<u>በግንዛቤ ላይ የተመሰረተ የስምምነት መግለጫ ቅፅ</u>

መግቢያ

ጤና ይስጥልኝ እኔ ስሜ_____ይባላል። እኔ **ከአብዲ ዩሱፍ** ከአዲስ አበባ ዩኒቨርስቲ የጥናት ቡድን ጋር አብሬ እየሰራሁ ነው ። የጥናቱ አላማ በአዲስ አበባ ከተማ ፀረ ኤች አይ ቪ ህክምና አገልግሎት የሚሰጡ የመንግስት ሆስፒታሎች ውስጥ ከቁርኝት አጋር ና ታካሚዎች መካከል በሞባይል ስልክ የሚደረገውን የጤና የመረጃ ልውውጥ ሂደትን ለመገምገም ነው:: ይህም ሁሉ ባለድርሻ አካላት ያለውን በሞባይል ስልክ የመረጃ ልውውጥ ሂደትና ሂደቱን ሊያበለፅጉ ወይም ሊገድቡ የሚችሉ ሁኔታዎችን በበለጠ እንዲረዱ ያግዛል:: በተጨማሪም የጥናቱ ግኝት ለወደፊቱ በህሙማ የጤና ሁኔታ ፤መረጃ አረዳድ፤ የመዳኒት አወሳሰድና ክትትል ለማሻሻል ይረዳል።በዚህ መሰረት በዚህ ሆስፒታል ውስጥ ያለውን በሞባይል ስልክ የመረጃ ልውውጥ ሂደት ለማወቅ ያስችል ዘንድ እርሶዎ ህክምና ከሚያደርግሎት ክፍል ና ከቁርኝት አጋር ጋር ባለፉት አንድ ዓመት ጊዜ ውስጥ አንዳንድ የመረጃ ልውውጥ ሂደትን እጠይቅዎታለሁ።

በቅድሚያ ግን ማንኛውም የሚሰጠኝ መረጃ ሚስጥራዊነት የተጠበቀ መሆኑኑን ልገልፅልዎት እወዳለው።በዚህ የጤና ተቋም ውስጥም ሆነ በጥናቱ ላይ የሚሳተፍ ሌላ ሰው እርሶዎ የሰጡትን መረጃ አያውቅም።ለዚህም ሲባል በመጠይቁ ለይ ስሞዎት ወይም የእሶዎ ማንነት ሊገልፅ የሚችል ማንኛውም መረጃ አይሞላም።

የሚሰጡኝ ማንኛውም አስተያየተት ጠቃሚ ነው። ሰፋ ያለ አስተያየት ማግኘታችን በጉዳዩ ላይ ያለውን ግንዛቤ በእጅጉ እንዲጨምር ይረዳናል።

በቃለ መጠየቅ ላይ ለመሳተፍ ፍቃደኛ ነዎት?

☐አዎ ፊርማ_____ ቀን_____

☐ፈቃደኛ አይደለሁም

አመሰግናለው!

የፍቃደኝነት መግለጫ መረጃ አሰባሳቢ

ስም_____ ፊርማ_____ቀን_____

Annex 4: Amharic version of written questionnaires

ክፍል አንድ ስለ ታካሚው አጠቃላይ ማህበራዊ ሁኔታን መረጀ መጠየቅ

ተቀኑ	ጥያቄ	አማራጭ	ኮድ
101	ፆታ	1. ወንድ 2. ሴት	
102	ዕድሜ ዎ ስንት ነው?	_____	
103	በአሁኑ ወቅት የጋብቻ ሁኔታዎ እንዴት ነው?	1. ያላገቡ 2. ያገቡ 3.የተፋቱ 4. ባል/ሚስት የሞተባቸው 5. ሌላ ካለ ይግለፁ_____	
104	ሃይማኖትዎ ምንድ ነው?	1. ኦርቶዶክስ 2. ሙስሊም 3. ፓሮቴስታንት 4.ካቶሊክ 5.ሌላ ይግለፁ----------	
105	ብሄርዎ ምንድ ነው?	አማራ ኦሮሞ ጉራጌ ትግሬ ሌላ ይግለፁ----------	
106	የት/ደረጃ እንዴት ነው?	1. ያልተማረ 2. ማንበብና መፃፍ 3. የመ/ ደረጃ 4. ሁለተኛ ደረጃ 5. ኮሌጅ/ዩኒቨርሲቲ	
107	በአማካይ የወር ገቢዎ ስንት ነው?	_____	
108	ቋሚ መኖሪያ ቦታዎ የት ነው?	1. በአዲስ አበባ ከተማ ውስጥ 2. ከአዲስ አበባ ከተማ ውጪ	
109	የስራ ሁኔታ እንዴት ነው?	1. የመንግስት ሰራተኛ 2.ስራ የሌለው 3.አርሶ አደር 4.የቤት እመቤት 5.ነጋዴ 6.የቀን ሰራተኛ 7.ተማሪ 8.ሌላ ከሆነ ይግለፁ_____	
110	ከማን ጋር ነዉ የሚኖሩት?	1.ብቻዎን 2.ከቤተሰብ ጋር 3. ከእናት/አባት ጋር	

		4. ሌላ ከአለ ይግለፁ_____	
111	ከቤተሰብ ምን አይነት ድጋፍ ይደረግልዎታል?	1. የስነ_ልቦና ድጋፍ 2. አካላዊ ድጋፍና እንክብካቤ 3. የገንዘብ ድጋፍ 4. የምክር 5. ሌላ ድጋፍ ይግለፁ _____	
112	ከመኖሪያ ቤትዎ እስከ ህክምና ተቋም ያለው ርቀት ስንት ነው (ኪሜ)?	_____	
113	ወደ ህክምና ተቋም ሲመጡ የትራንስፖርት ወጪዎ ስንት ነው?	_____	
114	የመድሃኒት ቁርኝት ሁኔታ እንዴት ነው? (ከካርድ)	1. Poor 2. fair 3. good	
115	ለፀረ HIV ህክምና በወር በአማካይ ለምን ያህል ጊዜ ይመጣሉ?		

ክፍል ሁለት ስለ ታካሚው መረጀ ቃለ መጠየቅ

ተቁ	ጥያቄ	አማራጭ	ኮድ
201	የሞባይል ቴሌፎን አለዎትን?	1. አዎ 2. የለኝም የለኝም →	303
202	መልሶዎት አዎ ከሆነ መጠቀም ከጀመሩ ምን ይህል ጊዜ ሆነዎት?	1. አንድ አመት 2. ሁለት አመት 3. ሶስት አመት ና ከዛበላይ	
203	የሞባይል ቴሌፎንዎ አጠቃቀምዎ ምን ይመስላል?	1. ሁልጊዜ ቀን ቀን አጠፋለሁ 2. ሁልጊ ከፍት ነው 3. ሌላ ካለ ይግለፁ_____	
204	ጥያቄ#201 የለም ከሆነ በጓደኛ ወይም በቤተሰብ አባላት በኩል ሞባይል ይጠቀማሉ ይጠቀማሉ?	1. አዎ 2. አይደለም	
205	መድኃኒት መውሰጀ ሰዓትዎን ለማስታወስ የሚጠቀሙት ነገር አለ?	1. አዎ 2. አይደለም	
206	ጥያቄ#205 መልሶ አዎ ከሆነ ከተዘረዘሩት ውስጥ የትኛው ይጥቀማሉ?	1. የደወል ጥሪ 2. ቤተሰብ 3. የጤና ባለሙያ 4. ጓደኛ 5. ሰአትን በማየት	

		6. ሌላ ካለ ይግለፁ_____	
207	ሆስፒታል ውስጥ ለፀረ HIV ህክምና ክትትል በሞባይል ስልክ አገልግሎት እንደ ሚሰጥ ያውቃሉ?	1.አዎ 2.አይደለም	
208	በሞባይል ስልክ ከART ክፍል ውስጥ ከሚሰሩት ከቁርኝት አጋር_ጋር ተነጋግሮ ያዉቃሉ?	1. አዎ 2.አይደለም	
209	ጥያቄ#206 መልሶ አዎ ከሆነ ስንቱ ተደዋዉለዋል?	1. በወር አንዴ 2. አንዳንዴ 3. አልፎ አልፎ 4. ሌላ ካለ ይግለፁ_____	
210	ጥያቄ#206 መልሶ አዎ ከሆነ ለምን ምክኒያት ተደዋዉለዋል	1. የቀጠሮ ቀን ለማስታወስ 2. የምክር አገልግሎት ለማግኘት 3. ስለ መድሃኒት ሁኔታ ለማግኘት 4. ሌላ ካለ ይግለፁ_____	
211	የቀጠሮ ቀን ለማስታወስ በሞባይል ስልክ ከART ክፍል ተደዉሎለት ያውቃሉ?	1. አዎ 2. አይደለም	
212	ጥያቄ#30 መልሶ አይደለም ከሆነ ምክኒያቱስ?	1. የቀጠሮ ቀኔን ስለ ማላሳልፍ 2. ሞባይል ስልክ ስለ ሌለኝ 3. መኖሪያ ቤቴ ለጤና ተቋም ቅርብ ስለ ሆነ 4. ፍራቻ ስለ ኔ ነፃነት ና ምስጥር 5. ሞባይል ስልክ ከቤተሰብ ጋር በጋራ ስለምጠቀም 6. ኔትዎርክ በአከባቢው ስለ ማይኖር 7. አላወኩም 8. የሞባይል የመጠቀም ዕውቀት 9. የቋንቋ ችግር 10. ሌላ ካለ ይግለፁ_____	

ክፍል ሶስት: ስለ ታካሚው በሞባይል ስልክ የመረጀ ልውውጥ አመለካከት የሚመለከት መጠየቅ

ተቁ	ጥያቄ ለፀረ ኤች አይቪ ህክምና ክትትል የሞባይል ስልክ መጠቀምን አስፈላጊ ነው ብለው ያስባሉ? ለ	በጠቅላላው አያስፈልጋል (1)	በመጠኑ ያስፈልጋል (2)	እርግጠኛ አይደለሁም (3)	ያስፈልጋል (4)	በጣም ያስፈልጋል (5)
301	ጊዜን በመቆጠብ					
302	ምስጥርን በመጠበቅ					
303	የመዳሃኒት ጥቅም ና ጉዳት ለማስረዳት					
304	መዳሃኒት በአግባቡ ና በሳዓቱ እንዲወሥዱ ለማስታወስ ና ለማስረዳት					
305	ከፀረ HIV መድህሃኒት ጋር የተያያዙ ህመም ና ቁርኝት ለመምከር					
306	ህሙማንን ለመከታተል ና የጠፉትን ወደ ህክምና ለመመለስ					
307	ስለ ፀረ HIV መድህሃኒት አስተሳሰብ ግን ዛቤ ና በሃሪ ሎውጥ ለማምጣት					