KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY
INSTITUTE OF DISTANCE LEARNING

EVALUATING THE EFFECTIVENESS OF TELEMEDICINE CARE AT ST. MARTINS HOSPITAL (AGROYESUM- ASHANTI REGION): - PATIENTS PERSPECTIVE
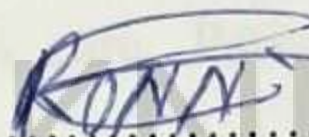
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BY

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A THESIS SUBMITTED TO THE SCHOOL OF GRADUATE STUDIES, KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF SCIENCE HEALTH INFORMATICS

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DECLARATION

This work has been the result of my own field research except where specific references are made which have been duly acknowledged. Except for this degree, it has not been submitted towards any other degree. I am responsible for views expressed, factual accuracy of the content and any other blemishes that this report might contain.
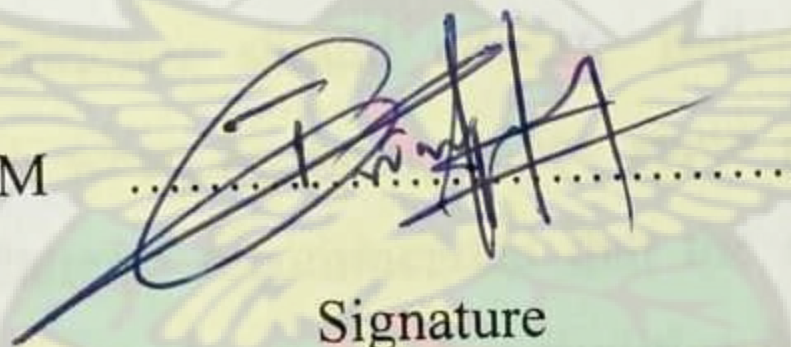
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ABSTRACT

Telemedicine is considered to be the use of communication and information technologies to deliver clinical care where the individuals involved are not at the same location. St Martin's hospital in the Amansie west in Ashanti region of Ghana, also uses this practice for health delivery. The objective to this study is to assess the telemedicine service/project at St Martin's hospital from patient perspective. Descriptive cross sectional design using both qualitative and observational method was used to conduct this study. Sixty respondents were interviewed out of the required eighty samples. All respondents were patients who have used the service once or more for their health care. Patients were assessed on the following: 1. patients' timeliness of care, 2. the comfort of patients with the teleconsultation and 3. patients' willingness to further use telemedicine. Upon the analysis of the data collected using on both descriptive and inferential statistics most patients who prefer to use telemedicine for their health care indicated that consulting and waiting time is convenient. They also expressed high comfort in the use of the service. Greater numbers of patients are willing to further use the service for their health care. It is recommended that practitioner should educate patients on the benefits of the telemedicine consultation when necessary since some patients at times have doubt about the technology. Patients recommended that the service should be availed to them extensively and be extended to all communities for their family and friends to also benefit.

DEDICATION

I DEDECATE THIS WORK TO THE MOST HIGH GOD FOR HIS DIRECTION
AND GUIDANCE AND TO MY PARENTS MR & MRS AMOAKO.
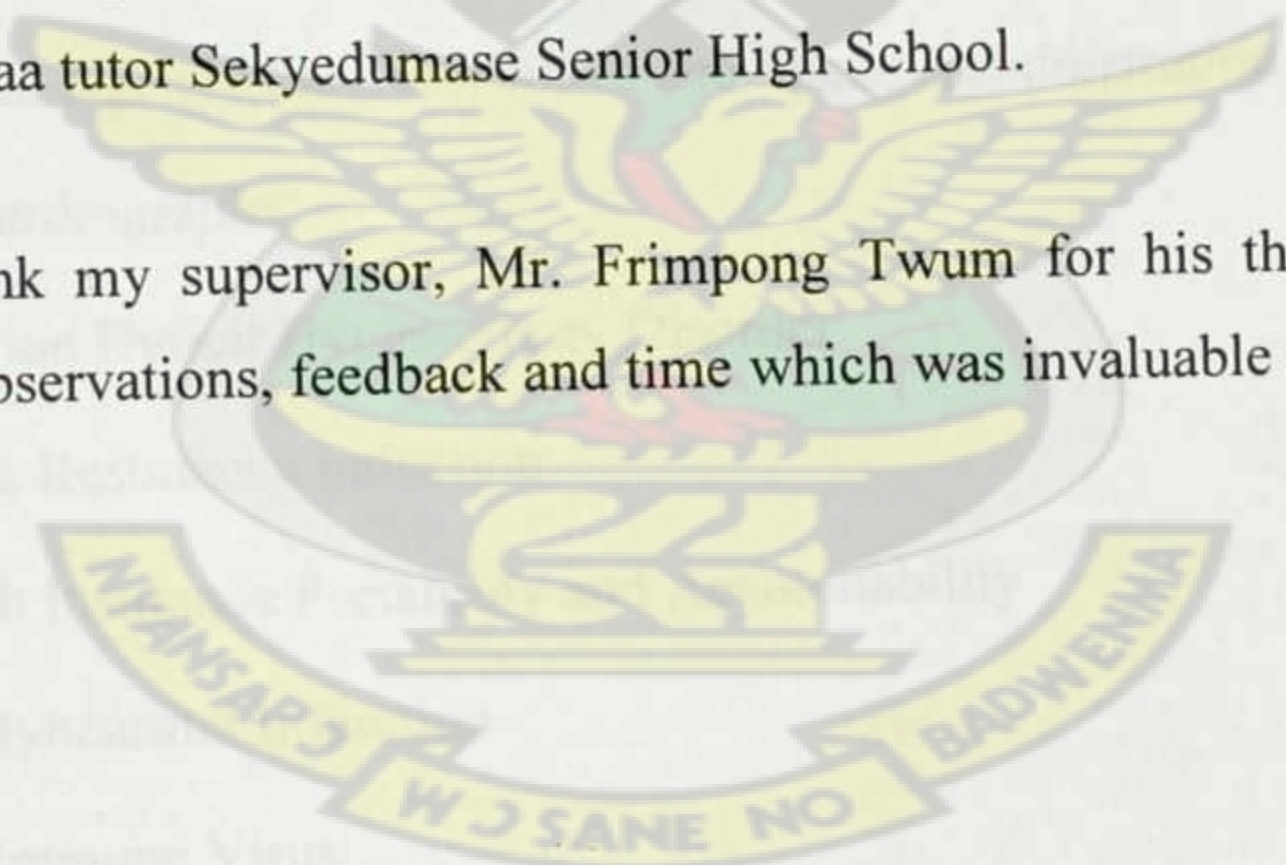
ACKNOWLEDGEMENTS

LIST OF ABBREVIATIONS AND ACRONYMS

ICT: Information Communication Technology

WHO: World Health Organization

E-HEALTH: Electronic Health

IT: Information Technology

NFSD: Novartis Foundation for Sustainable Development

MVP: Millennium Village Project

CHPS: Community-Based Health Planning and Services

CHW: Community Health Workers

TCC: Teleconsultation Center

CHN: Community Health Nurse

TTC: The Joint Commission

CMS: Center for Medical and Medical Service

NASA: National Agency for Aeronautics and Space Administration

ECG: Electrocardiographs

ADHD: Attention Deficit Hyperactivity Disorder

MRI: Magnetic Resonance Induction

HIPAA: Health Insurance Portability and Accountability

AMI: Acute Myocardial Infarction

HIV: Human Immune Virus

AIDS: Acquired Immune Virus

SPSS: Statistical Package for Social Science

GHS: Ghana Health Service

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CHAPTER ONE

1.0 INRODUCTION

This chapter begins with the origin of telemedicine in the world, Ghana and mode of operation in St. Martin hospital. The reasons and justification for the study are also presented in this section.

1.1 Background Information

Telemedicine, a term which was accepted in the 1970s, which means healing at a distance by the usage of ICT to improve patient outcomes by increasing access to care and medical information (Bajpai, 2012).

"Care at a distance (also called "in absentia" care), is an old practice which was often conducted via post. There has been a long and successful history of in absentia health care which, thanks to modern communication technology, has evolved into what we know as modern telemedicine.

In its early manifestations, African villagers used smoke signals to warn people to stay away from the village in case of serious disease. In the early 1900s, people living in remote areas in Australia used two-way radios, powered by a dynamo driven by a set of bicycle pedals, to communicate with the Royal Flying Doctor Service of Australia" (Verulkar et al,. 2012).

Description of Telemedicine in the World

Kay et al (2010) work reported that the World Health Organization has adopted the following broad description:

Base on the interests of advancing the health of individuals and their communities. The delivery of health care services, where distance is a main factor, by all health care professionals using information and communication technologies for the exchange of valid information for diagnosis, treatment and prevention of disease and injuries, research and evaluation, and for the continuing education of health care providers,

There are several interpretations that emphasis that telemedicine is an open and dynamic health science, as it incorporates new advancements in technology and responds and adapts to the changing health needs and contexts of societies. The

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difference that exists in telemedicine from telehealth is restricted to service delivery by physicians only, and the telehealth signifying services provided by health professionals in general, including nurses, pharmacists, and others. However, for the purpose of this report, telemedicine and telehealth are synonymous and used interchangeably.

There are four elements that are relevant to telemedicine:

1. Its objective is to give clinical support.
2. It is intended to overcome geographical barriers, connecting users who are not in the same physical location.
3. It involves the use of various types of ICT.
4. Its goal is to improve health outcome.

Types of Telemedicine

Telemedicine can be broken into three main categories: store-and-forward, remote monitoring and (real-time) interactive services.

Store-and-forward telemedicine involves acquiring medical data (like medical images, bio signals etc.) and transmitting this data to a doctor or medical specialist at a convenient time for assessment offline. It does not require the presence of both parties at the same time (Verulkar and Limkar 2012).

Dermatology (teledermatology), radiology, and pathology are common specialties that are conducive to asynchronous telemedicine. A properly structured medical record preferably in electronic form should be a component of this transfer (Corporate catalyst, 2012).

A key difference between traditional in-person patient meetings and telemedicine encounters is the omission of an actual physical examination and history. The 'store-and-forward' process requires the clinician to rely on history report and audio/video information in lieu of a physical examination (Corporate catalyst, 2012).

Remote monitoring, also known as self-monitoring or testing, enables medical professionals to monitor a patient remotely using various technological devices. This method is primarily used for managing chronic diseases or specific conditions, such as heart disease, diabetes mellitus, or asthma. These services can provide comparable

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health outcomes to traditional in-person patient encounters, supply greater satisfaction to patients, and may be cost-effective (Rowthorn, 2010).

Interactive telemedicine services provide real-time interactions between patient and provider, to include phone conversations, online communication and home visits. Many activities such as history review, physical examination, psychiatric evaluations and ophthalmology assessments can be conducted comparably to those done in traditional face-to-face visits. In addition, "clinician-interactive" telemedicine services may be less costly than in-person clinical visit (Suganthi et al., 2012).

1.1.1 Telemedicine in Ghana

The terms e-health and telehealth are at times wrongly interchanged with telemedicine. Like the terms "medicine" and "health care", telemedicine often refers only to the provision of clinical services while the term telehealth can refer to clinical and non-clinical services such as medical education, administration, and research. The term e-health is often, particularly in the UK and Europe, used as an umbrella term that includes telehealth, electronic medical records, and other components of health IT (Verulkar et al,. 2012).

Access to healthcare and medicines is a challenge for the majority of people living in Ghana. In an effort to strengthen human resources in rural areas and to improve the quality of primary healthcare, the Novartis Foundation for Sustainable Development (NFSD), in cooperation with the Millennium Villages Project (MVP), the Ministry of Health and the Ministry of Communications in Ghana, National Health Insurance Agency Ghana, Ghana Health Service, and Ghana Medical Association, initiated a Telemedicine Pilot Project in Bonsaaso cluster of villages in Ashanti Region in Ghana. The project started in August 2010 and had technical support from Airtel, Ghana, Ericsson Ghana and training support from Medgate Swiss center for telemedicine, Switzerland.

The objective of the project is to improve access to primary healthcare by using information and communication technologies (ICTs) to overcome geographical barriers. The experience and success of this pilot project will help expand the provision of a scalable and sustainable service at the national level.

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Operations are being monitored in order to extract and evaluate lessons learned. It is often overwhelmed by the number of cases that could be treated from a distance using ICTs. Furthermore, health-related emergencies need to be tended to in the villages when transport is not possible. One approach proposed to overcome transportation challenges is teleconsultation practice (training sessions and consultations via mobile phones). Best practices from the project aspire to inform future Ghana health strategies, particularly as the Ministry of Health looks to scale up telemedicine services across the country (Novartis foundation, 2012).

1.1.2 Bonsaaso Teleconsultation Project

From the staffs, the project was named after Bonsaaso because Bonsaaso is the center of all the 30 communities that benefit from the Telemedicine services. The Bonsaaso Teleconsultation Project is a private pilot project which was established, sponsored, funded by Novartis Foundation and support from Ghana government. Novartis foundation intended bringing their project to end for Ghana government to continue and scale it up across the country by the year 2015. The project has seven telemedicine health facilities: four CHPS Compound and three community health centers across the Amansie west communities. The health facilities use telemedicine technology for their health delivery. The project also has community health workers (CHW) in the very remote villages where there is no telemedicine health facility. St. Martin hospital popularly known as Agroyesum hospital has a telecommunication department which serves as a point of consult and referrals to the seven telemedicine centers in the villages and the community health workers. At the teleconsultation center (TCC) in the hospital there is a general nurse, midwife and a physician. There is also one in-charge in each telemedicine health facility with supporting community health nurses (CHN) in the villages. All in-charges are professional midwives with more than five years' experience. Midwives are responsible for antenatal deliveries, post natal and general consultation for patients in the health centers. The CHW just take vital signs of patients and call the TCC at the hospital for directions, first aid and class A drugs to administer to the patient. The CHW only provide or administer drugs under the order of the TCC. The only thing a CHW does on their own is to provide health advice to patients. They sometimes move from house to house to check on the health status of the local people. The main medium of communication between two

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health providers at a distance is through the phone. The phones used by the staff are provided by Sony Ericson and credits by Airtel Ghana.

1.1.3 Summary of Operation

From the staffs of St Martin's hospital, their telemedicine practice is the interactive type.

When a patient visits a health facility in the village and the midwife, community health nurse or worker encounters a challenge during consultation or process of care, she calls the hospital's TCC for assistance and directions. At times the consultation will be done between the patient at the village health center and the consulting practitioner at the district hospital or between the distant staffs. The communication is mainly through the mobile phone. Depending on the case, the call will be directed to the appropriate health personnel for assistance (General Nurse, Midwife or Physician) at the hospital. Also if a case or the drugs for the patient is above village staff's scope, the patient is referred to the district hospital. If it's an emergency, the ambulance in the village transports the patient to the main hospital.

1.2 Problem Statement

Telemedicine is a vital tool to reduce health care expenditure, to enhance health care delivery in remote areas, and to support modern home health care etc. Current works in communication technologies have motivated the development of telemedicine to a broader scope (Thiruvananthapuram, 2009).

But there is an overall lack of evaluation data, trials, and published results concerning telemedicine initiatives in developing countries. This has limited the amount of evidence on the impact and effectiveness of telemedicine (Kay et al., 2010).

St. Martins Hospital telemedicine is no exception since no evaluation has been conducted since the implementation in 2010. Evaluation is vital to systematically document best practices and lessons learnt from this telemedicine Network. In view of this, an evaluation of the Bonsaaso MVP is necessary to document patient's perception.

1.3 Significance of the Study

The application of telemedicine service can be good or bad and has a great impact on the social, economic and other activities of a country. It is hope that the results of this

research be of significant importance in diverse ways to the management, patients and policy makers.

a. **To the management of Telemedicine**: the findings and results of the study might provide a more reliable evidence to upgrade the level of performance of telemedicine. It will also bring to light the growth or failure of the telemedicine due to its performance in patient's perspective.

b. **To policy makers like government agencies such as the Ministry of Health and Ghana Medical Association**: the findings of this study might provide insights of telemedicine in Ghana and a guide in the establishment of other telemedicine project in other hospitals. It may also help the Ministry of Health of Ghana in achieving some of its policy goals, which include; free quality health for all by the year 2015

c. **To the stakeholders like investors: employees, pressure groups, patients and others**, the study will provide information that will allow them to provide useful suggestion to the improvement of telemedicine.

d. The findings may also serve as a source of knowledge for further research concerning evaluation of telemedicine.

e. Finally it may help in improving telemedicine implementation to make it attractive to patients and other health care providers.

1.4 General Objective

To evaluate the effectiveness of telemedicine care at St. Martins Hospital: - patients perspective.

1.5 Specific Objectives

1. To investigate whether or not the delivery of health care via telemedicine affect patients care timelines.

2. To establish whether or not patients receiving healthcare treatment via telemedicine are comfortable with teleconsultation

3. To establish whether or not patients receiving treatment via telemedicine are willing to further use telemedicine.

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1.6 Research Questions

- Does telemedicine affects healthcare delivery timelines.
- Are patients comfortable with the teleconsultation?
- Are patients willing to use telemedicine?

1.7 Organization of Thesis

The thesis consists of six chapters. Chapter 1 describes the background of the study, statement of the research problem, objectives of the study, justification and significance of the study. Also Chapter 2 comprises the review of related literature. This focuses on the conceptual base of the study. Chapter 3 is concerned with the methodology employed in carrying out the study, Chapter 4 deals with the presentation and interpretation of results, Chapter 5 involves the discussion of results. Finally, Chapter 6 presents the conclusions and recommendations of the study.
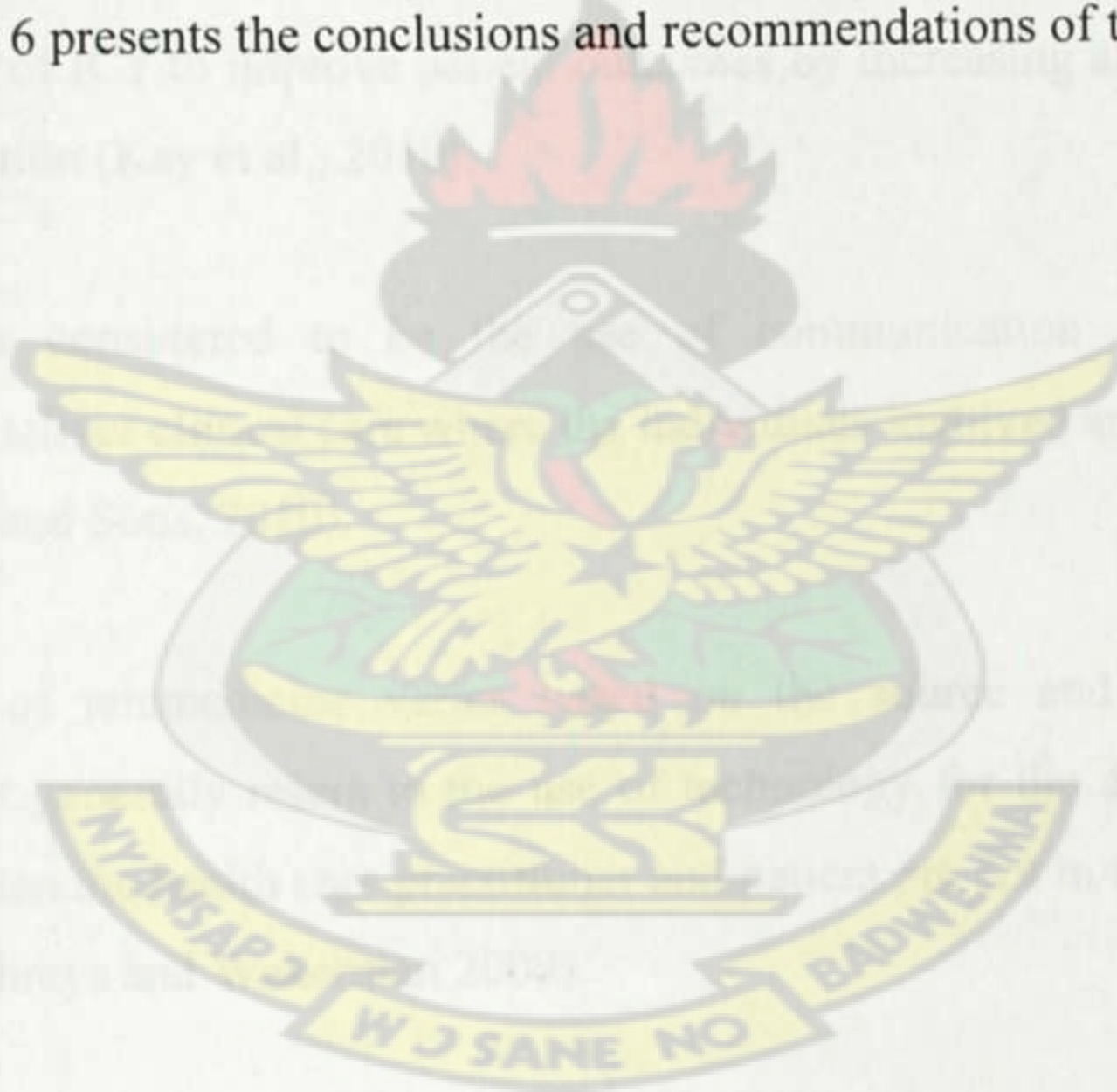
2.0 INTRODUCTION

This chapter brings out the findings from other studies and literature about telemedicine.

2.1 Telemedicine-OVERVIEW

Recognizing that there is no one definitive definition of telemedicine, a 2007 study found 104 peer-reviewed definitions of the word (Bajpai, 2012).

The following are some of the explanation stated by other scholars: Telemedicine signifies the use of ICT to improve patient outcomes by increasing access to care and medical information (Kay et al., 2010).

Telemedicine is considered to be the use of communication and information technologies to deliver clinical care where the individuals involved are not at the same location (Wiley and Sons, 2010).

The definition of telemedicine varies based on the source and purpose of the definition, but it generally refers to the use of technology for the delivery of health care services when the health care practitioner and patient are not in the same physical location (Humphreys and Wakerman 2009).

The American Telemedicine Association & the Joint Commission (TJC) defines telemedicine as the use of medical information exchanged from one site to another via electronic communications for the purpose of improving patient care, health and educating the patient or health care provider to enhance treatment and services (kepler and McGinty, 2009).

There is no agreed common definition for telemedicine. For example, the Centres for Medicare and Medicaid Services(CMS) focuses on telehealth services and defines telemedicine to include two-way, real-time interactive communication between the

patient and distant site physician but not via telephone, email, or fax (kepler and McGinty, 2009).

Although there are various definitions for telemedicine, they all carry the same meaning. The delivery of health care via electronic communication, where the provider and the patient are not in the same location

2.2 Brief History of Telemedicine
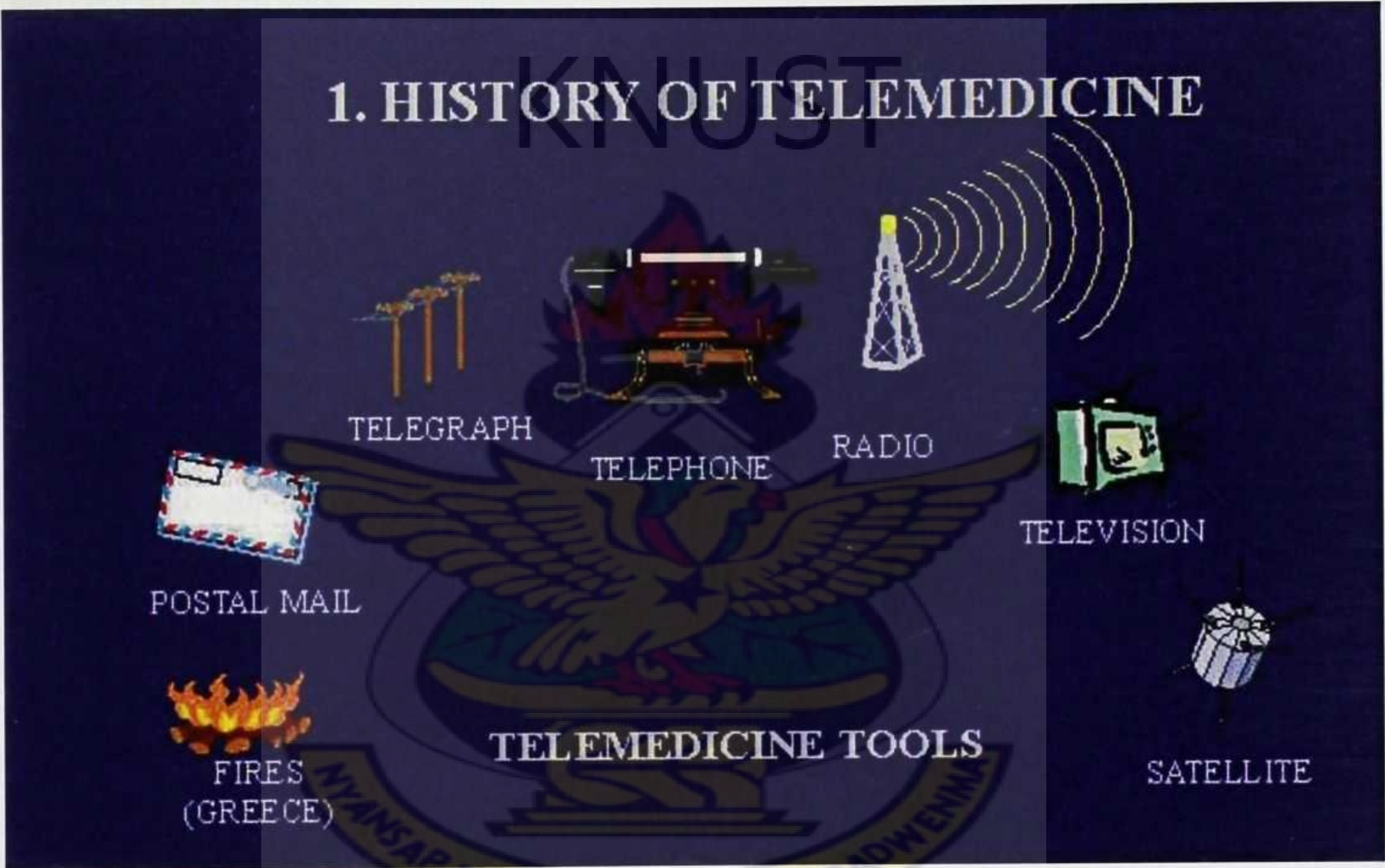
Fig. 1 Shows A Brief History Of Telemedicine. (Kayser et al., 1999)

Telemedicine was introduced into clinical practice around the year 1969 and became more significant within 5 years of development. The National Agency for Aeronautics and Space Administration, (NASA) was very instrumental in the development of telemedicine in early 1960; s. During that period astronauts sent their physiological reports to the Agency. In the same year, NASA and American Medical Service started to offer medical protection to people who lived in Indian reservations in Arizona, with the use of mobile EKG and X-ray facilities that were integrated by satellite. In 1967 microwave link was established between airport in Boston and Massachusetts General Hospital. In the **1970's** the possibility to use colour screen, that is teledermatology for

the skin infections treatment on space flights was mentioned and the School of Medicine in Miami provided telemedicine for prisoners at that time. In 1986, Mayo Clinic started with the implementation of two-way satellite program between Mayo Camp in Rochester, Minnesota and Arizona, to support doctors in distant locations (Kayser et al., 1999).

2.3 Application of Telemedicine

These are areas where telemedicine can be applied in the field of medicine for the delivery of health care.

Telerehabilitation

Telerehabilitation (or e-rehabilitation) is the delivery of rehabilitation services over telecommunication networks and the Internet. Most types of services fall into two categories: clinical assessment (the patient's functional abilities in his or her environment), and clinical therapy. Some fields of rehabilitation practice that have explored telerehabilitation are: neuropsychology, speech-language pathology, audiology, occupational therapy, and physical therapy. Telerehabilitation can deliver therapy to people who cannot travel to a clinic because the patient has a disability or because of travel time. Telerehabilitation also allows experts in rehabilitation to engage in a clinical consultation at a distance (Zeinab and Fatemeh 2013).

Teletrauma

Telemedicine can be utilized to improve the efficiency and effectiveness of the delivery of care in a trauma environment. Examples include: Telemedicine for trauma triage: using telemedicine, trauma specialists can interact with personnel on the scene of a mass casualty or disaster situation, via the internet using mobile devices, to determine the severity of injuries. They can provide clinical assessments and determine whether those injured must be evacuated for necessary care. Remote trauma specialists can provide the same quality of clinical assessment and plan of care as a trauma specialist located physically with the patient (First Med, 2012).

Telecardiology

ECGs, or electrocardiographs, can be transmitted using telephone and wireless. Willem Einthoven, the inventor of the ECG, actually did tests with transmission of ECG via telephone lines. This was because the hospital did not allow him to move patients outside the hospital to his laboratory for testing of his new device. In 1906 Einthoven came up with a way to transmit the data from the hospital directly to his lab (Ankita et al., 2012)

Teleradiology

Teleradiology is the ability to send radiographic images (x-rays, CT, MR, PET/CT, SPECT/CT, MG, US...) from one location to another. For this process to be implemented, three essential components are required, an image sending station, a transmission network, and a receiving-image review station. The most typical implementation is two computers connected via the Internet. The computer at the receiving end will need to have a high-quality display screen that has been tested and cleared for clinical purposes. Sometimes the receiving computer will have a printer so that images can be printed for convenience. The teleradiology process begins at the image sending station. The radiographic image and a modem or other connections are required for this first step. The image is scanned and then sent via the network connection to the receiving computer (Ankita et al., 2012).

Telepathology

Telepathology is the practice of pathology at a distance. It uses telecommunications technology to facilitate the transfer of image-rich pathology data between distant locations for the purposes of diagnosis, education, and research. Performance of telepathology requires that a pathologist selects the video images for analysis and the rendering diagnoses. The use of "television microscopy", the forerunner of telepathology, did not require that a pathologist have physical or virtual "hands-on" involvement is the selection of microscopic fields-of-view for analysis and diagnosis. (Hum, 2009).

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Teledermatology

Teledermatology is a subspecialty in the medical field of dermatology and probably one of the most common applications of telemedicine and e-health. In teledermatology, telecommunication technologies are used to exchange medical information (concerning skin conditions and tumours of the skin) over a distance using audio, visual and data communication. Applications comprise health care management such as diagnoses, consultation and treatment as well as (continuous) education (Ali, 2008).

Teledentistry

Teledentistry is the use of information technology and telecommunications for dental care, consultation, education, and public awareness (Ajay et al., 2010).

Teleaudiology

Tele-audiology is the utilization of telehealth to provide audiological services and may include the full scope of audiological practice (Lucille, 2010).

Teleophthalmology

Teleophthalmology is a branch of telemedicine that delivers eye care through digital medical equipment and telecommunications technology. Today, applications of teleophthalmologyen compass access to eye specialists for patients in remote areas, ophthalmic disease screening, diagnosis and monitoring; as well as distant learning (Yogesan et al., 2006).

2.4 Current State of Telemedicine Services in the World

"To obtain an impression of the current state of telemedicine service provision, four of the most popular and established areas of telemedicine were surveyed specifically. Respondents were asked to indicate whether or not their country offered a service in each field, and if so, to give its level of development. Levels of development were classified as 'established' (continuous service Supported through funds from

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government or other sources), 'pilot' (testing and evaluation of the service in a given situation), or 'informal' (services not part of an organized programme).

The survey examined four fields of telemedicine: Teleradiology, Telepathology, Teledermatology and Telepsychiatry.

KEY POINTS

Teleradiology has the highest rate of established service provision across the four fields of telemedicine surveyed.

Provision of telemedicine is far less progressed in upper- middle lower middle and low- income countries than high-income countries; this is the case for the proportion of countries with established services and the overall proportion of countries offering telemedicine services. Little difference was observed between upper middle, lower middle and low income groups with regard to the proportion of countries with established telemedicine services.

- The African and Eastern Mediterranean Regions generally had the lowest proportion of countries with established telemedicine services and a higher proportion of countries offering informal telemedicine services than other region" (Kay et al., 2010).

2.5 Importance of Telemedicine

1. Convenience

Telemedicine has reduced or removed the burden of one to travel for quality medical care; giving asymmetric information exchange at different times throughout the day; and addressing acute illness or providing chronic illness management for conditions such as asthma or Attention Deficit Hyperactivity Disorder (ADHD) in the school setting (Boxer, 2009).

2. Cost-efficiency

Physicians using the technology are charging less for a telemedicine consultation than they would for face to face visit. Telemedicine can also minimise travel expenses; this

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is especially true for those living in rural communities. Patients who normally travel more hours out of their way to obtain health care can do it from the comfort of their homes and communities (Harper, 2012).

3. Expedited transmission of MRIs or X-rays for a second opinion

This gives one the opportunity to get a second opinion about a thyroid condition. E-mailing an MRI or X-ray of the inflamed area to a specialist for a second opinion for assess. One of the beauties of telehealth is that it can improve communication between patients and their medical practitioners. In-person visits and postal mail are no longer the only options for receiving and sending medical documents (Harper, 2012).

4. Privacy assurance.

Telemedicine complies with HIPAA laws, which aim to prevent private or secure medical documents from being leaked. Telemedicine is safe and confidential (Ahamed et al., 2008).

2.6 Disadvantages of Telemedicine

1. Electronic glitches.

Technology is only as reliable as the electrical current that keeps it running. Unfavourable weather conditions and other annoyances can cause a power outage or disrupt an internet connection, thereby complicating online consultation with a doctor (Harper, 2012).

2. Physician resistance. Physicians resist the use of the technology due to the discomfort in its usage also coupled with the taught about how they might begin to use this to better manage patients with chronic illnesses or be able to expand access to rural areas in particular becomes a challenge (Boonstra and Broekhuis, 2010).

3. Inadequate assessment.

The ability for one to interact with the primary care doctor is an advantage since certain non-verbal cues might be difficult to manage since Physicians cannot personally see, touch or feel their patient when the need arises (Harper, 2012).

2.7 Impediments to the Development of Telemedicine Systems

There have been a limitation to the development of a complete "telemedicine society". Assessment of these factors has currently been deliberated in Switzerland. While there are important geographical and societal differences, it was known that the Swiss experience were similar to that in Western Canada, for which the following points appear to be significant (Ohinmaa et al., 2001).

- Siegal 2008 opined that, the specification, definition and clarifications of the truly needed application of telemedicine still remain unanswered (SIEGAL, 2008).

- The need to appreciate the consultation of health care professionals and others to re organize the services, infrastructure and adaption of telemedicine cannot be over emphasized (Ohinmaa et al., 2001).

- A large number of proposed telemedicine applications have not moved beyond the pilot project stage. Economic and other evaluation of most applications remains very limited (Kay et al., 2010).

- The operators and purchasers of telemedicine are not comfortable with the short duration of many equipment components and also the technologies fads easily (Sabin, 2008).

- One of the hindrances in the development of this technology is lack of resolution as to how physicians and other health care professionals should be reimbursed for services they provide using telemedicine. This is usually important in private-oriented health care systems (Hein, 2009).

- There are numerous products, services and respective industries that are involved in creating the various applications of telemedicine, therefore

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standards are not consistent across the health care system, so there is difference in the transmission costs and capability that apply to various regions (Hein, 2009).

- Due to a concern about inconsistency from equipment suppliers regarding assurance that agreed specifications will be achieved. Some equipment components may remain in the developmental stage longer than expected and that its application cannot be best established as planned (Ohinmaa et al., 2001).

- Problems relating to licensing and legal issues of medical staff and other operators are not agreed on (Matusitz and Breen, 2007).

- There are different problems related to relationships between different levels of government. Health authorities have encountered several financial and administrative pressures (Hein, 2009).

2.8 Satisfaction with Telemedicine

In a high-volume emergency room setting, patients in Brennan et al.'s study reported equivalent levels of satisfaction between telemedicine and traditional care (Whitten and Love , 2005)

"They examined the use of telemedicine at two major medical institutions in Ghana. Doctors and administrators were surveyed to assess their knowledge of computers and familiarity with telemedicine. The use of modern telecommunications and information technology products within the health service was also examined. Thirty questionnaires were distributed to staff at the two hospitals, one urban and one rural. Twenty were returned (a response rate of 67%). Although most of the respondents were computer literate, they were less familiar with telemedicine applications. Only a minority of the respondents were participating in an information-sharing network, transmitting information by fax or telephone, or had Internet access. Financial constraint appeared to be the major barrier to establishing information-sharing networks. Other constraints were technological and organizational. The respondents expressed an interest in using telemedicine, having access to health-care databases and specific telemedicine applications such as tele-education and videoconferencing.

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Staffs in the urban hospital were more likely to be familiar with telemedicine and more likely to have access to information technology than those in the rural hospital" (Darkwa, 2000).

Rosser used a standard telephone line, low-resolution video, and high-resolution pictures, researchers conducted postoperative consultations by sending a nurse and medical student to the patients' home while a physician attended remotely from the office. Patients reported extremely high satisfaction with the home visits, rating them 4.8 out of 5 (Whitten and Love , 2005).

A review of systematic reviews of telemedicine interventions was conducted; the review included 80 heterogeneous systematic reviews. Twenty one reviews concluded that telemedicine is effective, 18 found that evidence is promising but incomplete and others said evidence is limited and inconsistent (Anne et al., 2010).

Patient satisfaction results from a Spanish study also point to patients acknowledging increased access to specialists. The researchers provided televisits from two specialists and a nurse to 15 patients dealing with kidney, heart, or chronic pain issues. The patients reported satisfaction with the service, which may stem from more convenient access to necessary health care providers (Whitten and Love , 2005).

A systematic review of telemedicine assessments based on searches of the electronic data bases between November 1998 and December 2000 identified 38 scientifically credible studies that included comparison with a non-telemedicine alternative and which reported administrative changes, patient Outcomes or results of economic assessment.

Nineteen of the studies concluded that telemedicine had advantages over the alternative approach, 16 also drew attention to some negative aspects or were unclear whether telemedicine had advantages and three found that the alternative approach had advantages over telemedicine (Ohinmaa et al., 2001).

Working in a rural environment, Woods et al (1999) assigned patients with sickle cell disease to telemedicine or standard encounter groups and provided treatments.

Afterwards, they completed a questionnaire and had an opportunity to offer open-ended comments, which were recorded verbatim. Responses across the two 60-person groups were routinely positive, as well as comparable with no difference for any specific item. However, 95% of patients in the face-to-face group offered positive open-ended comments verse 70% in the telemedicine group. Negative comments within this group focused on concerns about the confidentiality of teleconsultations. Despite these concerns, the patients' high satisfaction rates stemmed from their appreciation of better access and continuity of care.

A prospective study by Terkelsen (2005) was performed to evaluate the technical feasibility of telemedicine in the prehospital evaluation of patients with acute myocardial infarction (AMI). It was found that 98% of ECGs transmitted from ambulance to the telemedicine centre was useful for diagnostic purposes. In 86% of the cases, the pre-hospital evaluation with the use of telemedicine was found successful.

2.9 CONCEPTUAL FRME WORK

EVALUATION OF TELEMEDICINE CARE AT ST. MARTINS HOSPITAL-PATIENTS PESPECTIVE

OBJECTIVES

- PATIENTS WILLINGNESS TO FURTHER USE THE SERVICE
  - HAPPY TO USE AGAIN
  - PREFER THE TECHNOLOGY OR GO TO HOSPITAL
- COMFORT IN THE TECHNOLOGY
  - SATISFACTION
  - PUT OFF BY TECHNOLOGY
- TIMELINESS OF CARE
  - ASSESSING PATIENTS ON
    - BURDEN IN ASSESSING
    - DISTANCE TO ASSESS CARE
    - CONSULTING TIME

COMMENTS

PATIENTS PERSPECTIVES

Fig. 2 Shows the Conceptual Frame Work

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CHAPTER 3

METHODOLOGY

3.0 INTRODUCTION

This chapter presents the methods employed in the study. It covers the study design, a brief description of the study district, data collection technique and tools, sampling technique, data handling, ethical consideration, limitations of the study and assumptions.

3.1 Profile of the Study Area

The Amansie West District is one of the 27 districts in the country. It was carved out of the Amansie East District in Ashanti Region in 1989, as part of the Government's Decentralization Policy. Manso-Nkwanta is the district capital. The district is located in the south-western part of the Ashanti Region. It shares common boundary on its Western part with the Atwima District. On its northern part can be found the Bosomtwe District and a regional boundary separates it from Western Region on its southern part (Ministry, 2006).

Bonsaaso Millennium Villages Project (MVP) is an initiative pilot project by the United Nations to aid rural communities in the Amansie West District to lift themselves out of extreme poverty through simple technologies. Under the project, a telemedicine centre has been established at the Agroyesum Saint Martin's Hospital, The project is benefiting a population of about 30,000 in 30 contiguous rural communities in the Amansie West District in the Ashanti Region (Ghana). The majority of the populace engages in cocoa cultivation and food crop farming (Novartis Foundation, 2012)

Map of Bonsaaso MVP in Amansie West, Ashanti Region, Ghana.

Fig. 3 Shows Map of Bonsaaso MVP in Amansie West, Ashanti Region, Ghana (Report, 2013)

3.2 Health Services

The Telemedicine Project covers seven Millennium Villages and thirty communities. The communities are separated by stretches of unpaved roads, often requiring four-wheel-drive vehicles to enable access to district hospitals. There are only seven health centers and one district hospital. The limited health facilities and health workers in the 30 contiguous rural communities (Bonsaaso cluster) have to address conditions, such as malaria, anemia, malnutrition, tuberculosis (TB) and HIV/AIDS, which affect many members of the community. The delivery of healthcare is often difficult and community members regularly travel up to 40km to access medical advice or attention. Similarly, the movement of sick people to health facilities is complex. For example, women are particularly at risk during pregnancy and delivery. There is increasing demand for point-of-care support for health workers, so as to minimize the number of referrals to the District Hospital in Agroyesum. Dr Mensah Homiah, the Cluster Manager, had an interaction with a group of selected journalists at Manso-Nkwanta to highlight the success story of the intervention. He said due to the dispersed nature of settlements and the bad nature of the roads the project's strategy focused on the building of more health facilities and rehabilitation of existing ones. The project is working to improve medical services, antenatal and clinical outreach and the supply of essential medicines in the communities. He also said he has deployed a number of health professionals through outright hiring and posting by the Ghana Health Service (Bonsaaso Project, 2012).

3.3 Research Method and Design

A descriptive cross sectional design using both qualitative and observational methods was used to conduct this study.

3.4 Study Population

The study population was drawn from the seven telemedicine health facilities, four CHPS compounds and three health centers. They are Datano, Aboaboso, Akyerekyerekrom, Assamang CHPS Compound, Tontokrom, Watreso, Keniago Health Centers and Agroyesum hospital. Eighty (80) patients were selected from the 30 communities in the Bonssaso Cluster.

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3.5 Sampling Technique and Sampling size

A laptop was log into the telemedicine department server (contains database of all patients) by the department technical manager. A selection of 80 patients was drawn from the department database using non-probability sampling method. The selection was restricted to telemedicine patients from November 1st 2012 to April 30th 2013. This selection period was chosen base on the idea that, within the last six months patients may have a better recall of their experience. Some of the patients have had multiple encounters and others once with telemedicine service. Each patient's data comprises the name, age, community; encounter Date, provider, form of consultation and location. The patients data retrieved were given to the in charges in the various health facilities to follow up the patients and inform them the day of meeting for the interview. Patients whose encounter dates do not fall within the November to April were excluded from the sampling. Most of the follow ups by the in-charges were done through phone calls since they have most of the patients contact numbers in their records and few were informed verbally.

The sample size used was 80 comprising of men, woman and children who have undergone teleconsultation.

3.6 Data Collection Technique and Tools

The data collection technique was a structured interview base on the written questionnaire. All existing relevant data on the area of study were collected from the telemedicine patients at the premises of the health facility as they were told. Two different days were used for the data collection. All questions were close-ended to give specific answers but column was provided so as to allow respondents to provide further details on some of the issues. Patients under thirteen were interviewed through the person who assisted them to the facility. Informants were duly informed about the purpose of the study and their consent was sought before the interview.

Two interviewers were trained on the content of the questionnaire and interviewing techniques to help the principal investigator. The local language was used throughout the interview for clarity. Sixty (60) patients were interviewed out of required sample of eighty (80) because some of the patients could not be tracked and some did not

appear on the day of interview. All completed questionnaires were checked for accuracy before entering into SPSS for analysis.

3.7 Pre-Testing

The data collection tools were pre-tested at Datano community on a few telemedicine patients. It was chosen because it's the nearest community from the seven under study. This was done to determine the appropriateness of the tools. Appropriate adjustments were made.

3.8 Data Analysis

The principal investigator and supervisors sort out the questionnaires collated and recorded responses. Cross validation and consistency checks were done. SPSS was used for data entry, cleaning and processing. Cross tabulation, descriptive and inferential statistics was used for analysis according to the order of questions. The relevant information was retrieved in a standard form and the results were presented in frequencies, tables, percentages, pie charts and text.

3.9 Ethical Consideration

The researcher sought a letter of introduction from the university to introduce himself to the authorities concerned in the telemedicine project. Authorities were assured of anonymity for participants and made to understand that names of patients would not be indicated on the questionnaires. The objective of the study was explained to participants. All the information collected for the study would remain confidential. The result of the project would be disseminated to the appropriate quarters to help in policy making which would be beneficial to the subjects. Appointments were made with the patients. Responses were recorded verbatim without changing the meaning as expressed by the respondents. Information obtained from respondents was not linked to any study participant.

3.10 Limitations of the Study

Some of the patients could not be tracked and some did not appear on the day of interview.

Due to time and financial constraints and the inaccessible nature of the road network in some portions of the communities made it difficult for the other patients to be followed up.

CHAPTER FOUR

PRESENTATION AND ANALYSIS OF RESULTS

4.0 INTRODUCTION

This chapter uses SPSS (descriptive statistics and inferential statistics) to describe and analyse the data collected in other to address the research questions

DESCRIPTIVE STSTISTICS

Table 4.1 – GENDER OF PATIENTS

Gender		Frequency	Percent
Valid	male	24	40.0
	female	36	60.0
	Total	60	100.0

Table 4.2 – AGE OF PATIENTS

Age	Frequency	Percent
0 – 17	22	36.7
18-35	18	30.0
36-50	17	28.3
51-65	3	5.0
66 and above	0	0
Total	60	100.0

4.1. To investigate whether or not the delivery of health care via telemedicine affect patients care timelines?

Per the above objective, **patients'** timeliness could be assessed from the following variables; Patients time of consultation, travelling time and the burden in receiving health care.
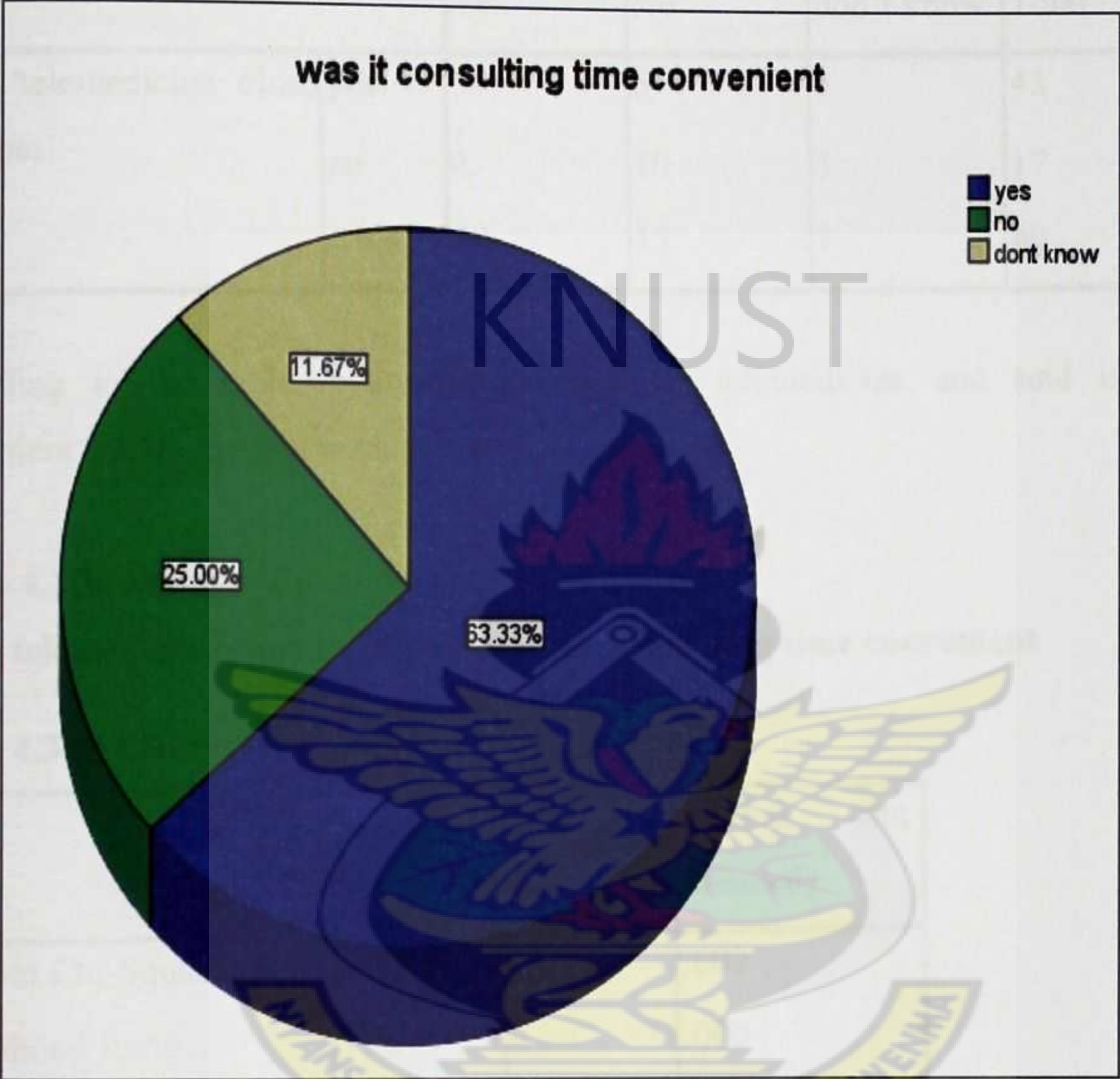
Fig 4.1 Shows whether consulting time was convenient

Out of the 60 respondents, 63% of the respondents indicate that the consulting and waiting time is convenient. 25% of the respondents believed that the consulting and waiting time was not convenient, while the remaining 12% were uncertain about it.

Table 4.3(a) shows Cross tabulation of: Using telemedicine close to home * was the consulting time convenient

Table 4.3(a) Count

		was the consulting time convenient			
		Yes	No	don't know	Total
Using telemedicine close to home;	yes	34	5	4	43
	no	4	10	3	17
Total		38	15	7	60

According to the table, many respondents use telemedicine and said is time convenient whiles the few were against.

Table 4.3(b) Shows a Relationship Test Between
Using telemedicine close to home * was the consulting time convenient

Table 4.3(b) Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	17.516[a]	2	.000
Likelihood Ratio	17.299	2	.000
Linear-by-Linear Association	10.122	1	.001
N of Valid Cases	60		

Conclusion on whether telemedicine usage has a relation with consulting and waiting time, using the chi-square test statistic in reference to (Fig 1, Table 3a & 3b)

NB: Rejection rule; the null hypothesis- H_0 is rejected when the p-**value** $<\alpha$-level 5% or 0.05

H_0 :{ there is no association between the usage of telemedicine and the consulting time of patients

H_1: {there is association between telemedicine usage and the consulting time of patients}

Decision; since the p-**value**=0.000 is $<\alpha$-level 5% we reject the null hypothesis. We therefore conclude that there is an evidence of relationship between the usage of telemedicine and the patients time spent on consultation. This infers that patients who prefer telemedicine care in the Amansie west villages spent less on waiting and consulting time during health care.

Fig 4.2

telemedicine reduced the distance and time for assessing health
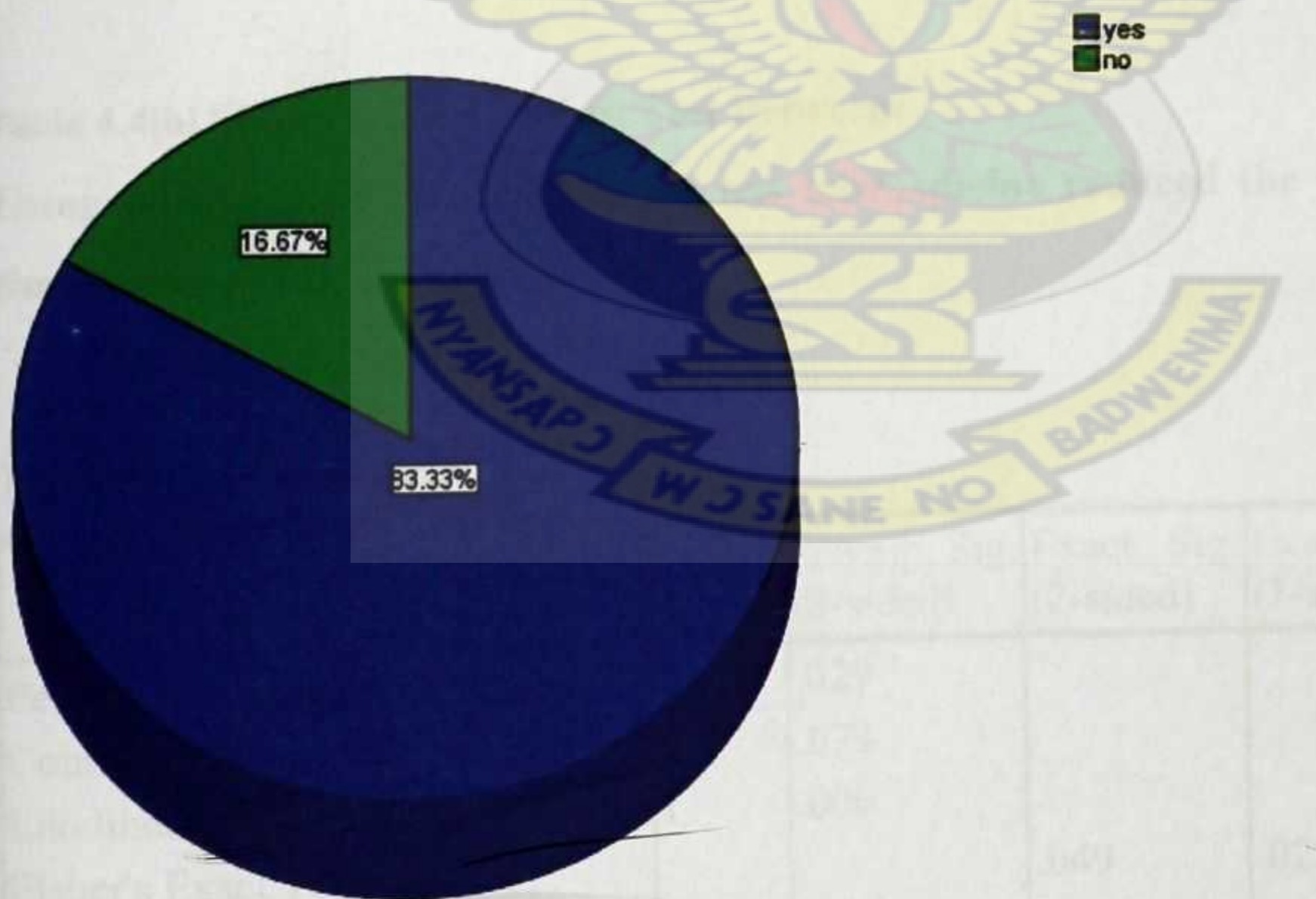
Fig 4.2 shows whether telemedicine has reduce distances and time for healthcare

The respondents were also asked whether telemedicine has reduced the distance and time of assessing health. About 83% of the respondent answered yes while 17% answered no.

Table 4.4 (a) shows Cross tabulation of: Using telemedicine close to home * has telemedicine reduced the distance and time for assessing health care

Table 4.4 (a) Crosstab Count

		has telemedicine reduced the distance and time for assessing health care		Total
		yes	no	
using telemedicine close to home	Yes	33	10	43
	no	17	0	17
Total		50	10	60

33 into telemedicine declared its radical effort of reducing the distance and time for assessing health care revealing greater section of the respondents with that notion.

Table 4.4(b) Shows a Relationship Test Between:

Using telemedicine close to home * has telemedicine reduced the distance and time for assessing health care

Table 4.4(b) Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	4.744[a]	1	.029		
Continuity Correction	3.218	1	.073		
Likelihood Ratio	7.425	1	.006		
Fisher's Exact Test				.049	.025
Linear-by-Linear Association	4.665	1	.031		
N of Valid Cases	60				

Conclusion on whether telemedicine usage has a relation with the distance and time for assessing health care, using the fisher's Exact test statistic in reference to (Fig 2, Table 4a & 4b)

H_0: {telemedicine usage has not reduced the distance and time of assessing health care}

H_1: {telemedicine usage has reduced the distance and time of assessing health care}

The p-value is evaluated 0.025 which is less than **α-level 5%**

DECISION: we reject the null hypothesis since the p-**value is**< α-level 0.05 and conclude that telemedicine usage has really reduced the distance and time of assessing health care. This implies that the invention of telemedicine has contributed towards the reduction of distance and time taken to assess health care at the district hospitals.

Fig 4.3

has telemedicine reduced the burden of obtaining healthcare

- yes
- no

15.00%

85.00%
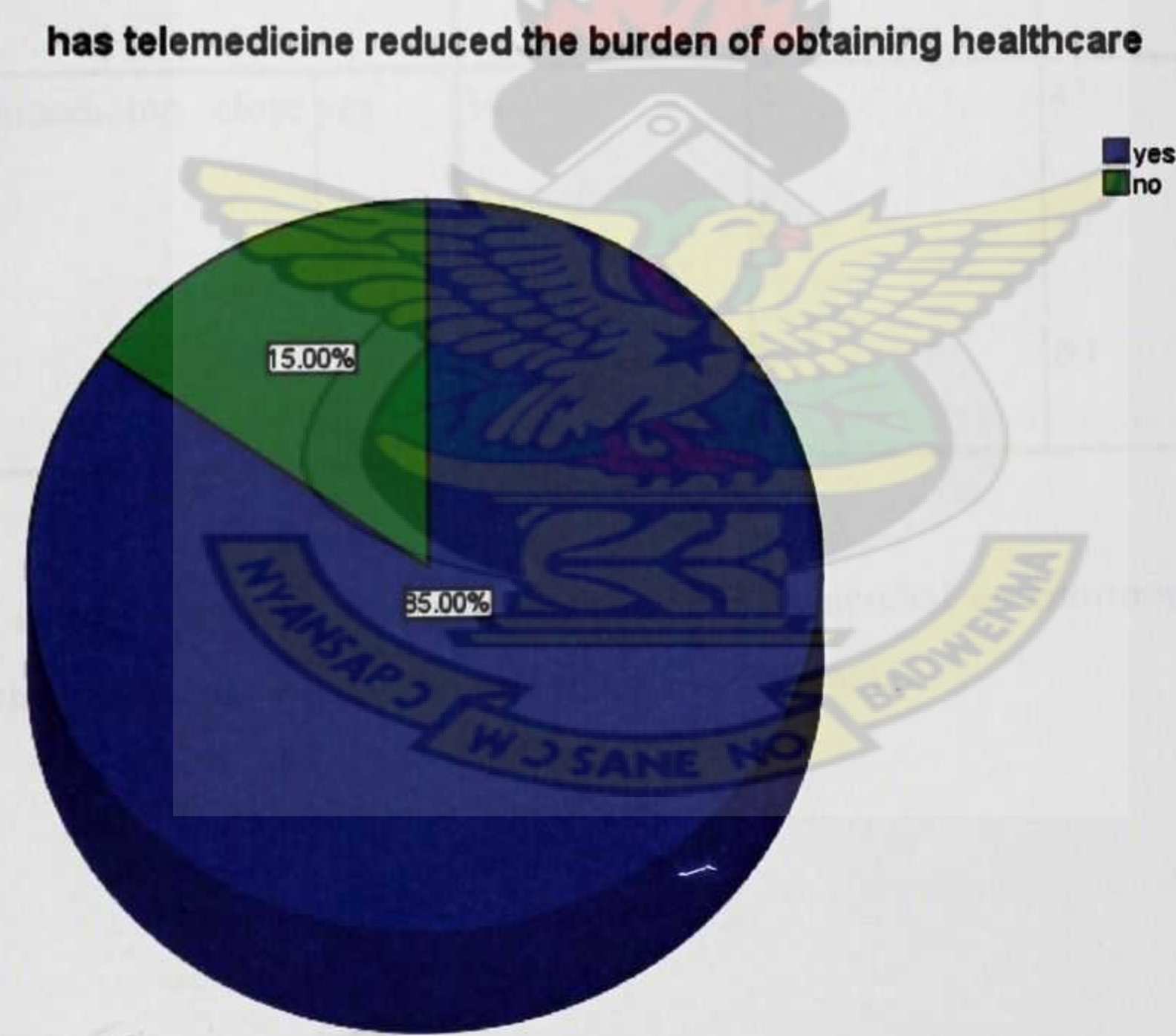
Fig 4.3 shows whether telemedicine has reduced the burden of obtaining healthcare

It was noticed that the use of telemedicine has reduced the distances and time to assess health. Questions were further asked whether telemedicine has reduced the

burden of obtaining healthcare. About 85% of the respondents said yes, while the remaining 15% said no. Telemedicine has been a great relieve of burden.

Table 4.5(a) shows Cross tabulation of:

Using telemedicine close to home * has telemedicine reduced the burden of obtaining healthcare

Table 4.5(a) Crosstab Count

		has telemedicine reduced the burden of obtaining healthcare		Total
		yes	no	
using telemedicine close to home	yes	34	9	43
	no	17	0	17
Total		51	9	60

34 out of the 43 respondents using telemedicine commended its enormous effort of reducing the burden of obtaining health care at Agroyesum.

Table 4.5 (b) Shows a Relationship Test Between: Using telemedicine close to home * has telemedicine reduced the burden of obtaining healthcare

Table 4.5 (b) Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	4.186[a]	1	.041		
Continuity Correction	2.705	1	.100		
Likelihood Ratio	6.604	1	.010		
Fisher's Exact Test				.050	.038
Linear-by-Linear Association	4.116	1	.042		
N of Valid Cases[b]	60				

Conclusion on whether telemedicine usage has a relation with the burden in obtaining health care ,using chi-square test statistic in reference to(Fig 3, Table 5a & 5b)

H_0: {the telemedicine usage has not reduced the burden of obtaining health.}

H_1: {the telemedicine usage has reduced the burden of obtaining health care.}

Prior to the rejection rule stated:

Decision: the researcher rejects the null hypothesis since the p-value 0.038 is < α-level of significant 0.05 and conclude that there is enough statistical evidence to prove that the usage of telemedicine has reduced the burden of obtaining health care at the St. Martins Hospital.

From the above statistics patients' timeliness to assess health care and burden has reduced.

4.2 To establish whether or not patients receiving health care via telemedicine are comfortable with their teleconsultation?

This objective was realized by blending the following variables analogy;

If patients were put off or not by the technology being used, As well as the patients' level of satisfaction/dissatisfaction

Fig 4.4

were you put off by the technology
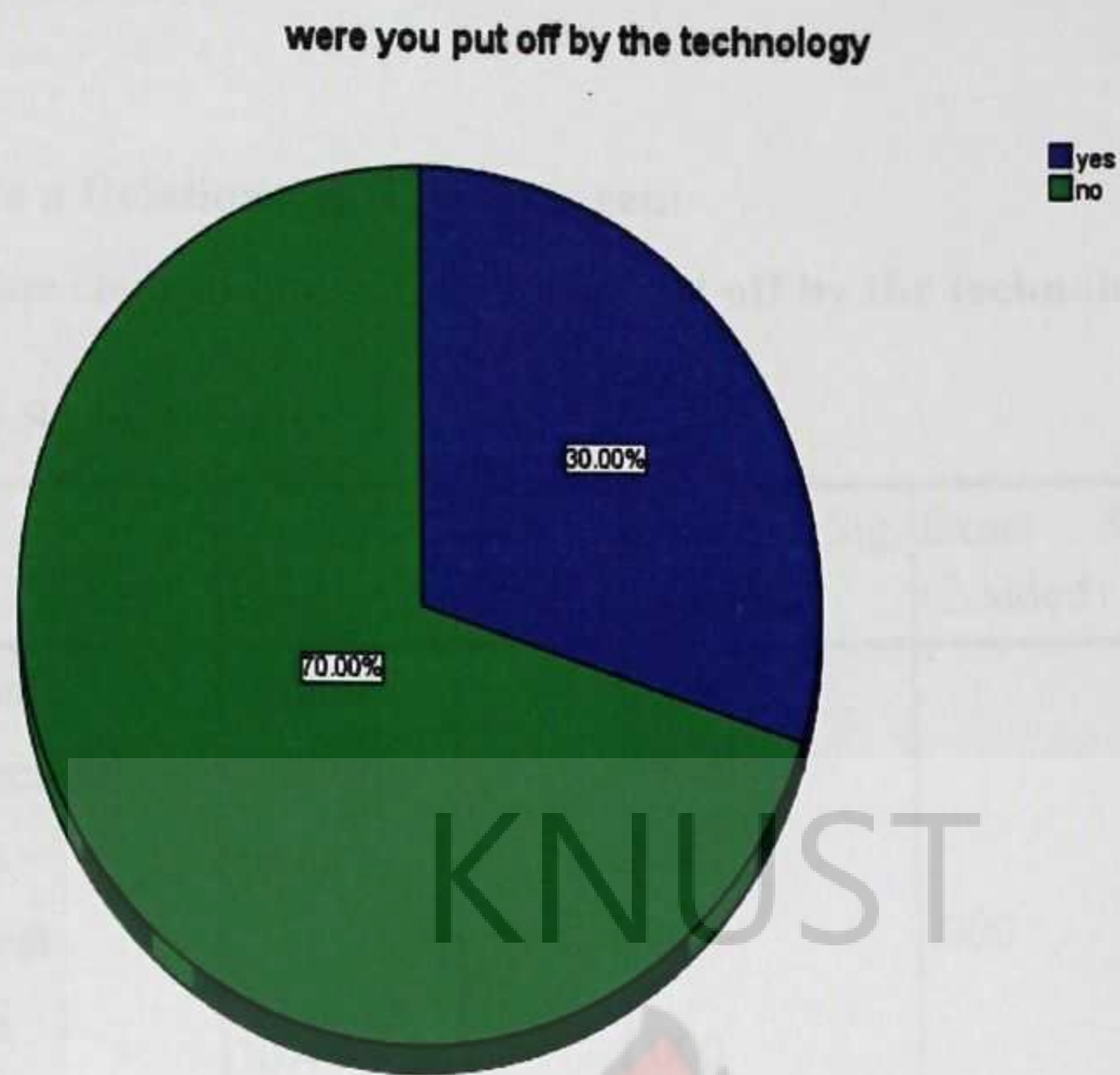
Fig 4.4 show whether patients were **put off or not by the technology** that is being employed

Patients were asked whether the technology used put them off from receiving teleconsultation. Out of the 60 respondents   30% said that the technology put them off, while the remaining 70% also said it did not put them off.

Table 4.6(a) shows Cross tabulation of:

Using telemedicine close to home * were you put off by the technology

Table 4.6(a) Crosstab Count

		were you put off by the technology		
		yes	no	Total
using telemedicine close to home	yes	4	39	43
	no	14	3	17
Total		18	42	60

39 respondents are conversant with technology being used hence were not put off while 4 were frustrated.

Table 4.6(b) Shows a Relationship Test Between:

Using telemedicine close to home * were you put off by the technology

Table 4.6(b) Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	30.960ª	1	.000		
Continuity Correction[b]	27.579	1	.000		
Likelihood Ratio	30.845	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	30.444	1	.000		
N of Valid Cases[b]	60				

Conclusion on whether there is a relation between patients using the telemedicine and (put off) convenience of the technology and satisfaction with the consultation, using the chi-square in reference to (Fig4, Table 6a & 6b Above) a (Fig 5, Table 7a&7b Below) respectively.

Ho: patients using telemedicine are put off by the technology and unsatisfied

H1: patients using telemedicine are not put off by the technology and satisfied

From the rejection rule:

We reject Ho since both p-value =0.000< α-level 5% or 0.05

The p-values of both variables gave 0.000. This respectively expressed the notion that patients using telemedicine are not put off with the adopted technology hence are satisfied with the consultation. This shows that patients carry vast degree of comfort in the project being enrolled at the St .Martins hospital at Agroyesum.

Fig 4.5

are you satisfied or unsatisfied with your teleconsultation
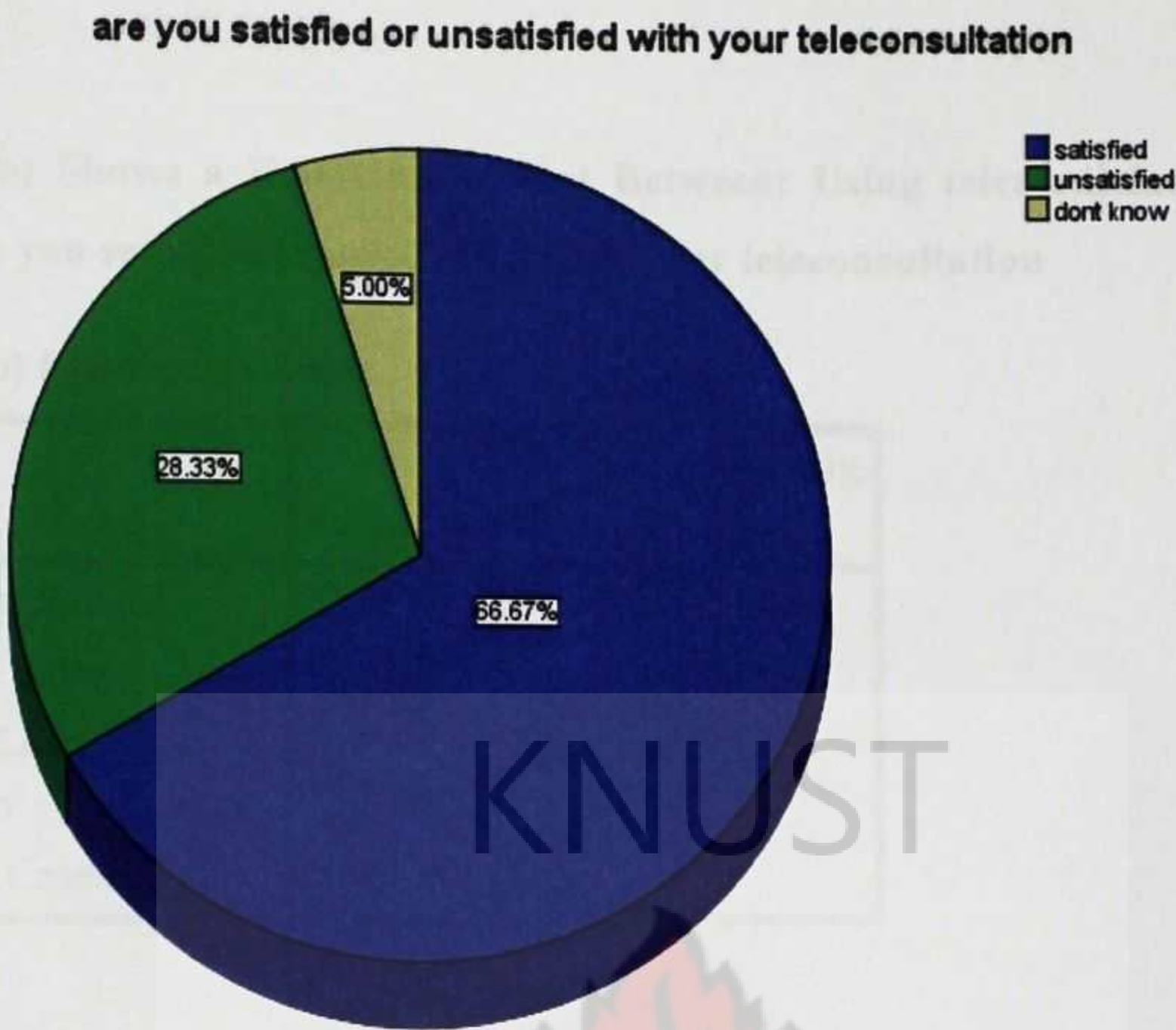
Fig 4.5 shows whether patients were satisfied with teleconsultation or not

They were asked whether they were satisfied with the teleconsultation. About 67% of the respondents responded that they were satisfied with teleconsultation, 28% also responded they are unsatisfied about teleconsultation. Also 5% of the respondents were uncertain whether they were satisfied or not.

Table 4.7(a) shows Cross tabulation of:

Using telemedicine close to home * are you satisfied or unsatisfied with your teleconsultation

Table 4.7(a) Crosstab Count

		are you satisfied or unsatisfied with your teleconsultation			
		satisfied	unsatisfied	dont know	Total
using telemedicine close to home	yes	38	4	1	43
	no	2	13	2	17
Total		40	17	3	60

From the table majority using the telemedicine are satisfied.

Table 4.7(b) Shows a Relationship Test Between: Using telemedicine close to home * are you satisfied or unsatisfied with your teleconsultation

Table 4.7(b) Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	32.296[a]	2	.000
Likelihood Ratio	33.278	2	.000
Linear-by-Linear Association	26.369	1	.000
N of Valid Cases	60		

4.3 To establish whether or not patients using telemedicine would be willing to further use

The literature attributed the patients' willingness in further usage to their preference, extent of happiness derived and overall health outcome. This then will be examined to draw a singular viable conclusion.

Which would you prefer

using telemedicine close to home
travel to hospital for consultation
dont know

3.33%

25.00%

71.67%
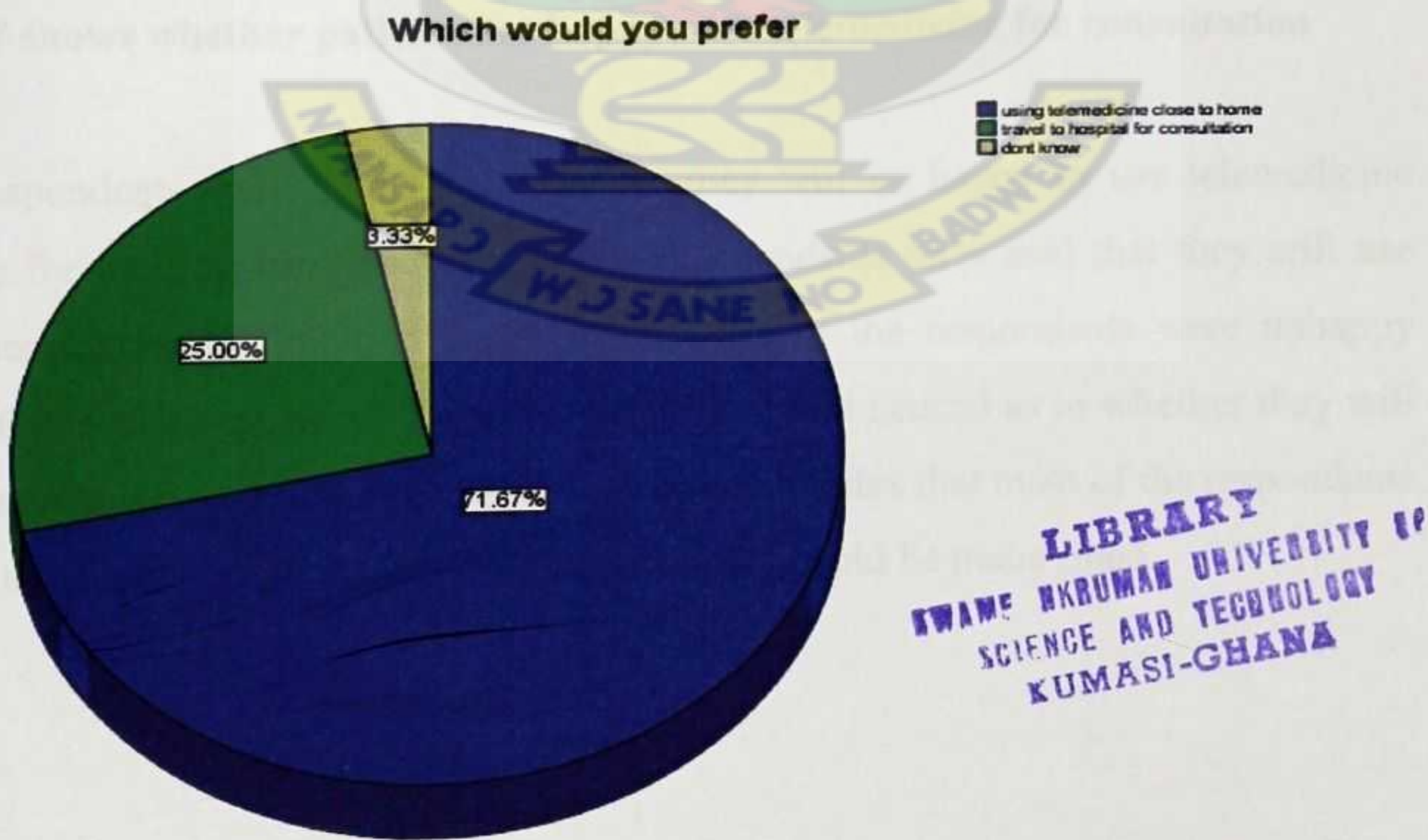
Fig 4.6 shows patients who prefer telemedicine close to home or travel to hospital for health care

They were then asked what form of care they prefer. Out the 60 respondents 43 out of 60 representing 72% prefer using telemedicine close to home, 15 out the 60 respondents representing 25% prefer to travel to hospital while remaining 3% do not know the type of care that they want.

Fig 4.7

ould you be happy to use telemedicine for your consultation again
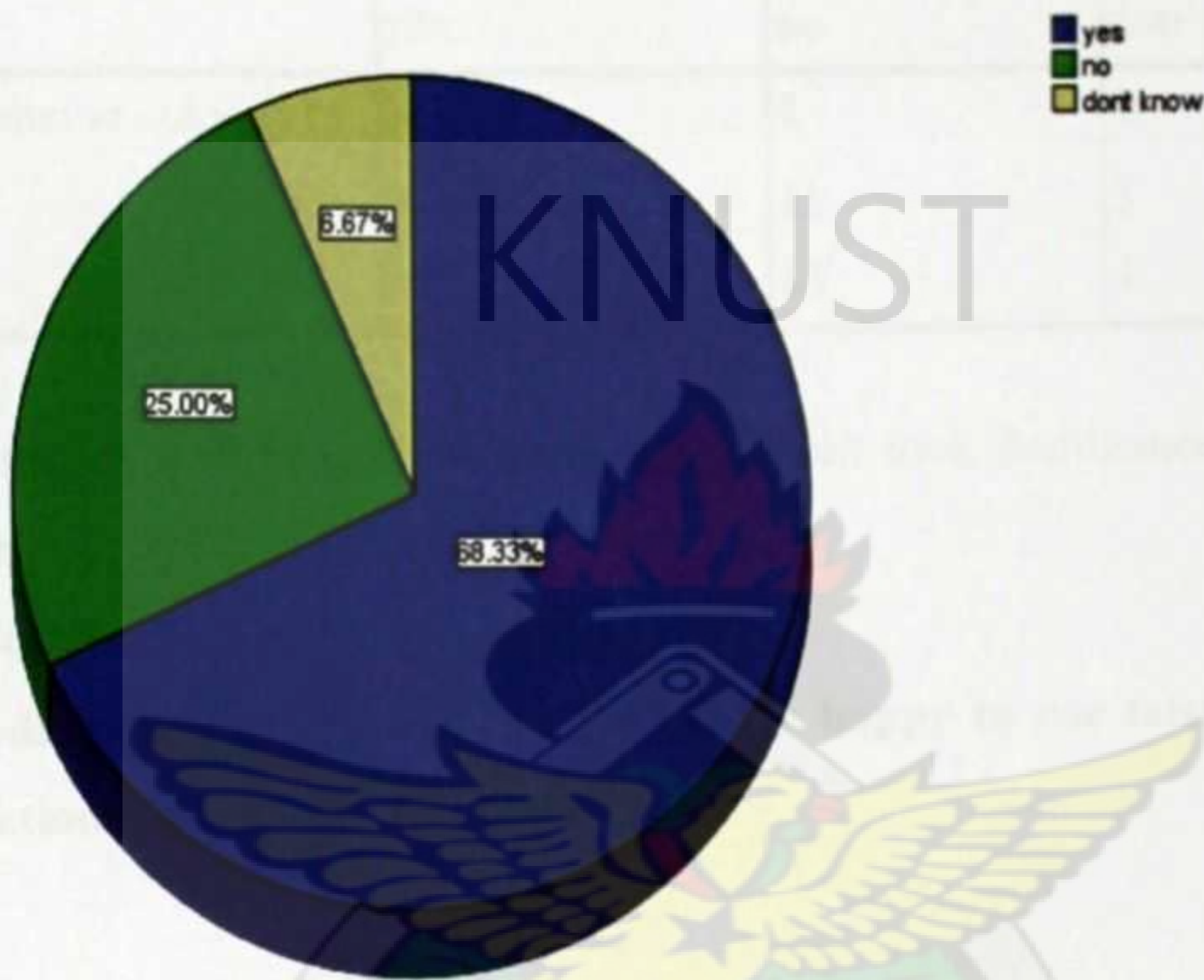
Fig 4.7 shows whether patients are happy with telemedicine for consultation

The respondents were then asked whether they will be happy to use telemedicine service for their health care again. Out 60 respondents 68% said that they will use such service for consultation again. While 25% of the respondents were unhappy about the technology, about 7% respondents remained neutral as to whether they will use the technology or not. Looking at scenarios it implies that most of the respondents prefer telemedicine and therefore that technology should be maintained.

Table 4.8(a) shows Cross tabulation of:

Using telemedicine close to home *would you be happy to use telemedicine for your consultation again

Table 4.8(a) Crosstab Count

		would you be happy to use telemedicine for your consultation again			
		yes	no	don't know	Total
using telemedicine close to home	yes	38	4	1	43
	no	3	11	3	17
Total		41	15	4	60

38 using the facility will be glad using it again which took dominance of all other response given.

Table 4.8(b) Shows a Relationship Test Between

Using telemedicine close to home *would you be happy to use telemedicine for your consultation again

Table 4.8(b) Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	28.167[a]	2	.000
Likelihood Ratio	28.168	2	.000
Linear-by-Linear Association	23.992	1	.000
N of Valid Cases	60		

Conclusion on whether patients using the telemedicine would be happy using it again, using the chi-square in reference to (Fig 7, Table 8a & 8b)

Ho: patients using the telemedicine would be unhappy using it again

H1: patients using the telemedicine would be happy using it again.

Refer table 1.1a for rejection rule.

We reject the Ho since the p-value significant at 0.000 is <α-level 5% or 0.05. We

therefore resolve that patients using telemedicine would be happy using it for further teleconsultation.

Fig 4.8

what was the overall health outcomein terms of treatment
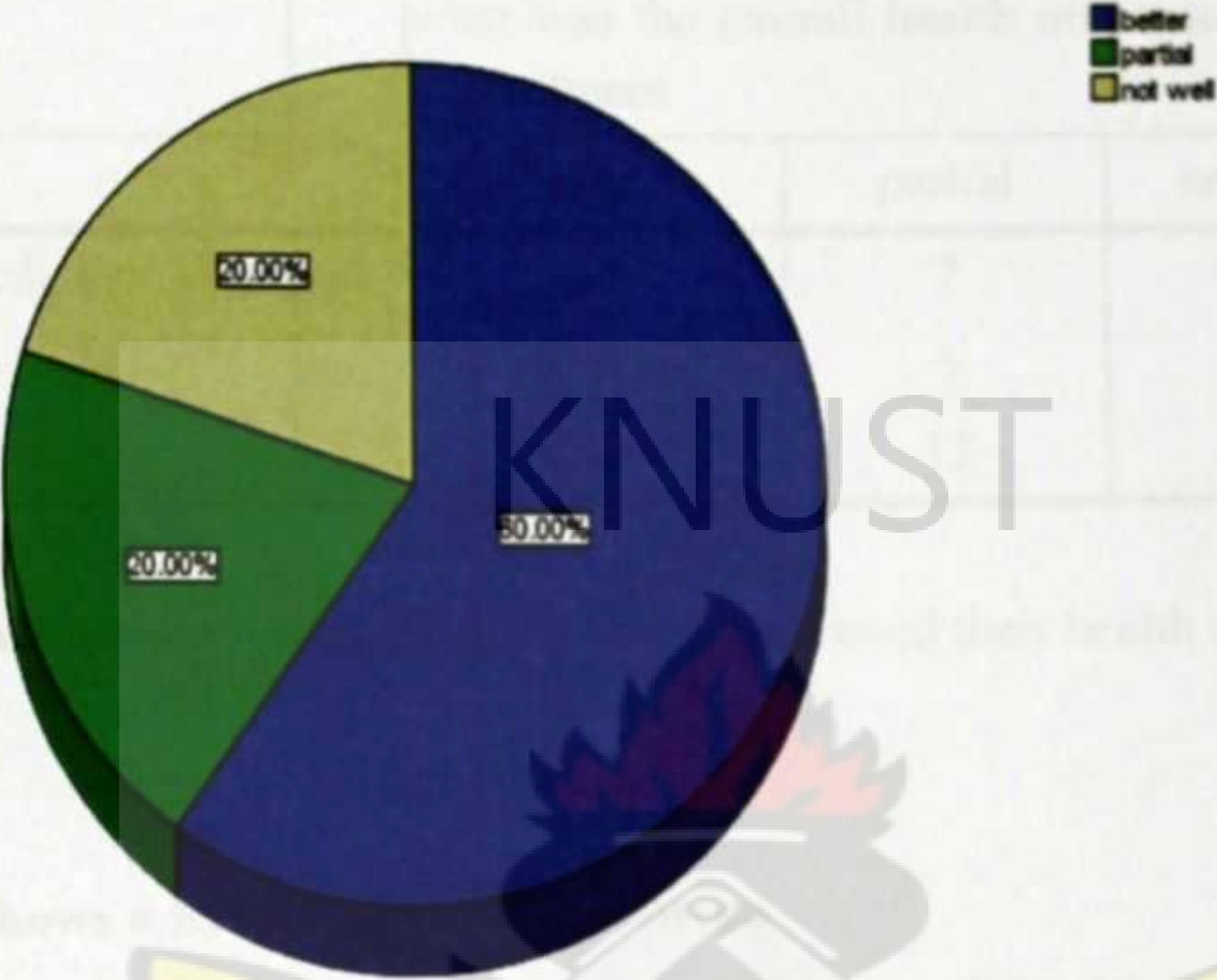
Fig 4.8 shows health overcome when telemedicine is used.

Out of 60 respondents, 60% said that they were better with respect to their health when they used telemedicine for consultation, 20% of the respondents say their health improved partially when they used the technology but other 20% were not well when they used the technology

Table 4.9(a) shows Cross tabulation of:

Using telemedicine close to home * what was the overall health outcome in terms of treatment

Table 4.9(a) Crosstab Count

		what was the overall health outcome in terms of treatment			Total
		Better	partial	not well	
using telemedicine close to home	yes	35	7	1	43
	no	1	5	11	17
Total		36	12	12	60

Majority representing 35 respondents felt it has improved their health status.

Table 3.3(b)

Table 4.9(b) Shows a Relationship Test Between

Using telemedicine close to home * what was the overall health outcome in terms of treatment

Table 4.9(b) Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	36.334[a]	2	.000
Likelihood Ratio	39.205	2	.000
Linear-by-Linear Association	35.594	1	.000
N of Valid Cases	60		

Conclusion on patients using telemedicine in relation to their health outcome, using the chi- square test statistic in reference to (Fig 8, Table 9a & 9b)

Ho: patients using telemedicine have no better health outcome

H1: patients using telemedicine have better health outcome.

From Rejection rule above:

Decision: we reject the H_0 since the p-value=0.000 < α-level 5%. It is conceptualized that most patients using telemedicine have better health outcome in general, justifying the patients' response given.

On the bases of their improved health outcome, and comments it is clear that patients assessing care via telemedicine would be willing to further use the technology for their health care.

CHAPTER FIVE

DISCUSSION

5.0 INTRODUCTION

This chapter discusses the results of the data gathered from the field of study as per the study objectives. These objectives were to assess: patients timeliness of care, the comfort of patients with the teleconsultation and patients willingness to further use telemedicine.

5.1 Patients Timeliness of Care

When patients were assessed on time majority of them said they do not waste much time in the waiting and consulting room at the health facility. According to patients' comments on the questionnaires, majority explained that there are always lesser patients at the facility as compared to the district hospitals. They are also assured of meeting a service provider without waiting for them each time and day. Initially patients' travelled over 40km and 90 minutes to assess health care but the implementation of the telemedicine health centers has reduced the time and distances. The reduction in time and distance vary from communities, since some patients live in the communities where the center is and some live in other communities. In all there is a massive reduction relative to the district hospitals. Due to the poor nature of the roads, it takes very low speed and extreme cautiousness for drivers to drive from the neighboring communities to the district hospitals. Initially if patient want to go to hospital for any form of care, it requires the whole day or more. This was due to the long travelling time and distance to the district hospitals. This was wasting patient's productive time but this technology now save their productive time. The few who did not agree with the concept of time saving indicated seeking healthcare away from home was in itself a way of wasting time.

Most respondents further said in the questionnaires that, initially they used to go through a lot of challengers before they get access to orthodox health care. One gets up at dawn to prepare for the hospital. In the rainy season, the roads are not motorable so most commercial vehicles have difficulties plying the roads. Sometimes passengers have to alight and push the cars through the mud when they get stuck. .

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Others also sometimes seek assistance from other cars to pull them out of the mud continuing on their journey. People who get sick in the night have to wait till morning because drivers are not willing to travel the roads at night. But since the establishment of this health delivery, patients no longer go through this stress to assess health care. Patients and caregivers at times get frustrated with the apparent lack of concern shown by the healthcare workers at the district hospitals. But now when a patient is referred from any of the telemedicine health centers to St Martin hospital, he is given the needed attention. Also when there is a referral emergency case from the telemedicine center at the village, nurses, physician and the ward at St Martin hospital is always ready for the incoming patient.

The study learnt that all the in-charges and some nurses live in or around the facilities so this makes availability of health care simple to the natives in and the surrounding villages.

In confirmation to my findings ERCA (2005) did a small study, where telemedicine units were connected from the main hospital to the satellite unit. Fourteen patients were assessed and advised via this method and of these patients, 8 were seen for help with their hyperphosphataemia. This study showed that the telemedicine unit is an effective way to assess patients and communicate information. Travel time has been saved.

Also in line with my outcome, a survey by Brown-Connolly (2002) working in 18 rural California counties, researchers developed a standardized satisfaction questionnaire using a five-point scale and collected data from patients receiving consultations in 27 specialties. The score for mean satisfaction with telemedicine among the 793 respondents was 4.5 out of 5. In addition, their survey probed at other topics related to telecare. Respondents conveyed a willingness to continue using telemedicine. Also, 741 of the patients noted travel information. Telemedicine decreased travel distance by 170 km on average and saved an average of 130 min.

5.2 The Comfort of Patients with the Teleconsultation

When patients were asked if they would prefer to go to the health facilities close to their homes or go to the district hospital for care. Greater number of patients said they will always prefer to visit the one close to them because of proximity for care. They

also explained to the interviewers that it is safer to take emergency cases there than moving a patient trough such a distance. Only a handful of patients said they will prefer to travel to hospital for treatment. They feel the nearby facilities are not up to standard. Also, they tend to believe they can only get well when they are treated at big hospitals.

Patients were further asked if they were satisfied with teleconsultation, most of them said yes and further explained that the questions are the normal questions and answers each physician consultant asks. The only difference is you don't see the person you are speaking with. Some of the patients said initially when the in-charge asks them to speak with the tele staff they had doubts and their doubts were allayed during the consultation. The dissatisfied patients said not knowing who they were speaking to prevented them from relaying all their problems/symptoms to the tele health provider. In connection with my findings Whitten and Love (2005) also researched into telemedicine Results from patient satisfaction studies indicated exceptionally high levels of perceived satisfaction, often above the rates of expected satisfaction for traditional forms of health delivery. Results from provider satisfaction studies are also generally quite positive.

Also Rosser used a standard telephone line, low-resolution video, and high-resolution pictures; he conducted postoperative consultations by sending a nurse and medical student to the patients' home while a physician attended remotely from the office. Patients reported extremely high satisfaction with the home visits, rating them 4.8 out of 5 (Whitten and Love, 2005).

In support with my outcome Currel et al (2010) work placed emphasis in previous studies that has focused on the clinical and service perspective with the patient perspective limited to 'patient satisfaction'. Patient-centered approaches to care are becoming better understood and more sophisticated in their methods of investigation

5.3 Patients Willingness to Further Use Telemedicine

Most of the respondents were familiar with the technology used for the consultation. They said the technology did not scare them since most of them already use mobile phones. Using mobile phones at the health facility for was not difficult to accept. Very few said the technology was not convenient since they were not hearing the consultation well on the phone.

Respondents were asked if they would be happy to use the service for their health care again. A lot of them said is really beneficial and would be happy to use it always. Few said "No" because they have personal problems with one or more staffs of the facility but not the service itself. In conclusion majority of patients declared that their health status has improved since the establishment of the project. The patients' elaborated by saying because of proximity of the facility, anyone who feels slight discomfort in health visit the facility for early health care.

In confirmation with my findings Piette et al (2010) also surveyed chronically ill patients with low incomes in Honduras to measure their use of mobile technologies and willingness to participate in mobile disease management support. 624 chronically ill primary care patients in Honduras were surveyed. Most patients (>80%) reported that they would be willing to receive automated calls focused on appointment reminders, medication adherence, health status monitoring, and self-care education. Patients were more likely to be willing to participate in automated telemedicine services.

Eikelboom and Atlas, (2005) had a similar outcome to my findings in which they also studied the willingness of patients to use telemedicine for ear- and hearing-related appointments, and the factors that influenced their decision to participate in telemedicine. A survey was designed with questions about patient appointments, perceived advantages and barriers to telemedicine, and prior use of the Internet for health-related matters. A total of 116 patients in four audiology centers were surveyed from December 2004 to May 2005. There were 54 male and 62 female respondents; 46% of the participants were aged over 66 years. In all, 75% had not previously heard of telemedicine. The most common reasons for willingness to use telemedicine were to reduce the time waiting for an appointment. The most common barrier to using telemedicine was a preference for face-to-face visits. Of those surveyed, 32% were willing to use telemedicine, 10% would sometimes be willing, 28% were unsure, and 30% were not willing. Further test proved that there was no relationship between willingness and age or gender, except that women over the age of 55 years were less willing. Patients who had previously heard of telemedicine and used the Internet for health-related matters, especially men, were more inclined to have a telemedicine appointment.

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CHAPTER SIX

RECOMMENDATION AND CONCLUSION

6.0 INTRODUCTION

This chapter wraps up the study undertaken at Amansie District and makes appropriate recommendations that could be adopted to restructure the telemedicine project for the benefit of patient. The study was undertaken with a view of evaluating the telemedicine care in St. Martin's hospital from patients' perspective. It assess: patients timeliness of care, the comfort of patients with the teleconsultation and patients willingness to further use telemedicine.

It is hoped that the findings of this study would assist in the recognition of the project, give it a place in the health care delivery in Ghana, and including it in the national budget.

6.1 CONCLUSION

Basing on the descriptive and the inferential analyses it can be concluded generally that telemedicine project in St. Martins hospital has been accepted by patients and the objective by sponsors has being achieved thus to improve access to primary healthcare by using information and communication technologies (ICTs) to overcome geographical barriers.

6.2 RECOMMENDATIONS

Based on the results of the study, the following are recommendations for improving the quality telemedicine services.

6.2.1 Recommendation to Staff

Consulting staffs at the district hospital should request a face-to-face consultation if they do not feel that they are being presented with adequate information since some patients feel reluctant to relay their health information to people they do not see.

The practitioner should educate patients on the benefits of the telemedicine consultation when necessary. This will clear the minds of some patients who think treatment at big hospitals only make them better.

6.2.2 Recommendation to Ghana Health Service

G H S should emphases the need for the nation to incorporate telemedicine into our health care delivery to the government. This service can be a strong tool to accomplish the millennium health goal (making quality health care assessable to all by the year 2015).

G H S should sponsor educational seminars for their members to gain knowledge relevant to the planning, development, implementation and operation of telemedicine systems. This will enlighten their staffs with this upcoming health delivery technology.

Ghana Health Services is encouraged to develop evaluation instrument to measure the impact of telemedicine in St. Martin Hospital. This instrument will bring up flaws and strength of the technology, which will serve as a reference guide for further telemedicine establishment.

They should coordinate telemedicine licensing, credentialing and reimbursing policies with neighboring West African states that are highly using the technology to support in diverse ways.

6.2.3 Recommendation to Management

Management should develop standards for the appropriate use of telemedicine within each health facility to check grievances of some patients against the staffs upon their visit to the center.

According to patients, management should extend the telemedicine service to all communities for their families and friends to benefit.

6.2.4 Recommendation to Ghana Education Service

Medical schools and professional groups involved in providing continuing medical education should develop and implement curricula to ensure that health care personals are sufficiently informed   about telemedicine use and its importance. This will also enlighten health students about the technology.

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QUESTIONNAIRE FOR PATIENTS OF TELECOMEDICINE SERVICE

Dear patient, this questionnaire is designed to collect information about how you feel and perceive about the telemedicine service in ST. Martins Hospital in Agroyesum. Your response will be treated confidential and used for only academic purposes. I am a Master of Science student of Kwame Nkrumah University of Science and Technology.

Please tick (√) the appropriate box for your answer

Question 1 – Gender

Male [ ] , Female [ ]

Question 2 – Age

00-17 [ ]

18- 30 [ ]

30-45 [ ]

45-60 [ ]

60-70 [ ]

Question 3 – Have you ever experienced teleconsultation?

Yes [ ]

No [ ]

Don't know [ ]

Question 4 – Which would you prefer?

Facility	yes	no
using telemedicine close to home		
Travel to hospital for consultation		

Question 5 Are you satisfied or unsatisfied with your teleconsultation?

Satisfied [ ]

Unsatisfied [ ]

Don't.know [ ]

Question 6 – Has telemedicine reduced the distance and time for assessing health care?

Yes [ ]
No [ ]

Don't know [ ]

QUESTION 7- Was the consulting time convenient?

YES [ ]

NO [ ]

Don't know [ ]

QUESTION 8 – Has telemedicine reduced the burden of obtaining health care?

YES [ ]

NO [ ]

Don't know [ ]

Question 9 – Were you put off by the technology?

YES [ ]

NO [ ]

Don't know [ ]

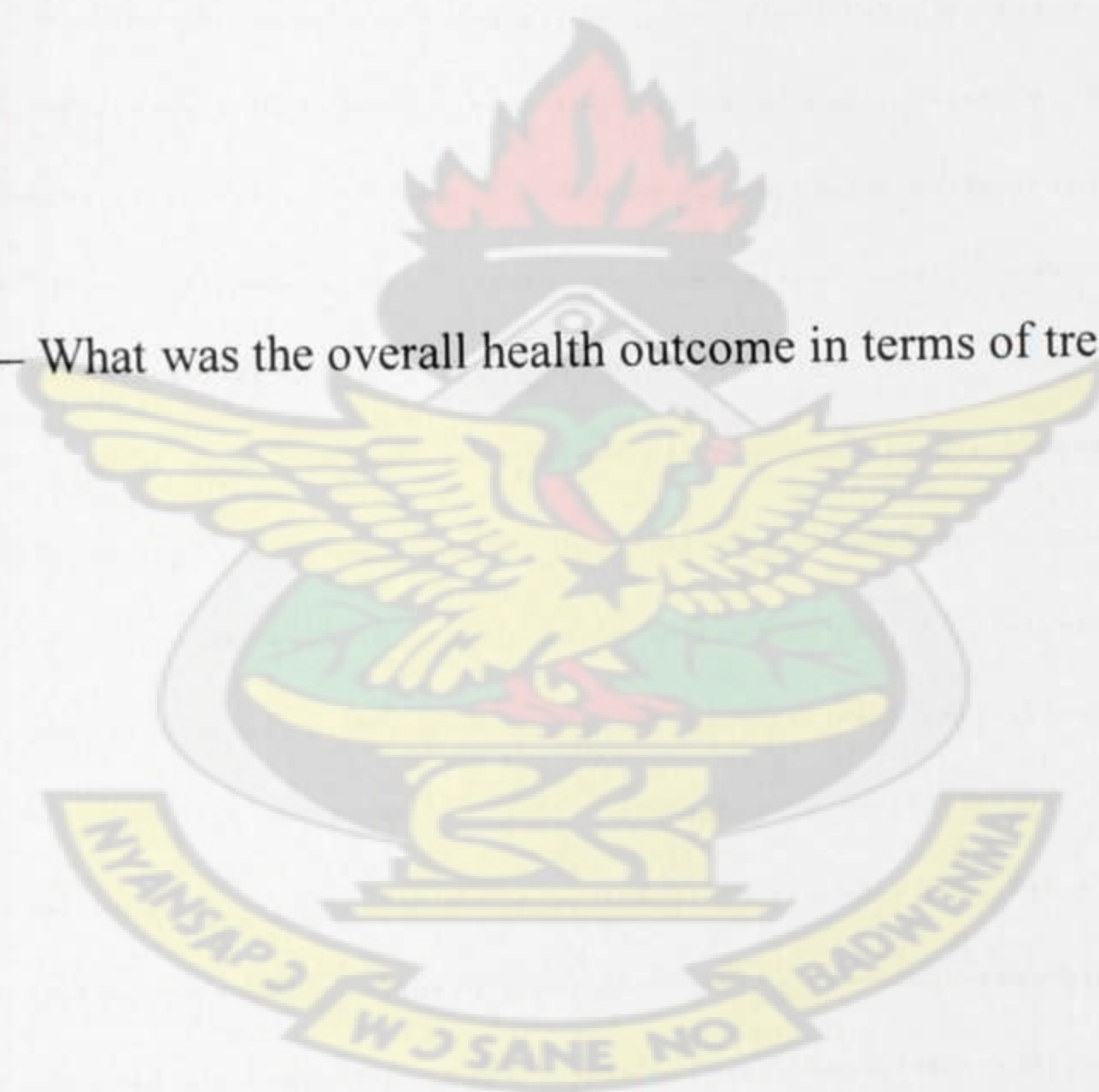Question 10 – Would you be happy to use telemedicine for your consultation again?

Yes [ ]

No [ ]

Don't know [ ]

QUESTION 11 – What was the overall health outcome in terms of treatment?
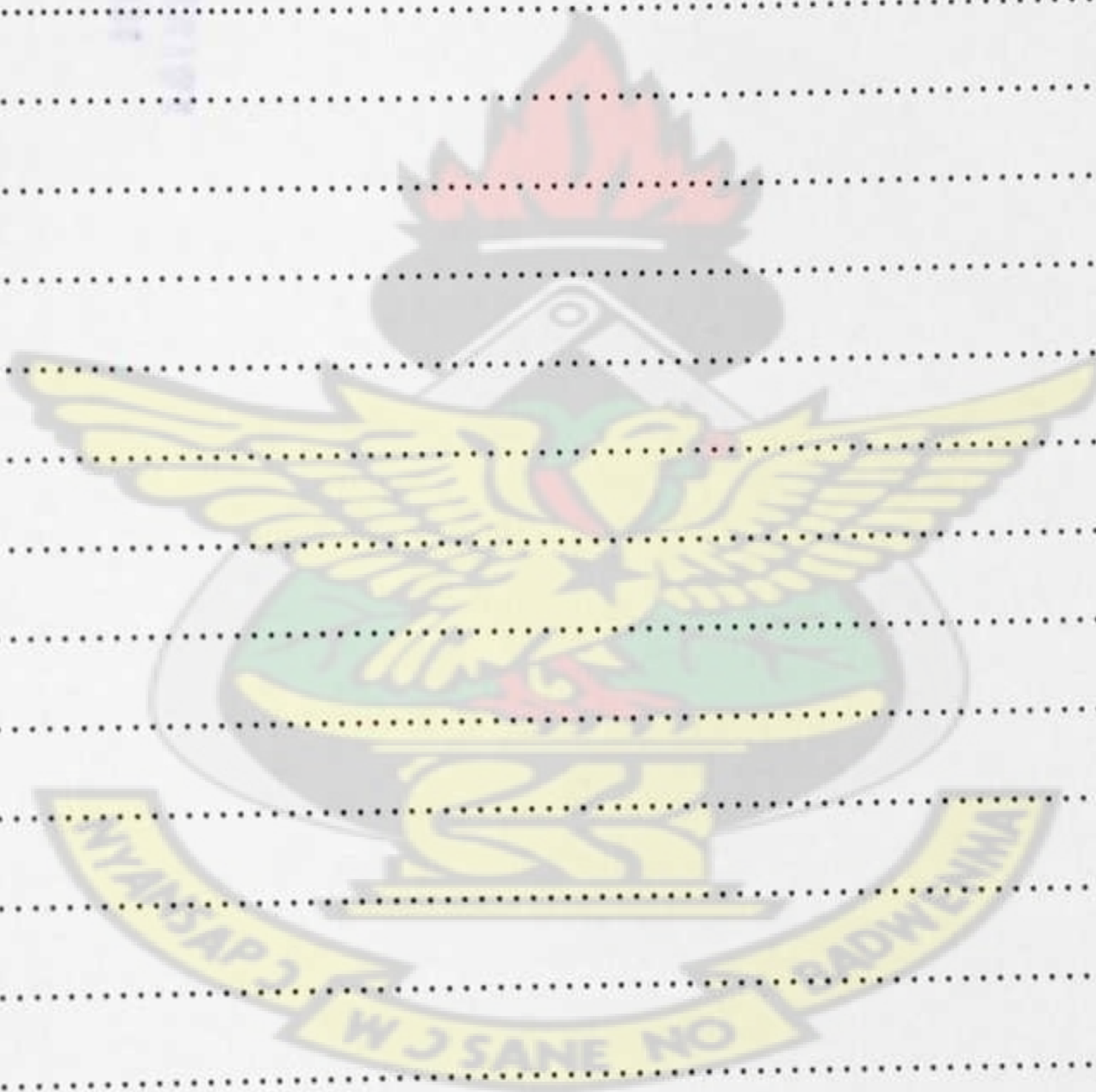
Better [ ]

Partial [ ]

Not well [ ]

REASONS FOR ANSWERS

Comments..

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Comments..

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