

ATTITUDES OF NURSING STAFF TOWARDS COMPUTERIZATION: A CASE OF TWO HOSPITALS IN NAIROBI, KENYA.

**A DISSERTATION PRESENTED IN PARTIAL FULFILMENT OF THE
REQUIREMENTS FOR THE AWARD OF MASTER OF SCIENCE
DEGREE IN NURSING ADMINISTRATION AND MANAGEMENT OF
THE UNIVERSITY OF NAIROBI.**

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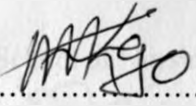
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Signed..........Date. 23rd Nov' 2011.....

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SUPERVISORS' APPROVAL


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DEDICATION

This work is dedicated to my dear wife Daisy and children for being there: for their support and encouragement all along the way.

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LIST OF ABBREVIATIONS

AKUH	Aga Khan University Hospital
CEO	Chief Executive Officer
CPR	Computerized Patient Records
EHR	Electronic Health Records
EMR	Electronic Medical Records
EPR	Electronic Patient Records
HIS	Health Information Systems
IT	Information Technology
ICT	Information Communication Technology
KMTC	Kenya Medical Training College
KNH	Kenyatta National Hospital
NATC	Nurses' Attitudes Towards Computerization
NCST	National Council for Science and Technology
SPSS	Statistical Package for Social Sciences
UK	United Kingdom
UoN	University of Nairobi
USA	United States of America

OPERATIONAL DEFINITIONS

Attitude: - a settled or preferred way of thinking or feeling about a certain phenomenon.

Computerization: - the adoption of or conversion to a system that is controlled, stored, or processed by a computer. Patient information, nursing data and medical records can be converted from a paper-based storage system to a computer-based one. In this text, the use of the term computerization is used interchangeably with computer systems to mean the same thing.

Ward: - a room or a set of rooms in a hospital allocated to a particular group of patients admitted with related conditions and are to be looked after by a particular team of physicians and nurses who have specialized in that field.

Staff nurse: - an experienced nurse who is less senior than a charge nurse or a designated supervisor. Staff nurses form the rank and file in the nursing workforce.

Charge nurses or nurse managers: - these are the nurses who are in charge of a ward in a hospital. Depending on the type of hospital a charge nurse can be found supervising a few nurses in a single ward or many nurses spread in more than one ward.

Computer knowledge: - possession of sufficient knowledge and skills to enable one to use computers

ABSTRACT

Aim: - This study aimed at determining the attitudes of nurses towards the use of computers and the factors that influence these attitudes.

Background: - The health sector is faced with constant changes as new approaches to tackle illnesses are unveiled through research. Information, communication and technology have greatly transformed healthcare practice the world over. Nursing, being an integral part of the healthcare delivery system, is exposed continually to a repertoire of changes. It is a common practice for authorities to plan and institute changes in hospitals without regard for the feelings or views of the intended end users.

Nurses have often found themselves compelled to adopt changes for which they had little or no contributions. This invariably bred resentment and resistance leading to slowed or unsuccessful realization of the intended change (Timmons, 2003). Variables such as age, educational level, years worked in nursing, computer knowledge and experience have been found to influence the attitudes of nurses towards computerization.

Methods: - This was a cross sectional descriptive study to determine the attitudes of nurses towards the use of computers in their hospitals. One hospital (AKUH) had introduced use of computers while the other (KNH) had not. The respondents from AKUH were taken to be users while those from KNH non-users.

The study was conducted in medical and surgical wards in both Aga Khan University Hospital (AKUH) and Kenyatta National Hospital (KNH) in Nairobi, Kenya. A convenience sample of 200 nurses filled the questionnaires. The response rate was 100%.

Data was collected using a modified version of the Nurses' Attitudes Towards Computerization (NATC) questionnaire that was developed by Stronge and Brodt (1985). The study instruments were tested for reliability and validity. The reliability coefficient for the likert-type questions was a Cronbach alpha was 0.82 implying a high internal consistency. The data was collected over a period of two months between May 2011 and June 2011. Descriptive statistics were used to analyze the data.

In addition, two nonparametric tests (Kruskal-Wallis Test and Mann Whitney *U*-test) were used to establish relationships between the variables.

Results: - Seventy eight percent (n = 156) of all the participating nurses were from Kenyatta

National Hospital (KNH) and the remaining 22% (n= 44) from the Aga Khan University Hospital (AKUH). Overall, the nurses in the two hospitals had a favorable attitude towards computerization. The total attitude scores for nurses at both hospitals was 73.53 (SD = 13.15) out of a maximum possible score of 100. The range of attitude scores for this sample was 34 to 100. The non-users had a significantly higher attitude score (mean = 74.56) compared to the users (mean = 69.86, Mann Whitney $z = 2.206$, $p = 0.0274$). Majority of respondents (72.4%) totally rejected the suggestion that computers should be confined to non-nursing departments such as finance. A similar majority rebuffed the idea that nurses should never use computers. The age of nurses showed a statistically significant association with attitude towards computerization (Kruskal Wallis $\chi^2 = 13.29$, $p = 0.039$). Gender did not significantly impact on their attitude towards computerization (Mann-Whitney $z = 0.179$, $p = 0.86$). Professional training significantly influenced the nurses' attitudes towards computerization (Kruskal Wallis $\chi^2 = 9.34$, $p = 0.025$). Holders of bachelors' degrees (mean = 82.07) and higher diplomas (79.07) had the highest attitude scores.

The duration of exposure to computers showed a significant association with attitude towards computerization (Kruskal Wallis $\chi^2 = 12.81$, $p = 0.025$). Nurses with longer durations of exposure to computers (at least three years) at both hospitals were likely to have more positive attitudes than those with relatively shorter durations of computer use.

Conclusion: - Generally, nurses have positive attitudes towards computerization. The findings further disclose that nurses with little or no experience in using computers in the places of work (non-users) and those from a hospital that had instituted use of computers (users) both had positive attitudes towards computerization. Interestingly, the non-users were more positive than the users.

This information is important for the planning and implementation of computerization in the hospital as suggested in other studies.

CHAPTER ONE

1.0 INTRODUCTION

We live in a constantly changing environment. Computers are among the many facets of information, communication and technology that have rendered the wide world a village. In most parts of the globe especially the developed nations, computers are used in almost all spheres of life (Kochuthresiamma, 2002; Kuroda et al. 2007). Computers are ubiquitous accessories in all sectors of the economy, from the banking sector, transport, engineering, education, health sector etc. In the 1990s the government of Japan gave incentives to hospitals willing to adopt electronic medical records (EMRs) (Kuroda et al. 2007). Things are not different in the UK where Chan et al (2004) reported that the health service had invested heavily in information technology. The establishment of a national Health Information System (HIS) in Canada has continued to receive government support through the Economic Action Plan (Huryk, 2010). In the USA, federal incentive payments for adoption and meaningful use of electronic health records (EHRs) are available for hospitals and office based physicians (US Department of Health and Human Services, 2011 press release). The payments could run into billions of dollars over a period of ten (10) years according to the press release. And in Australia, the national and state governments were reportedly investing heavily in health information systems (Eley et al. 2008). These efforts aim at mainstreaming information systems in the delivery of healthcare.

In Kenya, mobile banking (which is fast metamorphosing into mobile-commerce) is acclaimed as a first through the M-Pesa money transfer implemented by a giant mobile phone company, Safaricom. This represents the extent to which information technology can be applied in any country regardless of its economic status or ranking. Nevertheless, a push for the adoption of health information systems (HIS) in Kenya is yet to reach the proportions seen in the developed countries. Nonetheless, the goings on in developed countries in the area of HIS will certainly reach Kenya in the not so far future considering that the world is a global village.

The minister of medical services Prof. Anyang' Nyong'o (The Standard, 2011) made a case for the adoption of information technology in the public health sector in his weekly column in a local newspaper. Should the minister follow up his call with action, the introduction of IT in Kenya's public hospitals could happen sooner.

The health sector is faced with constant changes as new approaches of tackling illnesses are unveiled through research. Information, communication and technology (ICT) have greatly transformed healthcare practice the world over. Nursing, being an integral part of the healthcare delivery system, is exposed continually to a variety of changes (McBride and Nagle, 1996). The responses of the nurses to change could vary from unreserved support to total rejection (Timmons, 2003). For instance, the introduction of computers can elicit diverse feelings among nurses. A positive attitude could see a rapid adoption with accompanying realization of the benefits of computerization. A less positive attitude or rejection is likely to retard attempts to modernize service delivery.

1.1 BACKGROUND

In Kenya, the use of computers in hospitals is not a widespread practice. Computerization of hospital services has been embraced in such private (non-governmental) hospitals as the Aga Khan University hospital and the Nairobi hospital. The other hospitals that have embraced computer systems include the Forces Memorial Hospital (a military run hospital), Nairobi Women's Hospital and Metropolitan hospital. The coverage of such computerization is limited to non-clinical departments such as general administration, finance and procurement. Medical or health records department's computerization serves these non-clinical departments more than it does the clinical ones.

Attempts at computerization in government owned hospitals can be witnessed in a few non-clinical departments such as the finance and procurement. The health records departments in some government hospitals have installed and/or are using computer packages (for electronic data management) that can be extended to the entire hospitals. Naivasha district hospital, a government-run facility is worth mentioning for piloting the computerization of its services.

In the African region, there is a dearth of published research on the computerization of hospitals.

The Kenyan experience notwithstanding, the use of computers has slowly been implemented in many hospitals across the world (Ragneskog & Gerdnert, 2006).

According to Ragneskog & Gerdnert (2006), computers are no longer confined to hospitals but have been introduced in nursing homes and even in long-term facilities.

Since nurses comprise the largest part of the health workforce, their acceptance of information and technology systems will be mandatory for implementation of ICT (Eley et al, 2008).

1.2 PROBLEM STATEMENT

The introduction of computer-driven technologies into multiple aspects of modern health care indicates that a number of the competencies of the 21st century nurse will encompass mastery of computer technology. A great majority of nurses are uncomfortable and inexperienced with the use of computer technology (Alquraini et al, 2007). Nurses' tendency to resist change is consistent with change theory's proposition that people are naturally resistant to change (Huryk, 2010). Fear of the unknown, contentment with the status quo or lack of motivation and low staff morale can easily explain resistance to change. The documented lack of computer proficiency among many nurses compounds the problem of resistance. This poses the risk of making resistance a default response by nurses towards computerization. It is recognized that staff attitude is paramount to the implementation of any system being introduced (Marasovic, et al., 1997). Schwirian et al (1989) assert that the attitudes of nurses using computerized information systems are as important as the technology itself. Consequently, an understanding of the attitudes of nurses towards computerization, the factors that shape these attitudes and taking them into account is critical to the successful implementation of computerization in any hospital. Huryk concurs with the foregoing statement when she asserts that "nurses' opinions towards technology must be assessed prior to the implementation of any system" (Huryk, 2010, pp.607). In the same vein, Timmons (2003) found that resistance was associated with lack of involvement of nurses during the designing or implementation phases of computerization. Evidently, the incorporation of nurses is mandatory if opposition was to be avoided.

Savvy planners or change agents are likely to use a better and more acceptable approach while instituting new technology in the hospital. Such approaches might include roping in the nurses while designing the system to be launched as Huryk (2010) suggests.

Huryk (2010) further recommends the training of those nurses who have little or no computer experience. The importance of equipping staff with IT knowledge and skills cannot be overemphasized.

Government policies are expected to precipitate change. For example in the UK, the pressure to adopt ICT came from the government (Simpson and Kendrick, 1997). In the same way, it is anticipated that the government of Kenya will soon demand that public hospitals change from paper-based data management to computer-based systems. Unfortunately, the government of Kenya's HIS policy (2004) is vague but its impending review might change that. Prior to that happening, an understanding of nurses' attitudes towards computerization is necessary.

Therefore, the purpose of this study was to determine the attitudes of nurses towards computerization and the factors influencing these attitudes.

1.3 JUSTIFICATION

The era of writing reports and storing data using papers and files is seriously under threat from electronics such as computers. Nurses in Kenyan hospitals spend part of their time at work manually writing the cardex and other routine reports. In the developed world, such reports are entered in computers placed at the nurses' desk.

Electronic data management, electronic health records (EHRs), electronic medical records (EMRs), electronic patient records (EPRs) and computerized patient records (CPRs) are not uncommon phrases in other parts of the world particularly the developed countries such as UK, USA, Australia and many Asian countries like Japan, China among others (Ward et al, 2008; Jayasuriya & Caputi, 1996; Boonstra & Broekhus, 2010).

The use of computers in healthcare services is likely to be rolled out in public hospitals throughout Kenya. Already, the leading private hospitals (Aga Khan University hospital and The Nairobi Hospital among others) have adopted computer systems in their facilities. The attitude of intended users of a computerized system is significant to the outcome of its implementation.

Policy makers and implementers who have a predilection for a 'top down' approach to the introduction of change are likely to encounter many barriers since they do not involve the end users. Nurses are some of the key end users of computer systems in the health sector.

Since nurses form the largest part of health personnel in most Kenyan hospitals, their responses to the introduction of new programs is critical to its success or failure. It is possible that the reaction of nurses to change could vary from total support to absolute rejection (Timmons, 2003). The nurses' ability to frustrate the implementation of such new technology cannot be gainsaid. Even where open rebellion may not be encountered, a quieter form of resistance or resistive compliance (Timmons, 2003; Marasovic, et al., 1997) is likely to drag and delay the full implementation of the program. Timmons (2003) investigated and analyzed nurses' resistance to the successful use of computer systems and found that total refusal to use the systems was not common. Instead, the resistance took different forms from efforts to minimize use of the systems to extensive criticism of the systems (Timmons, 2003). Failure to take into consideration the nurses' views about the applicability of the systems and/or designs led to the resistance reported by Timmons (2003). If nurses do not believe that computer systems will be of help to them, they will reject it (Schwirian et al, 1989). It is therefore necessary to understand the feelings of nurses towards computerization, identify factors influencing those feeling and develop strategies for countering them. Failure to do that would result in unsuccessful computerization.

Numerous studies on this topic have revealed that nurses were ambivalent to the use of computer systems in their practice settings (Lee, et al., 2005). While some nurses were upbeat about use of computers, others were uncertain and others were outrightly unenthusiastic. Almost all the studies were conducted in many parts of the world but Kenya. Unsurprisingly, there is a paucity of published research on this subject in Africa and Kenya in particular, hence the need for this study. This study aimed at exploring the attitudes of staff nurses towards computerization as well as the factors that influence such attitudes.

1.4 RESEARCH QUESTIONS

- What attitudes do nurses' with or without computer experience have towards computerization?
- What is the association between nurses' age, education, years of nursing experience, experience with computers and their attitudes towards computerization?

1.5 HYPOTHESIS

- I. There is no significant relationship between age, education, years of nursing experience, exposure to computers and attitudes towards use of computer systems.

1.6 AIM

The aim of this study was to compare the attitudes of staff nurses with limited or no exposure to a computerized healthcare system (non-users) with those who had had some exposure (users) in the selected hospitals.

1.7. BROAD OBJECTIVE

To determine the attitudes of staff nurses towards computerization.

1.7.1 SPECIFIC OBJECTIVES

1. To establish the attitudes of nurses with limited or no computer experience(non-users) towards use of computers
2. To determine the attitudes of nurses who have been exposed to computer systems

1.8: STUDY BENEFITS

The findings of this study add to the body of nursing knowledge.

Policy makers and implementers of computerization are now aware that Kenyan nurses have positive attitude towards use of computers in their practice. With this information they can plan and initiate programs that are acceptable to all stakeholders and most importantly the users.

The findings of this study confirm that the views of nurses ought to be taken into consideration while introducing new technology. If heeded, the propensity of nurses to resist change will considerably be lowered (Alquraini et al, 2007).

CHAPTER TWO

2.0 LITERATURE REVIEW

This section examines the work of researchers on the attitudes of nurses towards computerization.

2.1 INTRODUCTION

A number of published studies have focused on the attitudes of nurses toward computerization (Bongartz, 1988; Brodt and Stronge, 1986; Sultana, 1990; Burkes, 1991; Scarpa et al, 1992; Marasovic et al, 1997; Simpson and Kendrick, 1997). Most of these researches were carried out in the UK, USA, Australia, Taiwan and other developed countries. Literature search on the African continent revealed very little. This implied that either no research was conducted on this area or any that was carried out had not been documented. Consequently, the findings from these studies (from outside Kenya) may not necessarily be applicable in Kenya. The only documented studies were done by Kivuti-Bitok (2009) and Kivuti & Chepchirchir (2011) both conducted at KNH. Both studies focused on the nurse managers at KNH who were found to possess positive attitudes towards computerization.

2.2 NURSES ATTITUDES TOWARDS COMPUTERIZATION

Concerning the attitudes of nurses towards computerization, the literature is almost equally divided between those that found nurses to have positive attitudes and those that found them to have negative attitudes.

According to Fishbein and Ajzen (1975, p.340) quoted by Jayasurya and Caputi (1996) 'attitude is a learned predisposition to respond in a consistently favorable or unfavorable manner with respect to a given subject'. The attitude of an individual can foretell his or her intention to perform a behavior regarding an object of interest (Jayasuriya & Caputi, 1996). According to Stronge and Brodt (1985), nurses' computer attitudes reflected their complex internal states that affect their choice or behavior towards computer use.

Effectively, the attitudes of nurses towards computerization will determine the success or failure of the program being introduced.

Other studies on the attitudes of nurses toward computerization have detailed a variety of findings (Bongartz, 1988; Schwirian et al, 1989; Burkes, 1991 and Brumini et al, 2005). Bongartz (1988) compared the attitudes of users and non-users found the non-users to be of a more positive attitude. Burkes (1991) adapted Vroom's expectancy theory and found significant relation between nurse' attitudes, satisfaction with computers and motivation to use computers. In yet another study, Schwirian et al (1989) compared the attitudes of nursing students and registered nurses toward use of computers in practice. They found that the students had more positive attitudes towards use of computers than the registered nurses. Further, Schwirian et al (1989) found that using computers in school, possessing a computer, having one at home or planning to purchase a computer contributed to the positive attitude. Eley et al (2008), also aver that nurses generally demonstrated positive attitudes towards computer use and acknowledged the benefits of ICT to clinical care.

Brumini et al (2005) conducted their study in two Croatian hospitals between November 2003 and March 2004. Brumini et al modified the Nurses' Attitudes Towards Computerization (NATC) questionnaire and administered it to over 1000 nurses. The NATC questionnaire consists of 20 items with a reported Spearman-Brown split-half reliability of 0.90 (Stronge and Brodt, 1985). The instrument has been used in various researches as it is or with minor alteration to suit particular environments or cultures. Responses to the questionnaire statements were provided on a Likert-type scale from 1-5, with 1 implying strong disagreement and 5 equaling strong agreement.

Findings from this study revealed that nurses had positive attitudes towards computers (Brumini, et al, 2005). In addition, nurses with a bachelor's degree had a higher score than nurses with a high school qualification. Similarly, nurses who used computers for any other purpose demonstrated higher attitude scores than those who did not use computers (Brumini, et al, 2005).

On the other hand, other studies have reported negative attitude of nurses towards computers (Alquraini et al, 2007). Sultana (1990) found that nurses had negative attitudes towards computerization.

Other authors brought to light the negative views held by nurses and reported that many felt threatened, apprehensive and even terrified at the idea of being exposed to a computer (Benton, 1990; Keenan, 1991; Rundell, 1992). More researches further reported that some nurses felt computers had a dehumanizing effect on the ward environment that is at variance with the caring nature of nursing (Dunlop, 1986; Chambers and Coates, 1990; Ford, 1990; Palmer, 1990; Hodgkinson, 1991; Rundell, 1992). It is worth noting that these negative views were obtained from the studies done in the early 1990s and late 1980s. Probably this was the time when use of computers in clinical practice was being introduced in the developed countries.

Reports from more recent studies like those carried out by Brumini et al (2005), Alquraini et al (2007), Lee et al (2008), Kivuti-Bitok (2009) and Kivuti & Chepchirchir (2011) indicate that nurses had favorable attitudes towards ICT. This suggests that over time, in this increasingly computerized world, the negative attitudes have been replaced by more positive ones. It is possible that as more and more nurses interacted with computer applications, their general disposition towards technology changed favorably hence the findings reported by these studies.

These equivocal findings on the attitudes of nurses towards computerization, the time differences notwithstanding, preclude them from being applied to different populations of nurses. This then necessitates the exploration of the attitudes of nurses in such resource constrained countries as Kenya.

2.2.1 FACTORS THAT INFLUENCE NURSES ATTITUDES TOWARDS USE OF COMPUTERS

Several factors have been found to shape the attitudes of nurses towards the use of computer systems. Age, educational level, years of nursing experience and experience with computers have frequently been described as factors influencing nurses' attitudes towards computerization. According to Lee, et al (2008) cited by Huryk (2010), age was consistently found to influence nurses' attitudes towards computerized nursing care plans. Younger nurses demonstrated a greater enthusiasm in the use of the technology.

Simpson and Kenrick (1997) were in agreement when they asserted that younger, less experienced nurses had positive attitudes towards computerization.

In an earlier study Brodt and Stronge (1986) discovered that the level of education, type of nursing and years of experience in nursing were associated with a positive attitude toward computers. Scarpa et al (1992) studying the attitudes of nurses in a non-computerized hospital also found that previous experience with computers was an important contributor to a positive attitude.

Similarly, Brumini et al (2005) established that computer education and experience were significant factors that contributed to the development of nurses' positive attitudes towards computers. Correspondingly, following a comprehensive review of the literature, Laurie Huryk (2010) found that computer experience was by far the most influential factor to nurses' positive attitudes. Conversely, Sultana (1990) reported no major relationship between attitudes and computer experience or any demographic variables.

Alquraini et al. (2007) conducted their study among nurses who worked in the general public and tertiary care hospitals in Kuwait. Their study sought to establish the nurses' background characteristics that influenced their attitudes towards the use of computerized health information systems in Kuwaiti government hospitals. The results revealed that the nurses had positive attitudes towards the use of computers (Alquraini et al, 2007). Further, the authors found that the nurses' attitudes were influenced by gender, nationality, education levels, and the duration of computer use. Alquraini et al, (2007) recommended the training of nurses in computer use and applications in order to encourage them to embrace computerized health information systems. This is especially true for those with little or no experience with computers (Alquraini et al, 2007). In addition, the author made a case for the incorporation of information technology applications training in all pre-registration nursing curricula.

The influence of computer experience on a positive attitude contradicts the findings of Bongartz (1988), Brodt and Stronge (1986) and Sultana (1990) but is consistent with those of Scarpa et al (1992) and Huryk (2010). Clearly, from the published research, there is little consistency in the findings regarding the factors that contribute to a positive attitude toward computerization.

2.2.2 COMPUTER KNOWLEDGE AND PRACTICES

Knowledge refers to information and skills that have been accumulated through experience and education. Computer knowledge is about having sufficient information and skills to be able to use computers.

Basic computer knowledge relates to knowing the hardware components of computers, the different computer software and how to operate the computer. According to Liu et al (2000), basic computer knowledge among nurses was low and needed to be improved. The study by Liu et al (2000) revealed that generally, nurses had average knowledge of computer operations and systems security. According to Liu et al (2000) nurses' computer knowledge ought to include the following:

- Basic understanding of computer hardware and software
- Computer programming
- The components of a computer
- Computer applications
- Computer vocabulary
- Word processing and
- Knowing how a computer system operates

In order to effectively use computers and enjoy the benefits of this technology, possession or acquisition of sufficient computer knowledge is mandatory. A key recommendation of Liu et al (2000) is that nurses' basic computer knowledge and skills need to be increased. Liu and group (2000) further asserted that formal training was essential for the nurse to acquire such knowledge and skills. A formal training that combines theoretical teaching with practice-based sessions will enhance the hands-on experience of the nurse (Liu et al, 2000). A prescribed preparation of nurses with computer knowledge and skills has not been documented. The lack of a recognized computers course for Kenyan nurses renders Liu et al's (2000) appeal for formal training most relevant.

Raja et al (2004) conducted a study in a Punjab hospital in India. The study sought to identify and assess the deficit areas of computer knowledge, attitudes and skills among nurses.

The results revealed that majority (75%) of the respondents had good computer knowledge while 20.8% had average computer knowledge (Raja et al, 2004). These findings appear to contradict those of Liu et al. (2000). However, cultural differences between India and China are likely to have influenced the results from these two studies. Furthermore, educational systems in different countries can lead to different knowledge and skills outcomes of its graduates.

In the UK, Chan et al (2004) found that most of the primary care nurses had good access to computers. Majority of the nurses used the computer either on a daily or weekly basis (Chan et al, 2004). Most of the nurses were savvy in the use of computers with only a small minority still preferring the use of paper-based resources rather than electronic patient records (EPR) (Chan et al, 2004). Undoubtedly, knowledge of computers affects an individual's attitudes towards their use.

Summary of Current Research Knowledge

Numerous studies that have been conducted on the attitudes of nurses towards computerization have so far been inconclusive. Demographic variables such as age, educational level, years worked in nursing, years worked in a hospital setting; computer experience and knowledge have all been studied with dissimilar results. Age, education and nursing experience had contradictory correlations in some of the studies. Even previous computer experience brought inconsistent facts although more researchers reported a positive association between attitudes and experience with computers (Brumini et al, 2005; Scarpa et al, 1992 and Schwirian et al, 1989). It is almost an agreed fact that in order for nurses to effectively use computers, their basic computer knowledge and skills need to be augmented through training. Such training ought to combine teaching with practical sessions to enrich the learner's hands-on experience.

CONCEPTUAL FRAMEWORK

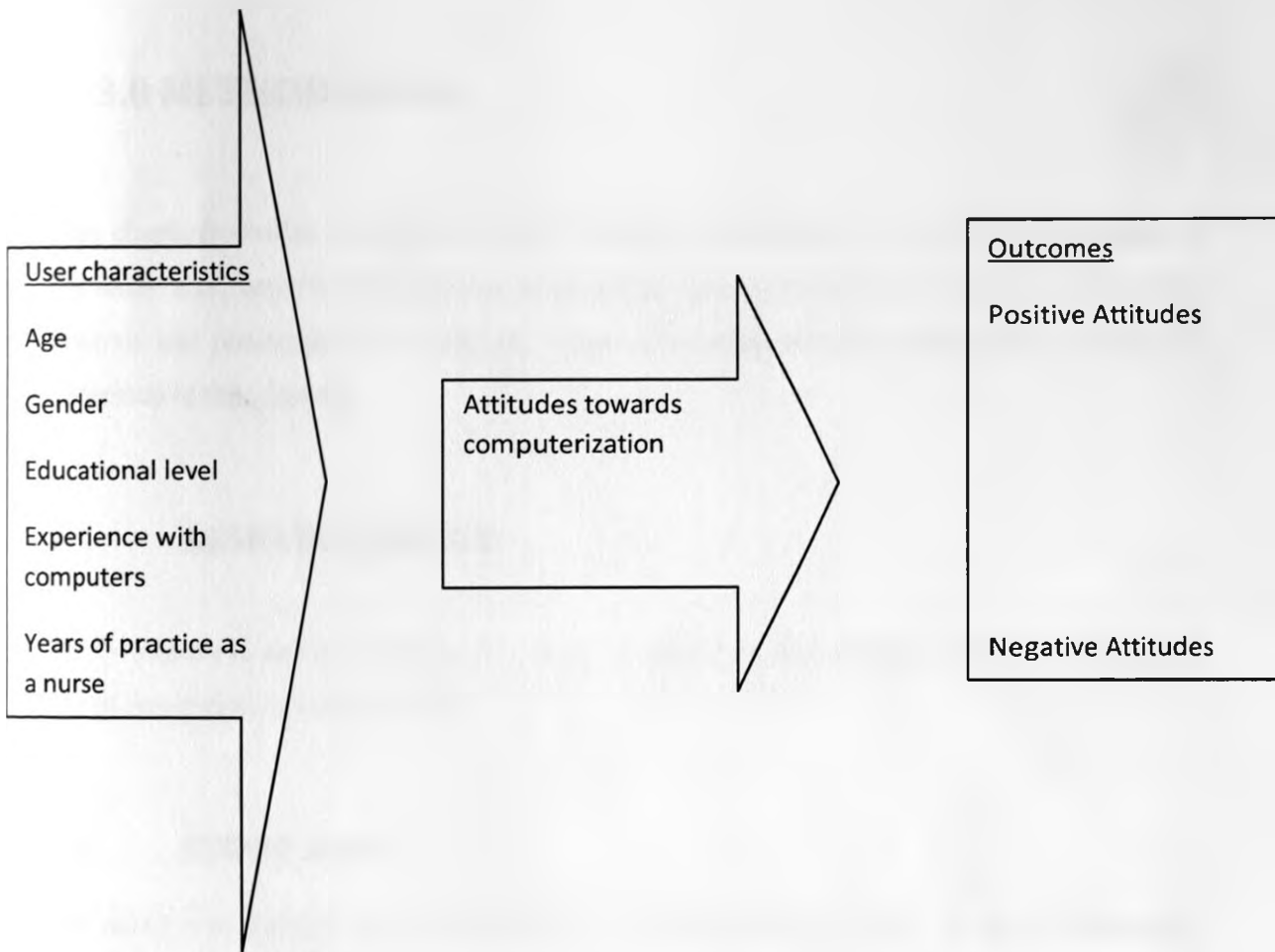


Figure 1 CONCEPTUAL FRAMEWORK

CHAPTER THREE

3.0 METHODOLOGY

This chapter provides an overview of the research methodology to be used, a description of the study area, sample and sampling approaches, data collection tools and procedures, data analysis and presentation. In addition, issues concerning ethical consideration will also be addressed in this chapter.

3.1 RESEARCH DESIGN:

This was a cross sectional descriptive study to determine the attitudes of nurses towards the use of computers in two hospitals.

3.2 STUDY AREA

The study was carried out in medical and surgical wards in both Aga Khan University Hospital (AKUH) and Kenyatta National Hospital (KNH). The Aga Khan University hospital (AKUH) in Nairobi was established in 1958. It is a private, not-for-profit institution that provides high quality healthcare services. It is one of the premier hospitals in East Africa with branches in the major cities (Kampala, Nairobi and Dar es Salaam). The AKUH Nairobi is a premier provider of ambulatory care and quality in-patient services including critical care.

Apart from clinical services the university hospital hosts a vibrant academic department that accommodates nursing and medicine related undergraduate as well as postgraduate courses. AKUH has a bed capacity of 250 with a total staff establishment of 1500 of whom 400 (27%) were nurses. In the year 2008, the hospital introduced the use of computer systems in selected departments.

The computers in the nursing department were intended for the documentation of such patient information as admissions, discharges and transfers. The extent to which nurses were involved in the use of the computers could not be determined in the present study.

The AKUH was deemed a suitable site for exploring the feelings of nurses towards computerization.

The Kenyatta National Hospital (KNH) on the other hand is a public institution. It is anecdotally described as the largest referral hospital in East and Central Africa with a bed capacity of 1800. The total number of staff stood at 5000 of whom 1800 (36%) were nurses. Of these nurses about 80% were staff nurses. KNH is a very busy hospital with approximately 2500 visits to the out-patient departments daily.

Regarding computerization, only a few departments employed electronic data management systems. These departments include pharmacy, finance, procurement and health records. Being the largest referral hospital in the country and in the East and Central Africa region, KNH is likely to be the first to be targeted when the e-health strategy is put into practice by the government. More than 20 years ago, the governments of such countries as UK and USA introduced the use of computer systems in the health sector. Over 25 years ago Brodt and Stronge (1985) did a study almost similar to this one; confirming the coming into use of computers in the USA. Certainly, the drive to computerize the health care services will be launched in Kenya in the not so far future. This study chose to include the nurses at this hospital in the belief that their views might mirror those of their colleagues employed at lower level public hospitals in Kenya.

3.3 STUDY POPULATION

Two groups of nurses were drawn: one from a hospital that had adopted use of computers (the Aga Khan University Hospital) and another that had not (Kenyatta National Hospital). The first group was described as users while the second group comprised the non-users. Staff nurses form the bulk of nurses working in hospitals across the country. Their qualifications are at two different levels-registered and enrolled nurses.

Enrolled nurses studied nursing at certificate level for a period of two and half (21/2) years. They are the equivalent of licensed practice nurses elsewhere.

The registered nurses were predominantly holders of diploma certificates who spent between three and half to four years in college. All diploma programs are offered at hospital-based colleges and only the bachelor's degree nurses were trained in institutions of higher learning. The staff nurses were found mainly at the bedside and rarely in administrative areas. These were the nurses the study targeted.

3.4 SAMPLE SIZE

The formula developed by Yamane (1967) was used to determine the sample size from each of the two hospitals. The formula is as follows:-

$n = \frac{N}{1 + N(0.05)^2}$ where n is the desired sample size and N is the total population.

A ward at KNH had an average of 25 nurses. Each floor (or level) of the hospital hosted four (4) wards meaning the population of nurses in one floor was approximately one hundred (100). Therefore, the approximate total population of the nurses at KNH was two hundred (200). Similarly, each ward in Aga Khan had about twenty five (25) nurses. So, one medical ward and surgical ward had a total of fifty (50) nurses.

Using the formula, the sample obtained from the hospitals was as follows:-

a. KNH:- $n = \frac{200}{1 + 200(0.05)^2}$

$$n = \frac{200}{1.5}$$

$$= 133 \text{ nurses}$$

b. AKUH nurses:- $n = \frac{50}{1 + 50(0.05)^2}$

$$n = \frac{50}{1.125}$$

$$n = 44 \text{ nurses}$$

$$\text{Total sample size: } - 133 + 44$$

Sample size was 177 nurses rounded of to 200 to cater for missing data.

Due to the rotational nature of nursing duties some nurses were either on night duty or on official offs. In order to achieve the desired sample size the data was collected over a period of four weeks or one month.

3.5 SAMPLING PROCEDURE

Convenience sampling was used to obtain the desired sample size. Nurses who met the inclusion criteria in the selected wards and were willing to take part were incorporated in the study. According to Brink and Wood (2001, p.141), a convenient sample (or an available sample) is a non-probability sample that happened to be available at the time of the data collection. Brink and Wood (2001) asserted that many samples in nursing studies were convenience samples but that was not entirely the reason for opting for a convenience sample. Rather, since the researcher was targeting all nurses on duty for several consecutive days, the need for a probability sampling method or any other sampling method was ruled out. The aim was attainment of a sizable number of participants that would permit the study findings to be generalized in the two hospitals (KNH and AKUH).

3.6: INCLUSION AND EXCLUSION CRITERIA

The inclusion and exclusion criteria for the study were as follows:

- The respondents had to be qualified nurses regardless of their level of preparation (i.e. enrolled and registered nurses).
- All staff nurses on duty in the medical and surgical wards in both AKUH and KNH (level 5 and 8) who agreed to participate were included.
- Nurses on leave as well as student nurses were excluded. Student nurses spend varying times in hospital wards and might not have provided reliable data for this study.
- Clinical nurse managers, supervisors and nurse specialists were also excluded.

3.7: DATA COLLECTION

Two research assistants were engaged to assist in the collection of data; one from each of the participating hospitals.

The assistants were equipped with knowledge about the questionnaire prior to the commencement of data collection.

The data was collected using a modified version of the NATC questionnaire containing attitude scales. This data collection approach allowed the respondents to indicate the existence and the strength of attitudes without the need for time consuming interviews (Crawley & Emery, 2006).

The data collection instrument was adopted based on a comprehensive review of literature and refined accordingly to ensure both content and face validity.

Before administration, the instrument was pretested with a panel of nurses to guarantee clarity and readability. A covering letter outlining the purpose of the study was attached to each questionnaire. The letter explained how anonymity and confidentiality was to be maintained. The rationale for using a questionnaire was: - they were suitable for a descriptive cross-sectional study; they provide greater assurance of anonymity; were less expensive and handy when time was a constraining factor (Brink and Wood, 2001). Time was a constraining factor in one of the hospitals where the approval for data collection delayed.

3.7.1: DATA COLLECTION INSTRUMENTS

For this study, the Nurses' Attitudes Towards Computerization (NATC) questionnaire that was developed by Stronge and Brodt (1985) was used with minor modification to suit the local setting before it was administered. Stronge and Brodt (1985) developed the questionnaire to measure nurses' attitudes toward computers. The NATC instrument has, in addition to attitude questions, demographic data-related items. According to Stronge and Brodt (1985), self-report techniques such as questionnaires can be used to measure attitudes and provide an insight into an individual's behavior. Scarpa et al (1992), Bongartz (1988), Sultana (1990) and Brodt and Stronge (1986) all used the NATC questionnaire. The findings of these and other studies that employed the NATC were detailed in the literature review section. The reliability and validity of the instrument has been ascertained by these earlier researchers.

The reason for preferring a questionnaire was its well recognized advantages. The written questionnaire is not only less expensive; it can also be given simultaneously to a relatively large population.

Apart from the above advantages, according to Brink and Wood (2001), questionnaires allow subjects to freely contribute their opinions even on controversial topics because there is the element of anonymity with questionnaires. Additionally, questionnaires are standardized for all respondents with no risks of change in emphasis (Brink and Wood, 2001).

The questionnaire comprises three sections; the first section had closed questions to obtain such demographic data as age, gender, level of education, number of years as a qualified nurse and amount of previous experience with computers. Information gathered from this section was used to determine factors that influenced attitudes towards use of computers. The next section contained attitude statements concerning the use of computers. The last section had statements that attempted to tease out the respondents' knowledge and practices regarding computer applications given that these attributes too, affected attitudes. The attitude questionnaire is a Likert-type instrument that had positively worded and negatively worded questions all rated on a five-point scale. The reliability coefficient for the likert-type questions was a Cronbach alpha was 0.82. Responses to the negatively worded items were reverse scored for ease of analysis. Item answers were added up to obtain a total score of an individual's behavior. Higher scores were interpreted to mean a more positive attitude. The highest possible score for this instrument is 100 indicating a very positive attitude toward computers. The least score was 20 signifying a low attitude towards computerization.

3.7.2: PROCEDURE

Once approval from the respective hospital and institutional research committees/boards was obtained, data collection was started. The assistance of the ward in-charges was secured for effective distribution of the research instruments. The questionnaires were then handed out to all staff nurses in the selected wards who met the inclusion criteria and were willing to participate.

Respondents were asked to return completed questionnaires to either the researchers or their unit in-charges.

3.7.3: DATA MANAGEMENT

All questionnaires were checked for completeness before data entry. Data entry was done using a database designed in MS office Access 2007. Data coding was implemented in the database interface to reduce errors during entry. Only valid codes were accepted into the fields in the database. All data entry errors were reconciled by confirming entry with values on the questionnaire.

The data were then transferred to SPSS for data cleaning and analysis. During data cleaning all entries were examined for validity and related variables were cross tabulated to check for consistency.

3.8: DATA ANALYSIS

The objective of analyzing data was to get answers for the research questions (Brink & Wood, 2001). Descriptive statistics were used to conduct univariate analysis for each variable defining sample characteristics including age, and education level. Inferential statistics were then used to compare attitudes of nurses at AKUH and KNH, or attitudes of nurses with different characteristics.

The overall attitude towards computerization for each nurse was calculated by summing up responses to all 20 Likert items. Since attitudes were shaped by certain factors, inferential statistical methods that revealed the relationships between variables were applied in analyzing the data. The non-probability sampling method used to obtain the sample called for the use of a non-parametric statistical method to analyze the data. To this extent, the Kruskal-Wallis test and the Mann-Whitney *U*-test were used to analyze the data. When data are on ordinal scales, the Kruskal-Wallis test is the most appropriate for testing associations (Brink and Wood, 2001). According to Brink and Wood (2001), this is a powerful nonparametric test for independent groups.

It is the nonparametric counterpart of the simple one-way ANOVA (Polit, 1996). The attitude was measured on ordinal scales hence the use of nonparametric tests to compare attitude in different groups of nurses.

The Mann-Whitney U-test is the other nonparametric test applied in this study. It is an analog of the independent groups t-test (Polit, 1996). As Brink and Wood (2001) proposed, the Mann-Whitney U-test was used to test for significant differences in attitudes between the two groups of nurses (for example nurses from KNH and AKUH, or male versus female nurses).

3.8.1: DATA PRESENTATION

Data was presented using frequency tables, pie charts and bar graphs.

3.9: ASSUMPTIONS OF THE STUDY

- The participants used a professional and honest approach while completing the questionnaire.
- The research tools accurately measured the attitudes and practices of the nurses in the study.

3.9: LIMITATIONS

The limitations of this study were:

- The use of a non-probability sampling method may have reduced the generalizability of the findings to a large population
- That the sample was limited to two hospitals in Nairobi might diminish the applicability of the findings to other hospitals in the country.

The limitations notwithstanding, the findings from this study are adequate to draw conclusions about the nurses at the two hospitals where the study was conducted.

3.10: ETHICAL CONSIDERATIONS

Authority to conduct the study was sought from the following institutions and bodies.

- i. University of Nairobi and Kenyatta National Hospital Ethics and Research Committee
- ii. Ministry of Health
- iii. Ministry of Science and Technology
- iv. Kenyatta National Hospital
- v. Aga Khan University Hospital
- vi. The individual respondents with whom full disclosure was made.

3.10.1: PROTECTION OF HUMAN SUBJECTS

The participants were fully informed of the implications of the study and their rights to withdraw from the study elucidated in an information sheet attached to the questionnaire. The information sheet also gave details of the intentions of the study as well as the expected benefits. The participants' completion and return of the questionnaire was taken to mean consent for inclusion in the study.

CHAPTER FOUR

4.0: RESULTS AND PRESENTATION

4.1: INTRODUCTION

This study was conducted within two hospitals in Nairobi and a total of 200 nurses were recruited. Seventy eight percent (n = 156) of all the participating nurses were from KNH and the remaining 22% (n= 44) from the AKUH. This chapter presents the findings of the study according to the specific study objectives.

4.2 DEMOGRAPHIC CHARACTERISTICS

(i) Age

Figures 2 and 3 show the age distribution of nurses in the two participating hospitals. The mean age of nurses in KNH was 36.7 years compared to a mean age of 29.8 years at AKUH. Overall, most (34%, n=68) of the nurses were aged between 31 to 35 years of age. Most (31.8%, n=14) nurses in AKUH were aged between 20 to 25 years while in KNH the most common age group was 31 to 35 years constituting 35.9% (n=56) of all nurses in that site. The proportion of nurses aged above 35 years in AKUH (16%) was less than that in KNH (48.1%).

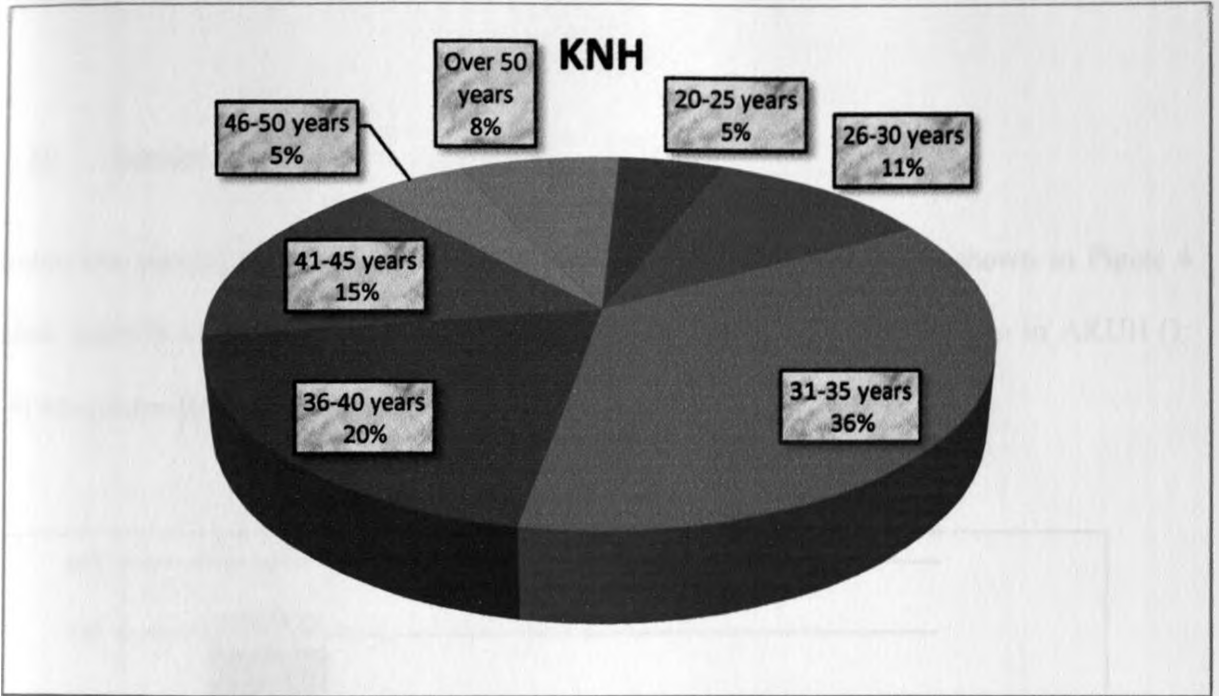


Figure 2: Age distribution of nurses at KNH

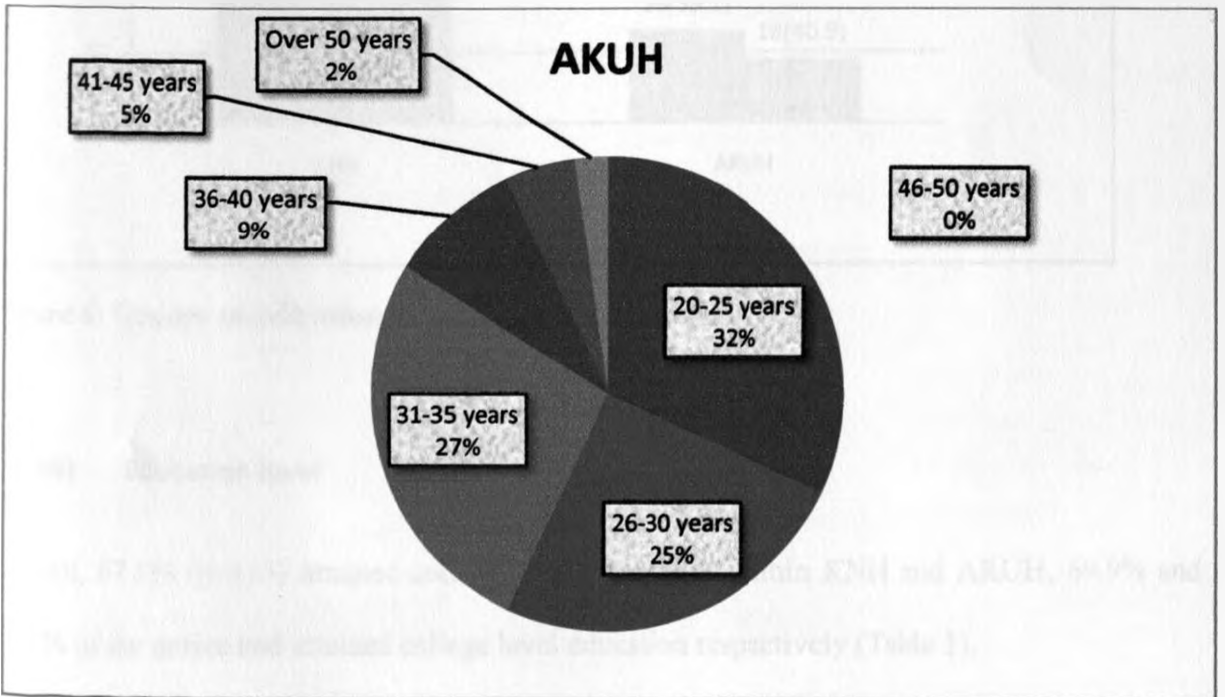


Figure 3: Age distribution of nurses at AKUH

(ii) Gender

Seventy-one percent (n = 142) of all nurses in the study were female. As shown in Figure 4 below, majority of nurses in both sites were female but the male to female ratio in AKUH (1: 1.4) was greater than at KNH (1: 2.9).

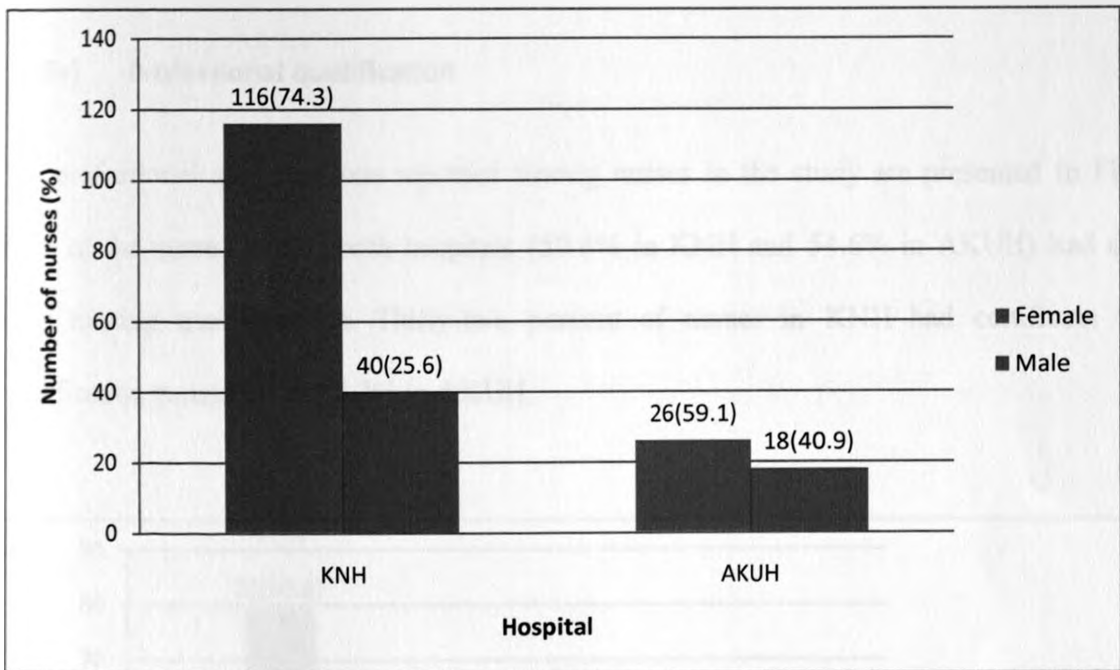


Figure 4: Gender distribution of nurses at KNH and AKUH

(iii) Education level

Overall, 67.5% (n=135) attained college level education. Within KNH and AKUH, 69.9% and 59.1% of the nurses had attained college level education respectively (Table 1).

This was followed by 'A' level qualifications among nurses in AKUH (25%) while in KNH the next most common education level was 'O' level (11.5%).

Table 1: Reported level of formal education

	KNH	AKUH	Total
Level of formal education	Frequency (%)	Frequency (%)	Frequency (%)
O level	18(11.5)	1(2.3)	19 (9.5)
A level	13(8.3)	11(25.0)	24 (12)
College	109(69.9)	26(59.1)	135 (67.5)
University	16(10.3)	6(13.6)	22(11)

(iv) Professional qualification

The professional qualifications reported among nurses in the study are presented in Figure 5. Most of the nurses within both hospitals (50.6% in KNH and 54.6% in AKUH) had diploma level nursing qualifications. Thirty-two percent of nurses in KNH had certificate nursing qualification compared to 18.2% in AKUH.

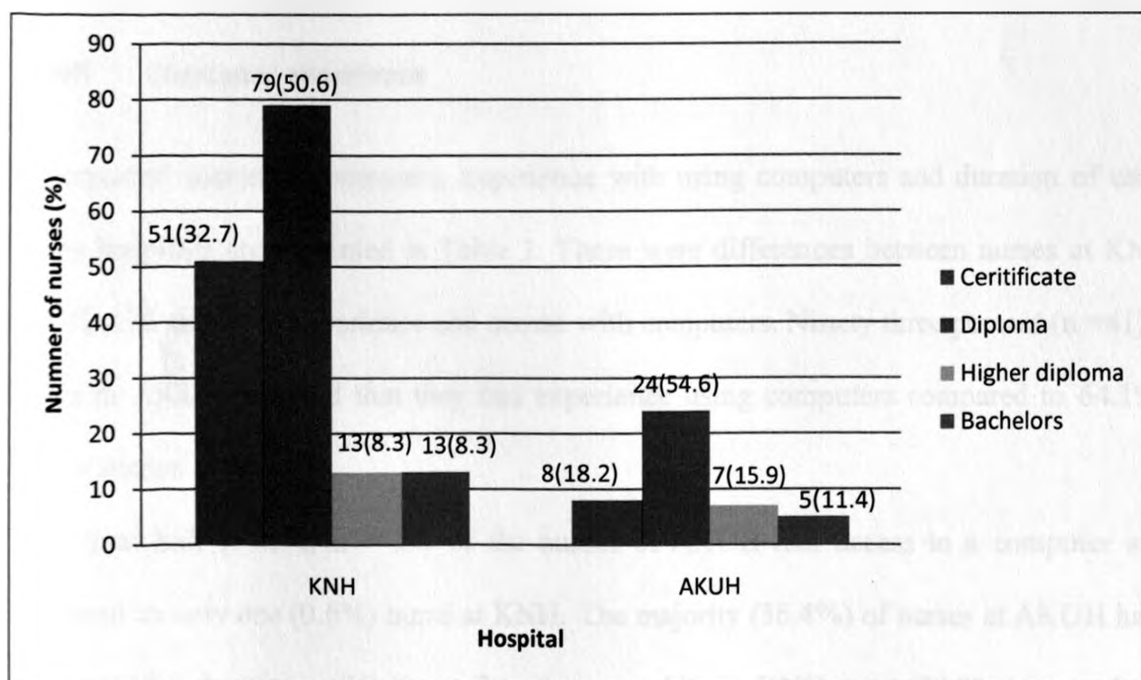


Figure 5: Professional Qualification of nurses in KNH and AKUH

(v) Nursing experience

The length of nursing practice and experience was different for the respondents in the two sites (Table 2). Most (40.9%) nurses in AKUH had durations of nursing practice ranging between 1-5 years while in KNH most (28.9%) nurses had worked for 16 years and above. Only 3.2% of nurses in KNH had worked in nursing for less than one year while in AKUH only 9.1% of nurses had worked for more than 16 years.

Table 2: Length of nursing practice among respondents

	KNH	AKUH	Total
Length of nursing experience	Frequency (%)	Frequency (%)	Frequency (%)
Less than 1 year	5(3.2)	7(15.9)	12(6)
1-5 years	25(16.0)	18(40.9)	43(21.5)
6-10 years	40(25.6)	8(18.2)	48(24)
11-15 years	41(26.3)	7(15.9)	48(24)
16 years and above	45(28.9)	4(9.1)	49(24.5)

(vi) Computer experience

The reported access to computers, experience with using computers and duration of computer use by hospitals are presented in Table 3. There were differences between nurses at KNH and AKUH with regard to experience and access with computers. Ninety three percent (n =41) of the nurses in AKUH reported that they had experience using computers compared to 64.1% (n = 100) of nurses at KNH.

More than half (54.6%, n = 24) of the nurses at AKUH had access to a computer at work compared to only one (0.6%) nurse at KNH. The majority (36.4%) of nurses at AKUH had used computers for durations of between 3 to 4 years while in KNH most (20.8%) nurses had used computers for 1 to 2 years. There were missing responses at KNH (5.3%).

Table 3: Experience, access and use of computers among respondents

	KNH	AKUH	Total
Experience with computers	Frequency (%)	Frequency (%)	Frequency (%)
Yes	100(64.1)	41(93.18)	141(70.5)
No	56(35.9)	3(6.82)	59(29.5)
Duration of computer use			
Less than 1 year	24(15.4)	7(15.9)	31(15.5)
1-2 years	31(19.9)	13(29.6)	44(22.0)
3-4 years	27(17.3)	15(34.1)	42(21.0)
5-10 years	13(8.3)	4(9.1)	17(8.5)
Over 10 years	5(3.2)	1(2.3)	6(3.0)
Not applicable/ missing	56(35.9)	4(9.1)	60(30.0)
Access to a computer			
Work only	1(0.6)	24(54.6)	25(12.5)
Home only	90(57.7)	1(2.3)	91(45.5)
Both work and home	12(7.7)	18(40.9)	30(15)
None	45(28.9)	1(2.3)	46(23)
Missing response	8(5.13)	0	8(4.0)

4.3: COMPUTER KNOWLEDGE AND PRACTICES

A total score for knowledge in computers was calculated by adding up nurses responses to the nine questions on computer use presented in Table 4. A score of one was awarded for a positive response and zero for a negative response to yield an individual knowledge score ranging from 0 to 9. The percentage of nurses providing a positive response for each of the nine knowledge and practice questions is shown in Table 5. Nurses in both study hospitals reported adequate knowledge of several aspects of computing and information technology.

However, nurses at AKUH scored higher on all the responses on computer knowledge and practice compared to their colleagues at KNH. Forty-one (93.2%) of nurses in AKUH were able to operate computers compared to 48.1% of KNH nurses.

Over three-quarters or 77.3% (n = 34) of nurses in AKUH reported that they were good in using word processor compared to less than half , 46.2% (n = 72) of nurses at KNH.

Table 4: Computer Knowledge and Practice among the respondents

	KNH	AKUH
	Frequency (%)	Frequency (%)
Ability to operate computers	75 (48.1)	41 (93.2)
Use computer mouse for navigation	112 (71.8)	43 (97.7)
Know how to use the key board for typing	109 (69.9)	42 (95.5)
Good in using the word processor	72 (46.2)	34 (77.3)
Conversant with computer vocabulary	77 (49.4)	33 (75)
Have an e-mail address	106 (68)	43 (97.7)
Capable of preparing and using PowerPoint presentation	76 (48.7)	28 (63.6)
Received formal computer training	73 (46.8)	29 (65.9)
Frequency of using computer		
Use the computer every day	37 (23.7)	27 (61.4)
Use the computer at least once in a week	65 (41.7)	25 (56.8)
Use the computer once in a month	27 (17.3)	10 (22.7)
Rarely use the computer	65 (41.7)	6 (13.6)

In terms of use of information technology, all except one nurse in AKUH (97.7%, n = 43) had an email account. In KNH 68% (n = 106) of nurses indicated that they had an email account. In addition, 63.6% of AKUH nurses reported that they were capable of preparing and using PowerPoint presentation while 48.7% of KNH nurses reported that they were similarly capable of using PowerPoint.

As expected, more nurses in AKUH reported regular use of computers compared to those in KNH. Twenty-nine (61.4%) nurses in AKUH used computers on a daily basis compared to 23.7% of those at KNH.

4.4: ATTITUDE OF NURSES TOWARDS COMPUTERIZATION

4.4.1: Overview

The attitude of nurses towards computerization was determined using 20 Likert scale items presented in Table 5 and measured on a five-point scale from strongly agree to strongly disagree. The reliability coefficient of the 20 items was examined and the Cronbach alpha was 0.82 implying that the items had high internal consistency.

The percentage of nurses giving different responses to each item within both hospitals was calculated. Next, the scores for the thirteen negatively worded statements were reversed. An overall attitude score, presented in the following section, was calculated for each respondent by adding up all responses to the 20 items to yield a score with a possible minimum value of 20 and maximum value of 100. A higher score represented a more positive attitude towards computerization.

4.4.2: Nurses responses to individual attitude items

As shown in Table 5, most nurses in KNH strongly disagreed with the suggestions that computerization could increase nursing workload (43.9%), represented a violation of patient rights (42.8%), should never be used outside finance department (73.9%) and if possible nurses should never use computers (72.4%).

Nurses, in AKUH strongly disagreed with the statements claimed that computerization will cause nurses to give less time to quality nursing (53.5%), increase workload (55.8%), should never be used outside finance department (72.1%) and if possible nurses should never use computers (80.5%).

On the other hand, areas of strongest agreement among nurses in KNH and AKUH were similar and included strongly agreeing that computers make nurses' jobs easier, reduces paperwork, offers opportunity to improve care and allows nurses to become more efficient.

A significant percentage of nurses in AKUH were undecided on whether time spent using a computer is out of proportion with benefits (36.6%) and costs of healthcare are likely to increase following computerization (29.6%).

Table 5: Nurses' responses to individual attitude items

Attitude statements	KNH (%)					AKUH (%)				
	SA	A	U	D	SD	SA	A	U	D	SD
A computer increases costs by increasing the nurses workload	5.2	11	4.5	35.5	43.9	16.3	Nil	2.3	23.3	55.8
Costs of health care are likely to increase because of computers	8.4	18.8	4.6	34.4	33.8	18.2	4.6	29.6	34.1	2.3
The time spent using a computer is out of proportion to the benefits	5.9	9.2	9.9	32.2	42.8	7.3	2.4	36.6	41.5	13.6
Computers represent a violation of patient privacy	6.7	17.3	8	31.3	36.7	17.1	14.6	22	34.2	12.2
Only one person at a time can use a computer terminal and, therefore, staff efficiency is inhibited.	16.2	27.9	10.4	26.6	18.2	27.3	9.1	15.9	20.5	12.2
Computerization of nursing data offers nurses a remarkable opportunity to improve patient care	49.7	35.5	2.6	5.2	6.5	40.9	29.6	22.7	6.8	27.3
Computers contain too much personal data to be used in an area as open as a nursing station	14.7	27.6	5.1	30.1	22.4	11.6	20.9	4.7	44.2	18.6
Computers can cause nurses to give less time to quality nursing care	8.3	11.5	6.4	35.3	38.5	14	14	4.7	14	53.5
If I had my way, nurses would never have to use computers	4	4.6	4	15.1	72.4	4.7	4.7	2.3	16.3	72.1
Computers should only be used in the financial department	4.6	0.7	2.6	17.7	73.9	4.9	2.4	2.4	9.8	80.5
Computers make nurses jobs easier	51.7	31.1	6	7.3	4	60.5	25.6	7	4.7	2.3
Paperwork for nurses can be reduced greatly by the use of computers	69.9	20.9	5.2	1.3	2.6	56.8	29.6	2.3	9.1	2.3

Orientation for new employees takes longer because of computers	7.1	8.4	11.7	38.3	34.4	4.7	11.6	9.3	37.2	37.2
Nursing data cannot be manipulated using computers	13.6	23.9	9.7	27.1	25.8	12.2	26.8	4.9	36.6	19.5
Computers save steps and allow the nursing staff to become more efficient	43.5	35.7	6.5	10.4	3.9	47.7	29.6	2.3	13.6	6.8
The more computers in an institution, the less number of jobs for employees	21.8	25	10.9	24.4	18	29.6	22.7	6.8	20.5	20.5
Increased computer use will allow nurses more time to give patient care	45.3	26	9.3	14	5.3	37.8	29.7	8.1	16.2	8.1
Because of computers, nurses will face more law suits	9.5	15.5	12.2	29.1	33.8	3	15.2	9.1	36.4	36.4
Computers can cause a decrease in communication between hospital departments	7.3	11.3	6.7	28.7	46	16.7	16.7	Nil	30.6	36.1
Confidentiality will be sacrificed by patient records being computerized	14	17.3	6	33.3	29.3	32.4	27	2.7	18.9	18.9

Key: SA=Strongly Agree; A=Agree; U=Undecided; D=Disagree; SD= Strongly Disagree

4.4.3: Overall attitude and knowledge scores according to hospital

The total attitude scores for nurses at both hospitals was 73.53 (SD = 13.15) out of a maximum possible score of 100. The range of attitude scores for this sample was 34 to 100. In general the nurses had a positive attitude towards computerization.

As shown in Table 6, nurses in KNH had significantly higher attitude scores (mean = 74.56) compared to those in AKUH (mean = 69.86, Mann Whitney $z = 2.206$, $p = 0.0274$).

Table 6: Scores for attitude and knowledge on computer use among the respondents

	KNH			AKUH			P value
	Mean	SD	Range	Mean	SD	Range	
Attitude	74.56	13.12	34-101	69.86	12.72	43-88	0.0274
Knowledge	5.03	3.5	0-9	7.52	1.77	4-9	< 0.001

Although nurses in KNH had a more positive attitude towards computerization the nurses in AKUH were more knowledgeable on computing (Mann Whitney $z = -4.128$, $p < 0.001$). The mean knowledge score at AKUH was 7.52 out of 9 compared to a mean score of 5.03 among nurses in KNH.

4.4.4: Attitude toward computerization and nurses' characteristics

(a) Age

Table 7: Attitudes toward computerization according to hospital and age of respondents

	KNH		AKUH		P value
	Mean	SD	Mean	SD	
Age					
20-25 years	76.87	10.42	66.85	13.23	0.039
26-30 years	81.88	11.70	73.18	11.76	
31-35 years	74.73	12.30	69.33	13.45	
36-40 years	77.71	10.59	74.5	9.71	
41-45 years	71.25	14.39	64.5	24.74	
46-50 years	68	14.13	-	-	
Over 50 years	64.75	16.10	-	-	

The age of nurses showed a statistically significant association with attitude towards computerization (Kruskal Wallis $\chi^2 = 13.29$, $p = 0.039$). Within KNH nurses aged less than 40 years had significantly higher attitude scores than that of nurses in age groups above 40 years. At AKUH nurses aged above 40 years had the lowest attitude scores (mean = 64.5), but were followed by those in the youngest age group, 20-25 years (mean = 66.85).

(b) Gender

As shown in table 8, gender did not significantly impact on attitudes towards computerization (Mann-Whitney $z = 0.179$, $p = 0.86$).

In KNH, male nurses had a more positive attitude compared to the female nurses (mean = 76.45 versus 73.91). Conversely, male nurses had lower attitude scores compared to female nurses at AKUH (mean = 67.16 versus 71.73).

Table 8: Attitudes towards computerization according to gender

	KNH		AKUH		P value
	Mean	SD	Mean	SD	
Gender					
Male	76.45	11.78	67.16	13.50	0.86
Female	73.91	13.53	71.73	12.06	

(c) Professional qualification

Figure 4 shows that overall, professional training had significant impact on the respondents' attitude towards computerization (Kruskal Wallis $\chi^2 = 9.34$, $p = 0.025$). Holders of bachelors' degrees (mean = 82.07) and higher diplomas (79.07) had the highest attitude scores within KNH. At AKUH, the bachelor degree and higher diploma holders were less positive towards computerization compared to their colleagues who had certificate qualifications.

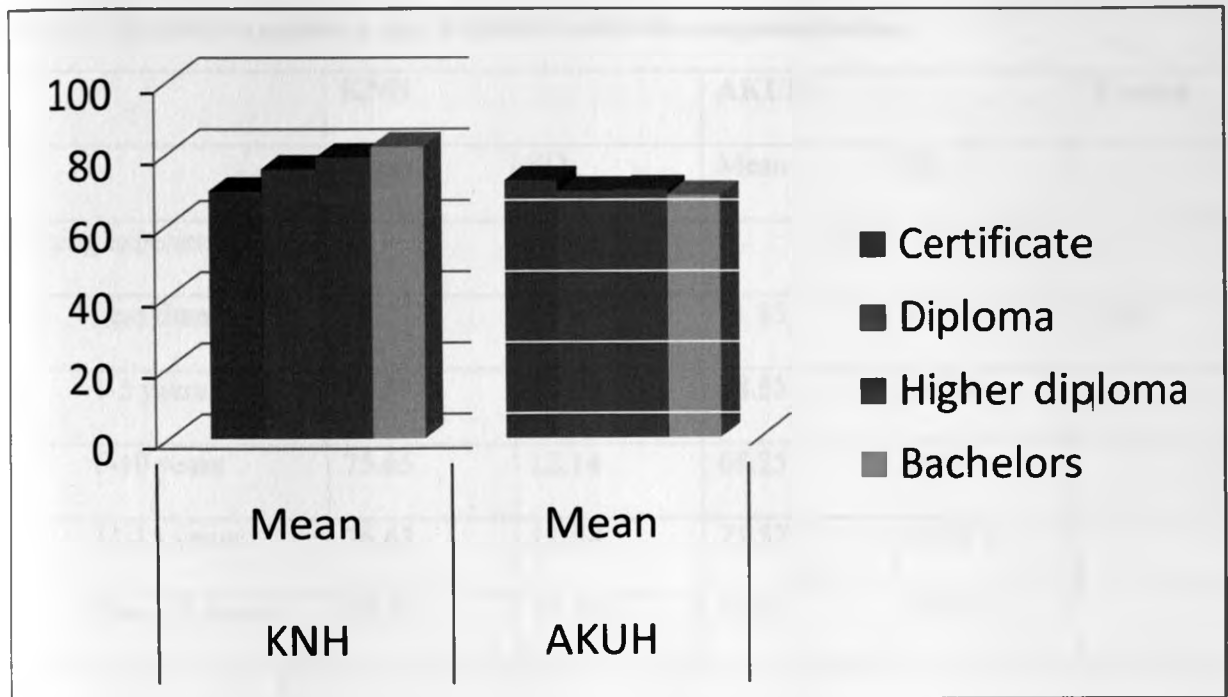


Figure 6: Professional qualifications and attitudes toward computerization

(d) Nursing experience

The length of nursing experience did not show a statistically significant association with the attitude of nurses towards computerization ($p = 0.527$).

In both KNH and AKUH, however, nurses with the shortest nursing experience had higher attitude scores than those with experience between 1 to 15 years. Nurses with more than 15 years experience had the lowest attitude score in KNH (mean = 70.57) while in AKUH they had the highest attitude score (mean = 72.5).

Table 9: Nursing experience and attitudes towards computerization

	KNH		AKUH		P value
	Mean	SD	Mean	SD	
Nursing experience					
Less than 1 year	78.2	5.76	71.85	10.51	0.527
1-5 years	75.88	11.86	68.55	12.16	
6-10 years	75.65	12.14	68.25	14.13	
11-15 years	76.63	12.58	71.57	14.74	
Over 15 years	70.57	15.10	72.5	17.82	

(e) Access to Computers

As shown in Table 10, nurses with access to computers at both KNH and AKUH were more positive in their attitude toward computerization but this association was not statistically significant (Mann-Whitney $z = 0.626$, $p = 0.531$).

Table 10: Access to computers and attitudes towards computerization

	KNH		AKUH		P value
	Mean	SD	Mean	SD	
Computer access					
Yes	76.32	10.78	69.97	12.35	0.531
No	71.42	16.13	68.33	20.55	

(f) Duration of computer use

The duration of exposure to computers showed a significant association with attitude towards computerization (Kruskal Wallis $\chi^2 = 12.81$, $p = 0.025$). Nurses with longer durations of exposure to computers (at least three years) at both hospitals were likely to have more positive attitudes than those with relatively shorter durations of computer use.

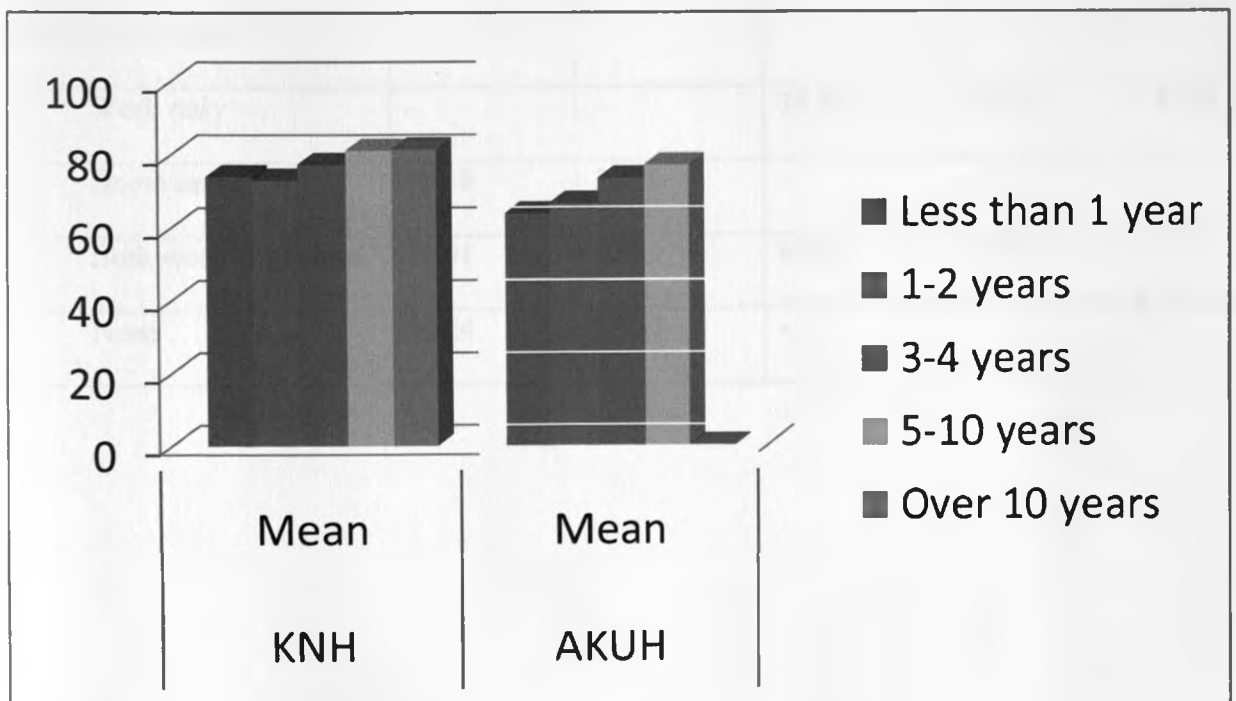


Figure 7: Exposure to computers and attitudes towards computerization

(g) Ability to access computers whether at home, work or both

The overall association between ability to access computers at home and work and nurses' attitudes towards computerization was not statistically significant (Kruskal Wallis $\chi^2 = 7.45$, $p = 0.114$). Nurses in KNH accessing computers both at work and home had the highest attitude score (mean = 79.91).

At AKUH, the nurses accessing computers at work alone scored 70.79 on average compared to 69.22 for nurses accessing computers both at work and home (Table 11).

Table 11: Ability to access computers and attitudes toward computerization

	KNH		AKUH		P value
	Mean	SD	Mean	SD	
Access to computer					
Work only	-	-	70.79	12.47	0.114
Home only	76.38	11.18	-	-	
Both work and home	79.91	6.08	69.22	12.56	
None	70.24	15.57	-	-	

CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATION

5.1: DISCUSSION

The attitudes of nurses towards use of computers are thought to greatly influence successful adoption of IT systems in healthcare. There is a paucity of literature that indicated that staff nurses' attitudes towards computerization have been determined in Kenya. The attitudes of Kenyan nurses in two hospitals toward computerization have been investigated in the present study.

According to the results of this study, the nurses have a positive attitude towards computerization. These findings are consistent with reports from other studies (Bongartz, 1988, Scarpa et al. 1992, McBride and Nagle, 1996, Getty et al. 1999, Brumini et al. 2005, Alquraini et al. 2007, Teo, 2008 and Kivuti & Chepchirchir, 2011). The findings of this study contradict those of Sultana (1990) who found that nurses had negative attitudes towards computerization.

The results revealed that both the users and non-users had positive attitudes towards computerization as found in other studies (Bongartz, 1988; Getty, et al, 1999). However, it was interesting to find nurses in KNH (non-users) had a significantly higher attitude score compared to those in AKUH (users). It was expected that exposure to computer use would significantly influence the attitudes of the nurses towards computerization compared to shorter or non-exposure. A qualitative study involving the respondents from AKUH would shed more light into this finding.

When Kruskal-Wallis test and the Mann-Whitney *U*-test were applied to analyze the data, significant associations between the respondents' characteristics and attitude were observed.

Demographic characteristics and attitudes of nurses towards computerization.

In this study, a significant association between age and attitudes towards computerization was found; this mirrors the findings in other studies (Simpson and Kenrick, 1997; Brumini et al. 2005). In the present study it was found that nurses aged 40 years and below had significantly higher attitude scores than their colleagues aged above 40. This reflects Simpson and Kendrick's (1997) observation that younger nurses were more positively inclined to computer use than their older colleagues. The null hypothesis was therefore rejected.

This result contradicts the findings of Getty et al. (1999) who found that positive and negative scores were evenly distributed across the age groups. Similarly, Scarpa et al (1992) found no such correlation between age and attitudes.

Like in Sultana's (1990) study, it was found that the years spent in nursing profession did not significantly affect the respondents' attitudes towards computerization. However nurses who had shorter nursing experience posted higher attitude scores than those with longer duration in nursing practice.

As expected, majority of the respondents in this study were females; a finding also reported by Alquraini et al. (2007). Nursing was and still is largely a female dominated profession.

Unlike Alquraini et al's (2007) report, gender in the present study did not have any effect on the nurses' attitudes towards computerization. This finding is consistent with those of other researchers (Garland and Noyes, 2004; Meelissen and Drent, 2008; Teo, 2008) who found no differences between gender and computer attitudes.

Professional qualification as a variable was found to have an influence on the nurses' attitudes with bachelor degree and higher diploma holders posting high score compared to the holders of certificate. This finding is consistent with those of other researchers (Stronge and Brodt, 1986, Brumini, et al. 2005, Alquraini et al. 2007) but contradicted that of Sultana (1990).

The high score by nurses with Bachelor's degree can be attributed to the general exposure university education may have provided to the respondents. However a different finding was observed at AKUH where the certificate (enrolled nurses) holders had the highest score. The reason for this variation could not be examined as it was beyond the scope of the present study.

Although access to computers was expected to significantly influence the attitudes of nurses, this study found that the effect of access was not statistically significant. The nurses in AKUH had greater access to computers than their counterparts in KNH. This result can be explained by the fact that AKUH had begun a computerization program in 2008. The KNH nurses who had access to computers largely did so at home or at the cyber café (Kivuti and Chepchirchir, 2011) rather than at work. KNH is yet to introduce use of computers.

It is therefore heartening to learn that a good percentage of nurses including those in KNH had some access to computers. This indicates nurses' willingness to use technology to further their work or personal courses.

Regarding duration of computer use, it was found that Nurses with longer durations of exposure to computers (at least three years) at both hospitals were likely to have more positive attitudes than those with relatively shorter durations of computer use. Brumini et al. (2005); Alquraini et al (2007) and Bongartz (1988) found a positive correlation between longer use of computers and positive attitudes. The findings of this study support Alquraini et al's (2007) suggestion that a prolonged use of computers enhanced the skill levels of the users leading to a positive attitude.

This finding is contradicts that of Garland and Noyes (2004) who found computer experience was insignificant in predicting positive attitudes toward computers. The results are also at variance with those of Burkes (1991) who reported that nurses with computer experience had less positive attitudes.

Attitudes of nurses toward computerization

Concerning individual attitude statements, the respondents rejected some statements and accepted others. They totally rejected the suggestion that computers should be confined to non-nursing departments such as finance and administration. They also rebuffed the idea that nurses should never use computers. With such emphatic opinions, administrators or managers planning to introduce the use of computers have minimal fear of resistance from nurses. However, such planners must bear in mind Timmons' (2003) and Huryk's (2010) recommendations that nurses ought to be involved in the planning if resistance was to be avoided.

According to Eley et al (2008, p.1156), if IT was to be accepted, practicing nurses must be involved in the “consultation process during development and prior to implementation of applications and services”.

A number of positively worded statements received strong endorsement from the respondents. For example, the statements that linked computer use to reduction of paperwork and improved care were greatly supported by the nurses. The respondents also strongly agreed with the idea that computers made nurses work efficient and much easier. This confirms that nurses' attitudes towards computerization would be favorable if they were aware of the benefits as found in other studies (de Veer and Francke, 2010).

AKUH nurses (users) were undecided on the benefits of computers vis a vis the time spent on them. They were also unsure of the cost implications of computerization to healthcare. These findings can be validated by the fact that computerization at AKUH was at nascent stage at the time of this study. Probably, the benefits and/or disadvantages of computerization were yet to be seen or even documented.

Computer Knowledge and practice

About computer knowledge and practice, nurses in both study hospitals reported adequate knowledge of several aspects of computing and information technology. The nurses at AKUH (users) scored higher on all aspects of knowledge and practice compared to their colleagues at KNH (non-users).

In terms of use of information technology, all except one nurse in AKUH (users) had an email account. In KNH 106 of nurses (non-users) indicated that they had an email account. In addition, more AKUH nurses reported that they were capable of preparing and using PowerPoint presentation than their counterparts in KNH. As expected, more nurses in AKUH reported regular use of computers compared to those in KNH. These findings are quite significant given that formal computer training in the institutions that prepare nurses is either limited or if in existence, had not been documented.

The respondents who indicated they had formal training probably received such training in private colleges within the city (Nairobi) or were part of in-house training within their hospitals.

This shows that nurses are ready to embrace technology and could go to any length to keep abreast. The implication is that the introduction of computers in the hospitals is likely to receive extensive acceptance. A pre-introduction training on computers will further ease their adoption since prior knowledge of computers is positively associated with favorable attitude towards computerization.

The findings on computer knowledge cannot be extrapolated to cover those nurses based in the rural areas or at the periphery of the country where computers are unlikely to be found let alone privately owned computer colleges. In order to even the situation, formal computer training ought to be introduced in all institutions involved in nursing education.

5.3 CONCLUSION

The results of this study reveal that the general attitudes of nurses towards computerization were positive. The findings further disclosed that nurses with little or no experience in using computers in the places of work (non-users) and those from a hospital that had instituted use of computers (users) both had positive attitudes towards computerization although the former were more positive.

Nurses were of the opinion that computers were relevant in their field (nursing). They were also aware of the benefits of computers to their professional practice and that awareness seemed to influence their attitudes. Any notion therefore that nurses were apprehensive of technology, going by the results of this study, is incorrect.

Variables such as age, exposure to computer use and level of education have an influence on the nurses' attitudes towards computerization. But gender and years of experience in nursing had no significant influence on the attitudes of the nurses.

Some respondents indicated that they had formal computer training. This kind of training is tenable in non-nursing colleges implying that the respondents had hunger for computer knowledge/skills and took the initiative of acquiring that knowledge. This confirms a readiness on the part of the nurses to embrace technology.

If any policy maker needed to assess the preparedness of nurses concerning use of computers, this finding would be a good starting point.

5.4 RECOMMENDATIONS

- For more positive attitudes towards computerization nursing managers and/or administrators must design in-house computer training courses for their staff.
- Computer training should be incorporated both in in-service and pre-service nursing curricula or programs.
- A qualitative study is recommendable as a follow up to the present one
- Follow up studies are in order in AKUH to assess the whether attitudes will change with time.
- A nationwide or sector wide study similar to this one is appropriate.

5.5: DISSEMINATION PLAN

The findings of this study will be disseminated to the following:-

- The chairman of the joint KNH and UoN Ethics and Research Committee
- The Chairman of AKUH Ethics and Research Board
- The National Council for Science and Technology
- Director KNH and the hospital's Chief Nurse
- The CEO AKUH and the hospital's Director of Nursing
- The Director, KMTC

In addition, the findings of this study will be presented at relevant scientific conferences, seminars and workshops.

The research will also be published in peer reviewed scientific journals.

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LIST OF APPENDICES

APPENDIX 1: CONSENT FORM

**TITLE: ATTITUDES OF NURSING STAFF TOWARDS COMPUTERIZATION: A
CASE OF TWO HOSPITALS IN NAIROBI, KENYA.**

Principal Investigator: Mathew K KIPTURGO
Master of Nursing Candidate
School of Nursing sciences
University of Nairobi
Phone: 0722876947

My name is Mathew Kipturgo. I am a Master's student at the University of Nairobi. I wish to invite you to be a participant in this research whose aim is to investigate the attitudes of staff nurses towards the introduction of computer systems in the work settings.

All nurses at the medical and surgical wards will be included in this study. You have been selected as a prospective participant since you work in one of the targeted wards.

You may not benefit from this study as an individual but information generated from the research may be of great use to policy makers, planners and implementers of new technological systems being introduced in your hospital. These policy makers, planners and implementers will get an insight into what nurses feel about computer systems. Such information will enable them to tailor the systems to suit the users and minimize undesirable responses from any quarters.

The study has been approved in the following hospitals.

- Aga Khan University Hospital
- Kenyatta National Hospital

If you are willing to participate, you will be given a self-administered questionnaire. Kindly fill it and return it to the designated collection point. This takes not more than ten (10) of your minutes.

I do not know of any risk to you for taking part in this study. The respondents are to remain anonymous as no names or any other form of personal identification is required when filling the questionnaire.

You are free to ask questions and seek clarifications about the study now or any other time.

Your participation in the study is voluntary. Refusal to take part will not attract any penalty. You retain the right to withdraw without risking any consequence from any authority. Participation or non-participation does not come with any financial costs. Equally, no compensation will be provided for participation in the study.

This study is part of a course requirement and the researcher has no competing interests.

I plan to hold meetings with relevant study institutions to share the findings from the research. In addition, the findings of this study will be published in national and International scientific journals and your identity will be kept confidential.

This study has been explained to me by Mathew Kipturgo and he has given me a copy of the explanation. All my questions about the study have been answered. I agree to participate in this study.

_____	_____	_____	_____
Informant	Date	Researcher	Date

APPENDIX B: RESEARCH QUESTIONNAIRE

SECTION I: DEMOGRAPHIC DATA

Please indicate by ticking the correct box regarding some personal information in the following statements.

i. Your age is:

20-25 yrs 26-30 yrs 31-35 yrs 36-40 yrs 41-45 yrs

46-50 yrs Over 50 yrs

ii. Your Gender: Male Female

iii. Your educational level:

'O' Level 'A' Level College University

iv. Your Professional Qualification:

Certificate Diploma Higher diploma Bachelor's degree

Master's Degree

v. Nursing work experience:

Less than 1yr 1-5yrs 6-10yrs 11-15yrs 16-20yrs 21-25yrs

vi. Do you have experience with computers? Yes No

vii. If Yes to 4 above please indicate by ticking the duration of computer use (years):

Less than 1yr 1-2yrs 3-4yrs 5-10yrs Over 10yrs

viii. Do you access to a computer at:-

Work only Home only

Both work and home None of the above

SECTION II: ATTITUDES OF NURSES TOWARDS COMPUTERIZATION

Please indicate the extent to which you agree or disagree with the following statements in reference to the introduction and use of computer systems in your hospital. Indicate with a tick () in the appropriate space based on the following scale: 5: Strongly Agree (SA), 4: Agree (A), 3: Undecided (U), 2: Disagree (D), 1: Strongly Disagree (SD)

		SA (5)	A (4)	U (3)	D (2)	SD (1)
1	A computer increases costs by increasing the nurses workload					
2	Costs of health care are likely to increase because of computers					
3	The time spent using a computer is out of proportion to the benefits					
4	Computers represent a violation of patient privacy					
5	Only one person at a time can use a computer terminal and, therefore, staff efficiency is inhibited.					
6	Computerization of nursing data offers nurses a remarkable opportunity to improve patient care					
7	Computers contain too much personal data to be used in an area as open as a nursing station					
8	Computers can cause nurses to give less time to quality nursing care					
9	If I had my way, nurses would never have to use computers					
10	Computers should only be used in the financial department					
11	Computers make nurses jobs easier					
12	Paperwork for nurses can be reduced greatly by the use of computers					
13	Orientation for new employees takes longer because of computers					
14	Nursing data can not be manipulated using computers					
15	Computers save steps and allow the nursing staff to become more efficient					
16	The more computers in an institution, the less number of jobs for employees					

17	Increased computer use will allow nurses more time to give patient care					
18	Because of computers, nurses will face more law suits					
19	Computers can cause a decrease in communication between hospital departments					
20	Confidentiality will be sacrificed by patient records being computerized					

SECTION III: COMPUTER KNOWLEDGE AND PRACTICES

For this section please indicate whether the following statements are True or False about your knowledge of computers and usage of computer applications.

1. I am competent in my ability to operate computers. True False
2. I can use the computer mouse for navigation. True False
3. I know how to use the key board for typing. True False
4. I am good in using the word processor. True False
5. I am conversant with computer vocabulary. True False
6. I have an e-mail address. True False
7. I am capable of preparing and using PowerPoint presentation. True False
8. I have received formal computer training. True False
9. I use the computer every day. True False
10. I use the computer at least once in a week. True False
11. I use the computer once in a month. True False
12. I rarely use the computer. True False

Thank you for taking time to fill this questionnaire.

APPENDIX C: BUDGET

COMPONENT	ACTIVITY DESCRIPTION	ITEM	UNIT OF MEASUREMENT	UNIT COST (KSH)	TOTAL (KSH)
Literature review	Search for literature in libraries	Transport and subsistence	20 days	@500	10,000
	Internet services	Browsing for 5 hours in cyber cafe	30 days	@150	4,500
	Stationeries	A 4 notebook	2	@100	200
		Foolscaps	4 reams	@200	800
		Photocopy papers	3 reams	@500	1,500
		Proposal typing	3 drafts	@400	1,200
		Proposal printing	4 drafts	@450	1,600
		Photocopying	250 pages	@3	750
Approvals		KNH ethics committee			1,000
		Ministry of Science and technology			1,000
		The Aga Khan University Research and Ethics Committee			1,000
Sub -total					23,550
Research	Pre-testing	Transport and subsistence	2 days	300×3 persons	1,800
		Typing, Printing	20 copies	@60	1,200
	Questionnaires	Photocopying	300 copies	@3	900
	Data Collection	Transport and subsistence	20 days	500× 3 persons	30,000
		2 research assistance allowance	30 days	@600	18,000
	Data processing and analysis				30,000
Sub -total					81, 900
Reports	Draft reports	Typing, printing	200	@20	4,000
		Photocopying	5 copies	@400	2,000
	Final reports	Correction and printing	200 pages	@ 10	2,000
		photocopying	5 copies	@ 400	2,000

		Binding	5 copies	@ 500	2,500
		Transport and Subsistence	30 days	@ 500	15,000
Sub total					27,500
		Contingencies 10%			14,600
Grand total					160,550

APPENDIX D: TIME SCHEDULE AND WORK PLAN FOR THE ENTIRE STUDY FOR THE YEAR 2010/2011

Month	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep
Activity											
Concept paper	Xxx										
Proposal writing and literature review		xxx	xxx								
Forwarding proposal for approval				xxx	xxx						
Correction of final proposal and forwarding to KNH-ERC					xxx	xxx					
Questionnaires pretesting							xxx				
Data collection							xxx	Xxx			
Data processing and analysis								Xxx	xxx		
Report writing									xxx		
Draft report presentation and correction									xxx		
Final report presentation and submission										xxx	
Thesis Defense											xxx



KENYATTA NATIONAL HOSPITAL

Hospital Rd. along, Ngong Rd.

P.O. Box 20723, Nairobi.

Tel: 726300-9

Fax: 725272

Telegrams: MEDSUP, Nairobi.

Email: KNHplan@Ken.Healthnet.org

9th March, 2011

Ref: KNH-ERC/ A/46

Mathew K. Kipturgo
Dept. of Nursing
University of Nairobi

Dear Dr Kipturgoi

RESEARCH PROPOSAL: "ATTITUDES OF NURSING STAFF TOWARDS COMPUTERIZATION; A CASE OF TWO HOSPITALS IN NAIROBI, KENYA" (P43/2/2011))

This is to inform you that the KNH/UON-Ethics & Research Committee has reviewed and **approved** your above revised research proposal for the period 9th March 2011 – 8th March 2012.

You will be required to request for a renewal of the approval if you intend to continue with the study beyond the deadline given. Clearance for export of biological specimens must also be obtained from KNH/UON-Ethics & Research Committee for each batch.

On behalf of the Committee, I wish you a fruitful research and look forward to receiving a summary of the research findings upon completion of the study.

This information will form part of the data base that will be consulted in future when processing related research study so as to minimize chances of study duplication.

Yours sincerely,

PROF A N GUANTAI
SECRETARY, KNH/UON-ERC

c.c. The Deputy Director CS, KNH
The HOD, Records, KNH
The Chairman, School of Nursing, UON
Supervisors: Ms Lucy W. Kivuti, School of Nursing, UON
Prof. Anna K. Karani, School of Nursing, UON

REPUBLIC OF KENYA



NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY

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254-020-310571, 2213123.
Fax: 254-020-2213215, 318245, 318249
When replying please quote

P.O. Box 30623-00100
NAIROBI-KENYA
Website: www.ncst.go.ke

Our Ref:

NCST/RRI/12/1/MED-011/44/5

Date:

20th April, 2011

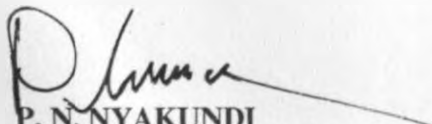
Mathew Kiptoigat Kipturgo
University of Nairobi
P. O. Box 30197
NAIROBI

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on "Attitudes of staff nurses towards computerization: A case of two Hospitals in Nairobi, Kenya" I am pleased to inform you that you have been authorized to undertake research in Nairobi District for a period ending 31st March, 2012.

You are advised to report to the Director, Kenyatta National Hospital and the Director/CEO Aga Khan University Hospital, Nairobi before embarking on the research project.

On completion of the research, you are expected to submit **one hard copy and one soft copy** of the research report/thesis to our office.


P. N. NYAKUNDI
FOR: SECRETARY/CEO

Copy to:
The Director
Kenyatta National Hospital
NAIROBI

The Director/CEO
Aga Khan University Hospital
NAIROBI

THIS IS TO CERTIFY THAT:

Prof./Dr./Mr./Mrs./Miss... MATHEW KIPTOIGAT
KIPTURGO

of (Address) UNIVERSITY OF NAIROBI
BOX 30197 NAIROBI

has been permitted to conduct research in

.....Location,
NAIROBI

.....District,
NAIROBI

.....Province,

on the topic ATTITUDES OF STAFF NURSES
TOWARDS COMPUTERIZATION: A CASE
OF TWO HOSPITALS IN NAIROBI,
KENYA.

.....
for a period ending 31ST MARCH, 2012.....

NCST/RRI/12/1/MED-011/44

Research Permit No.....

Date of issue 20/4/2011.....

Fee received KSHS . 1000.....



mk

Applicant's
Signature

Secretary
National Council for
Science and Technology

CONDITIONS

1. You must report to the District Commissioner and the District Education Officer of the area before embarking on your research. Failure to do that may lead to the cancellation of your permit
2. Government Officers will not be interviewed with-out prior appointment.
3. No questionnaire will be used unless it has been approved.
4. Excavation, filming and collection of biological specimens are subject to further permission from the relevant Government Ministries.
5. You are required to submit at least two(2)/four(4) bound copies of your final report for Kenyans and non-Kenyans respectively.
6. The Government of Kenya reserves the right to modify the conditions of this permit including its cancellation without notice



REPUBLIC OF KENYA

RESEARCH CLEARANCE
PERMIT

GPK6055t3mt10/2011

(CONDITIONS— see back page)

UNIVERSITY OF NAIROBI
MEDICAL LIBRARY