Perceptions among nursing staff regarding computerization and computer use at Kenyatta National Hospital Kenya: a cross-sectional study

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Abstract

Introduction: Information and communication technology (ICT) is among the exceptional tools that have globally immensely influenced human life and health service delivery in this century. Advances in telecommunication technology in the last two decades have led to the need to adopt computerisation and computer utilization to allow vast information acquisition, storage, retrieval and sharing. Kenyatta National Hospital has invested and implemented computerisation and computer use. It is with this in mind that this study sought to assess the perception of the nurses, being the largest hands-on health workforce, and custodians of much information, in this institution.

Methods: This was a cross sectional study of qualified nurses from all departments. Data were collected using questionnaires and observation checklists. Quantitative data were analysed using statistical package for social sciences package version 22. A sample size of 291 nurses participated in the study. Chi square test of independence was used to determine any statistically significant relationship between nominal variables. A P-value $\leq$0.05 was used to determine significance.

Results: The response rate was 100 % (291), mean age of the respondents was 39.48 years and the age group 40-44 years was the majority. Majority were senior nursing officers 132 (45.4%) and most were working in pediatric department 49(16.8%). Of the respondents 258(88.7%) felt that having computers to do work was better than when computers were unavailable; 260 (90%) perceived computerization and computer use to be useful. The results were statistically significant p<0.0001. Regarding computer skills, 164 (56.4%) felt they had adequate skills while 127 (43.6%) did not and this was statistically significant p<0.034. When asked their preferred method of documentation, 241(84.9%) were documenting using computers, 28(9.9%) paper and pen while 14(5%) were not sure and the results were statistically significant p<0.0001. Regarding rating of their computer use most nurses indicated good 116(39.9%), 102(35.1%) at fair and 40(13.7%) at excellent.

Conclusion: Majority nurses felt that the use of computers to do work was better than when they were unavailable, they had positive perception and willingness to adopt the technology and majority had basic computer skills.

What is already known on this topic?

- Application of the Hospital Information System is increasing and the successful implementation of Hospital Information System is significantly related to nurses' attitudes.
- Computer use and computerization enhance and optimizes workflow and increases nurse's productivity.

What this study adds

- Nurses have a positive perception towards computerization and computer use in this hospital.
- Majority of nurses use a combination of paper and computer based forms of documentation.

- Computers were inadequate for nurses' use.

Introduction

Information and communication technology (ICT) is among the recent exceptional innovations that has immensely influenced human life in this century worldwide [1]. Dephillips echoes that adoption of technology has been the focus of world healthcare policy makers in the recent past. He adds that computer use and computerization enhance and optimizes workflow and increases nurse's work productivity [2]. Kivitu-Bitok highlights that most healthcare workers have become depended on computer use especially following the occurrence of Covid-19 pandemic [3]. The World Health Organization (WHO) emphasizes the need to continuously monitor and regularly assess, document and provide regular feedback to stakeholders to address any bottlenecks to computerization and computer use [4].

WHO showed that only six out of forty-six countries meet health worker density of 2.5 doctors, nurses and midwives per 1000 population required to achieve health outcomes [4]. The National Coordinating Agency for Population and Development (NCAPD) reveals that Kenya had a health worker density of 1.98/1000 population [5] and nurses and midwives' density stood at 0.41/1000 population by 2010 [4]. In conclusion, to help bridge this gap of insufficient health worker density population ratio, countries have been asked to embrace the use of computers and technology [4–5].

NCAPD stresses that collection, collation, compilation; analysis and reporting of heath data in health information system (HIS) in most developing countries are associated with major problems. More often, than not, the data collected manually is not useful for health management decision making. This is because they tend to be incomplete, inaccurate, untimely, obsolete and unrelated to priorities of the local health care needs [5] associated with low skills and failure to embrace ICT [3].

Kimaro and Twaakyondo study shows that the paradigm shift from paper-based, to paperless documentation, means that nurses need to be in tandem because they are the majority in healthcare and do not exist in a vacuum. These authors conclude that inability to do so will exclude them from the benefits of ICT in their patient care and health systems management [6] and Olubunmi asserts that this will compromise documented advantages in data storage, retrieval and sharing using computers [7].

Although nurses' attitudes towards computer use has become increasingly positive, Kivuti & Chepchirchir showed that resistance to use and negative attitudes towards computers have often been attributed to lack of knowledge. They support that the nature of the nurses' work and the practical application of computers today and in future will contribute to less resistance and adoption of ICT [8].

Maclane states that, as the use of computer technology continues to rapidly advance in societies and nurses are being challenged to incorporate the use of computers into their daily routine of providing patient care and in documentation. He however, asserts that healthcare workers are reluctant to give up the traditional documentation and adopt electronic documentation [9]. It has been demonstrated that since nurses represent the largest group of computer users in healthcare, it is vital to understand their

perceptions, attitudes and motivational factors towards the use of computers in order to ensure successful implementation of computerization in a health system [10].

It is with this regard that this research sought to establish the perception of computerization and computer use among nurses to scale up positive attitude computerization and computer uptake among nurses in the national referral hospital.

Methods

Study design

a cross-sectional study was conducted at Kenyatta referral hospital, Nairobi Kenya to determine perceptions among nursing staff regarding computerization and computer use.

Study setting and population

KNH is a public tertiary teaching and Referral hospital, under the Ministry of Health and is situated about three kilometers from Nairobi city, Kenya. It is the largest hospital in the country and East and Central Africa.

The target populations were all nurses working at KNH. The study populations comprised of qualified nurses from all departments. Nurses on duty during the data collection period, hospital managers who voluntarily consented to participate were eligible for the study. Those absent from the study unit during the period or unwilling to give consent were ineligible. Multistage sampling technique was adapted to select specific units where nurses work. Systematic sampling was then utilized to select volunteer nurses in each unit.

Variables

variables included respondent's age, years of work experience in nursing, job designation, perceptions among nursing staff regarding computer use and computerization, satisfaction with computer use and training on computer use.

Data resource and measurement

Data collection tool

a structured questionnaire with quantitative characteristics was used to collect data from participants and key informants.

Data collection

A qualified research assistant with a diploma in nursing was recruited and trained on the consenting and interviewing process. The principal investigator (PI) and co -Investigators (CIs) provided necessary

support supervision during data collection. The PI and CIs performed scheduled random support supervisory duties through phone calls, field visits and checking on data collection and entry to ensure data integrity was achieved and maintained. Consenting participants filled the structured questionnaire which mainly had quantitative characteristics.

Sample size: The sample size was determined by using a single population proportion formula considering the following assumptions: prevalence (p) of perception of nurses towards computerization 74.6% based on a study done in Kenya [8]. Z, standard normal distribution value at 95% confidence level of Z^2 a/2 = 1.96, and margin of error (w) = 5%. This gave a sample size of 291 nurses.

Data analysis

Data collected was cleaned, validated and entered into customized MS Access database. Data completeness and consistencies were checked then exported to SPSS version 22 for analysis. Demographic data was analyzed using univariate analysis of each variable in the data set. Descriptive statistics were used. Chi square test of independence was used to determine whether a significant relationship existed between nominal variables. A cut off P-value of 0.05 was used to determine statistical significance.

Ethical consideration

Ethical approval was sought from Kenyatta National hospital/University of Nairobi (KNH/UON) ethics committee. Eligible respondents were asked to give written informed consent before participating in the study. No personal identifiable information was collected and confidentiality was ensured through anonymity.

Results

The mean age of the respondents was 39.48 (38.96-40) years; range was 37 years. The modal age group was 40–44 years 70 (24.1%) and the least was 20–24 years 8 (2.8%). Majority nurses were from pediatric units were 49 (16.8%), surgery had 42 (14.4%), private wing 41 (14.1%), specialized units 38 (13.1%), reproductive health 34 (11.7%), orthopedics 28 (9.6%), medicine 26 (8.9%), accident and emergency departments 22 (7.7%), theatres 8 (2.7%), staff training 2 (0.7%) and nursing administration 1 (0.3%). Majority respondents were senior nursing officers 132 (45.4), Nursing officer one were 61 (21%) and the least were enrolled community nurses 1 (0.3%) as shown in Table 1.

Comparing non computerized state with computerized state, 258 (88.7%) nurses felt that use of computers to do work was better than when they were unavailable. About, 40 (13.7%) rated it as excellent, 116 (39.9%) good, 102 (35.1%) fair and 18 (6.2%) poor. The rest 15 (5.2%) said it was not applicable because they did not have computers. In regards to documentation, majority 170 (58.4%) nurses use a combination of paper and computers. One hundred (34.4%) document entirely on paper, 21 (7.2%) entirely on computers as indicated in Table 2.

Majority 167 (57.4%) felt that other professionals should be allowed access to computers, 121 (41.6%) felt they should not while 3 (1%) said it was not good for others to access nursing notes as indicated in Table 2.

Of the nurses 262 (90%) perceived computerization and computer use was useful; 6(2.1%) felt it was not, 17 (5.8%) were not sure while 6 (2.1%) felt they needed more information to decide whether computerization and computer use was or not. One binomial test showed that the results were statistically significant $p < 0.0001$ as illustrated in table 3.

Perception on computer skills revealed that 164 (56.4%) nurses felt they have adequate computer skills while 127 (43.6%) felt inadequately skilled. This was statistically significant $p < 0.034$. Regarding satisfaction with computer use, 10 (3.5%) were very satisfied, 142 (48.94%) were satisfied, 112 (38.30%) were neutral and 27 (9.22%) were very dissatisfied. When the respondents with inadequate skills were further probed, 78 (61.4%) they had not received any basic computer training, 36 (28.3%) had been poorly trained, 13 (10.3%) had no training in funsoft (the software used in the hospital) as shown in Table 3.

As shown in Fig. 1, 241 (85%) nurses prefer to use computers, 31 (10%) prefer paper documentation, 14 (5%) prefer combination of computer and paper documentation. Less than 8 (0.4%) were not sure of their preferences.

Discussion

Nurses form the majority of human resource in healthcare. Subsequently, it is only possible to improve performance of healthcare organizations if nurses are taken on board of any change and are on the forefront regarding current trends in computer technology, knowledge, attitude and practice. Obviously, effective use of computers by nurses will enhance their work performance in healthcare delivery by improving communication, documentation, workflow and reducing nursing errors.

In the current study the mean age of the respondents was 39.48 (38.96-40) years with a range of 37 years. This mirrors a study by Mansoori *et al.*, in Qatar who found a similar finding of a mean age of 37 years among the study participants [11]. In our study majority of the nurses were senior nursing officers followed by nursing officer ones by designation. However, the categories of designation did not occur with equal proportions. This contrasts the study by Kivuti- Bitok where majority of the respondents were nursing officer ones [3]. Majority of the respondents were from the pediatrics department though the categories of representation did not occur with equal probabilities.

On perceptions on computerization and computer use, 88% of the respondents felt that the use of computers to do work was better than when they were unavailable. The positive findings in this study are similar to the results of other existing studies [12]. Similarly, Kivuti- Bitok found that nurse managers in Kenyatta National hospital perceived that computerization of nursing activities and procedures would be useful in provision of patient care. The author isolated activities including patients billing, health education to patients, incidences, mortality, entry of communicable diseases, off duty requests, nurses

complains and suggestions, updated nursing care from internet, memos, clinic booking/appointments, staff profiles/qualifications, bed occupancy, procedure manuals, investigations/lab requests and results, discharge of patients and nursing audits. Contrastingly these nurse managers were neutral on the view that computers would lower the cost of care and disagreed that use of computers in health care provision would lead to loss of jobs [3]. However, a study done in Australia estimated that 86% of nurses used computers in their workplace mainly for accessing patient related information, communication, updating their medical knowledge, professional development and policy [13].

Our results show that, majority 58.4% of respondents use a combination of paper and computer based forms of documentation. Contrastingly, in Australia, Yu surveyed nursing staff and over 70% respondents considered the time consuming nature of a paper based record system to be a major problem. The other challenge was large storage space required, lack of legibility for handwritten documents, difficulty retrieving the previous records, difficulty updating information and misuse of handwritten information/documents and loss of vital information from wear and tear [13].

On perception on usefulness of computerization and computer use, 90% of nurses felt it was useful. A similar observation was found by Darbyshire, where nurses accepted computerization and recognized their value [14]. Conversely in Australia more than half of the nurses said that computerization reduces the quality time of both nurses and patients because it forces nurses to spend more time in front of the computer away from the patients' bedside [13].

With regard to perception on computer skills, 56.4% of the nurses felt they have adequate computer skills while 43.6% felt they were not adequately skilled. A similar observation was documented by Kivuti-Bitok, where 95% of nurse managers felt that the hospital was not doing enough to equip the nurses with computer skills [3].

Our study findings show that 49% of the nurses were satisfied with computerization and computer use. This was in contrast to another study where nurses were reported to resist computerization, because they viewed computerized health information systems as dehumanizing, confusing and uncaring [15].

Limitations of the study

This study sought the perceptions of the respondents. There was no objective metric measures used thus findings are subjective. This was addressed through triangulated methods of data collection.

Conclusion

Nurse's perceptions on computerization and computer use have an important bearing on the uptake and utilization of computer systems in the workplace. Majority of the nurses felt that the use of computers to do work was better than when they were unavailable. Nurses with inadequate skills in computers had not

received basic computer training, yet they had positive perception and willingness to adopt the technology.

Recommendations

There is need to augment positive attitudes among the nurses, provide more training, technical support, support supervision and more computers for the nurses in their workstations.

Declarations

Competing interests

The authors declare no competing interest. This research was funded by KNH

Authors' contributions

Christine Mwikali Musee, Philemona Maina, Rosemary Mutua, Grace Omulogoli, Judith Mutindi Mweu tested the feasibility of the study.

Christine Mwikali Musee and Peter Kiteywo Sisimwo wrote the manuscript and all authors approved the final version of the manuscript.

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Tables

Tables 1 to 3 are available in the Supplementary Files section

Figures

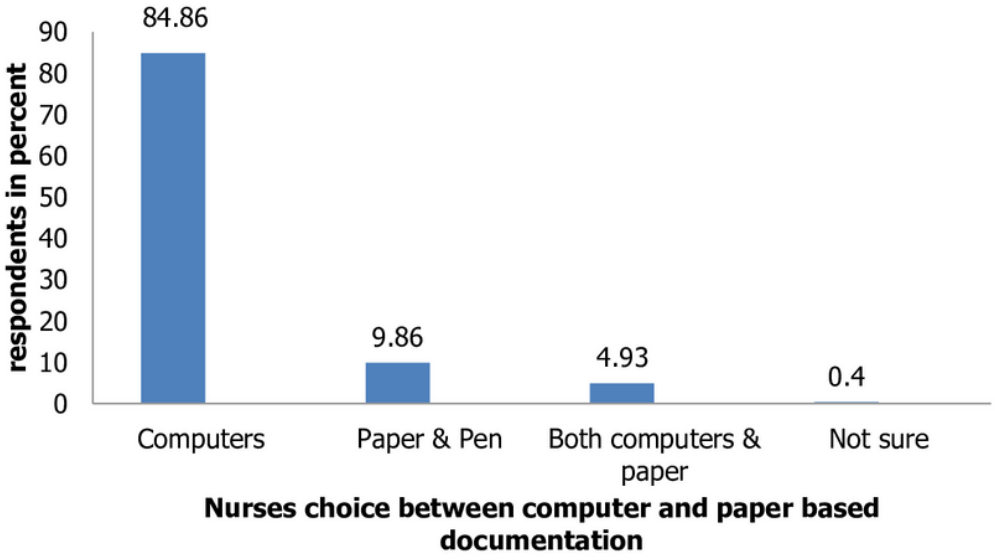

Figure 1

Choosing between computer and paper based documentation among nursing staff

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- tableone.png
- tabletwo.png
- tablethree.png