Original Article

Nursing Staff Practices Towards Computerization and Computer Use in a Teaching and Referral Hospital, Nairobi Kenya

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ABSTRACT

The use and dependence on information technology have recently become increasingly widespread in healthcare and nursing care delivery. The purpose of this study was to assess practices among nursing staff in relation to computerisation and computer use in a tertiary referral hospital. This was a cross-sectional study comprising qualified nurses from all departments. A sample size of 291(100%) nurses participated in the study. Data were collected using questionnaires. Data were analysed using a statistical package for social sciences software version 22. A p-value ≤ 0.05 was considered statistically significant. The majority of the respondent's age were in the category 40-49 years 112(38.5%); senior nursing officers were 132(45.4%); majority participants used computers for ordering supplies 160(55%), nursing notes 41(14.1%), billing 64(22%) and communication 26(8.9%). Two hundred and fifty-nine (89%) had the ability to type using the computer keyboard, while 32(11%) had difficulties. Use of a computer mouse, typing on the keyboard, use of a word processor, having an email, ability to prepare power-point presentations, and formal training were statistically significant (p-value <0.0001). Regarding communication, 50(17.2%) used electronic mails while 241(82.8%) did not. Evidently, nurses' practices on computerisation and computer use have an important bearing on the uptake and utilisation of computer systems in the workplace.

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INTRODUCTION

The use and dependence on information technology (IT) have recently become increasingly widespread in health and nursing care delivery (Goorman and Berg, 2000). Nkosi et al. (2011) assert that many health facilities use computers to enhance the quality of health services and nursing care delivery, increase the scientific information base in medicine and nursing and decrease healthcare costs.

Chan (2006) indicates that, historically, computer use in nursing began in the 1970s as the need for more information on its implementation and service documentation increased for nurses. In this period, computers were used effectively in the diagnosis and treatment of the problems of the healthy individual/patient, in planning, applying, and evaluating healthcare and for keeping records among nurses and other healthcare practitioners (Lee, 2005).

Nurse clinicians, educators, researchers, and administrators handle large amounts of data and information during their execution of daily duties. Traditionally, Lee (2005) says that client data are handwritten in an unstructured paper format in multiple versions. This process makes location, abstraction, and comparison of information very slow and difficult, thereby limiting the process of knowledge creation, sharing and development (Hebda and Czar, 2013). Moreover, prompt access to quality information by all stakeholders in the healthcare delivery system requires a structured and secured documentation mechanism for the provision of quality patient care, which can be achieved with Electronic Health Records (DOH, 1998). In the 21st Century, the use of computers has become the global best practice in the management of patient records, with developed countries taking the lead. Gradually, concerted efforts are being focused on phasing out manual paper records in developing countries, which had consumed huge space in antique health record libraries for centuries and notably delayed access to efficient medical care (Da've, 2004).

Several factors that influenced the use of computers among nurses have been documented in research. Some nurses were reported to have been resistant to using Information Technology, while others lacked the required preparedness for the effective application of ICT in nursing practice and documentation (Bertulis, 2008). Likewise, research by Bertulis concluded that nurses lack the time and skills to access and review electronic evidence-based information (Bertulis, 2008). Meanwhile, Lium, Laerum and Schultz et al. revealed that poor ICT implementation process, negative perception, and lack of awareness of the immediate benefits were also reasons for sub-optimal or non-use of ICT (Lium, Laerum, Shultx, et al., 2006). Likewise, Samoutis, Soteriades and Kounalakis et al. demonstrated that a lack of informatics and computer training and technical support increases resistance to use (Samoutis, Soteriades and Kounalakis et al., 2006).

Proficiency in using computers has become a necessity in healthcare settings. The benefits of utilising computerised systems are documented. Examples include the decrease in costs and improvement in the quality of health and nursing care provided (Ibrahim, Donelle and Sidani et al., 2019). Besides, computerised systems facilitate communication and reduce the risk of committing medical and nursing errors (Palabindala, Pamarthy and Jonnalagadda, 2016).

Computerisation is ongoing in Kenyatta National Hospital, with a robust master plan to ensure the digitisation of health services. Nurses form the bulk of the hospitals' workforce, they spend more time with patients, and their documentation is immense and diverse. However, nurses have lagged behind in computer use, and this adversely affects all other professionals due to interdependence in healthcare delivery. The purpose of this study was to assess practices among nursing staff in relation to computerisation and computer use in a tertiary referral hospital.

METHOD

Following ethical approval from the Kenyatta National Hospital/University of Nairobi (KNH/UON) ethics committee, a cross-sectional study was conducted at a national tertiary teaching and Referral hospital in Kenya.

The study population comprised qualified nurses from all departments in the hospital. Nurses on duty during the data collection period and 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.

Sample determination was done using the formula shown below. The sample size calculated was 291. From this number, proportionate calculations were allocated to all hospital departments pegged on the departmental qualified nurse population. Each departmental proportionate sample formed a stratum. Simple randomised sampling was then applied from all strata.

$$= \frac{p*(1-p)*z^2}{d^2}$$

Where: n = required sample size, Z = standard normal deviate corresponding to the specified size of the critical region (α), set at 1.96, P = Perception of nurses towards computerisation at KNH (74.6% according to Kipturgo et al., 2014), 1-P = Negative attitude/perception of nurses

towards computerisation (25.4%), d = margin of error at 5% (standard value of 0.05)

$$n = \frac{0.746*0.254*1.96^2}{0.05^2}$$ Sample = 291

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 and 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 out the structured questionnaire, which mainly had quantitative characteristics. Data collected was cleaned, validated, and analysed using SPSS version 22 at the descriptive and inferential level of data analysis for qualitative data. A p-value ≤ 0.05 was considered statistically significant.

RESULTS

The response rate was 291 (100%). The majority age group was 40-49 years (112, 38.5%), and the least was 50-59 years (41, 14%). Most nurses were from pediatric units (49, 16.8%), surgery was 42(14.4%), private wing 41(14.1%), specialised units were 38(13.1%), reproductive health 34(11.7%), orthopaedics 28(9.6%), medicine 26(8.9%), accident and emergency department 22(7.7%), theatres 8(2.7%), staff training unit 2(0.7%) and nursing administration 1(0.3%). The majority of nurses were senior nursing officers 132(45.4), Nursing officers one was 61(21%) and enrolled community nurses 1(0.3%), as shown in *Table 1*.

The majority of nurses use computers for ordering supplies at 160 (55%), nursing notes at 41 (14.1%), billing at 64 (22%) and for communication at 26 (8.9%).

Table 1: Demographic characteristics of the respondents

Demographic characteristics		Frequency	Percent	Cumulative percent
Age Groups	20- 29	49	16.9	16.9
	30- 39	89	30.6	47.5
	40- 49	112	38.5	86
	50- 59	41	14	100
	Totals	291	100	
Respondents' department's representation	Private wing	41	14.1	14.1
	Medicine	26	8.9	23
	Orthopaedic	28	9.6	32.6
	Reproductive health	34	11.7	44.3
	Paediatrics	49	16.8	61.1
	Specialised units	38	13.1	74.2
	Theatre	8	2.7	76.9
	Administration	1	0.3	77.2
	Staff training	2	0.7	77.9
	Surgery	42	14.4	92.3
	Accident & emergency	22	7.7	100
	Totals	291	100	
Respondents' designation	Assistant chief nurse	7	2	2
	Senior nursing officer	132	45.4	47.4
	Nursing officer I	61	21	68.4
	Nursing officer II	21	7.2	75.6
	Nursing officer III	56	19.1	94.7
	Senior enrolled nurse	13	5	99.7
	Enrolled Community nurse	1	0.3	100
	Totals	291	100	

Table 2 shows computer proficiency among the nursing staff. Of the respondents 271(93.1%) had the ability to use a computer mouse (p-value < 0.0001) while 20(6.9%) could not; 259(89%) had the ability to type using the keyboard (p-value < 0.0001) while 32(11%) did not. About 181(62.2%) could use the word processor (p-value < 0.0001) while 110(37.8%) could not; 240(82.5%) had an email address (p-value < 0.0001) while 51(17.5%) did not; 146(50.2%) knew how to prepare and use powerpoint presentations (p-value < 0.0001) while 145(49.8%) did not. In regards to training, 168(57.7%) had been formally trained (p-value < 0.0001) while 123(42.3%) had not. The majority of respondents (274, 96%) said that their computers were protected using a password (p-value < 0.0001), while 11(4%) said they were not. About 227 (78%) nurses said it was possible to correct wrong data entered in the computer (p-value < 0.0001), while 64(22%) said it was not.

Table 2: Confirming computer proficiency among the respondents

Computer Proficiency	Response	Freq.	Percent	Cumulative %	P-value
Can use a computer mouse	NO	20	6.9	6.9	<0.0001
	YES	271	93.1	100	
Can use a keyboard for typing	NO	32	11	11	<0.0001
	YES	259	89	100	
Use word processor	NO	110	37.8	37.8	<0.0001
	YES	181	62.2	100	
Have email address	NO	51	17.5	17.5	<0.0001
	YES	240	82.5	100	
Preparing & using PowerPoint	NO	145	49.8	49.8	<0.0001
	YES	146	50.2	100	
Have formal computer training	NO	123	42.3	42.3	<0.0001
	YES	168	57.7	100	
Computer security using password	NO	17	3.86	3.86	<0.0001
	YES	274	96.14	100	
Data Correction after entry	NO	64	22	22	<0.0001
	YES	227	78	100	

Regarding communication, 50(17.2%) nurses used email as a means of communication (p-value < 0.0001) while 241(82.8%) did not, 22(7.6%) used written documents to communicate (p-value < 0.0001) while 269(92.4%) did not; 111(38%) communicated through face-to-face meetings (p-value < 0.0001) while 180(62%) did not (see *Table 3*). The most utilised means of communication by the nurses among colleagues was the telephone, with approximately 251 (86%) of them using it (p-value < 0.0001), while 40 (13.7%) did not.

Table 3: Common communication methods among the respondents

Communication method	Response	Frequency	Percent	P value
Email	No	241	82.82	<0.0001
	Yes	50	17.18	
Written	No	269	92.4	<0.0001
	Yes	22	7.6	
Face to face	No	180	62	<0.0001
	Yes	111	38	
Telephone	No	40	13.7	<0.0001
	Yes	251	86.3	

According to the frequency of computer use, 235 (83.3%) of the respondents used computers several times daily; 16(5.5%) weekly, 12(4.1%) fortnightly, 7(2.4%) monthly and 21(7.2%) once a month and this was statistically significant at a P-value <0.0001 as shown in *table 4*.

Table 4: Frequency of computer use among the nurses

Frequency of computer use	Number	Percentage	P value
Daily	235	80.8	<0.0001
Weekly	16	5.5	<0.0001
Fortnightly	12	4.1	<0.0001
Monthly	7	2.4	<0.0001
Never	21	7.2	<0.0001
Total	291	100%	

DISCUSSION

This study aimed at determining the practices among nursing staff in relation to computerisation and computer use at a national referral hospital. The majority of nurses were in the age group 40-49 years, and the least was 50-59 years 41(14%). The majority of the nurses were aged 40-49 years, in contrast to studies done in Nigeria, where the majority of the respondents were aged 31-40 years (Edward et al., 2020). The majority of the respondents were senior nursing officers in managerial positions, congruence with a study done in Kenya by Kivuti- Bitok where the majority of respondents were nurse managers (Kivuti-Bitok, 2009).

The majority of the nurses used computers for ordering supplies, nursing notes, billing, and communication. Comparatively, Kivuti and Chepchirchir (2011) found that nurse managers utilised computers for various activities such as sending emails, typing personal work, and searching for information on the internet. Contrastingly, in Australia, Hegney Buikstra, Eley and Fallou et al. (2007) found that nurses were using computers to access patient's records, patient's results, continuing professional education and communication (Hegney Buikstra, Eley and Fallou et al., 2007). Similarly, Dumas, Dietz-EOand Connolly (2001) showed that nurses used computers for creating and accessing patient-related information.

The findings of the study showed that the majority of the nurses were proficient in using computer mouse (93.1%). In regard to typing using a keyboard, 89% were proficient, while 62.2% were proficient with word processors. A similar observation was made in Nigeria, where 77.9% of the nurses had good knowledge of computers, and 98.3% of the respondents knew that it could be used for storing and processing information (Edward et al., 2020). Of the respondents, 82.5% had an email address, while 17.5% did not. This mirrors a study done by Kipturgo, Kiviti-Bitok and Karani (2014) on the attitudes of nurses towards computerisation, where the majority of the nurses had email accounts. In this study,

57.7% of the nurses had formally received computer training, while 42.3% had not been formally trained. Comparatively Kivuti-Bitok (2009) found that the majority of the nurses did not receive computer training as part of their basic training in nursing. Many health workers do not have any computer training during their basic training. The majority of the respondents, 96%, said that their computers were protected using a password. Similarly, Hegney Buikstra, Eley and Fallou et al. (2007) found that only 8% of the nurses considered the level of security of patient's records to be poor. They rated workplace policies in security and confidentiality as high, with 58% of the nurses rating it good.

In our study majority of the nurses (82.8%) did not use email as a means of communication; only 17.2% used it. The reason could be the inadequate link of the internet to the available computers. In a national survey in the USA, findings indicated that nurse administrators felt that the ability to use email effectively, operate basic computer Windows applications, and search databases were critical information technology skills for nurses (McCannon and O'Neal, 2003). In addition, Brijendra and Senthil (2015) reported that communication-related activities were highly correlated with the advantages of using computers among nurses. They recommended that communication-related activities should be enhanced in nurses working environment in order to realise the benefit that comes after using computers frequently.

CONCLUSION AND RECOMMENDATION

Computerisation and computer use have significant implications in nursing practice and nursing care service delivery. Factors that influence their adoption and practice have been isolated. This study offers critical elements that can help inform facilities that are computerising their healthcare and nursing services at all levels of healthcare. Narrowing on improving nurses' proficiency in using a computer mouse, typing on the keyboard, use of word processor, having an email and ability to prepare a power-point presentation. Nurse managers need additional in-

depth training in computer use so as to offer support to junior staff.

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