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# What do nurse managers want computerized?
## Needs based assessment study of middle and functional level nurse managers at Kenyatta National Hospital, Kenya.

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## Abstract

This cross sectional descriptive study was conducted among middle and functional level nurse managers at Kenyatta National hospital, Kenya. A purposive sample of 107 nurses' managers was selected from every department in the hospital. Data was collected using a self administered questionnaire.

The study revealed that nurse managers had very positive attitudes towards use of computers in provision of health care. The attitudes of the nurse managers towards use of computers in nursing were not significantly influenced by accessibility to a computer, previous training in computer (p=0.05). However the length of practice as a nurse and the age of the respondents have negative influence on attitudes (p=0.05).

Majority of the nurse managers (85%, n=91) did not have computer studies as part of their training in basic nursing, fifty one percent ( n=55) had received training in computers after their basic training in nursing.

Majority of the nurses 98.1% (n=105) desired to be trained in computer applications. Most nurse managers (69.1%) on job training in computers.

The first five nursing activities and procedures identified in order of priority for computerization were; Billing patients(mean=4.74), Admission of patients(mean=4.61), Cost analysis and finding trends for budget purposes(mean=4.49, Procedure manuals/ instructions(4.43),Drug dosages calculations(4.40).

Study results could be used to plan for training of nurse managers as well as a basis for designing needs based computer software for nurses at the hospital.

*Keywords*
*Nursing Computerization, preparedness, nurse managers, nursing procedures and activities*

## Background

The use of computers in the work place has increased in recent years with more and more professions becoming dependent on information and communication technology (ICT). Nurses form the bulk of healthcare providers all over the world and especially in Africa. It therefore follows that adoption of ICT by nurses is essential to the success of e-health.

In order to increase the success of adoption of Information, communication and Technology (ICT) by nurses it is important that all measures be taken into consideration before adoption. Majority of the nurses in Kenya are females. Since it has previously been urged that women in general tend to be slow in engaging with computing and there are many records of women's negative experiences with ICT this could have an effect in the nursing care fraternity's adoption of ICT since majority of the nurses in the world are women. Women have often been portrayed as passive users of ICT (Moody et al, 2001).

Many accounts of failed ICT Systems have been attributed to failed mismatch between technology capabilities, needs and constraints of health care workers (Little et al, 2007; Martich et al, 2004).

The need for timely effective information in health care has motivated much ICT development in health care but reality often falls short of expectations and needs.

Many e-health and other ICT initiatives fail because of lack of developers to take into account the need of the users (Sanderson, 2007).The cost to health care organizations and society of such failures in technology can run to millions of dollars. (Martich et al, 2004)

ICT adoption has poor record of enthusiastic adoption in practice. Part of the problem is failure to adequately address during development stage the context of use ICT in health care. ICT innovation can only succeed if design is deeply informed of

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practice and context. Within the context of practice, different levels of health care providers have different priorities, whose needs must be met at the earliest possible stage.

One possible way of addressing this challenge is assessment of user needs before development of the ICT initiative. However, user studies which can be a positive indicator of adoption are not always performed at the right time in design and development cycle (Sanderson, 2007). Even when performed earlier, people's view of benefits of ICT health care initiatives can change over time. In one case , the initial assessment of time gains in achieved in EMR was overturned some months later when the health care workers realized that use some aspects of the EMR led to significant time loss as well(Koppel, 2005).

This study aimed at assessing the mid level and functional level nurse managers' computer needs long before computerization at Kenyatta National Hospital.

## Objectives of the study

1. To assess the preparedness of middle and functional level nurse managers in computer skills.
2. To establish attitudes of nurse managers towards computer utilization in general health care provision.
3. To identify the nursing activities which the nurse managers felt needed to be computerized.
4. To identify the training needs and mode of training preferred the nurse managers.

## Materials and Methods

**Research Design**
This was a cross sectional descriptive study conducted at Kenyatta National Hospital, Nairobi. Data was collected between August 2008 and September 2008.

**Selection and description of setting**
The study was conducted at Kenyatta National Hospital, Nairobi, Kenya. The hospital, the largest referral and teaching hospital in Eastern and Central Africa was established in 1901. The hospital renders services for all specialties and acts as the main training hospital for college of health sciences, University of Nairobi.

KNH has a bed capacity of 1800, and 52 wards. Mostly the wards are not equipped both for administrative purposes and at the bedside except for the intensive care units, accident and emergency units and the amenity (private) wing.

The hospital has a staff capacity of 6,0000. Annual average outpatient attendance is 600,000 visits while in patient attendance are 89,000 patients.

The hospital has employed about 1800 nurses who are of different carders and academic qualification.

**Population of Study**
The study population consisted of all Assistant chief Nurses(ACNs) who are in charge of different Departments with each department consisting of eight wards and/or clinics. The ACN are considered as middle level nurse managers. Functional Level nurse managers consisted of Senior Nursing officers who are in charge of Wards, or clinics and Nursing officer ones( NO1s), Nursing Officer twos(NO2s) and Nursing officer threes(NO3s) who deputize the Senior Nursing Officers.

**Sampling**
A convenient sample of all the middle level Nurse Managers and Functional level nurse managers was done.

**Development and Description of Data Collection Tool**
A structured questionnaire was developed after review of literature. The study tool consisted of three parts.

*Part 1*; consisted of information on demographic variables like age, sex, level of education, years of service in nursing, previous training in computers and access of computers.

*Part 2*; of the questionnaire consisted of a five statement on use of computers in general health care provision. These were structured in Likert scale ranging from strongly disagrees to strongly agree. The second part of part two consisted of 18 nursing activities commonly carried out in the hospital. The nurse managers were asked to rate their perceived usefulness of computerizing the activities on a scale of 1-5. 1 being the lowest score of not necessary and 5 being the highest score of very useful.

*Part 3*; Consisted of three questions addressing the felt need of training by the nurse managers, their perception of if the hospital was doing the best it could in training the nurse managers in computer skills and the mode of training the nurse managers preferred being trained through.

**Data Collection**
A self administered questionnaire was distributed to the nurse managers' office by trained research assistants and collected after 48 hours of administration.

**Ethical consideration**
Approval to conduct study was obtained from Kenyatta National Hospital, ministry of Education and research as well as Joint University of Nairobi and Kenyatta National Teaching and referral hospital ethics committee.

Full disclosure of information to respondents was done. Study subjects anonymity was ensured as no names were used on the questionnaires. Consent was obtained in writing from the respondents. The respondents were informed of their choice to participate and withdraw from the study without any repercussions whatsoever. No compensation was given to the respondents as research was conducted during their normal routine hours. There were no competing interests, the study was self sponsored and was aimed at improving nursing care provision.

**Pilot study**
The pilot study was conducted in the month of July 2008 among nurse managers working on the ground level of the hospital. These nurse managers were not included as study subject during the main study. This was to ensure feasibility, reliability and validity of the study tools. The plot study subjects were encouraged to give their opinions.

**Data Analysis**
The data was analyzed using SPSS version 11.0. Data analysis was done in accordance with the objective s of the study. Descriptive statistics (mean, standard deviation, percentages and range) and inferential statistics (correlation) were done. P values of ≤0.05 were considered statistically significant.

## Study results

One hundred and twenty five (125) questionnaires were sent out to middle level and functional level nurse managers at Kenyatta National Hospital. The response rate was 85.6% (n=107) response rate.

**Demographic characteristics.**
The sex distribution of the respondents was 20.6 %( n=22) males while 79.4 %( n=85) were females. Majority of the respondents 75.7% (n=81) were married, these were followed by widowed/widowers 3.7 %( n=4), singles who constituted 2.8 %( n=3), while separated and divorced constituted of 0.9 %( n=1) each.

Majority, 51.4%(n=55) of the nurse managers were aged 26 to 35 years; these were followed by those aged 36 to 45 years(27.1%, n=29)those aged 46 to 55 years constituted (19.6%, n=21) . Only 1.9 %( n=2) were aged 25 years and below.

In academic qualifications, majority of the respondents were diploma holders constituting 72.9 %( n=78), these were followed by those with a first degree (12.1%, n=13), those with Ordinary level qualifications (5.6%, n=6), those with Advanced level qualifications constituted 4.7 %( n=5) while only 2.8% (n=3) had a masters degree.

Majority of the nurse managers (36.4%, n=39) were nursing officer ones, these were closely followed by nursing officer twos and nursing officer three who constituted 20.6%(n=22) each. The Senior nursing officers constituted 15.9 %( n=17) while Assistant chief nurses constituted 5.6 %( n=6) of the respondents.

Majority (36.4%, n=39) of the nurses had practiced for a period of 6 to 10 years. They were followed by those who had practiced for 11 to 15 years (22.4%, n=24), while 16.8%, (n=18) had practiced for less than five years.

Of the same respondents 11.2 %( n=12), had practiced for a period of 21 to 25 years. Only 6.5% of the nurse managers had practiced for 26 to 30 years.

**Previous Training in Computers**
Of the nurse managers, only 13.1 %( n=14), had computer training as part of their basic nursing training. The rest 85 %( n=91), had no computer training as part of their basic nursing training.

The nurse managers who had training as part of their basic training in nursing were asked to specify the skills/ knowledge they had been trained in. They reported training in different contents as follows; 28.6 %( n=4) had received training in MS DOS, 21.4 %( n= 3) had training in International Computer Driving License(ComputingNZ, 2008), 14.3 %( n= 2) had been trained in word processing. The rest of the respondents (35.7%, n=5) had received other trainings in computers.

Fifty one point four percent (n=55), had received computer training after qualifying as nurses.

Nurse Managers who had received training in Computers after their basic training in nursing trained in various packages. Majority 40.7 %( n=11) had training in word processing. The second most trained in computer software was International Computer driving license (ICDL) accounting for 22.2% (n=6).

**Computer Access**
The nurse managers who had access to a computer constituted 57.9% (n=62) while 40.1 % (n=43) of the respondents did not have access to a computer.

Of the nurse managers who had access to a computer, 29.9 %( n=32) accessed the computer at the cyber café, 36.8 %( n=21) accesses the computers at home, while only 1.8 %( n=1) had access at the work place.

**Attitudes towards computer use in general health care**
The nurse managers were presented with five statements on use of computers in general health care provision. The statements were ratted on a Likert scale ranging from strongly disagrees to strongly agree. The results were as tabulated in table one.

Majority 98% (n=104) of the nurse managers had positive attitudes towards use of computers in general health care provision. Highly positive attitudes were reported in issue of computers would save time (mean =4.59, X=.92), use of computers would improve communication (mean=4.55, SD=.996), and that computers had improved exchange of information in Kenya (mean=4.33, SD=.973)

The nurse managers were more neutral on view that computers would lower the cost of care in Kenya (mean=3.47, SD= 1.56)

Most (mean=2.13, SD=1.28) disagreed with the statement that use of computers in health care provision would lead to loss of jobs in Kenya.

**Table 1**
Attitudes towards computer use in general health care

| | n = | Sum | Mean | Std. Deviation |
|---|---|---|---|---|
| Computers in health care saves time | 104 | 477 | 4.59 | .920 |
| Computers in health care improves communication | 106 | 482 | 4.55 | .996 |
| Computers has improved exchange of information in health care in Kenya | 106 | 459 | 4.33 | .973 |
| Computers will lower cost of health care in Kenya | 103 | 357 | 3.47 | 1.558 |
| Computers will lead to job loss in health care in Kenya | 104 | 222 | 2.13 | 1.278 |
| Valid N (list wise) | 102 | | | |

1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree

*Perceived usefulness of computerization of various procedures*
The nurse managers were asked to rate their perception of potential benefit of computerizing various nursing activities and procedures on a rating scale of 1 to 5, whereby

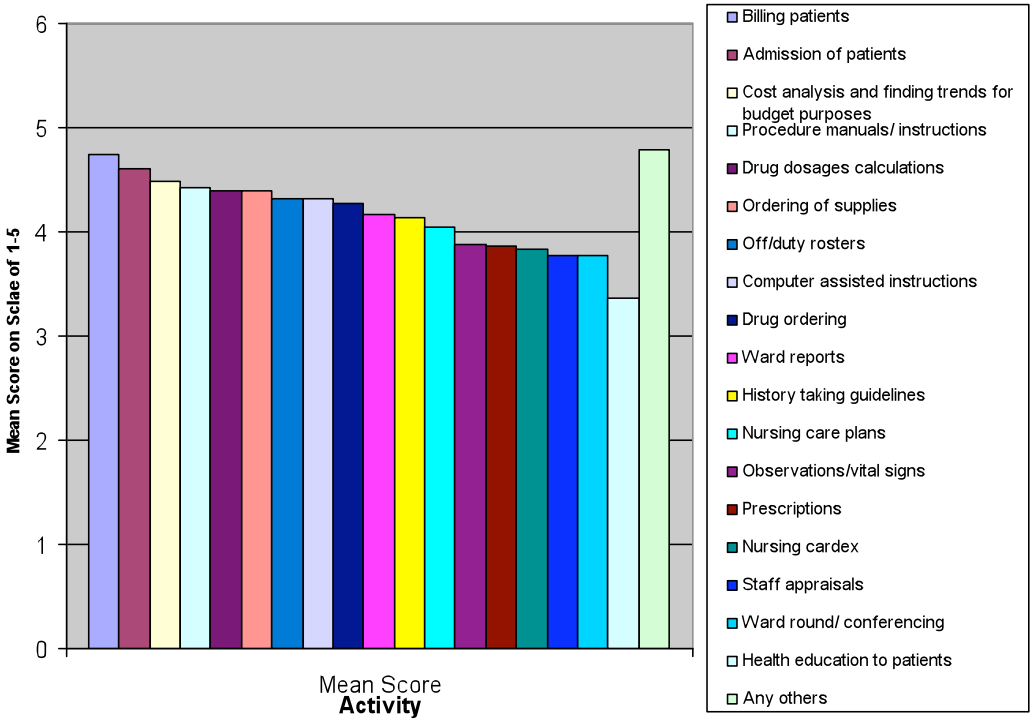
1. Not necessary
2. Neutral
3. Somewhat useful
4. Useful
5. Very useful

The results were as shown in Figure 1.

Figure 1 shows that the nurse managers perceived that computerization of 90% (n=18) of nursing activities and procedures would be useful in provision of patient care. The procedure with the highest mean hence the highest score was patients billing (mean= 4.74), while the lowest score was Health education to patients.

Other areas the nurse managers identified as useful for computerization included; 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 audit

**Figure 1**
Nursing activities identified by nursing for computerization in order of priority



*Perceived Training Needs and Modalities of Training*

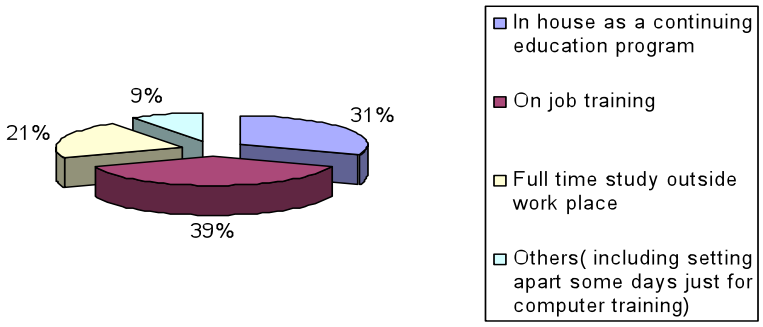
Asked whether they felt it necessary for the hospital to train them in computer applications, 98.1 %(n=105) of the nurses managers were positive about the training while 1.9%(n=2) felt it was not necessary for the hospital to train them in computer skills.

While 95.3 %( n=102) nurse managers felt that the hospital was not doing enough to equip the nurses with computer skills, only 1.9 %( n=2) of the nurse managers felt that the hospital was doing enough to equip the nurses with computer skills. 2.8 %( n=3) of the nurse managers were non committal on the issue.

Figure 2 shows that of the nurse managers who wished to be trained in computer applications, 30.8 %( n=33) preferred in-house training as part of continuing education, 38.3 %( n=41) preferred on the job training while 21.5 %( n=23) preferred full time study, outside of work place training.

Some of the nurse managers 9.3 %( n=10) preferred other modalities of training.

**Figure 2**
Preferred mode of training




## Discussion

Few studies if any have been done to access the preparedness of the nurses and their attitudes prior to use computerization systems.

This study was conducted prior to computerization of the nursing procedures and related services.

**Computer Skills and Practices.**

This study revealed that 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 (Mars& Seebregts, n.d)

Only one nurse manager had access to a computer at workplace, the hospital would have to invest heavily to enable all health units to have computers and connect to the Internet or e-mail networks Inaccessibility of computers in developing countries is a contributing factor to the fact that health care workers are unable to take advantage of the progress in EHR development because of lack, or inadequacy, of necessary infrastructure (Nabirye& Moss, 2008)

While majority of the nurses at KNH accessed computer at a cyber café, those in developed countries and some developing countries accesses computers at the work place (Vernon, 2006, Raja et al, 2005).

**Attitudes of Nurse Managers towards Use of Computers in Provision of Health Care**

The use of computers in provision of nursing /health care in some developing countries has not become a reality. In some countries however, nurses as a group of care providers have been found to resist computerization, seeing computerized health information systems as dehumanizing, confusing and uncaring (Alquraini et al, 2007).

This study revealed that 98% (n=105) of the nurse managers had a positive attitude towards use of computers in health care provision. The study results are consistent with those of others studies ( Alquraini et al, 2007; Andrus & Mullins ,2006 Gordana et al, 2005; Raja et al , 2005;M.Getty et al,1999; Dillon et al, 1998) suggesting that nurses in general have a positive attitude towards use of computer systems.

The study results contradicted studies (Lui et al, 2000) that shown nurses to have negative or neutral attitudes towards computers.

There was no significant correlation between computer knowledge and attitudes. This supported a study done in India (Raja et al, 2005) but contradicted studies (Andrus and Mullins, 2006; Chan, 2009) done else where which revealed that the level of computer competency and experience was an indicator of positive attitudes towards computerization.

Length of practice as a nurse (p=0.05) and age of the respondent (p=0.05) negatively influenced the attitudes of the nurse manager towards computer use. The results of this study contradicted finding of a research done in china which showed that older age, higher educational levels and attitude scores are factors that significantly improve nurses' knowledge(Chan,2009) but supported other studies which proposed that younger nurses were likely to have more positive attitudes towards use of computers(Gordana et al, 2005)

**Perceived Usefulness / Need of Computerization of Various Procedures and Activities**

According to Vernon (2006), nurses overwhelmingly validate the potential of information technology (IT) to improve the quality of patient care.
In this study Nurse Managers were of a strong opinion that the computerization of most of the nursing activities was useful and needed. The areas identified as needing computerization contradicted those by studies done else where.

According to Pulley (2008), American Academy of Nursing's Workforce Commission identified 10 main areas required for computerization by nurses. These were;

- Touch-screen or voice-activated technology for documentation.
- Automated networks that download patients'

vital information directly into their electronic health records.
- Computerized order entry systems, which would eliminate handwriting legibility issues.
- More hands-free applications, particularly wireless technologies.
- Smart beds that monitor patient movements and use pressure sensors to reduce bedsores.
- Greater use of radio frequency identification to track people, supplies and equipment.
- Greater use of robotics for delivering supplies.
- Interoperable systems that allow a full view of patients' records without toggling or entering multiple passwords.
- Multifunction solutions rather than separate electronic devices for each activity.
- IT that enhances workflows rather than disrupting them.

These information technology solutions would allow nurses to spend more time on direct patient care. Even though this contrasts the main computerization areas identified by nurse managers in this study, it is important to note that the level of computerization in nursing is different in the two countries. The needs of nurses in developing countries are different to those of the developed world in some areas.

Perceived Training Needs and Modalities of Training
This study revealed that majority (98.1%) of the nurse managers wanted to be trained in computer skills. However they also felt that the hospital was not doing enough to assist them in achieving this objective.

This was contrary to a study done in Taiwan which revealed that 44% of the respondents agreed or strongly agreed that the hospital puts emphasis on the development of Nurses in computer skills. (Gordana et al, 2005). The institution studied in Taiwan revealed that 14% of the investigated hospitals have advanced program of nursing information education. (Gordana et al, 2005). Furthermore, 34% of the hospitals investigated were prepared to teach nursing information, and 24% of them offer information education for executive levels. In this study the nurse managers who wished to be trained in computer applications, 30.8 %(n=33) preferred in-house training as part of continuing education, 38.3%(n=41) preferred on the job training while 21.5%(n=23) preferred full time study , outside of work place training. Some of the nurse managers 9.3 %( n=10) preferred other modalities of training. The results supported those of M.Getty et al (1999) who found that nurses preferred being trained by technical staff in the clinical area.

## Study Limitations

This study was done in a single hospital and therefore the results may not be generalized to the whole country. The purposive sampling involved middle and functional level nurse managers hence did not take into consideration the views of the lower level nurses.

## Conclusions

The nurse managers at Kenyatta National hospital have positive attitudes towards use of computers in provision of health care.

The nurse managers know what they need computerization in their working environment, procedures and activities.

Even though majority of the nurses did not have computer training as part of their basic nursing training, almost all (98%) desire to be trained in computer skills.

Majority preferred on Job training hence the hospital would not need to contend with staff study leave.

Kenyatta National Hospital is ripe for computerization. However the hospital need to put more effort in training of the nurses in computer skills to keep in trend with the global development where there will be an increase in demand for individuals trained in informatics and the need to educate patients in the use of Electronic Health Records and health information resources.
The nursing schools need to be challenged to include computer studies as part of their training in Basic Nursing programs.

The results of this study will be used by for planning training of nurse managers by the hospital, Nursing Council of Kenya, who regulate the nursing curriculums for nursing programs in Kenya could use this information for policy on inclusion of computer informatics as part of basic nursing programs while the results could be used as a basis for developing a needs based computer software for use by the nurse managers in KNH.

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