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TECHNOLOGY UTILISATION: A SURVEY OF COMPUTER LITERACY LEVELS AMONG HEALTH PERSONNEL AT CHINHOYI PROVINCIAL HOSPITAL.

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Abstract

The study explored the levels of computer literacy among health personnel at Chinhoyi provincial hospital in Zimbabwe. This was necessitated by the observation that, computers are not being utilised in nursing schools. A descriptive research design was used to collect data from a random sample of 30 nurses who responded to questionnaires administered by the researchers. Findings revealed that, the level of computer literacy among nurses was low. The majority of them (63%) are familiar with Microsoft Word and the Internet. The study attributes this distribution of computer knowledge to the software's high utility value. None of the tutors were aware of how to use power point and computer aided instruction. None of the nurses knew any programme that can be used to monitor patients. There was no association between computer literacy level and gender. Those nurses who are computer literate acquired the skills out of the nursing field. Factors accounting for this level of computer literacy include the limited availability of computers in schools of nursing and lack of the need to use them. The study recommends that, nurse education curriculum planners revise the nursing education curriculum with the aim of including computers. The current shortage of computers can be reduced by charging each nursing student an extra $ 20,00 to raise funds for computers. Workshops can be held to raise awareness of computer programmes for monitoring patients. Courses in computers may be introduced in the nursing curriculum and that students submit computer typed assignments to increase computer utility value among nurses.

Key words: computer,   clinical area, health personnel and computer literacy.

Introduction

Computer literacy has become an important part of today's world. Computers are found at work, bank, supermarket and even entertainment places. It is now easy to send messages through computers using e-mail and cell phones. Students and other people have used the internet to study and find current information on different topics. This computer utility value makes it critical for everyone to be computer literate.

The words health personnel bring into mind a picture of someone in white uniform, in a place full of patients and medicine. Talk of a secretary one sees a picture of a person behind a computer. A school of Nursing brings a picture of young people in white, training to be nurses. All these images make people including policy makers overlook the need for computer literacy among health personnel because nurses are associated more with patients than computers. Even His Excellency overlooked the need for computers in hospitals and Schools of Nursing when he donated computers for educational purposes in the country. A visit to a hospital reveals that computers are in the administration section where there is a pool of stenographers. At the School of Nursing computers are in the school secretary's office and sometimes the librarian's office.

All these observations zero to the fact that health personnel are overlooked were computer technology is concerned although Holzinger and Snowden (2000) urges that in today's world it is important to become familiar with computers. This observation inspired the researchers to find out the levels of computer literacy among health personnel at Chinhoyi Hospital.

Contextual Analysis
In countries such as South Africa hospitals have found themselves invaded by a host of computerised machines. In theatre, X-ray, rehabilitation and intensive care units computers are a common tool for monitoring patients. In other areas of education, computers have become a teaching and learning tool. Last (1984) observed that computers can be of great assistance to the teacher and the student. In Zimbabwe's nursing education the tutor and the student can get latest information on disease trends and management on the internet. The tutor can also utilize computer power point to deliver lectures. Holzinger and Snowden (ibid) noted that computers increase motivation attention and interest in students. Despite all these possibilities for computer application in nurse education, Chinhoyi provincial hospital has not yet introduced computers in its school of nursing. There are many such schools of nursing in Zimbabwe. In fact the national nursing education curriculum and national nursing examinations are still silent on computer application.

At Chinhoyi hospital and the school of nursing, computers are present but underutilised. In the clinical area, health personnel do a lot of record keeping manually, using registers and files. This can be made easy if computers are used to create data bases for each patient, ward or clinic. Every month statistics which can be done by computers are done manually leaving them open to calculation and presentation errors. Schools of nursing do not teach computer application although some nurse administrators are expected to be computer literate.

Outside the hospital, private companies and none-governmental organisations have many posts for nurses and usually computer literacy is a prerequisite. Some job advertisements for nurses require applicants to e-mail their applications and others require them to download application forms from the web page on the internet.Nurses whose curriculum was deprived of computer literacy are disadvantaged in such situations.

Research Problem

Despite the advancement in computer technology and presents of computers in various areas of health, nurse education has remained without computer application. Although nurses are expected to use computers in executing their duties effectively, lack of computer literacy limits them to manual operations. The levels of computer literacy among nurses are not yet known hence a need for the current study. This problem ripples to patients in that the nurse spends a lot of time doing paper work instead of being on the patient's bed side, thereby compromising the care given to the patient. The study is critical for nurse education curriculum evaluation and development. It sought answers to the following questions:

1. What are the levels of computer literacy among health personnel?
2. What factors contributes to the levels of computer literacy?
3. How can computer literacy among nurses be improved?

Hypothesis

It was hypothesised that;

Ho: Computer literacy levels are not association with gender

H_1: Computer literacy levels are associated with gender.

Significance of the Study

The main purpose of this study exploring levels of computer literacy among nurses is to improve technology utilisation in health. It is also a source of feedback to policy makers in Nursing Education on the need for computer application in the nursing curriculum. Nurses in the clinical area will use it as a basis for computers requirements. For the researcher, the study provides training ground for the development of research skills. Being the first study to explore computer literacy among nurses in Chinhoyi, the study also contributes literature on nurses' computer literacy in Zimbabwe and is a source of insights for further research in technology application.

Literature review

Change silently permeates everything, people, professions and organisations. This statement is true when one looks at the history of nursing, nursing education and medicine. Computer technology is one such

Computer technology in Medicine and Nursing

Medicine and nursing have evolved extensively since the middle ages. Many discoveries have resulted in improvement of patient care. One such discovery is computer technology. Hasset(1984) in Litwack, link and Bower (1985) projected that by 1990 nurses will be capable of entering data, nursing interventions and nursing care plans on pocket microcomputers. This projection implies that by now (2010) nurses are expected to be computer literate hence a call for an exploration of the current levels of computer among nurses at Chinhoyi Hospital.

In medicine and nursing today so many procedures are being computerized. Delough (1991) observed that the development and implementation of computer technology enhances the management and delivery of health care and will continue to do so in future. Health personnel therefore need to be computer literate in order to operate and provide quality care using computerised equipment.

Computers in medicine and nursing have a variety of tasks. Deloughey (ibid) pointed out that advanced medicine technology include, high technology devices such as cardio monitors, respirators and oxygen monitors. These machines require a highly skilled nurse in computer technology. French (1993) supported this by highlighting medical areas in which computer technology is used. These include, diagnosis of diseases and conditions, monitoring patient conditions and recording children's immunizations.

According to Sellu (1994) computers have been in use since the 1960s and have greatly improved medical application. He cited the following areas of computer application in medicine, clinical data analysis mainly auditing in research and patient management, decision making and patient diagnosis. This was supported by De Doubal et al (1972) in Sellu (ibid) who pointed out that the computer has been shown to be consistently more accurate than even the most experienced clinician. This is critical in monitoring patient's biological signals such as electrocardiogram. The computer is programmed to collate analyse and record the signals as shown in this scanning process. The signals are stored for future analysis to establish any complications which could arise during the delivery process. Computers can scan and enable parents to approximate the delivery date.

Nurse using a computer to
examine a pregnant mother

There are many computer programmes which nurses can use in their day to
day duties. French (1993) suggests the following computer programmes
that are useful to nurses
-Word processing (Microsoft Word)for typing and printing documents and
patient reports
-Graphics for publications, lectures and displaying clinical data
-Spreadsheets for graphs
-Statistical Packages for Social Sciences, SPSS, SAS and Minitab
-E-mail for learning and communication
-Internet for access to current information about disease management and
nursing issues
-Power point for lectures and group presentations
This was supported by Quinn (2000) who added that computer assisted
learning (CAL) and video conferencing for nurse education and circuit
television for theatre and intensive care unit are ideal.

Nurses in America, Britain and Canada use computers to enter patient data,
check nursing and medical orders and to order services for the department.
In these countries, several interest groups for computer use in nursing have
been established. Many nurses have home computers and some nursing
programmes have effective courses for computer literacy and application.
In Britain computers in hospitals are used as means of communication
between care givers (Kennorthey Snwoley and Cilling (1994), Quinn
2000).
Computers can be used in documenting nursing care plans to reduce time
spent and help in accuracy. Springhouse Corporation (1996) highlighted
that speech recognition systems (SRS) which are critical for patients
affected by diseases like sore throat, reduce diagnostic time and free nurses
from paper work. Kenworth Snowley and Cilling, (1999) added that

computers are also useful in research for storage of information, literature review, data analysis and sampling. Awake (November 2008) identified new computer technology being used in Britain such as the computerised robot which dispenses drugs in pharmacy and controls surgical operations.

Global Studies on Computer Literacy Levels

In America a survey by the International Council of Nurses (2006) undergraduate student nurses reported that, on admission the nurses were less experienced in database, spreadsheets, word processing and graphics but were better in e-mail and worldwide web. On graduation students showed competence in all areas. The implication was that nursing education programmes can provide beginning nurses with computer literacy skills needed to effectively and efficiently work in the technology rich health care system.

In Taiwan and South Korea the International Council of Nurses (2007) conducted a survey to examine the levels of computer literacy among nurses and to establish variables influencing computer literacy. The findings revealed that most nurses were computer literate and personal motivation, innovativeness, computer education and age influenced the level of computer literacy

The Nurses Council of Taiwan (2006) conducted another survey to establish basic computer competence among nurses. A questionnaire was e-mailed to 329 practising nurses. Findings showed that Microsoft word was frequently used and most nurses were competent in the area. Nurses had little or no knowledge of power point. What is clear so far is that computer literacy levels among nurses is an important issue that can be determined by use of surveys.

Factors which contribute to computer competence included the number of hours spent on line at home, weekly amount of time online at work and weekly frequency of computer use at work, previous computer training, job position, level of education and age. One can conclude that, exposure plays a role in the development of computer literacy skills.

For developing countries the International Council of Nurses (2006) conducted a survey in Greece and the findings from a sample of 100 nurses were as follows; (32.6%) used computers, (67.4%) could not use a computer, (75%) had never used a computer, (25%) had never come across a computer

The most common programmes used by computer literate nurses were e-mail, database applications and library on line. The sample mean age was 40.5 years which points at age as an influencing factor. Younger nurses used computers more than older nurses.

At home in Zimbabwe, there is limited literature on levels of computer literacy among nurses. Related literature is found in other areas such as education. In a study on students' perception of information technology and projection for future use in science education, Zezekwa and Mudavanhu (2008) discovered that of the 350 randomly selected students at Bindura University of Science Education most of them needed to be taught how to use a computer first.

Another survey by Zengeya (2008) of Bachelor of Education degree students at University of Zimbabwe revealed that student teachers were generally from rural areas and had no or very little experience with computers. The majority were using the computer for the first time.

Literature showed that surveys were the commonly used research design. Samples used were randomly selected and the questionnaire was the instrument chosen as the population comprised of literate professionals. The findings indicated that in developed countries nurses are well ahead in computer literacy. Findings in Greece revealed that developing countries still have a long way to go in terms of computer literacy among nurse. In Zimbabwe no literature is available about nurses' levels of computer literacy.

RESEARCH METHODOLOGY

Research Design
This study was influenced by literature findings to use a descriptive survey research design. According to Colleman and Brigs (1998) surveys collect information from people's minds using a set of questions in a predetermined sequence on a structured questionnaire to a sample of individuals drawn to be representatives of a defined population. A descriptive survey is a way of extracting ideas, feelings, attitudes and views from people by asking questions. In this study the major aim is to describe the levels of computer literacy among nurses. The descriptive survey is considered ideal for the study which seeks to explore the levels of computer literacy among health personnel. Another benefit of descriptive surveys is that they use several data collection methods to facilitate the validation of findings.

The questionnaire was ideal for this study because the sample comprised of literate health personnel, individual information was required and information was collected simultaneously. Respondents had time to think about their responses before writing them which enhanced the reliability of findings. Each nurse responded to the same question, worded in exactly the same way to facilitate comparison of responses.

Population and Sampling

According to Sidhu (1984), a population is the aggregate or totality of individuals possessing the variable of interest. This study is interested in the levels of computer literacy among nurses, hence all 8 tutors and 135 nurses at Chinhoyi provincial hospital constituted the study population. Since the sampling frame is known, probability sampling was appropriate. Computer literacy was considered to be uniformly distributed within tutors' level and varied between nurses and tutors hence the population was stratified in terms of the variable.

In this study a census of tutors and simple random sampling method was used to select nurses. Sidhu (1984) defines simple random sampling method as a strategy in which every member of the population has essentially the same probability of being selected. In this study a sample of 30 participants composed of all the 8 tutors and 22 nurses was raised by matching computer generated random numbers to a nurse's last two digits on the nurse's employee number. A repeated number was ignored. The sample size 30 was considered large enough for variables to be normally distributed. Sampling saved resources and time. The researchers were comforted by the fact that, findings from a statistically large random sample can be generalised to similar contexts.

Data Collection

Data collection was initiated by seeking permission from the medical superintendent. Researchers carried out a pilot study on fellow Bachelor of Science Nursing Education students in order to test the instrument and language suitability. The findings enabled the researcher to restructure questions 5 and 7 on the questionnaire. Questionnaires were hand delivered to respondents and the return rate was 100% as the researcher collected the completed forms.

Data Analysis

Questionnaires were examined and screened for completeness and accuracy. Data was then transferred to worksheet to form categories of findings. Descriptive statistics were used to summarise and compare,

provide visual images and to interpret findings using tables and graphs. For inferential statistics a Chi-Square test at 5% level of significance was used to confirm association between computer literacy levels and gender.

Findings and Discussions

The study intended to explore the levels of computer literacy among nurses at Chinhoyi Hospital. The target population was composed of 8 tutors and 135 nurses. Findings presented here are derived from 30 respondents who returned questionnaires.

Table 1, Participants' distribution by Age   N = 30

Gender	Age range					Total
	(20-25)yrs	(26-30)yrs	(31-35)yrs	(36-40)yrs	Over 40 yrs	
Male	4	2	0	5	1	12
Female	8	6	2	0	2	18
Total	12	8	2	5	3	30

The table shows that the majority (60%) of the respondents are females and that 12 of the respondents are in the (20-25) years age group. Findings may be greatly influenced by dominance of the female voice due to their being in the majority. The distribution of (60%) women may be due to the fact that nursing is still viewed as a profession for women. The age range can be accounted for by the fact that many health institutions are faced by staff exodus where the senior and older nurses are leaving the system.

Table 2, Respondents distribution by years of experience   N=30

	(0-5) years	(6-10)years	(11-15)years	16years	Total
Male	6	1	3	2	12
Female	13	3	1	1	18
Total	19	4	4	3	30

The table shows a positively skewed experience distribution in years. The majority of them (63%) are young with less than 5 years experience in nursing. According to the International Council of Nurses (2006), these formed the group competent in Microsoft Word. The group's limited experience could deprived this study of practical situations in which computers can be applied. Their being young may have limited their influence on others on the need for being computer literate.

Table 6, Analysis of computer programmes respondents are familiar with   N = 30

Programme	Frequency
Microsoft Word	11 (37%)
Microsoft Excel	5 (17%)
Database	3 (10%)
Spreadsheets	2 (7%)
Graphics	0 (0%)
PowerPoint	3 (10%)
Desktop	2 (7%)
E-mail	5 (17%)
Internet	8 (27%)
Statistical programmes	0 (0%)

Microsoft word is the programme most nurses (68%) are familiar with. Findings slightly deviates from those of a survey in Taiwan which indicated that most nurses were familiar with Microsoft Word but had little or no knowledge in power point. Findings tally well with those of Greece. This concurrence can be attributed to the level of technology development of Greece and Zimbabwe. The two are in the third world. One can also infer that the utility value of Microsoft word in day to day activities contributes to its popularity among nurses in Zimbabwe.

Table 7, Analysis of Computer Literacy by gender   N=30

Gender	Computer Literate	Not computer literate	Total
Male	6	6	12
Female	10	8	18
Total	16	14	30

Findings reveal that (55.3%) of the respondents are computer literate and of these (62.5%) are female. By reflexion (46.7%) of the respondents are not computer literate. The inequality could be a result of the nursing profession being dominated by females.

Hypothesis testing

Data for the hypothesis was presented in table 8:
Ho: Computer literacy level is not associated with gender
H_1: Computer literacy level is associated with gender

Table 8, Chi-Square Observed and Expected Frequency is in brackets N = 0

Gender	Computer literate	Not Computer literate	Total
Male	6(6.4)	6(5.6)	12
Female	10(9.6)	8(8.4)	18
Total	16	14	30

At 5% level of significance, one degree of freedom, the critical value is 3.84, while the calculated value is 0.022. Since X^2crit > X^2calc the Null hypothesis was not rejected. Researchers concluded that computer literacy among nurses is not associated with gender at 5% level of significance. Any likely variations are due to chance factors.

Computer literacy distribution by Age
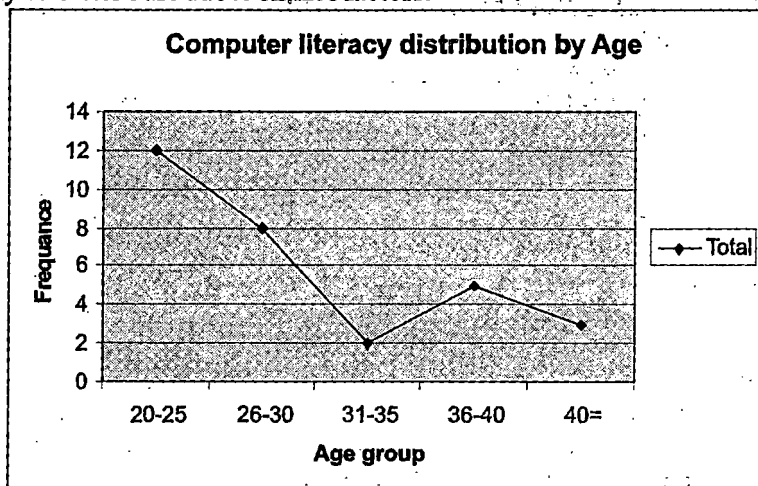
The distribution shows that the majority (66.6%) of nurses who are computer literate are in the (20 to 25) years age group. The trend shows that computer literacy decrease with age. These results support a study done in Taiwan which showed that nurses' age influenced the level of computer literacy.

Table 10, Mode of computer literacy acquisition   N=16

	Informal	Secondary school	College	Workshop	On–Job Training	Total
Male	3	0	3	1	1	8
Female	1	3	4	0	0	8
Total	4	3	7	1	1	16

The findings indicate that computer literacy was acquired mostly outside the nursing profession. One respondent acquired computer literacy through on the job training from a None Governmental Organisation (NGO). Another respondent acquired computer literacy from a training workshop in South Africa during an International Conference for nurses. These findings also reveal that in Zimbabwe there are no basic computer training courses for nurses.

The omission of nurse computer training in Zimbabwe is supported by findings of a survey of undergraduate student nurses in America, which

indicated that nursing programmes do not provide beginning nurses with tools needed to effectively and efficiently work in a technology rich health system.

Respondents cited the following as contributing to their learning computer application

- Self motivation and interest
- Part of school syllabus at secondary school which does not include computers
- Interest in office work before joining nursing
- Need to use the internet
- To present country's report at a workshop
- Nature of the job required computer knowledge

Table11, Respondents views on improving computer literacy   N = 30

View	Frequency
Should be part of the curriculum	17 (56.7%)
On job training for those nurses already in the system	14(46.7%)
Use of computers in the wards	7(23.3%)
Workshops training	4(13.3%)
Computer literacy as an entry requirement for beginning nurse	2(6.6%)

Findings show that (56.7%) of the respondents were of the view that computer application should be part of the general nurses syllabus. (46.7%) felt it was necessary to have on job training for those already in the system. The results indicate that nurses in Zimbabwe feel left out where computer technology is concerned.

Conclusion

Basing on the findings, the following conclusions were drawn

- The level of computer literacy among nurses at Chinhoyi Hospital is low only (53%) can use one out of ten computer programmes.
- The departments in which the majority (97%) of the nurses work have no computers
- Nurses who are computer literate acquired the knowledge and skills outside the nursing profession
- Microsoft word and the internet are the most popular programmes that nurses are familiar with, this could be accounted for by the programmes' utility value.
- Nurses are of the view that computer application should be part of the Registered General Nurse Diploma curriculum.
- Computer literacy is not associated with gender.

Recommendations

The study recommends that:

1. Schools of nursing charge an extra $ 20, 00 per term per student towards raising money to buy computers.
2. Computer courses can be introduced for qualified nurses during evenings to develop their skills and confidence in computer instruction.
3. Courses in computer application can be introduced in the state registered nurses curriculum for all students
4. Tutors can ask students to submit computer typed assignments to compel students to use computers and increase computer courses utility value
5. Nurses can take personal initiatives to upgrade their computer literacy levels by joining short-courses offered by World links in Chinhoyi or University of Zimbabwe.
6. Chinhoyi Hospital can provide on- job- training for its tutors, senior nurses ward managers, Senior Nurse Officers on computer application.
7. Nurses Council and Zimbabwe Nurses Association to advocate for computer training for all nurses in the country.
8. Chinhoyi Hospital should acquire computers for each ward or department for use by nurses monitoring patients.
9. There is need for a nation wide survey on the levels of computer literacy among nurses and their computer training needs.

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