

## **Evaluating Information Technology Application on Nursing**

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### **Abstract**

This paper tackles the attitude of nursing staff towards the use of computers in hospitals especially in matters of documenting patients' records, and surgeries by Microsoft Access program which store data and other relevant information as information-bases set in tables and organized formulae, then displaying them in a way that facilitates access to data, storage of data and retrieve of data. Besides, this paper has designed a questionnaire consisting of question items regarding the attitudes of nurses made up of a sample of secondary school, health institutes and university graduates who currently practise or work at four hospitals in Nineveh district.

Their answers have been statistically analyzed by Microsoft Excel according to their qualifications.

Results confirmed hypothesis regarding the positive response to the use of computers since they reduce the paper work bulk, let alone the usefulness of computers as a clinical and administrative tool that is highly efficient in organizing nursing processes .However, the secondary school graduates do not find computers useful for their work.

## **Introduction**

Computerized clinical documentation systems provide for the documentation of patient care using computers. for example, The records the vital signs directly from the cardio –respiratory monitors. while other documentation, such as nursing assessments are entered by the clinician[6]. Nursing documentation is one important part of clinical documentation [1,2,4].A through nursing documentation is precondition for good patient care and for efficient communication and cooperation with in the health care professional team [4]. The nature of health care information is such that a massive volume of data must be collected in order to diagnose, manage treatment and provide evidence of care delivered. The potential of information technology in supporting the management of patient related data is well-established. Advances in information technology offer nurses an efficient way of organizing, storing, retrieving and communicating nursing information regarding patient care [11]. Computers influence now every sphere of human activity and bring many changes in education, healthcare and scientific research etc. Computers can perform a wide range of activities that save time and help nurses to provide quality nursing care. Nurses need to be aware of the forces having an impact on nursing computerization could resolve certain problems and derive benefits including reduction in clerical work required of professionals, reduction in printed forms, centralized patients care data etc. A fast, accurate method of patients identification would give the nurse more time for the direct patient care . The nurse could use more time to develop the nurse-patient relationship and educate patients and relatives about medication and treatments etc. The computerization will improve the efficiency of health care [7].

Paper-based systems have been introduced to support nursing process documentation [2] . Frequently, however, problems ,such as low quality and limited acceptance of nursing process and high writing efforts are reported [2,3,4]. However, it is still unclear if computer-based documentation systems can reduce these problems [2,3,4]. Therefore, there have been some attempts and discussions on using computer-based documentation systems to support nursing documentation [2].

Nursing records is usually supported by the ability to define and use individual forms containing structured and unstructured information based on the information gathered in the records, a nursing care plan for an individual patient can then be created. to support this, Typical nursing problems, aims and tasks can be predefined and selected during creation of the care plan .Typical combinations of problems, aims and tasks can even be combined in predefined nursing care plans [3].

During care planning, these predefined items and standards can be selected and adapted to the patients individual needs by adding or removing certain items. this makes care planning much easier and more efficient than conventionally possible.

### **Aim of the Study:**

The aim of this research is to identify the nature and distribution of attitudes toward information technology or computer among nurses in Ninavah province.

To reduce documentation efforts, to increased documentation quality and to allow reuse of data for nursing management and nursing research . To present first result concerning prerequisites of computer based nursing process documentation system. The hypothesis of research to prove positive or negative response differences in answers of questionnaire in their qualifications.

### **Nurse's attitudes toward change and computers:**

Information systems are a powerful engine of change. managing the change process effectively, While implementing a new information system within the care environment, may facilitate development of quality patient care may determine whether a computerized clinical documentation system, decreased time spent charting and increased time spent in patients care. Incorporating the use of a computerized information system into everyday nursing staff practice, requires nurses not only to overcome any resistance to change, but also to become willing users and creative operators of information technology. Paper-based is often criticized as time- consuming , of low quality, and as an insufficient support of nursing care [1,4]. Some nurses may feel that the change is challenging and exciting, presenting an opportunity for growth. Others may have an opposite reaction to change, viewing the situation as threatening and disrupting. Nurses often resist technological change because of concerns about intrusions into the normal and routine way of performing activities. Barriers may be self-imposed to protect and preserve

convention rather than face a new and uncertain situation. Individual reactions to change occur for many different reasons. previous involvement in similar situations that were unsuccessful may cause nurses to react negatively to the proposed change. individual life skills, knowledge, and abilities have an impact on how nurses view change and whether they feel capable of handling the change. Levels of involvement in the organization and relationships with other individuals all have an effect on the process of change [5].

A computerized record system was designed by the community nursing services to strengthen the planning and evaluation of community nursing care. with this system, attempts were made to generate reports on identification and description of individual patients and patient population, use of agency resources by patients, identification of health and quality assurance indicators, financial information, analysis of case loads , activity levels, expenses, and time allocations, the system was also design to assist in the evaluation of patient care [8].

### **Documentation by computer:**

The use of computer systems for Documentation in health care agencies varies in scope depending on the agency of most health care agencies have in- corporated. Agency-wide computer information systems are more efficient in that information entered in the system can be automatically transferred to other areas.

Many agencies have incorporated software for Documentation of client care . Systems may include options for generating individualized care plans, automated kardex and acuity levels, as well as providing a mechanism for recording ongoing assessment data. Charting systems refered to as point-of-care systems often include prompts for you to input data that provide more accurate and complete records.

In addition, charting at the besides saves time and allows current information to be immediately available to all who need access to client information. Some systems automatically retrieve and record information from electronic device (vital signs) and place the information in more than one place on the record simultaneously, a voiding duplication of effort. legibility of information is an added benefit from computer provide an efficient method of documentation. there is increased concern for security of information in order to protect client rights.

Documentation on the client's computerized record requires the individual charting to have a log-in and password for entering the computer record system. it is imperative that this password not be shared with any one because any thing entered will be created to the person to whom the password or signature is assigned.

In addition should log off the computer before leaving the terminal in order to ensure that information about a client is not displayed on the monitor for others to view computer –generated print should also be protected sothat information about clients is not indiscriminately duplicated or distributed, most agencies using computer charting incorporate a system for logging and tracking computer print , charting procedures for computer records systems vary by agency [8].

A record cannot be updated by more than one person at a time . In addition , to access the system, One must logon using a unique password . Each use of the system is provided password .Once logged on, the system present a census list of patients from which the user can open any one chart at a time. Access time is almost instantaneous.[9].

## **Methodology**

### **Setting and subjects**

A short five item attitude questionnaire figure (1) which was designed by one of the author to act as the data collection tool , The questionnaire includes 5 statements relating to practical and professional issues, focusing on three key factors:

- 1 computer use and the provision of patient care .
- 2 computer use and the benefits to the organization (hospital).
- 3 computer use and the impact on the multi-disciplinary communication process.

nurses were asked to indicated their responses to five statements on a five point by marking whether they strongly agree, agree, don't know (neutral), disagree or strongly disagree with selected statements.

Additional questions concerning demographic variables were incorporated at the beginning of the questionnaire. This was intended to enable an analysis of the effect of nursing experience, qualification, on attitudes towards computers. Space was also provided for individual comments.

## **Procedure**

The electronic documentations consisted of a specially designed software package on a computer for beside use with structured decision trees for examination, obtaining a history , and coding . Technology is an integral part of the daily workflow for nurses, College- graduate, institute-graduate and preliminary-graduate nurses in Al Zahrawi teaching hospital

for surgery , Ibn Sina teaching hospital for medicine, Al-'am hospital and Bin Al-atheer hospital for pediatric and 60 sample were requested to answer questionnaire. While this study was located with in some hospitals all nursing qualifications, clinical locations and working ages were included. This rich mixture of subjects, details, all contribute to the general ability of the findings within the Ninveh province despite this, the limitation of the study to some hospitals may the general ability of the findings.

## Data Analysis

Data are coded and analyzed using statistical analysis procedure and system of Microsoft Excel [12,13]. Since the aim of this research is to identify the distribution of attitudes toward information technology, descriptive statistics were calculated. Chi- square tests were used to look for differences in attitudes between nursing qualifications .

Nursing qualification: preliminary, institute, college.

## Research Questions

Items	Strongly agree	agree	disagree	Strongly disagree	Don't know
Computer will reduce paper work.					
Information technology will improve multidisciplinary communication.					
Computer will record nurses workload accurately.					
Current practice of gathering patient information is efficient.					
Using computers in clinical areas will enable quick access to patient information.					

Figure(1) Questionnaire (Data collection Tool)

## Results

A total of 60 nurses were selected by random sampling from the list of staff nurses. The distribution qualifications is summarized in the table(1) below:

qualification	preliminary	institute	college	total
Number of staff	15	25	20	60
percentage	33.3%	41.7%	25%	100%

Table(1) Distribution of Qualifications

### 1- Computers Will Reduce Paper Work.

The paper chart didn't contain the information needed to complete the analysis in the majority of the cases . 50% of nurses believed that introduction of computers would reduce paperwork, 23.3% of nurses don't believe the introduction of computer will reduce the paperwork. furthermore, 26.7% are unsure whether the introduction will reduce the paperwork see table (2). Staff qualifications were re-coded such that preliminary, institute were re-classed as non-university with college as university. A chi-square test showed that there was significant difference in the responses of university and non-university nurses (chi-square=2.8687). Nurses who agree with this statement commented: "hope this will be the case. Too much paperwork at present." "paperwork has become very time consuming " "hopefully, thereby allowing increased patient contact time ".those who indicated that they disagreed with the statement commented:" I still feel that the same paperwork will have to be done for nurse" " I used to do paperwork , I don't think I can on computer better . " I don't know anything about computer".

summation	Don't know	Strongly disagree or disagree	Strongly agree or agree	qualifications
15	6	4	5	Preliminary
25	6	6	13	institute
20	5	3	12	college
60	17	13	30	

Table (2) Computers will reduce paper work

## 2- Information Technology Will Improve Multi-Disciplinary Communication.

The view that information technology will benefit the care environment where the clinical working practice relies on a collaborative, multidisciplinary interaction was agreed by 58.4% of nurses (see table 3 ). A chi-square test ( $\chi^2=10.0678$ ) again indicated that there was a significant difference in response between university and non-university graduates. As with the reduction of paperwork university graduate were more likely to strongly agree or strongly disagree. At the same time fewer university nurses responded with "don't know" .

summation	Don't know	Strongly disagree or disagree	Strongly agree or agree	qualifications
15	9	3	3	Preliminary
25	6	4	15	institute
20	4	2	14	college
60	19	9	32	

Table(3) information technology will improve multi-disciplinary communication

## 3- Computer Will Record Nurses'workload Accurately:

Computer-based nursing documentation systems allow for the storage of pre-defined problems, goals, tasks and care plans in order to support efficient nursing care planning. Recording of nurses' workload proved to be also controversial statement as can be seen table (4). 21.6% of nurses don't believe that computers will record their workload accurately. Furthermore 26.7% of nurses don't know whether computers will record workload accurately. A chi-square test ( $\chi^2=12.707$ ) again indicated that there was a significant difference in response between university and non-university graduates. The largest number of written comments was made in regard to this statement. These include agree "only if nurses use the system properly" " but only if the nurses know what he/ she is doing" "pending enough time available to do computer" (disagree): "nothing can do this unless it is hands on " "cannot record practical workload" "computers will be unable to record everything there is lots we do! One stated in intensive care unit "I always records ECG monitoring for physician to watch".



summation	Don't know	Strongly disagree or disagree	Strongly agree or agree	qualifications
15	8	4	3	Preliminary
25	7	2	16	institute
20	2	6	12	college
60	17	12	31	

Table (4) computer will record nurses'workload accurately:

#### 4- Current Practice of Gathering Patient Information is Efficient:

This statement relating to the efficiency of the manual process of gathering patient information provided a diverse range responses. 65% of all the nurses who completed the questionnaire disagreed or strongly disagreed with the statement indicating a belief that the computerized system may be more efficient in gathering information (see table 5). In contrast, however, 11.6% of nurses believed that current systems were efficient. A chi-square test ( $\chi^2=6.1065$ ) again indicated that there was a significant difference in response between university and non-university graduates. Comments include agree " too many people involved in care everyone appears to have their own ways". Comments include disagree " too much repetition of basic information i.e. patients asked for same information over &over".

summation	Don't know	Strongly disagree or disagree	Strongly agree or agree	qualifications
15	3	4	8	Preliminary
25	5	14	6	institute
20	7	8	5	college
60	15	26	19	

Table(5) Current Practice of Gathering Patient Information is Efficient

#### 5- Using Computers in Clinical Areas Will Enable Quick Access to Patient Information

Table (6) shows that 66.6% of nurses believe that computers will provide quick access to patient information .only 10% of nurses disagreed with the statement. An examination of university and non-university attitudes revealed that none of university disagreed that computers would provide quick access compared to 10% of university responsibility. A chi-

square test ( $\chi^2=10.5668$ ) again indicated that there was a significant difference in response between university and non-university graduates.

summation	Don't know	Strongly disagree or disagree	Strongly agree or agree	qualifications
15	3	7	5	Preliminary
25	5	7	13	institute
20	1	2	17	college
60	9	16	35	

Table (6) using computers in clinical areas will enable quick access to patient information

### Discussion

A chart (paper or computer) audit was performed to determine the difference in time between scheduled and actual medication delivery . To assess the speed of clinical decision-making [6]. we audited this study has generally found positive attitudes, among nurses, towards computers and their use in the clinical areas. A large majority of nurses believe that a computerized information systems improve multi-disciplinary communication and provide a tool to enable quick access to patients information .This finding is in agreement with British study [11], and Indian study [7] which found that nurses' computer related attitudes were generally positive but there was difference in proportion as the proportion for nurses who stated " don't know, disagree or strongly disagree" whether the computer use will reduce the paperwork ,improve multidisciplinary communication , enable quick access to patient information were higher, whereas, for who stated "strongly agree ,agree "were lower at present study . this result may be due to lack of computer knowledge among nursing staff because of what the educational foundations were living during oppressive blockade imposed on Iraqi people from shortage of computer systems, fewer contacts with abroad and no formal curriculum for computer was being studied in those foundations ,otherwise ,the cost of informal computer-training coursers was high, beside low member income.

The conviction which university nurses present, in regard to attitudes towards computers, is another interesting finding .university nurses have higher qualification, had received some training on computer at college and hope to be distinctive. this may impact on the way university nurses view the introduction of computers to their wards. the level of

conviction of attitude towards information technology held by these nurses means that they may prove to be a driving force behind the effective introduction of information technology in the clinical areas.

studies examining nurses'attitudes toward computers have shown conflicting results. for example, early studies indicated a correlation between positive attitudes toward computers and increased years of nursing experience. Study of nurse's attitudes toward computerization found that years of nursing experience and the education level of the nurse correlated with positive attitudes about computers nurses with more than 21 years of experience in healthcare had a more positive attitude toward computers than nurses who had worked in the field fewer than 10 years[see 5]. This study concluded that there were no significant differences in attitudes toward computers among nursing units, and that years of nursing experience were not a factor in determining negative or positive attitudes toward computers. clinical areas in which nurses worked also affected attitudes toward computers [see 5]. Every computerized clinical documentation systems chart contained all the necessary information .in addition, the audit of the paper chart required in excess of 40 hours to get a set of incomplete data, whereas the computerized clinical documentation systems audit required about 20 minutes [6]. Documentation with the handled computer increased the median number of diagnoses per patients, but it produced some over coding for false or redundant items. The preliminary data from this study suggest that hand computers may improve the quality of hospital charts in orthopedic surgery [10].

## **Conclusions**

From its beginning caring has incorporated the activities of collecting, managing, and processing information: nurses deliver and manage patient care through continuous communication with patients, their families and other members of the multidisciplinary team. Nurses study the patient's records and add their observations and planned care to it. They monitor instruments that report patient's condition, perform tests and review the results of tests performed by others .Nurses not only use patients/clients data extensively but also obtain and record much of it. They have therefore a pivotal role in the success of any computerized information system. However, if nurses are to use information held on a computer, to influence care given, a cultural change is required and higher qualification nurses (university nurses). Positive attitudes, as found in this study, indicate initially willingness to using information systems, which may stem from the desire to benefit from the latest technology.

## Recommendations

- 1- Wide evaluation study include nursing process using computer-based documentation.
- 2- Encouraging all nurses to use computers, correct nurses misconception and resolve actual problems in educational foundations concerning curriculum and training on computer.
- 3- Increase the depth and width of nurses basic computer knowledge and skills, their understanding about computer applications and its impacts on the nursing profession.

## REFERENCES

1. Ammenenwerth. E., Eichstadter. R., kochenburger. L., Pohl. U., Rebel. S. , R,"systematic evaluation of a computer-based nursing documentation system", medical informatics , biostatistics and epidemiology for efficient health care and medical research contribution from 44<sup>th</sup> annual conference of the gmds, Heidelberg ,286-290,(1999),.
2. Ammenwerth. E.,Iller.C.,"Acceptance of information technology in a clinical environment-result of quantitative and qualitative analysis",Mansmann.U,European conference on information technology evaluation,15-16.7,(2002).
3. Ammenwerth. E., kutscha.U., kutscha.A., Mahler.C., Eichstadter. R., Haux. R.,"nursing process documentation systems in clinical routine-prerequisites and experiences",international journal of medicals informatics 187-200, 64(2001).
4. Ammenwerth. E.,Mansmann.U.,Iller.C., Eichstadter. R.,"Factors affecting and affected by user acceptance of computer-based nursing documentation: results of a tow-years study",journal of the American medical informatics association,10(1):69-84,(2003).
5. Marilyn,G.Bozak,R.,"using lewin's force field analysis in implementing a nursing information system", computers informatics nursing, vol. 21, no. 2 pp 80-85,(2003) .
6. Menke,J., Broner, C., Campbell, D. , Mckissick,M.and Beckett,J."computerized clinical documentation system in the peditic intensive care unit", BMC medical informatics and decision making,1:3 (2001) .
7. Raja, E.E.J., Mahal, R. and Masih,V.B.,"An exploratory study to assess the computer knowledge,attitude and skill among nurses in healyh care setting",computer in nursing ,18:197-206.(2001)

8. Saba, V. ,Levine, E."management information systems for public health nursing services", vol.93,no. 1, pp 79-83, January- February 1978.
9. Saunders,W.B.,"fundamentals of nursing caring and clinical judgment", harcourt health sciences company,(2000).
- 10.Stengel,D.,Bauwens,K.,Walter,M.Kopfer,T. and Ekkernkamp, A.,"comparison of handheld computer-assisted and conventional chart documentation of medical records", national library of medicine 86-a(3):553- 600,March(2004).
- 11.William, B.,Levy,S.,"Attitude to information technology",nursing on line,13(52):151-170,(1999).

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.(1999) 191

-13

. (2004) 227