

Educational Needs Regarding Nursing Informatics and its Relation to Quality of Care as Perceived by Nurses

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Abstract

Background: In both nursing practise and education, nursing informatics is crucial. In order to increase the quality of care, it is important to focus on the educational needs of nurses in relation to nursing informatics.. **Aim:** Assess educational needs regarding nursing informatics and its relation to quality of care as perceived by nurses. **Design:** A descriptive correlational research design was used. **Setting:** Critical care units at Benha University Hospital. **Subjects:** Convenience sample included (418) nurses who had previously worked.. **Tools of data collection:** Two tools were utilized. I) Nursing informatics educational needs questionnaire. II) Quality of care questionnaire. **Results:** the highest educational needs regarding nursing informatics was related nursing skills (74.9%), followed by computer skills (72.7%), then information technology skills (69.1%) . Also (46.7%) of nurses perceived that educational needs of nursing informatics was high. About half of nurses reported that level of quality of care was high. **Conclusion:** There was negative statistically insignificant correlation between educational needs and quality of care. **Recommendations:** Hospital administrators need to conduct inservice training, workshops, seminar to increase awareness, gain support and engagement of nurses about nursing informatics.

Keywords: Educational needs, Nurses, Nursing informatics, Quality of care.

1. Introduction

Health information technology has made it possible for nurses to give care in a more vivid and scientifically sound manner while reducing the likelihood of error through the use of barcoding medication administration systems. Using electronic health records has made it simple for nurses to gather, evaluate, and safely retain data. Telehealth technologies have made it simple for nurses to communicate with their patients. [1]

An essential resource in the information-intensive field of healthcare is reliable, current information. The methods to obtain the information are provided by computer-driven technologies. Potential advantages of using computers and information technology in the healthcare sector include greater efficiency and communication, as would be expected in any other sector. The national policies for electronic health records are a driving force behind the adoption of relevant technologies to assist health delivery. [2]

In order to store and share data, information, and knowledge to help patients, nurses, and other providers in the decision-making process across all roles and contexts, nursing informatics merges nursing science, computer science, and information science. Another word for these technologies that help nurses manage patient care and health care more effectively and efficiently while also increasing nurse accountability is nursing informatics. [3]

Since nurses make up the majority of the workforce and are the biggest consumers of nursing informatics in healthcare, simply giving them access to nursing informatics is insufficient; they also need to have the necessary skills or abilities. In order to embrace technological changes, to be open-minded to learn new skills, and to keep up with the latest developments, nurses must provide accessible and

relevant education and training in nursing informatics. These skills include computer skills, information technology skills, and nursing skills. [4]

Nurses must possess fundamental software tools and user-level computer abilities. Within the latter, nurses must efficiently and appropriately search for, recognize, and apply information. A nurse's educational needs for computer skills should be evaluated because basic computer abilities in nursing informatics include Microsoft Word, such as creating new documents in Word, saving files in Word, and utilizing word processors, as well as basic Microsoft Excel. [5]

By boosting patient safety and information accessibility, nursing informatics has raised the standard of care. It has improved nurses' abilities to evaluate a patient's general wellbeing and supported nurses in making decisions. It has enhanced disease surveillance and boosted adherence to care recommendations. It has decreased medication errors and made it possible for nursing staff and patients to communicate effectively. [6]

The possibility that intended health outcomes will occur as a result of individual and population health interventions is referred to as quality of care. The iron triangle of healthcare—the links between the calibre, expense, and accessibility to healthcare within a community—plays a significant role in describing the quality of care. Analyze the quality of medical care to spot issues brought on by the excessive, inefficient, or improper use of medical resources [7]

structure, procedure, and outcome are a chain of three components that are frequently used to indicate aspects of care quality. These elements reflect three different forms of data that can be gathered to make deductions about the structure, method, and result of care quality in a specific system. [8]

Significance of the study

Nursing informatics continue to grow as nursing incorporates expanded roles and new technology into practice of nursing informatics necessary to prepare practical nurses to deal with selecting, developing, implementing and interpreting data as usable knowledge and information based on technology informatics. [9]

Nurses at intensive care units should have the ability, responsibility and authority in carrying out nursing care with high quality at various level in nursing services, so providing hospitals with competent nurses who had adequate informatics skills to ensure practice of quality and safe patient care, stressing the importance of informatics in the advancing nursing career development. Increasing implementation of information technology in healthcare settings as it will promote quality, safety and evidence-based nursing care and a growing emphasis on the importance of nursing informatics competencies has emerged [10]

Nurses in critical care units not have enough time for paper registration as a result of the excessive work in the units due to the nature of critical care patients. There for its better to introduce a nursing informatics system which begins with identifying educational needs regarding nursing

2. Aim of the study:

This study aims to assess educational needs regarding nursing informatics and its relation to quality of care as perceived by nurses.

3. Subjects and Method

Research design:

A descriptive correlational research design was used to carry out this study.

Study setting:

At Benha University Hospital, eleven critical care unit including the emergency room, intensive care unit, cardiothoracic intensive care, stroke intensive care unit, cardiac catheterization care unit, coronary care unit, chest intensive care unit, neonatal intensive care unit, pediatric intensive care unit, intermediate care unit, and liver intensive care unit were used for the current study.

Subjects:

The convenience sample was made up of (418) nurses who agreed to participate in the study and were working in critical care units at the time of the study.

Tools of data collection

Data was collected by using the following two tools:

I- Nursing informatics educational needs questionnaire.

It was developed by the investigator based on the literature [11] [12] [13] to assess educational needs of nursing informatics as perceived by nurses. It consisted of two parts:

Part I: Personal traits of the nurses were listed (unit, age, gender, marital status, educational qualification,

years of experience and training courses about nursing informatics).

Part II: Educational needs regarding degree of importance and needs of nursing informatics as perceived by nurses. It consisted of 19 items divided into 3 domains. Computer skills (7) items, information technology skills (7) items and nursing skills (5) items.

Scoring system

Nurses responses regard degree of importance and needs regard educational needs of nursing informatics was measured by using three point likert scale ranged from important (2) to not important (0), while the nurses responses regard degree of needs of nursing informatics was measured by using three point likert scale ranged from needed (2) to not needed (0). Total scores of importance and needs was (38) where summed up and converted into percent that reflect levels of importance and needs regard educational needs of nursing informatics. Levels in importance and needs was high level when total score was >75% (>28-38), levels in importance and needs was moderate level when total score was 60%-75 (22-28) and levels in importance and needs was low level when total score < 60% (<22) [13].

II- Quality of care questionnaire.

It was developed by investigator based on related literature [14] [15] [16] [17] to asses quality of care as perceived by nurses. It consisted of (34) items divided into three domains; Structure quality of care (15item) divided into sub items rules and regulation (4) items, work environment (3) items, physical and financial resource (5)items and human resource (3) items, process quality of care (10) items and outcome quality of care (9) items.

Scoring system:

Each statement response was measured on three point likert scale that ranged from (2) agree to (0) disagree. Total scores of quality of care was (68) and each dimension summed up and converted into percent scores. Level of quality of care was high if the percent score was >75% (>51-68), level of quality of care was moderate if the percent score was located between 60%-75% (41-51), while level of quality of care was low if the percent score < 60% (<41) [17].

Administrative design:

An official permission was obtained from the Dean of Faculty of Nursing, Benha University to the \ director of Benha University Hospital to conduct the study and seek their support. The investigator met the head nurse of each unit to determine suitable time to collect data from her nurses.

Preparation phase

This phase started from February 2022 to June, 2022 covering five months included the following:- using journals, publications, periodicals, textbooks, the internet, and theoretical understanding of the numerous components relating to the study's issue to

review the national and international related literature.

-Creating and translating data gathering tools, a questionnaire on the quality of care and nursing informatics educational needs.

-Five nursing administration professionals from the jury panel—three assistant professors of nursing administration from Benha University and two professors of nursing administration from Menoufyia University were shown the tools.

-Modifications were made in response to jury feedback, such as changing a few words to clarify a term that the jury had difficulty understanding.

Pilot study

In July 2022, a pilot study was conducted on 41 nurses to gauge the time required to complete the surveys. The nursing informatics educational needs questionnaire takes between 10 and 15 minutes and the quality of care questionnaires take between 8 and 10 minutes. A pilot was included to the primary study subjects without change being necessary.

Reliability of the tool:

Cranach's Alpha was used to measure it, and the results for the questionnaire on nursing informatics educational needs and the questionnaire on quality of care were (0.824) and (0.804), respectively.

Field work

Data were gathered three days a week in the investigator's presence to avoid any misunderstanding. 16–18 sheets were typically collected per day on average. Each nurse was given a questionnaire sheet to complete during work hours that had been predetermined with the chief nurse of each unit based on workload.

Ethical consideration

Before the study began, the nurses were informed of its goals and advantages. They were also made aware that participation was entirely voluntary and that they had the right to resign from the study at any time, for any reason. Each study participant provided their informed consent. Additionally, by the coding of all data, the subjects' confidentiality and anonymity were guaranteed.

Statistical design:

- Using an IBM personal computer running the statistical package of social science (SPSS) version 21, the data were gathered, tabulated, and statistically analyzed

-Data that is statistically descriptive and contains the mean, SD, frequency, quantitative information, and distribution of percentages.

-The association between two qualitative variables was examined using the correlation coefficient (r).

-The chi-square test was used to look for associations (between two qualitative variables).

-The p -value test was one of the statistical tests that was employed. It was determined whether a p -value was significant when it was 0.05 or less, very significant when it was 0.001 or less, non-significant

when it was 0.05 or more..001, and non-significance when it was >0.05 .

4. Results

Table (1): Indicates that less than half of nurses (47.1%) were in the age group <30 years with mean \pm SD (32.44 \pm 6.84) years. As regarding their gender, (59.3%) of them were females. As regarding their marital status the majority (81.3%) was married and educational level (38.5%) of them were had associated degree of nursing. As regarding years of experience, more than one third (35.4%) of them from fifteen years of experience with mean \pm SD (10.81 \pm 7.61) years. finally, the majority (83.0%) of them didn't attends training courses about nursing informatics.

Figure (1): Displays that (51.2%) of nurses perceived that importance of educational needs regarding nursing informatics was moderate . Also (46.7%) of nurses perceived that educational needs of nursing informatics was high.

Table (2) : Shows that total mean and standard deviation of importance of educational needs regarding nursing informatics was (23.82 \pm 5.41) that represent 62.7% of total score and the highest percentage(67.4%) was related to educational needs regard nursing skills followed by (65.4%) educational needs regard information technology skills and (56.6%) educational needs regard computer skills. Also the table showed that total mean and standard deviation of educational needs regarding nursing informatics was (25.90 \pm 5.31) that represent 74.0% of total score and the highest percentage (74.9%) was related to educational needs regard nursing skills followed by (72.7%) educational needs regard computer skills and (69.1%) educational needs regard information technology skills.

Figure (2): Displays that about half (50.2%) of nurses perceived that quality of care was high.

Table (3): Shows that mean and standard deviation of total quality of care was (49.46 \pm 7.26) that represent 88.3% of total score. The mean and standard deviation of structure quality of care was (23.13 \pm 2.92) that represent 77.1% of total score, mean and standard deviation of outcome quality of care was (12.73 \pm 2.35) that represent 63.7% of total score and finally mean and standard deviation of process quality of care was (13.59 \pm 2.87) that represent 45.3% of total score. Regarding ranking of quality of care, the highest percentage (77.1%) was related to structure quality of care followed by (63.7%) of outcome quality of care and (45.3%) of Process quality of care as perceived by nurses.

Table (4): Indicates that there was negative statistically insignificant correlation between total needs of educational needs and total quality of care as perceived by nurses, and there was no statistically significant correlation between total importance of educational needs and total quality of care among nurses. There was highly statistically significant

correlation between total needs and importance of educational needs as perceived by nurses.

Table (1) Frequency distribution of nurses regarding their personal characteristics (n=41).

Personal Characteristics	No	%
Age/years		
<30	197	47.1
30 <40	149	35.6
≥40	72	17.3
Min –Max	23-48	
$\bar{x} \pm SD$	32.44±6.84	
Gender		
Male	170	40.7
Female	248	59.3
Marital status		
Married	340	81.3
Unmarried	78	18.7
Educational qualification		
Diploma of Nursing	71	17.0
Associated degree of Nursing	186	38.5
Bachelor of Nursing	125	29.9
Master degree of Nursing	41	9.8
Doctorate of Nursing	20	4.8
Years of Experience		
<5	146	34.9
5<10	57	13.6
10<15	67	16.0
≥15	148	35.5
Min –Max	1-23	
$\bar{x} \pm SD$	10.81±7.61	
Training courses about nursing informatics		
Yes	71	17.0
No	347	83.0

Fig.

(1)

Educational needs regarding degree of importance and needs of nursing informatics as perceived by nurses.

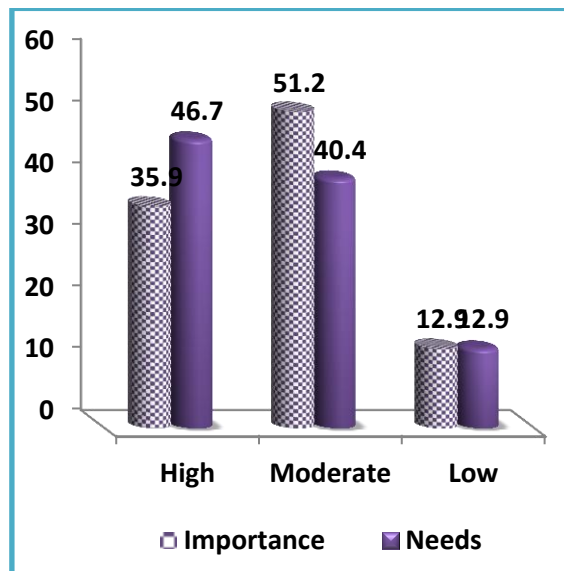


Table (2) Mean and Standard Deviation educational needs regarding nursing informatics as perceived by nurses

Educational Needs	Importance of educational needs				Educational needs			
	Max Score	$\bar{x} \pm SD$	Mean%	Ranking	Max Score	Mean %	Ranking	
computer skills	14.00	7.93 ±2.50	56.6	3	12.00	8.72 ±2.20	72.7	2
information technology skills	14.00	9.15 ±2.61	65.4	2	14.00	9.68 ±2.74	69.1	3
nursing skills	10.00	6.74 ±1.63	67.4	1	10.00	7.49 ±1.74	74.9	1
Total	38.00	23.82 ±5.41		62.7	35.00	25.90 ±5.31		74.0

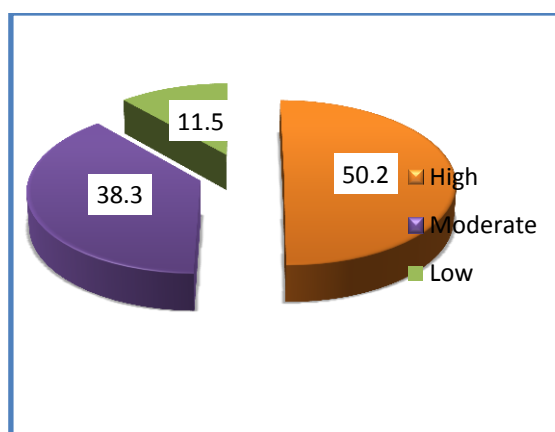


Fig. (2) Quality of care as perceived by nurses.

Table (3) Mean and Standard Deviation of quality of care as perceived by nurses

quality of care	Max score	$\bar{x} \pm SD$	Mean %	Ranking
Structure quality of care	30.00	23.13±2.92	77.1	1
Process quality of care	30.00	13.59±2.87	45.3	3
Outcome quality of care	20.00	12.73±2.35	63.7	2
Total quality of care	56.00	49.46±7.26		88.3

Table (4) Correlation matrix between importance and needs of educational needs and quality of care

Variables		Total importance	Total needs	Total quality of care
Total importance	r	1	0.958	0.029
	p-value	—	0.000**	0.559
Total needs	r	0.958	1	0.058
	p-value	0.000**	—	0.236
Total quality of care	r	0.029	- 0.058	1
	p-value	0.559	0.236	—

Discussion

The potential for using information systems in various disciplines, including nursing, is growing throughout the world in order to raise the caliber of nursing services. The majority of people who are close to patients are nurses, and they frequently use information technology at work. The engagement of informatics has improved the standard of patient care

in hospitals, hence nurses must be involved in informatics to further improve care. [18]

The study's objective was to evaluate the educational needs of nurses in nursing informatics and their relationship to perceived quality of care by nurses

Concerning personal characteristic of studied nurses the current study revealed that less than half

of nurses were in the age group <30years. As regarding their gender, more than half of them were females. As regarding their marital status the majority was married and more than one third of them were had associated degree of nursing. As regarding years of experience, more than one third of them from fifteen years of experience years. finally, the majority of nurses didn't attend training courses about nursing informatics.

The finding of the current study revealed that more than half of nurses perceived that importance of educational needs regarding nursing informatics was moderate and less than half of nurses perceived that educational needs of nursing informatics was high. From investigator point of view there are several informatics devices in critical care units such as automated IV pumps and portable monitor and so on electronic record will be used which keeping patients have more accessibility to data, saving time and decrease human mistakes and errors.

The current study findings was supported with [19] who conducted study about "Perceptions of Information Technology in Nursing Education" they found that educational needs regarding of information technology was moderate. Also this study findings was agreed with [20], who conducted study about "Competencies and needs of nurse educators and clinical mentors for teaching in the health information system" found that importance of the health information was moderate.

The current study findings was agreed with [21] who conducted study about "Technological literacy in nursing education" pointed out that needs of nursing informatics was high. Also this study supported with [22] who conducted study about "Competency in Nursing Informatics of Health Educators" found that needs of nursing informatics was high.

The findings regarding the mean and standard deviation of educational needs for nursing informatics showed that less than two third of the total score and the highest percentage of educational needs were related to nursing skills, followed by two thirds of educational needs that were related to information technology skills, and more than half of educational needs were related to nursing. From investigator point of view nursing skills more importance than others to provide nursing care to patients. Information technology important for security of information and finally computer skills important for documentation and storage of data.

The current study findings was in similarity with [23] who conducted study about "The Importance of Training In Healthcare Technology" found that mean score of importance of healthcare Technology was nearly to three quarters of total score. Also this result of current study findings was supported with [24] who conducted study about "Investigating Students' Perceptions of Health Informatics

Education: What Action Needs to Be Taken? "found that needs of nursing informatics was more high.

Also mean score of educational needs regarding nursing informatics was represented that more than two third of total score, the highest percentage was related to educational needs regard nursing skills followed by educational needs regard computer skills and educational needs regard information technology skills. From investigator point of view nursing skills needed to develop deeper understanding of skills to pursue career in health informatics, computer skills needed to write nurses notes and retrieve various types of information and information technology needed for information assurance that protect information systems by ensuring confidentiality and integrity.

These result of this study was agreed with [25], who conducted study about "Designing a national model for assessment of nursing informatics competency" found that the highest domain of nursing informatics competency was related to nursing skills, then information technology skills and finally computer skills. These result of this study was disagreed with [26], who conducted study about "Perceived Informatics Competencies among Nurses" found that highest nursing informatics competency needs was related to computer skills competency, nursing skills competency and technology skills competency..

Concerning quality of care as perceived by nurses the current study represented that about half of nurses perceived that quality of care was high. From investigator point of view quality of care improve productivity and efficiency so nurses committee with strategies that necessary in quality such as setting standards of the output according to patients needs and putting in place the optimal input systems..

This finding was in the same line with [27], who conducted study about "Burnout and its relationship to self-reported quality of patient care and adverse events during covid" stated that two thirds of nurses reported that level of quality of care was high.

Also this finding supported with [29] who conducted study about "Professional quality of care and caring behaviors among clinical nurses during the COVID-19 pandemic" stated that less than one quarter of nurses stated that level of quality of care was high .

Concerning mean and standard deviation of quality of care as perceived by nurses the current study revealed that the highest domain of quality of care was structure quality of care that followed by outcome quality of care, Finally process quality of care. From investigator point of view these result may be explained as nurses commitment with the rules of work, feel harmony at work that lead to decrease errors and increased patient satisfaction so quality of care improved.

The current study finding was nearly similar with [30] who conducted study about "Personal protective

equipment in Covid-19: Evidence-based quality of care and analysis after one year of pandemic" found that the highest domain of quality of care was structure quality of then outcome quality of care and process quality of care.

Regarding correlation matrix between importance and needs of educational needs and quality of care, the current study illustrated that there was negative statistically significant correlation between needs of educational needs and quality of care, and there was no statistically significant correlation between importance of educational needs and quality of care among nurses. There was highly statistically significant correlation between needs and importance of educational needs among nurses.

The result of current study was agreed with [31], who conducted study about "Total quality management in education" found that was negative significant correlation between educational needs and quality management.

Also These result of present study was agreed to [32]who conducted study about "Adaptation of nursing skill training among undergraduate nursing students" found that there was significant correlation between nursing skill needs and importance of this needs.

Also these results of present study was agreed with. These findings are in line with those of a study by [33] who conducted study about "Career education needs of Korean nursing students and professionals" found that statistically significant correlation between needs and importance of educational needs.

These result of present study was disagreed with [34], who conducted study about "The support needs of Australian primary health care nurses during the COVID-19 pandemic" showed that there was statistically significant correlation between needs of primary health care and quality of care.

Conclusion

Based on the finding of the current study finding, it could be concluded that total level of educational needs was high as perceived by nurses, and the highest educational needs regarding nursing informatics was related nursing skills, followed by computer skills, then information technology skills. About half of nurses perceived that quality of care level was high. There was negative statistically insignificant correlation between educational needs and quality of care.

Recommendations

Based to the finding of the present study, it was recommended that:

- 1- Hospital administrators need to conduct inservice training, workshops, seminar to increase awareness, gain support and engagement of staff nurse about nursing informatics.
- 2-Hospital administrators need to support nurses to participate in scientific meetings to raise

awareness about their roles and responsibility in application of nursing informatics.

- 3-Nurses need to be self-motived to enhance and update their knowledge and skills about new trends in nursing care as nursing informatics.
- 4-Nursing skills program management is needed to be conducted periodically for all nurses specially who working in.
- 5-Develop and integrate nursing informatics undergraduate course specification design based on student educational needs
- 6-Nurses need to conduct electronic communication skills courses .
- 7-Effect of nursing informatics application on nurses performance.
- 8-Assess barriers of nursing informatics application within the health care settings and educational sectors.

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