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RESEARCH ARTICLE

EFFECTIVENESS AND EVALUATION OF ELECTRONIC NURSING DOCUMENTATION PROGRAMME IN TERMS OF NURSES PERCEPTION AND QUALITY OF NURSING DOCUMENTATION IN SELECTED HOSPITAL OF RAJASTHAN

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ABSTRACT

Nurses are the only frontline professionals of the healthcare team that spend maximum time at the patient bedside. As a part of the nursing process, nurses generate and record pertinent patient information which primarily forms the basis for the decisions made by the healthcare team. Continued commitment to maintaining nursing excellence and quality nursing documentation remains crucial. Quality nursing documentation isa prerequisite for a safe and effective nursing care. Substandard nursing documentation poses risk to evaluation and outcomes of patient care. Despite so much attentionbeingfocused on quality nursing documentation, deficiencies in nursing documentation however, continue to exist. In order to resolve these insufficiencies, it is paramount to identify, develop and operationalize strategies to improve quality of nursing documentation. Electronic health records are being promoted as a strategy for exchange of pertinent patient information among members of the health care team while protecting patients' privacy and improving the safety, efficacy and quality of care. It is believed that technology will help improve clinical decision-making ability, ensure better quality of patient care and contain healthcare cost. However, operationalizing a change in practice in healthcare environment has the tendency to create unease among nurses with the risk of making them defiant to the change. The main aim of the study was to evaluate the effectiveness of electronic nursing documentation programme in terms of quality of nursing documentation and nurses' perception. It was also planned to ascertain nurses' acceptability and utility of the electronic nursing documentation programme. The objectives of the study were to: assess and compare the quality of paper based and electronic nursing documentation; explore the perception of nurses regarding electronic nursing documentation before and after the implementation of electronic nursing documentation programme; ascertain opinion of nurses regardingacceptability and utility of electronic nursing documentation programme; determine the relationship between perception and acceptability and utility of nurses exposed to electronic nursing documentation programme. This quasi-experimental study with one group pretest posttest design was conducted in a tertiary teaching hospital of Haryana. The sample included; 152 randomly selected paper-based nursing records, 644 electronic nursing records selected by total enumeration and 44 nurses working in selected units using total enumeration sampling technique. In phase I, 152 randomly selected paper-based nursing records were reviewed to examine the quality of paper based nursing documentation from day 1 to day 75. In the phase II, day 1 was assigned to assessment of nurses' perception regarding electronic nursing documentation. Day 2 to day 5 were dedicated to; sensitization of nurses regarding basic computer functions; electronic nursing documentation and hands on practice by nurses to familiarize themselves with computers. The implementation of the END programme comprised of 19 days of training programme for the nurses from day 6 to day 24. Nurses received training on the five modules of electronic nursing documentation programme that includeddemonstration of electronic documentation of the module by the investigator and hand on practice by the nurses till at least one correct return demonstration. Modules I (patient profile) and II (health assessment) were introduced from day 6 to 8 and day 9 to 11 respectively. Modules III (vital signs) and IV (intake output) were introduced together from day 12 to 14. module V (medication administration and need based care)was introduced from day 15 to 17. Day 18 to day 24 were dedicated to handholding that included; open discussions with nurses, obtaining feedback, clarification of doubts, reinforcement and practice of all the five modules of electronic nursing documentation programme together. On day 100 of phase II, nurses' perception and acceptability and utility of END programme was assessed. Data was analyzed using SPPS 20.2. The level of significance was kept at 0.05. Findings revealed that END programme was effective in improving the overall quality of nursing documentation in terms of patient profile, admission, intake, output, medication administration and need based care and nurses' perception regarding electronic nursing documentation. However, no improvement was seen in quality of electronic nursing documentation in terms of vital signs. In addition, nurses expressed END programme to be highly acceptable and useful. Low positive but non- significant relationship was established between the nurses' perception and acceptability and utility of END programme. Further studies can be undertaken to; identify and develop strategies for best practices and standards for improved, streamlined nursing documentation; explore the factors that contribute to poor nursing documentation; include nursing process, nursing care plan in electronic nursing documentation; examine the various types of hardware and supporting equipment used in electronic documentation, such as computers on wheels and handheld devices and how different types of equipment enhance compliance with use and accessibility; compare the quality of nursing documentation and nurses' perception in private and public sector.

INTRODUCTION

Initial medical records exist in various forms. In early Modern England, medical practice records range from a few cases jotted on scraps of paper to the collections of Theodore de Mayerne, the Royal physician who wrote around 1000 cases between 1603 and 1653. Before the 1700, Forman's and Napier's casebooks are believed to be the most systematic and extensive surviving set of medical records. As encounters between early modern medical practitioners and their patient, case books are the richest sources of information. Patient record is written and legal document that includes a sequence of established processes which primarily constitutes a base of information pertaining to patient's health. It is record of judgment and critical thinking utilized in professional practice and an integral component of safe and appropriate practice. Objective, contemporaneous and relevant documentation promotes consistency in patient care and effective communication among members of the healthcare team. The purpose of the medical records originated to document the patient's history thus allowing physicians to recollect the past and organize exchange of information when multiple professionals were involved. Quality medical records are vital from both patient as well as physician perspective for different reasons. Medical records aid the physician in monitoring what has been done thus minimizing the risk of errors creeping into the treatment process. In addition, careful attention to minute details also lowers the likelihood of patients returning for additional treatment. Not only that, health records also provide evidence that the provided care meets the quality and safety standards set and monitored by regulators and the contractual requirements set by commissioners The Mid Staffordshire NHS Foundation Trust Inquiry (2010) recommended that accurate and thorough record keeping is a significant component of the care to be provided to any patient. Without this, it is not feasible to develop or follow through appropriate plans, monitor changes in condition and continuity of care is prejudiced. Failure to maintain adequate records is a regularly cited allegation in fitness to practice cases. The primary purpose of documentation and record keeping systems is to facilitate information flow which supports the continuity, quality, and safety of care. However, this fundamental purpose of the records is being undermined as record keeping systems now serve multiple purposes thus fueling discontinuity of care, near misses, and errors. Professional Standards are a necessity for nurses in order to document timely and accurate patient reports. Information technology is proving to be a vital element in the administration of healthcare. The wide spread use of information technology has affected the way the hospitals maintain documentation of their daily transactions including data repository, recovery and communication. Clinical documentation presents an ongoing challenge in healthcare among all disciplines. The transition from narrative notes to EHRs is occurring now and directly impacts the future of healthcare system.

Objectives of the Study

Analysis and interpretation of data was done based on the following objectives:

- To assess and compare the quality of paper based and electronic nursing documentation.
- To explore the perception of nurses regarding electronic nursing documentation before and after the implementation of electronic nursing documentation (END) programme
- To ascertain nurses‟ acceptability and utility of electronic nursing documentation (END) programme
- To determine the relationship between nurses‟ perception and acceptability and utility of electronic nursing documentation (END) programme.

Assumptions

- Nurses document patient care provided and maintain records and reports of directpatient care
- Nursing documents can be maintained on paper or electronically
- Nurses will be ready to adapt to electronic nursing documentation
- The training programme including hands on experience and hand holding on electronic nursing documentation will enable nurses to enter patient data electronically
- Nurses would be able to utilize electronic nursing documentation programme
- Quality of nursing documentation can be assessed by audit tool
- Implementation of electronic nursing documentation programme may improve quality of nursing documentation
- Implementation of electronic nursing documentation programme would influence nurses‟ perception and opinion of acceptability and utility of electronic nursing documentation programme
- Perception of nurses can be measured by perception assessment scale
- Nurses will feel free and be honest in responding to their perception towards electronic nursing documentation
- Nurses would give their frank opinion regarding acceptability and utility of electronic nursing documentation programme which can be ascertained usingopinionnaire.

METHODS

This Article deals with methods and techniques adopted by the investigator for the present study. The methodology of research indicates the general pattern of an organized procedure for valid and reliable data for the purpose of investigation. The aim of the present study was to evaluate the effectiveness of electronic nursing documentation programmein terms of quality of nursing documentation in selected hospital. It was also planned to determine nurses‟ perception and opinion on acceptability and utility of electronic nursing documentation programme.

Nursing Education

The seriousness of quality nursing documentation cannot be over emphasizing. Nursing education prepare future nurses in such a manner that should enable nurses to; recognize the purpose and importance of nursing documentation; identify potential consequences of poor nursing documentation; be familiar with the legal and regulatory standards an requirement pertaining to nursing documentation.

Electronic Doc Results Tables 1.

Group	PHASE I	PHASE 11									
	day 1 -day 75	**day 1 – day 5**	**day 6 – day 8**	**day 9- day 11**	**day 12 – day 14**	**day 15- day 17**	**day 18 – day24**	**day 25 - day 49(E1)**	**day 50 - day74 (E11)**	**day 75 – day99 (EIII)**	**day 100**
Nurses		Assessme	**Implementa**	**ntation of module II**	**Implementation of**	**Implementation of**	**Hand holding**	Concurrent audit of	Concurrent	Concurrent	assessment of
		nt of	**tion of**	**of END programme:**	**module III and IV of**	**module V of END**	**via;**	electronic nursing	audit of	audit of	nurses" perception,
		nurses"	**module I of**	**Health assessment**	**END programme;**	**programme; Medication**		documentation	electronic	electronic	acceptability and
		perceptio	**END**		**Vital signs and Intake**	**administration and need**	Open		nursing	nursing	utility of electronic
		n	**programme**	Review of electronic	**output**	**based care**	discussion		documentatio	documentation	nursing
			; Patient	nursing documentation			sessions to		n		documentation
			profile	of patient profile	Review of electronic	Review of electronic	obtain feedback				programme
					nursing documentation	nursing documentation of					
			Demonstrati	Demonstration of	of patient profile and	patient profile , health					
			on of	electronic nursing	health assessment	assessment, vital signs and					
Nursing	Retrospecti	Orientatio	electronic	documentation of		intake output	Troubleshootin				
documen	ve audit of	n to basic	nursing	health assessment with			g based on the				
tation	randomized	computer	Documentati	hands on experience		Demonstration of	feedback and				
	15% paper	functions	on of patient		Demonstration of	electronic nursing	identified				
	based		profile with		electronic nursing	documentation of	issues				
	nursing	Introducti	hands on		documentation of vital	medication administration					
	documentat ion of the	on to electronic	experience	Return demonstration of electronic nursing	signs and intake output with hands on	and need based care withhands on experience					
	patient	nursing	Return	documentation of	experience		Practice and				
	records	document	demonstratio	health assessment		Return demonstration of	demonstration				
	from 1st	ation	n of		Return demonstration	electronic nursing	of all modules				
	April to 14th		electronicnursing	till at least 1 correct recording	of electronic nursing documentation of vital	documentation of medication administration	of electronic nursing				
	June,3013		documentati		signs and intake output	and need based care till at	documentation				
			on of patient		till at least 1 correct	least 1correct recording					
			profile till at least 1correct	Feedback and problem solving session	recording	Feedback and problemsolving session					
			recording		Feedback and problem						
					solving session						

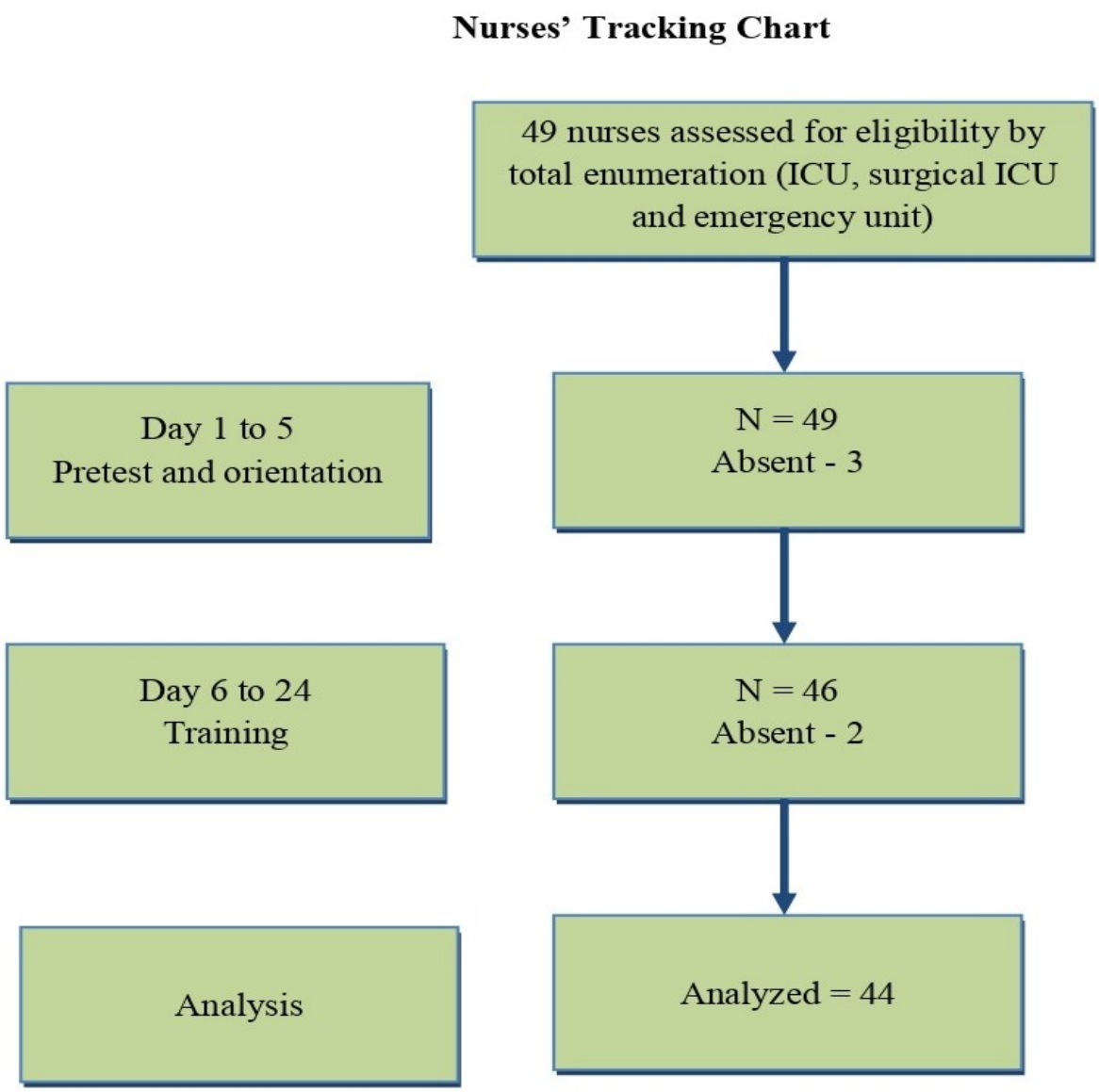
Electronic Doc Results Tables 2.

Sample	ICU	SurgicallCU	Emergency	Total
Total nurses in each unit	15	18	22	55
Nurses who met the inclusion criteria	13	17	19	49
Total number of paper-based patientrecords (phase I)	300	280	434	1014
Number of paper- b a s e d patient records (15%)thatmetthe inclusioncriteria (phase I)	45	42	65	152

Electronic Doc Results Tables 4

Component	Electronic nursingdocumentation	Paper based nursingdocumentation	
Patient profile	12		12
Admission record	11		11
Vital signs	08		08
Intake output	23		23
Medication administration	10		10
Need based care	08	08	
General considerations	--	08	
Total items	72		80

Electronic Doc Results Tables 3.



Electronic Doc Results Tables 4.

Blueprint of the Audit Tool to Assess the Quality of Nursing Documentation

Component	Electronic nursing documentation	Paper based nursing documentation
Patient profile	12	12
Admission record	11	11
Vital signs	08	08
Intake output	23	23
Medication administration	10	10
Need based care	08	08
General considerations	--	08
Total items	**72**	**80**

Electronic Doc Results Tables 6.

Blueprint of Acceptability and Utility Opinionnaire of Electronic Nursing Documentation Programme

Domain	Item no.	Total items
Training	1, 2, 3, 4, 5, 6, 7, 8	08
Operation	9, 10, 11, 12, 13, 14, 15, 16	08
Flexibility and learnability	17, 18, 19, 20	04
Outcome	21, 22, 23, 24, 25, 26, 27, 28	08
Total		**28**

Electronic Doc Results Tables 7.

Summary of the Problems Identified and Rectifications Related to Functionality of Electronic Nursing Documentation ProgrammeDuring Tryout

	Identified problems	Rectifications
Module I	1. Submission of IPD Number more than once even if the patient was already in the system 2. Common diagnoses not listed in the drop box 3. Fonts too small to be read 4. Problem with documenting height (typing height in feet and inches) 5. No calendar	1. Ensured by software developer that the patient was entered only once in the system. In case the patient was discharged or transferred to another unit, a red button was inbuilt on the top of the module I which when clicked made the nurse aware that the patient was already in the system 2. More diagnoses added to drop box 3. Font size increased to easily visible size 4. Height conversion tables were prepared and displayed (Annexure M) alongside all the computer that the nurses would use to document electronically and nurses entered height in centimeters 5. Calendar added
Module II	1. The option "un-recordable" not included in the vital signs field 2. Nursing alerts not displayed in the vital signs 3. Confusion when documenting the Braden scale (limited being confused with ability) and fall risk assessment 4. Data submitted successfully widow not displaying upon submission of patient information	1. The option "un-recordable" added to vital signs 2. Nursing alerts added 3. Added red help buttons for Braden scale (Annexure N) and fall risk assessment (Annexure O). When the nurse clicked these complete information was displayed. Copies were also displayed at all the computers that the nurses would use to document electronically 4. Window "data submitted successfully" added
Module III	1. Vital signs graph not displayed as the vital signs were entered 2. The SpO_2 window disappeared in the 2nd row 3. Venturi mask and mechanical ventilation options missing in methods of oxygen administration	1. It was not feasible to display graphical vital signs and the decision was made that nurses will enter the vital signs in the blank fields only 2. Done by the software developer 3. The options; Venturi mask and mechanical ventilation added
Module IV	1. Wrong calculations of total intake 2. Total intake output balance not displayed upon entering the pertinent information 3. Submit button missing when nurse confirmed no intake output ordered	1. The auto calculations corrected 2. Total intake output balance was displayed 3. Green submit button added
Module V	1. Drop box for "route" of medication administration not displayed 2. Medication withhold button not picking up time at which the drug was withheld 3. Discontinuation of one medication, discontinued all the medication	1. Drop box added to the "route" of medication administration 2. Medication withhold button corrected 3. Ensured that only discontinued medication was removed from the list of administered medications

A deficiency in knowledge about documentation may result in poor and inaccurate documentation about patient care which may result in a breakdown in the continuity of care. Today, the use of technology to document patient data is at the forefront of healthcare discussions. It is therefore vital to train nursing students to use technology efficiently so that they are prepared well in advance to deliver quality patient care.

Nursing informatics should be a component of undergraduate and graduate nursing curriculum in order to develop computer skills. In addition, training should be provided to students who do not possess a basic level of computer proficiency. Availability of basic infrastructural support in nursing education institutes is necessary to impart computer skills. Equipping nursing education institutes with computer experts is an important step towards inculcating computer skills in nursing students. Because educational interventions have a positive effect both on nursing care, therefore exposure of students to electronic health records by planning trips to healthcare institutions that have implemented electronic nursing documentation so that they are aware of technical aspects and advantages of it.

Nursing Administration: The responsibility to maintain optimal standard of nursing documentation rests mainly on the shoulders of the nurse administrator. The nurse administrator should cultivate and promote an organizational culture for attaining optimum level of nursing documentation. Nurse administrators should play a proactive role in the formation of hospital wide informatics committee involving representatives from all disciplines that would help in development and continuous monitoring the quality of nursingdocumentation as an ongoing process.

The nurse administrators should be an active member of this committee and contribute towards policy making and decision making related to nursing documentation. The identified issues should then be addressed and brought to the attention of nurses to reflect upon the areas to be strengthened anddeveloped.

Recommendations

- A study can be conducted to assess quality and continuity of care by Implementation and integration of END in all the clinical settings viz. nursing care homes, community health sector and tertiary care hospitals.
- A developmental study can be conducted to develop comprehensive need specific END for health care setting based on the ongoing monitoring and feedback from these settings.
- A study can be conducted to explore the types of hardware and supporting equipment used in electronic documentation, such as computers on wheels and personal data assistants and how different types of equipment enhance compliance with use and accessibility.
- A study to determine the effectiveness of electronic nursing documentation in terms of nurses‟ satisfaction, barriers and inhibitors to adapt END, patient record redundancy, time spent providing direct patient care and patient outcomes.
- A study can be conducted to examine cost benefit analysis using END.
- A correlational study can be conducted to assess the relations between the compliance to END and quality of patient care in terms of patient care, safety and outcomes.

Conclusion

- Electronic nursing documentation programme was effective in improving overallquality of electronic nursing documentation.
- Electronic nursing documentation programme was effective in improving quality of electronic nursing documentation of seven out of the eight components. No improvement was found with regard to the vital sign's component
- The electronic nursing documentation programme was effective in enhancing the perception of nurses regarding electronic nursing documentation programme
- There was weak positive relationship between perception and acceptability and utilityof nurses exposed to electronic nursing documentation programme
- Nurses expressed electronic nursing documentation programme to be highlyacceptable and useful.

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