

## Impact of Nursing Informatics on the Quality of Patient Care

Rami Ibrahim Al Najjar<sup>1</sup>, Zainab Mohd Shafie<sup>2</sup>

<sup>1,2</sup>Faculty of Medicine, Universiti Sultan ZainalAbidin, 21030 Kuala Nerus, Terengganu, Malaysia

### ABSTRACT

Currently, nursing informatics is a part of nursing professional activities. Electronic health records have enhanced the nursing field by bridging the gap from nursing to nursing as a science. Additionally, nursing informatics actively reinforces nursing by providing standard language systems, decision-making support, technological advancements, and enhanced relationships between patients and clinical professionals. As data science continues permanenting in the healthcare systems, nursing informatics promotes the quality of healthcare provided to the patient when applied to routine hospital activities. Notably, nursing informatics has improved data handling and improvement initiatives among the nursing staff. This article aims at assessing the impact of nursing informatics on the quality of patient healthcare. Several benefits are evident, including but not limited to minimization of medical errors, timely diagnosis, and the efficiency of care services, improved communication between the healthcare providers and the patients, and drivers for research and integration of more advanced technologies aiming at improving healthcare quality.

**KEYWORDS:** quality of healthcare; nursing informatics; patient care

### ARTICLE DETAILS

**Published On:**  
**31 May 2022**

**Available on:**  
<https://ijmscr.org/>

### 1.0. INTRODUCTION

Technology is essential in the modern dynamic healthcare systems as it plays a crucial role in nursing and education work. Darvish (2014) defines nursing informatics as the application of information technology in the nursing responsibilities encompassing management, practice, and education. Additionally, nursing informatics includes integrating computer science, nursing science, and information science to reinforce the nursing practice. Currently, clinical nursing information systems, medical diagnostic systems, and decision support systems are linked to patient information collection. Healthcare environments characterized by increased technology integration in routine operations have improved patient care quality and enhanced management efficiency. According to Cherry (2016), implementing information systems provides better access to evidence, positively affects patient care quality, and augments evidence-based nursing.

Numerous researchers have conducted surveys concerning the impact of nursing informatics on a patient's quality in different clinical environments, and the outcomes conflict with improved patient care quality. Primarily, nursing informatics reduces medical errors, increases efficiency,

improves communication loops, enhances service delivery, and promotes medical professionals' performance in all fields of medicine. This article focuses on the impact of nursing informatics on the quality of patient care under specific themes, including patient outcomes, patient satisfaction, medication errors, and timely delivery of care/ timely diagnosis.

Keywords: quality of healthcare; nursing informatics; patient care

#### 1.1. Impact of nursing informatics on the quality of patient care

##### 1.1.1. Impact of nursing informatics on patient outcomes

The presence of health information on the internet has equalized knowledge opportunities among the healthcare providers and the patients creating an e-patient phenomenon (Darvish et al., 2014). Nursing informatics can enhance the information sharing between the nurses and the patients building unique relationships that lead to positive patient outcomes. Electronic health records can change the quality of care and patient outcome. Persell et al. (2011) conducted a study to investigate how integrating the electronic health records system would provide more value to specific

## Impact of Nursing Informatics on the Quality of Patient Care

patients and populations for chronic diseases. The author employed a quantitative research design using a time series analysis of significant internal nurses with experience with electronic health record tools. The study's findings indicated that electronic health records significantly improved nurses' performance (Persell et al., 2011). Besides, the implementation of electronic health records bolstered compliance with the mainstream care standards.

According to Brennan & Bakken (2015); Gephart et al. (2015), nursing informatics allows healthcare providers to address patient needs on time while allowing the patients to access their diagnosis information quickly. Moreover, the authors underlined that nursing informatics promotes patient-centered healthcare, educates patients and health professionals, and improves healthcare quality. Nursing informatics have improved management systems, information systems, communication systems, and computerized decision-making systems. Fundamentally, improvements in the healthcare systems point back to the patient outcome, where promotion in each system improves the well-being of the patients in the hospitals, leading to positive results. However, the issue of implementing nursing informatics remains a complicated subject encompassing dynamics at various levels, including patients, healthcare providers, and healthcare organizations. Such challenges may result in reduced performance, and patients' needs may not be addressed to the recommended standards, hindering the patient-centered healthcare framework (Rouleau, 2017). A quantitative, mixed-method, and qualitative review by Asiri (2016) showed that nursing themes such as patient outcomes, care quality, and efficiency of healthcare systems were influenced by information technology, ICT, and data science. Nursing informatics promoted time management, time spent on patient care, documentation time, information access and quality, knowledge updating and utilization, nurse-patient relationship, the teaching of families and patients, communication, and care coordination, among others (Khajouei, 2017). such positive benefits of nursing informatics imply an improved patient outcome.

### 1.1.2. Nursing informatics and patient satisfaction

For decades issues in nursing efficiency and patient safety have been a pressing concern. However, promoting the role of nursing informatics is proved to be the best mechanism for addressing the mentioned issues. Lee et al. (2017) surveyed nurses and patients through questionnaires in a Taiwan hospital to determine whether nursing informatics improved patient safety and quality of care. The study identified that nursing informatics reduced time for completing electronic records while diminishing medical errors. Nonetheless, the findings showed increased satisfaction with electronic shifts and reduced nurse turnover. Significantly, nursing informatics increased patients' satisfaction implying an increase in nursing efficiency. Therefore, there is a pressing need for healthcare organizations to continually enhance nursing information

systems to provide high-quality services to patients in the modern competitive environment.

According to Farber et al. (2015), nursing informatics plays a critical role in providing effective and safe healthcare. On the same premise, a survey by Evans (2016) reinforced that electronic health records improve operation efficiency by decreasing office visits. Similarly, the approach reduces medication costs while ensuring that patients access their health reports and records within a precise diagnosis time. According to Farber et al. (2015), patients presented their satisfaction levels in patient-centered communication, physician interpersonal skills, and physician clinical skills. The results implied that the patients were highly satisfied with the services received from the physicians who used electronic records to track patient performance and relay similar information to the patients. Clinicians using electronic health records actively attend to their patients and are more motivated than those using charts. Therefore, patients express satisfaction with the short medication time used by nursing informatics.

### 1.1.3. Nursing informatics and medication errors

One of the negative indicators of inefficient patient care is medication error. The revelation that medical errors in hospitals are one of the leading causes of death has caused unsettling reverberations in the healthcare industry. Scientists have proposed several measures to curb this turmoil. Hoover (2017), for instance, suggested that to achieve a more reliable healthcare system, there is a need to improve the means of sharing data locally and internationally. Neves et al. (2018) conducted quantitative research and compiled the findings. The author found that Electronic health record systems may detect and curb errors and facilitate healthcare quality monitoring.

Bae and Encinosa (2016) conducted quantitative research to evaluate the accuracy of electronic medical record medication reconciliation in emergency department patients. The authors performed a comprehensive analysis of medication ingestion history for 48 hours. 502 out of 655 patients representing a response rate of 76.6 percent, consented to the study. The patients were categorized into two groups; those whose details were captured in the Electronic health records and those captured in the paper documentation system. Several errors in inpatient data were captured among the group that used paper documentation compared to the control group. The authors continued to examine some of the factors that might lead to a medication error in the paper documentation. One of the striking factors that were captured was the illegibility of the nurse's writings. Some of the reports could not be read well; hence nurses often assumed some details. Furthermore, the authors identified lack of time and workload as other factors that led to patient records documentation errors. Nurses were overwhelmed with the bulk of work which made them too often assume some patients' medication details.

## Impact of Nursing Informatics on the Quality of Patient Care

The finding that nursing informatics helps reduce medication errors in the hospital, as revealed by Monte et al. (2015), is echoed in Tubaishat's (2019) finding. Tubaishat recommended that hospitals embrace a computing system in their care delivery to reduce the likelihood of errors and improve delivery quality.

Furthermore, the retrospective investigations have noted the critical role of nursing informatics and the immeasurable role of nurse informatics during the covid-19 pandemic (Kaminski, 2020; Lin et al., 2020). Garcia-Dia (2021) presents a narration of the critical of nurse informaticists in leading the management of emergent infectious diseases, notably the covid-19. The American nurse informatics specialists worked remotely around the clock in the healthcare command centers to monitor various health departments that need more nurse deployments or volunteers to keep the patient care activities in progress for positive patient outcomes. At the same time, other nurse informaticists concentrated on the real-time data analysis to provide prompt reports about the situation of clinical care, supplies, and the infection pattern cases. Due to the linkages of the informaticists' dashboard with the electronic health record systems, the healthcare agencies could trace patients' movements to track infection routes. The real-time data also provided pertinent information about the number of patients with critical care needs to guide triage nurses. As such, the implication of information technology, as integrated into the electronic health record, helps nurses manage and coordinate the patient care services during the infectious pandemic while diminishing associated diagnostic errors (Rouleau et al., 2017).

### 1.1.4. Nursing informatics and quality patient care

Cornell, Herrin-Griffith, et al. (2010) examined nurses' workflow and computer use through a quantitative study design. The researchers identified the following four objectives of the research; the first objective was to evaluate the amount of time care providers spend on the computer and other related activities. The second objective was to identify preliminary information about nurses' actions before adopting the electronic health record system. The third objective was to capture the nurses' workflow, and the last goal was to examine if the workflow integrates into the care delivery model. The authors revealed that electronic health records reduced the workload for the nurses, such as recording of data, thus giving them time to concentrate on their patients. The availability of accurate data was also found to facilitate quality care delivery for the patients (Lee et al., 2017).

Booth et al. (2021) examined the future of nursing informatics in promoting healthcare service delivery. According to these researchers, applying robotic process automation in nursing informatics will relieve the nurse informaticists' role in managing the electronic health record's dashboards. The innovative practices and research around electronic health records in healthcare hold the

potential solutions to automated management of the electronic health records for effective and optimal operationalization of patients' care, including nursing activities and workflow (Booth et al., 2021; Khodambashi, 2013; Kangasniemi et al., 2019). The applications of robotics such as robots have been mentioned to be effective in augmenting nurses' operations, healthcare processes, and patient care

The electronic health records system has the potential to increase the overall costs of the hospital support structures. Himmelstein et al. (2009) conducted a study assessing data from 4000 healthcare organizations from 2003 to 2008. The study's rationale was to evaluate if the electronic health records system lowered healthcare costs and improved nurses' quality of patient care. The authors used Pearson bivariate correlations to calculate the hospital's costs, quality of care, and electronic health records order entry. However, the results obtained from the bivariate analysis showed that hospitals that used electronic health records incurred higher costs.

Similarly, the results indicated that hospitals with higher health informatics adoption rates recorded higher costs. This finding is inconsistent with Siedlecki and Hixson's (2015) study, which reported that using an electronic health records system in the healthcare units reduces the overall costs incurred by the hospitals. The strength of this study was grounded on the large data sets that were used.

Nursing informatics uphold nursing by giving standard language frameworks, data sets, choice help, promptly available examination results, and innovation appraisals. Through standardized datasets spreading over a whole undertaking or other enormous segments, nursing informatics apparatuses support the improvement of medical services by responding to inquiries concerning patient results and quality enhancement for an endeavor scale and by giving documentation to business process definition, business process designing, and vital preparation (Koch et al. 2012). Nursing informatics instruments provide an approach for cutting-edge practice attendants to look at their training and the impact of their activities on quiet results.

## 2.0. CONCLUSION

Nursing informatics is critical and expanding component of medical operations. The benefits of electronic health records are vast, particularly from both patients' and medical professionals' perspectives. The approaches enhance efficiency, reduces medical errors, promote time management, enhance communication, trigger profound patient-nurse relationship, and simply complex medical operations leading to quality health care. However, studies imply that nursing informatics depends on innovation and requires a specific capability to guarantee successful nursing practice. Specific capabilities necessary for nursing informatics' success involve incorporating the vital information, conduct, and skills required for medical

## Impact of Nursing Informatics on the Quality of Patient Care

caretakers to gather, store, recover, interact, and use information. Conclusively, technology has played a crucial role in transforming healthcare systems and improving the quality of healthcare provision. Nursing informatics and promoting other essential technological methods will continue shaping the healthcare environment.

### REFERENCES

- I. Booth, R., Strudwick, G., McMurray, J., Chan, R., Cotton, K., & Cooke, S. (2021). The Future of Nursing Informatics in a Digitally-Enabled World. An Introduction to Nursing Informatics (pp. 395-417). Springer, Cham.
- II. Cornell, P., Herrin-Griffith, D., Keim, C., Petschonek, S., Sanders, A. M., D'Mello, S Shepherd, G. (2010). Transforming nursing workflow, Part 1: The chaotic nature of nurse activities. *The Journal of Nursing Administration*, 40, 366-373. doi: 10.1097/NNA.0b013e3181ee4261
- III. Evans, R. S. (2016). Electronic health records: then, now, and in the future. *Yearbook of medical informatics*, 25(S 01), S48-S61.
- IV. Farber, N. J., Liu, L., Chen, Y., Calvitti, A., Street, R. L., Zuest, D., ... & Agha, Z. (2015). EHR use and patient satisfaction: What we learned. *J Fam Pract*, 64(11), 687-696.
- V. Garcia-Dia, M. J. (2021). Nursing informatics: An evolving specialty. *Nursing Management*, 52(5), 56.
- VI. Himmelstein, D., Wright, A., & Woolhandler, S. (2009). Hospital computing and the costs of quality of care: A national study. *The American Journal of Medicine*, 123, 1-7. doi: 10.1016/j.amjmed.2009.09.004
- VII. Hoover, R. (2017). Benefits of using an electronic health record. *Nursing2018 Critical Care*, 12(1), 9-10.
- VIII. Kaminski, J. (2020). Informatics in the time of COVID-19. *Can J Nurs Inform*, 15(1).
- IX. Kangasniemi, M., Karki, S., Colley, N., & Voutilainen, A. (2019). The use of robots and other automated devices in nurses' work: An integrative review. *International journal of nursing practice*, 25(4), e12739.
- X. Khodambashi, S. (2013). Business process re-engineering application in healthcare in a relation to health information systems. *Procedia Technology*, 9, 949-957.
- XI. Koch, S. H., Weir, C., Haar, M., Staggers, N., Agutter, J., Gorges, M., & Westenskow, D. (2012). Intensive care unit nurses' information needs and recommendations for integrated displays to improve nurses' situation awareness. *Journal of the American Medical Informatics Association*, 19(4), 583-590.
- XII. Lee, T. Y., Sun, G. T., Kou, L. T., & Yeh, M. L. (2017). The use of information technology to enhance patient safety and nursing efficiency. *Technology and Health Care*, 25(5), 917-928.
- XIII. Lin, C. T., Bookman, K., Sieja, A., Markley, K., Altman, R. L., Sippel, J., ... & Pell, J. (2020). Clinical informatics accelerates health system adaptation to the COVID-19 pandemic: examples from Colorado. *Journal of the American Medical Informatics Association*, 27(12), 1955-1963.
- XIV. Neves, A. L., Carter, A. W., Freise, L., Laranjo, L., Darzi, A., & Mayer, E. K. (2018). Impact of sharing electronic health records with patients on the quality and safety of care: a systematic review and narrative synthesis protocol. *BMJ open*, 8(8), e020387.
- XV. Persell, S., Kaiser, M., Dolan, N., Andrews, B., Levi, S., Kahndekar, J., Baker, D. (2011). Changes in performance after implementation of a multifaceted electronic-healthrecord-based quality improvement system. *Medical Care*, 49 (2), 117-125.
- XVI. Rouleau, G., Gagnon, M. P., Côté, J., Payne-Gagnon, J., Hudson, E., & Dubois, C. A. (2017). Impact of information and communication technologies on nursing care: results of an overview of systematic reviews. *Journal of medical Internet research*, 19(4), e6686.
- XVII. Siedlecki, S., & Hixson, E. (2015). Relationships between nurses and physicians matter. *The Online Journal of Issues in Nursing*, 20(3).
- XVIII. Tubaishat, A. (2019). The effect of electronic health records on patient safety: A qualitative exploratory study. *Informatics for Health and Social Care*, 44(1), 79-91.
- XIX. Brennan, P. F., & Bakken, S. (2015). Nursing needs big data and big data needs nursing. *Journal of Nursing Scholarship*, 47(5), 477-484.
- XX. Darvish, A., Bahramnezhad, F., Keyhanian, S., & Navidhamidi, M. (2014). The role of nursing informatics on promoting quality of health care and the need for appropriate education. *Global journal of health science*, 6(6), 11.
- XXI. Gephart, S., Carrington, J. M., & Finley, B. (2015). A systematic review of nurses' experiences with unintended consequences when using the electronic health record. *Nursing administration quarterly*, 39(4), 345-356.