

Nursing Technologies

Areeba Rahim*, Inara Saleem, Maria Baber, Meraj Uddin, Nusrat Fatima, Sanila Nadir, Zainish Salim

The Aga Khan University School of Nursing and Midwifery, Pakistan

Introduction

Healthcare nowadays is a far more advanced field than it was half a century ago. This advancement could only happen due to the new nursing technologies introduced in past years. "Nursing technology was defined as nursing tools, machines, automata, utensils, nursing intervention procedures, health education techniques, substance, and clothes designed and used by nurses in nursing practice." [1].

Nurses use these nursing technologies every day, which makes their work a lot easier. It includes automatic BP apparatus, Portable Defibrillator and monitors, Electronic IV apparatus, Electronic Health Records, Telehealth, Barcoding and Radiofrequency Identification Systems. Other than that, robotics is also introduced in nursing technology. These nursing technologies not only give advantages to nurses but also benefit the patients.

Significance

Nursing technologies bring numerous benefits in improving the healthcare system. According to [2], less invasive technologies show better results and lower the risks for patients. Technologies help in the early identification of the problems for prompt interventions. It prevents the incidences of adverse effects and minimizes delays in nursing interventions. Nurses can continuously monitor patient conditions and take immediate action. Biometrics advances the confidentiality of healthcare documents which reduces management costs.

E-health, telemedicine, and web support services help patients connect with the nurses and doctors for consultations. Cloyd B et al, [3] reported that virtual nursing aids in nurses' retention as their physical requirement at the bedside decreases. Moreover, it helps minimize the worldwide staff shortage and mitigate high healthcare costs.

Prevalence

The data collected for the last 5 years shows that healthcare technologies are used 46% for researches, 30% for implementation, and 12% for app development in digital health [4].

Globally, 7 million patients had used telemedicine by 2018 already [5].

Plus, 86% of office-based physicians have adopted the electronic medication record system EMR by 2017 in the US [6].

Global perspective

Nurses throughout the globe are increasingly using modern technologies to improve nursing care. These emerging modern technologies are:

- Artificial Intelligence is used to handle resource allocation like bed management and nurse staffing in the delivery department [7].
- The Electronic infusion device is used to keep track of intravenous infusions.

*Address for Correspondence: Areeba Rahim, The Aga Khan University School of Nursing and Midwifery, Pakistan. E-mail: areebakherany@gmail.com

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- The Automatic Blood Pressure Cuff determines the heart rate of a patient and is more efficient and accurate.
- Virtual Reality helps patients cope with painful wound dressing. It provides a soothing environment in a high-stress healthcare setting by using diversions.
- Radio-Frequency Identification recognizes and tracks tags that contain electronically recorded patient data using electromagnetic waves [8].

Local or national perspective

Nursing Technology is being used in Pakistan for many years. According to [3] following nursing technologies are currently being used in Pakistan.

- Information and communication technology is used for the electronic storage of medical data, which reduces workload and saves time.
- Nurses use smartphones/mobile devices to instantly access drug references, diagnoses, textbooks and other medical apps.
- SMS- based intervention helps in medication compliance after patients discharge from the hospital.

Besides the technologies mentioned above, eDoctor, sehat Kahani, Teeku (app), and Dengue Activity Tracking System have successfully been used in Pakistan.

Theory/Framework

With the advancement in nursing technologies, many models, theories and frameworks have been introduced. Likewise, [9] introduced the theory of technological competency as caring in nursing. It is a middle-range theory that emphasizes co-existence between the core component of caring in nursing and the use of technology. His idea was to preserve humanization with the growing use of technologies. Moreover, the NursingAI framework has also been established in Europe, a document that contains four domains (assessment, planning, implementation, evaluation) based on the nursing process. It serves as a guide to using technology in nursing practice [10]. Similarly, Powell-Cope et al [11], 2008 after a literature review developed a conceptual framework that shows the relationship between nurses and technology by predicting factors and outcomes with technological use. All these models/frameworks are assisting in making the use of technologies easier for nurses.

Challenges/Strategies

Nurses are resistant to computerization, believing that computerized health information systems are complicated. Those nurses lacking ICT knowledge think modern technologies are dehumanizing by reducing face to face interaction between patients and health care staff [12]. They also reported that it's confusing, complex, and time-consuming. EHRs in the form of large data are vulnerable to hacking, violating patients' right to confidentiality. Some hospitals show a lack of interest in using modern technology because of increased management costs [12]. We can solve all these problems in such a way that we can arrange training and workshops for nursing staff before implementing new technologies in patient care. Plus, we can create awareness among the public about the importance of modern technologies.

Recommendations

Here are the following recommendations for improving nursing technologies:

- Strengthening the implementation process, i.e., adoption, sustainability, and dissemination of the services, there is a need for a clear vision from the hospital management.
- Nurse leaders are required to play a vital role in supporting the staff and building their competency [13,14].
- Stakeholders should be involved in the process, including staff and service users.
- Ample resources should be provided, including fundings, time, and infrastructure.
- Integrate innovation with the existing healthcare policies and programmes.
- Take regular feedback from the users and evaluate the efficiency of the technologies and their satisfaction level [15].

Conclusion

Nursing technology is described as nursing tools, machines, automata, and nursing intervention mechanics used in nursing practice [16]. This benefits in timely identification of the problems resulting in improved patient comfort and safety. Besides its countless advantages, nurses face challenges like time constraints, lack of IT knowledge, etc. Therefore, it is recommended that hospitals arrange ICT training and workshops for all staff regarding the use of modern technology. Locsin's theory of technological competency and NursingAI framework serve as the models/frameworks for use of nursing technologies.

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