

Application of Smart Technology in Nursing

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Abstract

The smart technologies have been widely applied in the field of professional medical care to serve the humanistic demands of patients, improve medical service qualities and patients' safety, raise nursing staffs' working efficiency, and facilitate the interaction between nursing staffs and patients. The smart technologies are satisfactorily employed to inspire nursing staffs' learning motivation with good efficacy. This paper, taking literature review approaches, majorly addresses some crucial issues regarding the utilization of smart technologies in the field of nursing profession and reflectively discusses several concerns following the emerging trend of intensively applying smart technologies to human patients. Some suggestions are subsequently provided for better service qualities and humanistic concerns in this global trend. This paper finally drew comprehensive conclusions: (1) The smart technology created impressive impacts on the both medical services and nursing ones; (2) This emerging trend of intensively applying high technologies will keep enhancing nursing service qualities and even inspire nursing revolution; (3) The smart technologies in the nursing field will raise administration efficiency as well as human resource management in hospitals; and (4) this trend of nursing technology development will revitalize nursing staffs' working efficiency and wellbeings which tightly encourage nursing staffs with positive coral values. In the future, adapting mobile technologies for use in teaching materials and courses may be further developed. Moreover, empirical studies may be used in future research in order to facilitate the increasingly successful integration of relevant technologies into nursing education.

Key Words: Smart Technology, Nursing, Application

1. Introduction

As the proportion of elderly in society continues to rise, telecare, using advanced information and communication technologies, has become a mainstream trend in healthcare for this client group (Chou, et al., 2009; Tsai, et al., 2010). The innovative smart care model has changed the current way of care. The nursing profession also uses information technology to integrate a large amount of information to simplify the nursing process, improve nursing quality and management performance. And the digitalization of nursing information is an important direction and trend for the development of global medical care in the future (Hu, et al., 2021). In the era of digital and information explosion, technological changes are rapidly changing the way of human life. The medical care industry applies technology to care products and services, and it has become a very important issue to provide innovative products and services through technology. In order to improve the efficiency of medical services, medical institutions gradually introduce new technologies and develop towards intelligence to meet and meet the needs of the times. With the development of

information technology, the medical care model must be adjusted according to the needs of treatment and care (Kao, 2018). Healthcare services combined with innovative technology will extend telehealth services to our rapidly evolving healthcare system, making our patient care services efficient.

Stimulated by a rapidly advancing environment such as knowledge, technological development and product improvement, the current nursing care is bound to pursue innovation and change in order to be efficient and competitive and create excellent nursing quality. Therefore, nursing services cannot be static (Chen, et al., 2008). The introduction and integration of mobile technology brings innovative application areas to medical education and services, and enhances the professional knowledge of nursing staff. The advancement of technology will affect the care and management mode of the medical system. Through mobile technology, it is introduced into the workplace, It can improve the work efficiency and immediacy of nursing staff, and give patients more comprehensive care and services (Wu, et al., 2017). Technology improves service efficiency and safety and quality of patient care, and is rapidly changing the appearance of hospital services(Chung & Kuo, 2021).

This paper, taking literature review approaches, majorly addresses some crucial issues regarding the utilization of smart technologies in the field of nursing profession and reflectively discusses several concerns following the emerging trend of intensively applying smart technologies to human patients.

2. Literature Review

Application of Information Technology in Nursing (Fig 1)

In terms of remote care, nursing education, nursing clinical, and nursing administration, it includes: teaching activities, nursing information system, physiological monitoring, technology barcode, Line video meeting, mobile nursing station, QR code barcode and automatic scheduling system, etc. It has been widely used in medical care and the community.

2.1 Remote care

In response to the advent of the technology era in the 21st century, it will break through the traditional care model in the past. Remote home care is an innovative nursing care. The use of medical technology to provide home care services is the trend of the times. Tele-home care (THC) is an innovative nursing care mode and has been applied in home care services in European countries and America. It has shown tremendous effects and benefits in disease administration and care costs (Lou, et al., 2005). Due to the increasing population aging society, and the demand for home care of elderly patients, the development of online home care is provided by nursing staff to provide online services and shared care services. This home care service provides patients with limited mobility. the help of the elderly, and then establish a high-quality online home-based care

service for the elderly (Zhao, et al., 2021) ◦ Mahoney (2020) The problem of distance in health care services has evolved, telemedicine can deliver care services, and telemedicine is any health care service provided in overcoming distance. Nursing services for paramedics provide care for people's needs through a wide range of technological means. Under the concept of "Technology Begins with Humanity", how to apply the innovation of information technology to provide humanized services, integrate technological services into people's lives, and then assist their health management and health promotion. The application of information-based remote care will become the trend of people's medical care in the future. Nursing staff can obtain health and physiological monitoring data based on the remote care information system, and provide appropriate nursing and care services, which will improve remote care. functions and benefits (Chou, et al., 2009). At present, the social environment of Taiwan's aging population continues to rise, and remote care has become an inevitable trend. Remote care is not limited to home monitoring, but also has the function of promoting active participation in self-health management, self-care, video health education, and pharmaceutical consultation. It is of great help to the safety and independence of the elderly in the quality of life at home. The majority of patients positively affirm the effectiveness of remote care (Tsai, et al., 2010). In the era of the development of the Internet and the advancement of information technology, the development and implementation of long-distance care has become an innovative service project that is actively developed at home and abroad.

2.2 Nursing education

Shu, et al., (2019) Combining ARCS (attention, relevance, confidence, satisfaction) motivation model and virtual reality technology in nursing education, helping students acquire the basic knowledge of professional nursing cognition and skilled clinical practice skills through the simulated situation of virtual reality, and add different clinical skills Situational simulation exercises, this situational learning method promotes students' learning motivation, and expands new knowledge learning based on the basic knowledge they have, enhances students' learning cognition, and strengthens students' practical skills. Clinical nurses need to improve the quality and process of care through innovative models to ensure patient safety. The hospital clinical nursing teaching strategies cultivate nursing capacity, from novice to proficient with knowledgeable practical experience, in accordance with clinical needs and care quality. Hu, et al., (2021) The National Taiwan University General Hospital produces nursing clinical education such as online tranquility and relaxation multi-teaching materials in virtual reality and pediatric e-Book interactive multimedia e-books to enhance the learning effect of education. In addition to providing students with learning in real situations, teachers guide students to reflect, give feedback and share, and carry out reflection in action and after action, which is also a very important process in this teaching (Huang & Chao, 2018).

2.3 Nursing clinical

2.3.1. Physiological monitoring: Click on the basic information of the patient, and upload the data directly to the cloud system after the bedside measurement. Nursing staffs can directly receive the physiological monitoring data from the computer information system. In recent years, major medical centers have successively used computer technology equipment in patient care and records, which is a major breakthrough and change for the nursing profession. The biggest advantage of the innovative system is that it can automatically transmit physiological data as electronic medical records, reducing the time of each nursing staff by about 580 seconds per shift, and the system transmission is stable without omission, so it can indeed increase the accuracy of the records, and the automatic record system can be connected with other units, so there will be no communication problems between units. The purpose of technology to improve clinical work and increase patient safety (Wu, et al., 2017).

2.3.2 Technology barcode: Medical institutions have begun to develop barcode technology to improve medical quality and administrative efficiency. Barcode technology is widely used in patient identification, medication confirmation and inspection processes due to its simple operation. After the barcode was imported, the average time spent on each specimen report was reduced by 109 minutes compared with that before the import; the specimen return rate decreased from 2.18% to 0.28%. Nursing staff have a positive acceptance of barcode technology, which shortens the sample reporting time and reduces the sample return rate, but can improve network speed and workflow to facilitate clinical operations (Cheng, et al., 2016).

2.3.3 Line video chat: Due to the COVID-19 epidemic, medical institutions have restricted family members from visiting guests. Instead, the Line video online system has been adopted. It can not only soothe the patient's anxiety, but also ease the anxiety of the family members, which is also in line with infection control. Standard measures for outbreaks.

2.3.4. Mobile nursing station: The mobile nursing station is a new type of nursing work vehicle that introduces wireless network and combines information technology and clinical nursing practice innovation. The overall acceptance of the mobile nursing station by nursing staff is high. The perceived usefulness and ease of use of the mobile nursing station, willingness to use, supervisor and peer support all have an impact on caregiver acceptance (Yang, et al., 2007).

2.3.5. QR code: QR code barcode, allowing patients and family members to scan the video and content of "related disease care" to improve the quality of patient care (Lo, 2015). For patients or their families, it is convenient and effective, reduces paper waste, and increases the effectiveness of nursing and health education.

2.3.6. E-books: The e-book system helps save nursing staff's time for health education, empowers patients to read e-books for health education first, and if readers have questions, they can discuss

with professionals. Evidence-based content conveys more accurate nursing medical knowledge (Lo, 2015)

2.3.7. Nursing information system: Use information technology to automatically notify alerts, and connect the treatment prompt function of the nursing information system to improve the immediacy of clinical information transmission and treatment. After the introduction of the system, the staff's work efficiency, information quality and medical quality have been improved, and the system's auxiliary functions have also reduced staff's work pressure. Staff does not need to spend time repeatedly transcribing or entering the same information into different systems, which improves the efficiency of nursing operations and increases the time for nursing staff to communicate with patients and provide care. It helps to reduce the workload and pressure of staff, and also improves the efficiency of nursing records and the accuracy, completeness and timeliness of data quality, which helps to improve the quality of medical care and patient safety; and there is no delay for staff to leave work (Teng, et al., 2014).

2.3.8. Long-term care: Nursing staff use technology to explain complex issues to patients, enabling effective monitoring of patients' chronic diseases in long-term care. Remote video consultation can save time and money. The application of technology in nursing can improve the quality of patient care. . Rapid technological development plays an important role in changing the nursing profession, and the advancement of technology in medical care can save people's lives. Sustainably inform, educate and innovate and expand the roles and skills of the nursing staffs (Chhetri & Koirala, 2017). Dewsbury (2019) Technology provides caregivers with new tools to enhance the care-health relationship, indeed providing the capacity for community long-term care management and empowering patients to participate in the control of their conditions and for caregivers to support them. Technology overcomes language and distance barriers to make nursing care more efficient and convenient.

2.3.9 COVID-19 innovative application: innovative care-mobile care package, which is equipped with blood oxygen machines and measuring instruments; we first teach patients how to operate and use technology and electronic software, so that patients can automatically upload medical information after self-monitoring The system allows medical staff to view the relevant information of the patient through the computerized medical information system, and can evaluate, observe, give advice and take care of the patient. Reduce the frequent access of medical staff to the isolation care ward and reduce the risk of cross-infection of infectious diseases.

Based on the above analysis, it can be seen that the application of smart technology is extensive and has practical benefits, the nursing business of nursing staff is more efficient, and the care of patients is more complete and high-quality, which is a win-win benefit.

2.4 Nursing Administration

Nursing scheduling: Scheduling is an important business in human resource management. In addition to coordinating with organizational policies and individual needs, there are many factors that need to be considered and are time-consuming and labor-intensive. With the promotion and application of nursing information-based operations, nursing staff developed an automated scheduling system to improve nursing scheduling operations. Compared with manual scheduling, the specific benefits of building an information-based scheduling system are: 1. Save scheduling time; 2. Improve nursing staff's scheduling satisfaction (Wung, et al., 2009). The application of smart technology in NTU medical system in nursing includes: smart bedside service system, smart electronic room door card, indoor positioning system, smart electronic whiteboard, nursing information system, automatic smart medicine cabinet, bedside health education system, transmission-based physiological monitors, Pepper robots, virtual reality teaching, etc., simplify the nursing process and improve the quality of patient care (Hu, et al., 2021). These technological advances include bedside service systems, a primary nurse call system, a room positioning system, an attendant online management system, a nursing information system 2.0, supporting system for clinical-decisions, and nursing application, to name a few. Clinical nurses need to improve the quality and process of care through innovative models to ensure patient safety.

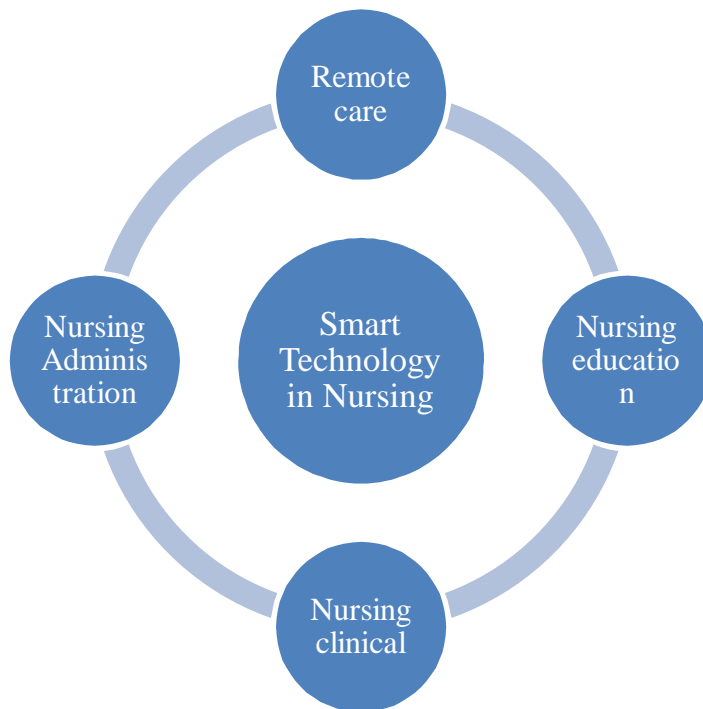


Fig 1 Application of Information Technology in Nursing

3. Conclusions

The global aging has led to an increasing demand for remote health care. Smart technology mainly enhances the communication between medical personnel and patients, and makes up for the actual distance between medical personnel and patients. Smart technology is actually of great help to medical institutions, and plays an important role and influence in the medical services of medical institutions. Technology comes from human nature, intelligent and innovative technology, so as to share medical resources and provide prompt and immediate services, so that patients or people's chronic diseases can be effectively monitored, which can save time and money, improve patient experience and satisfaction, and improve the quality of patient care, to maintain the quality of life of individuals and families.

The application of smart technology not only saves nursing staffs' time, but also increases the interaction between nursing staffs and patients or their families. Through the interaction process, the knowledge and concepts of humanized nursing services, health promotion and disease prevention can be implemented in daily life. Among them, establish a relationship of close trust, so that patients or their families can actually feel the core value and professionalism of nursing services, thereby promoting the brand and services of the hospital organization, and then generating when the demand arises, they will then seek the nursing service of the medical institution. In addition to the nursing professions that are generally required, the nursing staffs also emphasize active, warm and humanized care, showing the spirit of self-confidence, caring and nursing in the overall performances, so that patients and their families can deeply feel the connotation of nursing services and the importance of medical care. Institutional trust is the characteristic of high-quality medical institution nursing services. The smart technology created impressive impacts on the both medical services and nursing ones; This emerging trend of intensively applying high technologies will keep enhancing nursing service qualities and even inspire nursing revolution; The smart technologies in the nursing field will raise administration efficiency as well as human resource management in hospitals; and this trend of nursing technology development will revitalize nursing staffs' working efficiency and wellbeings which tightly encourage nursing staffs with positive coral values. In the future, adapting mobile technologies for use in teaching materials and courses may be further developed. Moreover, empirical studies may be used in future research in order to facilitate the increasingly successful integration of relevant technologies into nursing education. In addition, we reflect on this " Smart Nursing" model as a development milestone, we should consider its influential impact on the development of nursing informatics. (Fig 2)

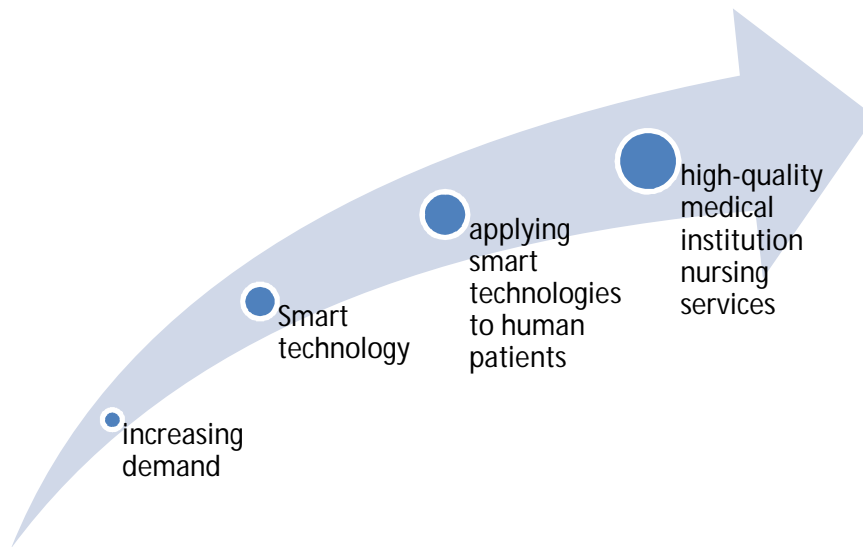


Fig. 2 Conclusion of the paper

4. Suggestion

4.1 The establishment and development of the smart technology nursing information system, it is recommended to arrange the responsible nursing supervisor, set up a nursing information team, the research and development of the nursing information system, education and training, implementation of follow-up counseling, use effect analysis, etc., and the use of smart technology by nursing staff. More clearly grasp and modify at any time.

4.2 Assess the professional suitability of nursing staffs, think about the education and process of nursing development, provide a complete talent training and coaching plan, and implement the overall training plan of information technology, so that the right people can be suitable for their talents.

4.3 In addition to the benefits that smart technology brings to our medical care, we should also carefully consider the privacy and rights of patients. In addition to complying with the hospital ethical principles, staff must respect patients to ensure the safety of patients' personal data.

4.4 Modern hospitals emphasize the service of smart medical care. Nursing staffs participate in the overall process of smart care and are familiar with every detail. In addition to the advanced technology of smart technology displayed in patients' medical treatment, they are still people-oriented and service-oriented.

4.5 Artificial intelligence continues to evolve and integrate into life, and the era of smart technology and medical care has come. Continue to develop medical technology and nursing technology, and use smart medical care to prevent or treat diseases in advance. Expand the boundaries of team medical technical support services, extend medical care to other countries, assist in the cultivation of medical professionals in other countries, provide domestic advanced medical technology and professionals, and devote to the dissemination of people's health knowledge and the maintenance of healthy behaviors.

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