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The Effect of Digital Technology Training on the Competence of Nurses in Telenurse Services

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ABSTRACT

The development of digital technology has changed the paradigm of health care, including in the practice of Telenurse, where nurses are required to have sufficient digital competence to provide remote services effectively. Purpose: This study purpose to determine the effect of digital technology training on the competence of nurses in Telenurse services. Methods: this study uses quasi-experimental quantitative design with pretest-posttest approach. The sample consisted of 20 purposively selected nurses at Hermina Hospital Pekanbaru. Data were collected using the nurse digital competency questionnaire and analyzed using the Wilcoxon test to determine significant differences in competency before and after training, because the sample size is relatively small and the data is not always normally distributed. Results: the results showed a significant increase in nurse competence after training, with an average pretest value of 60.5 increased to 82.3 on the posttest ($p < 0.05$). These improvements include aspects of mastering Telenurse applications, digital communication with patients, and technical troubleshooting. Conclusion: digital technology training effectively improves the competence of nurses in Telenurse services, thus enabling more efficient, accurate, and responsive services. The implications of this study emphasize the importance of continuous training programs for nurses to master digital technology, as well as hospital management support in the provision of adequate facilities and Telenourse systems to improve the quality of health services.

***Keywords**: Technology, Digital, Competence, Nurse, Telenurse*

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INTRODUCTION

The development of digital technology has changed almost all aspects of health care in the world, including in nursing practice. Digital technology offers solutions that can expand the range of services, improve patient access, and facilitate coordination between health workers. These changes require nurses to not only perform clinically, but also be able to utilize technology in their practice. This opens up great opportunities and challenges in improving the competence of nurses in the digital era. Therefore, understanding the role of digital technology training becomes very important to support the quality of nursing services in the future (Nazeha et al. 2020).

One of the health service innovations that utilize digital technology is telenursing, which is the provision of remote nursing care through communication technology. Telenursing focuses on the use of digital devices such as telephones, video applications, and information systems to support interactions between nurses and patients. With telenursing, patients can receive services efficiently without having to be physically present at a health facility. However, the implementation of telenursing requires nurses to have sufficient digital competence to run this service effectively. This condition is an important concern in the context of digital technology training for nurses (Hilfida et al. 2023).

The competence of nurses in telenursing practice includes social, personal, methodological and professional abilities integrated with digital skills. Social competence includes the ability to communicate effectively through digital media, while methodological competence includes knowledge of the assessment process and digital documentation. In addition, professional competence requires an understanding of ethics, data safety, and digital service standards. The inability to make good use of technology can potentially decrease the effectiveness of services and affect patient safety. Therefore, comprehensive training is a key element in building these competencies (Hilfida et al. 2023).

But in reality, the level of digital readiness of nurses in many settings is still not optimal due to the limitations of formal training and practical experience. Some studies show that nurses have limited knowledge of telenursing and telehealth practices, as well as a lack of experience in the use of such technologies in clinical services. This not only affects the effectiveness of services, but also poses obstacles to the wider adoption of digital technologies in health facilities. Thus, a clear mapping of the digital competence needs of nurses is needed. This mapping will be the basis for designing training programs that match the demands of telenursing practices.

Digital technology training in health is not new; many training programs have been developed to improve the competence of health workers. For example, digital simulation training has been used to teach telehealth competencies and the use of technology in clinical interactions. This kind of training helps participants to understand technology, while increasing confidence when using digital tools in a real context. Digital educational interventions are proven to improve knowledge, self-efficacy, and telehealth use across a variety of nursing practice settings. The effectiveness of this training suggests that a structured training approach can be an effective strategy for improving nurse competence (Van Houwelingen et al. 2020).

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In the context of Higher Education, the integration of telehealth skills into the nursing curriculum has been identified as an urgent need. An education for nursing students that includes telehealth prepares them to face the digital nursing practices of the future. This is important because graduates who are ready to use will be easier to adapt to the increasingly technology-based health care system. Formal education on telehealth also helps build the competency base required for telenursing practice. These demands are increasingly relevant in the face of a changing healthcare landscape (Love & Carrington 2020).

The existence of gaps in formal training causes many nurses to experience significant digital competency gaps. Less digitally trained nurses tend to have difficulty performing tasks involving information technology devices. This not only hinders the effectiveness of services, but also has the potential to lead to job stress and professional dissatisfaction. The impact is increasingly visible when nurses have to transition from conventional practice to digital practice in a short time. Therefore, training strategies need to be designed taking into account the characteristics of nurses ' learning needs.

On the other hand, the use of telenursing has significant benefits to the quality of nursing services, including increased access to services for patients in remote areas. Digital services allow nurses to provide patient education, monitoring, and follow-up without having to meet in person. This is particularly impactful for patients with limited mobility, chronic patients, or patients who live far from health facilities. Thus, the digital competence of nurses will have a direct impact on the quality of care received by patients. This lack of competence can reduce the effectiveness of telenursing as a modern health service solution (Zuliatika & Purnamawati 2023).

At the global level, health organizations emphasize the importance of digital competence for health workers to be able to face the challenges of 21st century health services. The digital competency framework for healthcare professionals includes technology literacy, information management, digital communication, and an understanding of ethics and data security. These competency standards guide the development of relevant curricula and training programs. Without training based on competency standards, health digitization programs run the risk of not achieving the expected goals. This standard is also a reference for evaluating the ability of nurses in telenursing practice (Nazeha et al. 2020).

In addition, effective training not only increases theoretical knowledge, but also increases the confidence and self-efficacy of nurses in using digital technology. Self-efficacy is an important factor in determining the extent to which nurses can apply new skills in real practice. Training that involves simulations, hands-on practice, and feedback can strengthen this ability. Without high self-efficacy, nurses tend to be reluctant to use technology optimally. Therefore, an effective training strategy should pay attention to the psychological aspects of the participants (Van Houwelingen et al. 2020).

Institutional health policymakers need to develop policies that support the integration of digital training into sustainable professional development (PKB) programs. The policy should include incentives for nurses to attend training, budget allocations for technology and instructors, as well as mechanisms for evaluating training outcomes. Without supportive policies, digital

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training programs will be difficult to run systematically. The policy should also consider the specific needs of nurses in various service units. This is so that the training provided is relevant to the needs of each nurse's duties (Nazeha et al. 2020).

In addition, collaboration between educational institutions and health care facilities can strengthen the development of contextual training programs. This kind of collaboration allows sharing of resources, experiences and access to real practice. New students and nurses can gain hands-on experience from the time of Education. While already working nurses can continue to update their skills through joint development programs. This collaborative Model demonstrates the potential in accelerating the improvement of nurses ' digital competence (Love & Carrington 2020).

Evaluation of digital technology training also needs to be carried out on an ongoing basis to ensure its effectiveness. This evaluation includes aspects of knowledge, technical skills, practice implementation and impact on patient services. Without evaluation, the training effort cannot be improved or adapted to changing needs. A good evaluation also helps the health institution to determine which training programs are most effective. It is important to guarantee that the resources used provide maximum results (Van Houwelingen et al. 2020).

Empirical research that examines the direct relationship between digital technology training and nurse competence in telenursing services is still relatively limited. Many of the new studies focus on the description of competency needs or perceptions of telehealth without measuring the impact of training directly. This research gap makes the scientific substantiation of the effectiveness of training in the context of telenursing less robust. Empirical evidence is the basis for designing evidence-based educational and clinical policies. Therefore, research linking digital training and nurse competency is becoming urgent (Nazeha et al. 2020).

In practical terms, effective digital technology training will open up opportunities for nurses to be more innovative in solving health problems digitally. Trained nurses can optimize technology for patient assessment, Health Education, monitoring, and remote follow-up. This not only reduces the physical workload, but also extends the range of services to a wider community. This positive impact will ultimately improve the overall quality of Health Services. This study is expected to provide evidence and recommendations for the development of digital training in the future (Nazeha et al. 2020).

Digital technology training has a very important role in improving the competence of nurses for telenursing services. Structured training and supported by adequate policies and infrastructure will produce clinically and digitally competent nurses. This competency is an important prerequisite in facing digital transformation in the health care sector. This study aims to fill the void of empirical evidence on the relationship between digital training and nurse competence in telenursing. It is hoped that the results of the study will form the basis for policy recommendations for education, training, and better nursing practices in the future (Nazeha et al. 2020).

This research provides an important contribution in understanding how digital technology training can affect the competence of nurses in telenursing services. With the increasing digital competence of nurses, telenursing services can be optimized to improve access and quality of health

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services. Researchers ' interest in this topic is based on nurses as the frontline of health services have a strategic role in ensuring the quality and safety of technology-based services. However, there is still a gap between the demands of digital competence and the readiness of nurses in real practice, especially related to digital technology training that has not been optimal. This condition encourages researchers to examine more deeply the effect of digital technology training on the competence of nurses in telenurse services.

METHODS

This study used quasi-experimental quantitative design with pretest-posttest approach to assess changes in nurse competence before and after digital technology training intervention. The sample consisted of 20 purposively selected nurses at Hermina Hospital Pekanbaru with inclusion criteria, among others, active nurses involved in nursing services, willing to follow the entire series of training, and have basic skills in the use of digital devices. The exclusion criteria included nurses who were on leave, did not complete training, or did not complete the questionnaire.

Data were collected using a nurse digital competency questionnaire and analyzed using the Wilcoxon test to determine significant differences in competency before and after training, given the relatively small sample size and not always normal distribution of data. The entire research process was carried out by observing the principles of research ethics, including respect for the autonomy of respondents through informed consent, confidentiality of data, the principle of justice, and the principle of beneficence and non-maleficence to ensure the study does not cause harm to participants.

RESULTS

1. Frequency Distribution of Nurse Competence before and after

Table 1. Frequency Distribution of Nurse Competence before and after Digital Technology Training (n = 20)

Nurse Competency Variables	Mean	SD	Minimum Value	Maximum Value
Pretest	60,5	6,8	48	72
Posttest	82,3	5,9	70	92

Based on Table 1, the results of the univariate analysis showed that the average value of nurse competence before digital technology training was 60.5 and increased to 82.3 after training. This increase in the average value indicates an improvement in the competence of nurses in a descriptive manner after being given digital technology training intervention. The range of posttest scores also showed that most respondents achieved higher competency scores than before the training.

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2. Frequency Distribution of Telenurse Competency Aspects After Training

Table 2. Frequency Distribution of Telenurse Competency Aspects after Training (n = 20)

Telenurse Competency Aspects	Mean	SD
Mastery of Telenurse applications	83,1	5,7
Digital communication with patients	81,8	6,2
Technical troubleshooting	82,0	5,9

Table 2 shows that all aspects of telenurse competency are in the high category after digital technology training. The mastery aspect of the Telenurse application had the highest average score, followed by technical problem solving and digital communication with patients. These results show that training has a positive impact evenly on all aspects of competence measured.

3. The Effect of Digital Technology Training on Nurse Competence

Tabel 3. The Effect of Digital Technology Training on Nurse Competence (n = 20)

Variable	Mean Pretest	Mean Posttest	Mean Difference	p-value
Nurse Competence	60,5	82,3	21,8	0,000*

Specification: * significant at $\alpha < 0.05$

Based on Table 3, Wilcoxon test results showed a p-value of 0.000 ($p < 0.05$), which means there is a significant difference between the competence of nurses before and after digital technology training. Thus, it can be concluded that digital technology training has a significant effect on increasing the competence of nurses in telenurse services.

DISCUSSION

The results of this study indicate that digital technology training has a significant effect on increasing the competence of nurses in telenurse services. An increase in the average value of 60.5 on the pretest to 82.3 on the posttest shows that the training is able to improve the ability of nurses significantly. These findings indicate that technology-based educational interventions can be an effective strategy in responding to the demands of modern nursing services. Nurse competence is the main element in ensuring the quality and safety of Health Services.

Nurse competence is conceptually understood as the integration of knowledge, skills, and professional attitudes that are reflected in the ability to provide nursing care in a safe and quality manner. In the context of technology-based nursing services, the strengthening of competencies cannot be separated from a structured learning process that is relevant to the needs of the practice. Digital technology training serves as a learning tool that accelerates the mastery of new competencies needed in telenursing. This is in line with the study of van Houwelingen et al. which confirms that planned training can significantly improve the competence of nurses in distance nursing practice (van Houwelingen et al., 2020).

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The increase in the competence of nurses after training also reflects the effectiveness of applying the principles of adult learning in nursing education. Adult learning emphasizes that the learning process will be more optimal if the material is tailored to the needs of work, is applicable, and oriented to problem solving. The digital technology training in this study was designed based on the real demands of telenurse services, thus encouraging active involvement and motivation of nurses during the learning process. These conditions allow nurses to more easily integrate new knowledge and skills into clinical practice (Love & Carrington, 2020).

The mastery aspect of telenurse application experienced a significant improvement after the training. Mastery of technology is part of digital literacy which is a basic competence in modern nursing practice. Digital literacy enables nurses to access, manage, and use information technology effectively in health care. Hands-on practice-based training gives nurses the opportunity to interact directly with the telenurse app. The researchers ' analysis showed that practice-based learning is more effective in improving the technical skills of nurses (Van Houwelingen et al., 2020).

Increased mastery of the telenurse application is also closely related to increased nurse confidence. According to Bandura's theory of self-efficacy, an individual's confidence in his abilities will increase through direct experience and success in completing tasks. Nurses who attend training become more confident in operating digital technology. This confidence is critical in ensuring nurses are able to apply acquired skills in real practice. Researchers consider that increased self-efficacy to be the main supporting factor for training success (Nazeha et al., 2020).

In addition to technical aspects, digital communication skills with patients have also increased significantly. Communication is at the core of nursing services, including telenourse services. In telenursing, communication is carried out without physical contact and therefore demands greater clarity and empathy. The training helps nurses understand therapeutic communication techniques through digital media. This is in line with the research of Nazeha et al. which emphasizes the importance of digital communication competence in maintaining patient safety and satisfaction (Nazeha et al., 2020).

Improving digital communication capabilities is essential to prevent miscommunication in remote services. Miscommunication can impact clinical decision-making errors and decrease the quality of care. The training provides nurses with an understanding of the ethics of digital communication and how to convey medical information effectively. Researchers assess that good digital communication skills will strengthen the therapeutic relationship between nurses and patients. These findings are in line with Love and Carrington's emphasis on the role of communication in telenursing success (Love & Carrington, 2020).

The technical problem solving aspect also shows improvement after digital technology training. In the practice of telenursing, nurses often face technical obstacles such as network interruptions or incorrect use of applications. Problem solving theory states that the ability to solve problems can be improved through targeted training. Training in this study equips nurses with the basic knowledge to overcome technical problems. The researchers ' analysis showed that nurses

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became more prepared and adaptive in the face of technical challenges (van Houwelingen et al., 2020).

This increase in technical ability also has an impact on reducing nurses ' anxiety about using technology. Before training, nurses tend to feel doubt and fear of making mistakes. After training, nurses showed a more positive attitude towards the use of digital technology. This is in accordance with the theory of adaptation which states that a good understanding will make it easier for individuals to adapt to new environments. Researchers assessed that nurses ' adaptation to technology improved after training (Van Houwelingen et al., 2020).

Overall, the improvement in nurses ' competence shows that digital technology training is effective as an educational intervention. Training improves not only the knowledge, but also the skills and professional attitude of nurses. This is important in the face of digital transformation in the health sector. Researchers consider that training is a strategic means to bridge the digital competence gap of nurses. (Van Houwelingen et al. 2020).

The results of this study are also in line with Love and Carrington's research that emphasizes the importance of telehealth integration in nursing education and training. Digital technology training prepares nurses to deal with changing patterns of health care. Digitally competent nurses will be better equipped to provide telenurse services. Researchers assess that this training can improve the readiness of nurses in modern nursing practice. Thus, training has strategic value in the development of nursing (Love & Carrington, 2020).

Increasing the competence of nurses also has an impact on the quality of Nursing Services. The theory of Health Service Quality states that the competence of health workers is the main determinant of service quality. A competent nurse will provide a safer and more effective service. Digital technology training helps nurses achieve the required competency standards in telenursing. The researcher considered that this increase in competence would have a positive impact on the quality of patient care (Nazeha et al., 2020).

From an organizational perspective, the results of this study show the importance of institutional support in the implementation of training. Support in the form of facilities, time, and policies greatly affect the success of the training. Systems theory states that individuals and organizations influence each other in achieving goals. The researchers considered that the support of health institutions to be the main supporting factor for the success of this training. Without organizational support, training will not run optimally (Van Houwelingen et al., 2020).

This study also shows that digital technology training can improve nurses ' readiness to face changes in the health care system. Digital transformation requires nurses to constantly update their competencies. The theory of change states that training can improve an individual's readiness to face change. Researchers noticed that nurses became more adaptive after training. This is important for the sustainability of telenurse services (Nazeha et al., 2020).

Increasing the competence of nurses also has the potential to increase job satisfaction. Nurses who feel competent tend to have lower levels of job stress. Job satisfaction theory states that ability and self-confidence affect professional satisfaction. Researchers assume that digital technology

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training can have a positive impact on the well-being of nurses. This aspect can be investigated further in subsequent studies.

From the patient's perspective, the nurse's competence in telenursing largely determines the quality of the service experience. Patients will have more confidence in nurses who are able to use technology well. Patient trust is an important element in the therapeutic relationship. Researchers assess that increasing the competence of nurses will increase patient satisfaction and confidence. This is an added value of digital technology training (Love & Carrington, 2020).

This research also supports the development of technology-based training policies in hospitals. Policies that support training will accelerate nurses ' adaptation to new technologies. Human resource management theory emphasizes the importance of training in improving workforce performance. Researchers suggest that digital technology training be a routine program. Thus, the competence of nurses can be continuously improved (Nazeha et al., 2020).

The integration of digital technology training into continuous professional development programs became a strategic step. The Program allows the nurse to constantly update her skills. Researchers consider that one-time training is not enough to deal with the rapid development of technology. Therefore, continuous training is indispensable. This is in line with the principle of lifelong learning in nursing (Love & Carrington, 2020).

This research also provides theoretical contribution in the development of Nursing Science. The research findings reinforce the theory that competence can be improved through appropriate educational interventions. Researchers see that digital technology training can be a model of technology-based nursing intervention. This Model can be applied in various health care settings. Thus, the study has significant academic value (van Houwelingen et al., 2020).

Overall, the results of this study indicate that digital technology training is an important investment for the development of nursing. This investment not only improves the competence of nurses, but also the quality of Health Services. Researchers assess that the benefits of training are much greater than the costs incurred. Therefore, digital technology training needs to be a priority. This finding reinforces the urgency of telenursing development in Indonesia (Love & Carrington, 2020).

The increase in competency that occurs reflects the success of training interventions designed according to the needs of the practice. The results of this study are consistent with relevant theories and previous research. The researchers concluded that digital technology training is an effective strategy in improving the competence of nurses. This research is expected to be the basis for the development of nursing practices, education, and policies based on technology and can be applied in health services, especially hospitals.

CONCLUSIONS

The results showed that digital technology training provides a significant increase in nurse competence, both in terms of mastery of Telenurse applications, digital communication skills with patients, and technical problem solving skills. The increase in the average competency score from

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60.5 on pretest to 82.3 on posttest ($p < 0.05$) proves that the training intervention has a real effect on the practical ability of nurses. This training provides a structured learning experience and relevant to the demands of telenursing services, so that nurses are able to be more confident in using digital technology and adapt to the evolving work environment.

Overall, digital technology training has proven effective as a strategy to strengthen nurses ' competence in telenurse services, which has a direct impact on the quality of services that are more efficient, accurate, and responsive. This increase in competence also opens up opportunities for continuous professional development and wider application of technology-based practices in hospitals. The researcher considered that the integration of digital technology training in the nurse professional development program is a strategic step to ensure that health services remain quality in the digital era. Therefore, investment in digital technology training not only improves nurse skills, but also improves the quality of Service and overall patient satisfaction.

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