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Self-efficacy and students' readiness for providing nursing care through telenursing

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ABSTRACT

The advancement of technology has transformed the way nursing care is delivered. This study aimed to assess self-efficacy and readiness among nursing students in providing nursing care through telenursing at STIKES Amanah Makassar. Research design was a mixed-methods with a sequential explanatory consisting of two phases. The first phase used a retrospective quantitative approach with a standardized questionnaire. The second phase employed a qualitative approach through in-depth interviews. The results indicated that all students had high self-efficacy (100%), but their readiness to implement telenursing varied, where students' high readiness (88.2%) and moderate (11.8%). Qualitative analysis revealed that although students were confident in their basic nursing skills, they still faced challenges with the technical aspects and adaptation to telenursing technology. Self-efficacy and readiness played a significant role in students' ability to provide nursing care through telenursing. All students have high self-efficacy were better prepared to face mental and technical challenges, including technology adaptation. While most students showed good readiness, there was still a need for strengthening technical skills and understanding of telenursing. Although each student showed a high level of self-efficacy, there were differences in their preparedness to use telenursing.

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INTRODUCTION

In the age of Industry 5.0, the quick development of information and communication technology has had a profound impact on a number of industries, including healthcare. One significant development in this area is telenursing, which is the practice of delivering nursing care remotely using phones, messaging apps (like WhatsApp and Telegram), and other online platforms (Pandin et al., 2021). Even when nurses and patients are in separate places, telenursing makes it possible to provide nursing care that is more effective, efficient, and continuous. This innovation enhances

patient condition monitoring and reporting while also facilitating contact between patients and distant nurses (Pepito and Locsin, 2018). Telenursing is popular and has been shown to be successful in raising patients' quality of life in a number of developed nations. The goal of telenursing is to support, educate, and provide information rather than to make medical diagnoses. Nurses can analyze and gather information, intervene, assist families, implement creative, team-based care, and offer health education using telenursing. Additionally, in telenursing practice, nurses also conduct follow-up assessments, planning, interventions, and evaluations of care outcomes (Fadhila and Afriani, 2019). Telenursing also would be helpful in future disasters (Nejadshafiee *et al.*, 2022). Telenursing is influential for patients' activities of daily living (Nejadshafiee *et al.*, 2022). In Korea, 19.1% of the population has used telenursing for nursing services (Mun, Choi, and Woo, 2024). Meanwhile, in Indonesia, the digital health transformation is also underway with the vision of digitalization to achieve a Healthy Indonesia (Kementerian Kesehatan, 2023).

Telenursing has been introduced in various educational institutions abroad to enhance nursing students' skills in providing technology-based nursing care. Telenursing is used as a learning media in nursing school to meet the direct care requirement (Hargreaves *et al.*, 2021). In Indonesia, telenursing education is also beginning to be implemented as an innovative method to broaden nursing students' horizons and encourage their achievements (Fadhila and Afriani, 2019). Telenursing is viewed as a complex method of care delivery that must be taught continuously in line with the increasingly dynamic pace of development in information and communication technology. This presents challenges for students in delivering remote nursing care. However, not all educational institutions or nursing students utilize telenursing applications optimally. With the continuous advancement of technology, nursing students and nurses are required not only to master conventional clinical skills but also to be skilled and innovative in applying technology-based nursing care.

According to Abusubhiah et al. (2023), self-efficacy plays a crucial role for nursing students and nurses in facing challenges, including the rapidly advancing technology, as self-efficacy reflects an individual's confidence in their own abilities. This significantly affects how students manage academic and clinical challenges. A high level of self-efficacy enables students to be more confident in applying their knowledge in clinical practice, including in the context of telenursing, which requires specific skills such as effective communication and the use of technology. According to Bandura's theory (1977), self-efficacy refers to a person’s confidence in their capacity to carry out a task or attain a specific goal; a high level of self-efficacy can improve motivation, perseverance, and one’s capability to deal with challenges. In nursing education, Bandura's self-efficacy theory can be conceptually deepened within the readiness framework by understanding that self-efficacy is the bridge between students' cognitive-affective potential and the actualization of their clinical readiness. Self-efficacy strengthens readiness, while adequate readiness strengthens self-efficacy, forming a continuous learning cycle.

In the field of telenursing, individuals with high self-efficacy regarding their abilities tend to utilize current technology and can provide optimal nursing care even when patients are located remotely or far from the nurse. In addition, students’ readiness to embrace digital transformation in nursing care is also a crucial factor. Technology preparation encompasses technical proficiency in using digital equipment, comprehension of telenursing protocols, and mental fitness to handle a variety of possible obstacles, according to Madhuwanthi et al. (2022). It will be simpler for people who are prepared to adjust to technological advancements to provide high-quality nursing care. A generation of nurses who can adjust to the demands of technology-based nursing care should be prepared by prioritizing the development of students' self-efficacy and preparation. Research on self-efficacy and students' preparedness for telenursing in Indonesia is still scarce, despite the fact that telenursing has previously been used in a number of developed nations. The challenges of telenursing in Indonesia (limited internet, low digital literacy, regulations, and workforce

readiness) provide an applicable context because they force the world of nursing education and practice to innovate, adapt, and adjust technology to the realities of local communities, rather than simply copying foreign models.

The advancement of technology-based nursing care and the incorporation of telenursing into nursing education programs both benefit from this research. Thus, the purpose of this study is to investigate nursing students' self-efficacy and preparedness for telenursing. It is anticipated that the results would be used as a guide by hospitals, community health centers, and nursing schools to enhance the provision of technology-based nursing services, especially in Indonesia. Assessing students' self-efficacy and preparedness to provide nursing care via telenursing at STIKES Amanah Makassar is the aim of this study.

RESEARCH METHOD

Study Design

A mixed-methods strategy is used in this study, integrating quantitative and qualitative techniques. The method employed is a sequential explanatory design, where data collection and analysis are done first in the quantitative phase. In the quantitative phase, a retrospective survey is conducted to assess nursing students' self-efficacy and readiness to prepare themselves to provide nursing care through telenursing at STIKES Amanah Makassar. Subsequently, in the qualitative phase, a descriptive-analytic design is employed to gather data that will deepen the research findings. The qualitative approach employed descriptive-analytic methods through in-depth interviews, and the results were analyzed using the NVivo 12 software.

Sample/Participants

The sampling technique used was purposive sampling with a sample have 110 nursing students from STIKES Amanah Makassar. The inclusion and exclusion criteria for informants are as follows: The inclusion criteria included: (a) willing to participate in the study, (b) active students currently completing the nursing program at STIKES Amanah Makassar, (c) students involved in clinical practice or related nursing experience, (d) students who have attended telenursing courses. The exclusion criteria: (a) students on leave or not actively enrolled, (b) students without knowledge of telenursing.

Instruments

The instrument used was the Indonesian version of the General Self-Efficacy Scale (GSES) (Novrianto, Marettih, and Wahyudi, 2019) and a questionnaire on students' readiness for telenursing. The GSES questionnaire aimed to assess students' self-efficacy regarding telenursing. It consisted of 10 questions with response options: Strongly Disagree (SD) scored 1, Disagree (D) scored 2, Neutral (N) scored 3, Agree (A) scored 4, and Strongly Agree (SA) scored 5. The categories for self-efficacy scores are as follows: low self-efficacy: scores 10-29, high self-efficacy: scores 30-50, which had a construct validity test value with a t-value > 1.96. Additionally, the questionnaire also measured students' readiness for telenursing. The student readiness for telenursing questionnaire was tested for validity and reliability by the researcher using product-moment validity and reliability tests with SPSS 23. The validity test results showed a significance level of 5%, with the calculated r-value > r-table (0.279). The reliability test results indicated a Cronbach's alpha of α=0.964 > r-table (0.279), demonstrating that the questionnaire was both valid and reliable. This questionnaire consisted of 20 questions with response options: Strongly Agree (SA) scored 4, Agree (A) scored 3, Disagree (D) scored 2, and Strongly Disagree (SD) scored 1. The categories for readiness are: low readiness (scores 20-39) and high readiness (scores 60-80). The questionnaire was distributed to 110 nursing students at STIKES Amanah Makassar who met the study's inclusion criteria. SPSS 23 was utilized to analyze the quantitative data. In the second phase, data were collected using a qualitative method by conducting in-depth interviews with 5 informants, nursing students from STIKES Amanah Makassar, using interview guidelines and

voice recording tools. The in-depth interviews were conducted by the research team. Subsequently, qualitative data were analyzed using the NVivo 12 software.

Data Analysis

Quantitative data using descriptive analytic methods through SPSS. Qualitative data, collected in the second phase, were analyzed by transcribing interview recordings verbatim (word-for-word), anonymized to protect respondents' confidentiality, and then uploaded into NVivo 12 (qualitative data analysis software).

Information on Ethical Clearance Fit Test

Research ethics were applied by asking respondents/informants to voluntarily fill out an informed consent form to ensure confidentiality, protect their identities, and respect their rights. Participation in this study was voluntary, and respondents/informants were free to participate if they met the eligibility criteria. Once respondents/informants filled out and signed the informed consent form, it indicated their readiness to participate in the study. However, if they did not complete and sign the informed consent form, they were not included in the study, even if they met the inclusion criteria. This research has received ethical approval from another institution (Approval number: 108/STIKES-NH/KEPK/V/2024).

RESULTS AND DISCUSSIONS

Characteristics of the Respondents

Table 1. Characteristics of the respondents

Characteristic	Category	N	Percentage (%)
Age (year)	18 - 27 years	63	57.3
	28 - 37 years	36	32.7
	38 - 47 years	11	10
Sex	Male	20	18.2
	Female	90	81.8
Academic	Semester 2	59	53.7
	Semester 4	27	24.5
	Semester 6	24	21.8

Table 1 shows that respondent majority were aged between 18-27 years (57.3%), while the remaining respondents were aged 28-37 years (32.7%) and 38-47 years (10%). Female respondents accounted for around 90 participants (81.8%), while male respondents made up approximately 20 participants (18.2%). Based on academic levels, 59 respondents (53.7%) were in their second semester, 27 respondents (24.5%) were in their fourth semester, and 24 respondents (21.8%) were in their sixth semester.

Self-Efficacy and Students' Readiness for Telenursing

Table 2. Frequency distribution of self-efficacy and students' readiness for telenursing

Variabel	Category	N	Percentage (%)
Self efficacy	High	110	100
	Low	0	0
Students' readiness	High	97	88.2
	Moderate	13	11.8
	Low	0	0

Table 2 shows that all respondents demonstrated high self-efficacy (100%) in providing nursing care through telenursing. In terms of student readiness, 97 respondents (88.2%) showed a high level of readiness to provide nursing care through telenursing, while 13 respondents (11.8%) had moderate readiness, and none of the respondents demonstrated low readiness.

Nursing students involved in telenursing possess crucial skills for delivering healthcare services through technology. Firstly, nursing students should have good technological skills, including proficiency in using software, email, and other applications that support technological competence. This will facilitate their access to telenursing. In addition, nursing students should possess effective communication skills, as this will ensure that information provided to patients and their families is delivered completely and accurately. Besides these skills, it is also essential for them to have the competence to provide nursing care through telenursing. Although technology is used, the nursing process must be carried out comprehensively, starting from assessment, diagnosis, intervention, implementation, to evaluation and documentation of nursing care. They must be capable of performing all these steps. Furthermore, even when providing care through telenursing, they must uphold professional nursing values in every interaction with patients and their families. It is also necessary to have the skills to deliver health education to clients, explaining health information clearly and simply, so that patients and their families understand the instructions and follow the guidance provided by the nurse.

The role of nurses' skills in providing remote healthcare services, or telenursing, is crucial for enhancing the quality of healthcare services. In the context of telenursing, nurses need to be proficient in using information technology such as computers, mobile health applications, and other communication devices to facilitate communication with patients and deliver effective health education. Remote communication requires specific skills, so nurses must be able to communicate clearly and effectively using technology, while also understanding potential barriers in remote communication. Effective telenursing takes into account the content of education, the timing of evaluations, and follow-up. Nurses must be capable of collecting data, providing follow-up, and delivering multidisciplinary care. Moreover, the use of information technology is essential in telenursing. Nurses must be trained in using electronic and communication devices to ensure smooth communication with patients and to offer effective health education.

"……Telenursing allows health checks to be conducted from home, providing care for patients remotely. Nurses can directly observe patients via televideo, which makes the service more efficient. Through telenursing, healthcare services can be improved, even with the patient at home. It's more comfortable and accessible for healthcare services." Informant 01

"……You need to have the skills to provide telenursing services. Telenursing can reach a wide range of people since many are now using social media. It also saves a lot of time when using telenursing." Informant 02

"……Regarding practical skills in the field, they may still be lacking. But in terms of the theory, I understand a little because I've had some direct practice before. Telenursing is very helpful for people, especially those in remote areas where the distance to the hospital is far from their homes. It is more efficient to use telenursing in situations like check-ups. Some people may not have transportation or are hindered by distance, so this is very helpful for those needing remote check-ups or consultations." Informant 03

"……..Nurses must master skills and theory, especially when it comes to IT. These skills are crucial for telecommunication." Informant 04

"……You can communicate remotely to provide care and health services. Telenursing also helps minimize costs." Informant 05

Telenursing is beneficial for patients suffering from chronic illnesses who require consultations and additional services. This method allows nurses, equipped with enhanced skills through virtual meetings, to provide better nursing care. Standardization and nursing training are essential for developing the telenursing system. Nurses must be trained to use medical information technology and to develop systems and applications that meet patients' needs.

"……We use laptops, video conferences, teleconferences. Technology is evolving now." — Informant 01

"…….We can contact patients through social media, like WhatsApp or others." — Informant 02

"……..We use those applications, and sometimes people also use apps like Satu Sehat, or there's teleconferencing through social media apps." — Informant 03

"…….We check patients remotely, or doctors can assess their health using telecommunication, such as mobile phones or social media apps like WhatsApp. There are also apps like Halodoc that allow for health check-ups." — Informant 04

"……Telenursing uses video or Zoom to show images so that they can understand better." — Informant 05

Thus, the role of nurses in providing remote healthcare or telenursing is crucial in improving the quality of healthcare services and ensuring that patients receive effective and integrated nursing care. Therefore, healthcare institutions need to prioritize training and skill development for nurses in utilizing technology, while also strengthening their self-efficacy in delivering remote healthcare services.

Self-efficacy is a person's belief in carrying out actions to achieve desired outcomes. In nursing, particularly in telenursing (remote nursing care), self-efficacy plays a crucial role as it involves technology and non-face-to-face or virtual interactions with patients. In this research, all students have self-efficacy was categorized as high (100%). This finding is consistent with the study previously, which indicated that nursing students possess a high level of awareness, knowledge, and positive attitudes toward the use of technology in delivering quality healthcare (Alshammari et al., 2024). The study, conducted at public universities in Saudi Arabia, highlighted the importance of implementing focused educational strategies aimed at improving students' technological skills and their understanding of telenursing practices. The relationship between knowledge, awareness, and attitudes highlights the importance of a comprehensive approach that integrates various aspects. Future qualitative research is recommended to identify nursing students' perspectives on telenursing and their roles in supporting telenursing as an advancement toward improved nursing services. In this study, nursing students demonstrated a high level of self-efficacy; they felt more prepared to interact with patients, communicate with healthcare teams, and provide professional nursing care. Additionally, students who had high self-efficacy were already aware of how to use their skills to accept problems and believed they could overcome any challenges that might come up when telenursing to provide nursing care. As a result, self-efficacy is crucial for nursing students, particularly when it comes to becoming ready for the job. These results are in line with earlier studies that have shown that students who have high levels of self-efficacy are more comfortable taking on difficulties and believing in their own abilities (Holleb, 2016). According to another study, self-efficacy plays a significant role in determining nursing students' preparedness for clinical exposure sooner (Kumalasari et al., 2021).

A high level of self-efficacy boosts a person's perceived capacity to apply theoretical knowledge in practical settings and gives them more confidence to face problems in clinical settings. Increased preparation is also linked to higher self-efficacy, which helps students deal with clinical issues more skillfully. Prior studies have demonstrated a strong relationship between students' self-efficacy and their preparedness for self-directed learning (Turan and Koç, 2018). This study focuses on how students' confidence in their own skills is shaped by their particular learning readiness. The results show that critical thinking, self-efficacy, and a number of other educational outcomes are influenced by preparation for self-directed learning. These findings support the current study's conclusion that, in the context of telenursing, self-efficacy and learning preparedness are critical components in guaranteeing efficient nursing care delivery. Furthermore, preparation and self-efficacy have an impact on knowledge, abilities, and attitudes in addition to schooling. The idea of self-efficacy, which refers to a person's confidence in their capacity to carry out particular activities, is crucial to nursing education since it has a direct bearing on students' capacity to deliver high-quality nursing care. Self-efficacy can be a determinant of personal readiness to enter the workforce in the future.

According to theory of Bandura (1977), self-efficacy is strongly influenced by motivation and persistence. Individuals with high self-efficacy are more likely to face challenging tasks, whereas those with low self-efficacy tend to avoid challenges. Additionally, self-efficacy affects decision-making and stress management: individuals who trust in their abilities are better prepared to handle pressure and stress.

Nursing students in this study reported that having a high level of self-efficacy makes them less likely to give up when facing technical difficulties in telenursing. They are determined to continue working until they succeed in providing optimal care. Confident students are also able to remain calm and focused, even when dealing with technological barriers or communication problems with patients. The self-efficacy that students have regarding their abilities also influences their readiness to face early clinical exposure. Low self-efficacy may cause students to feel less prepared for clinical exposure, even if they are genuinely interested. However, if their readiness is low, they may feel anxious and fearful about being unable to manage clinical exposure well and achieve satisfactory outcomes.

To apply telenursing effectively, nursing students must possess a combination of both material knowledge and mental skills. From a knowledge perspective, students must understand the information and communication technologies used in telenursing, such as the internet, video conferencing, and computer information systems. Good communication skills are also crucial, as students must communicate with patients and their families through remote media. Additionally, students should be able to conduct advanced assessments, plan care, intervene, and evaluate the outcomes of care.

"……Students need to learn telenursing before taking action. We should seek out materials or references related to telenursing so we can later explain it to users. There are many telenursing training programs available now. As nurses, we should attend these trainings to apply what we've learned. One of the key skills to master is communication." — Informant 01

"……...There are many resources, like YouTube videos or seminars, that can help us upgrade our telenursing skills. We can join and learn from them." — Informant 02

"……We prepare ourselves on how to give therapeutic communication to patients by learning. We can search or upgrade our knowledge to achieve our goals in telenursing. Skills include communicating in a way that patients can easily understand, and providing education to improve their health." — Informant 03

"……We need to prepare our equipment and our own appearance to ensure that we gain the patient's trust. We must know what telenursing and telecommunication are because technology is getting more advanced, and we must know how to apply it." — Informant 04

"……..We need communication skills so that patients can understand quickly, maybe through pictures, because most patients struggle with verbal explanations. Visual aids can be helpful." — Informant 05

In terms of mental skills, students must have empathy and good therapeutic communication to understand and support patients psychologically. In telenursing, students must adapt to different situations and diverse patients, especially with remote communication. Additionally, students should be able to motivate patients and their families to follow the care plans and advice provided.

"…….Students need to be physically, materially, and mentally prepared before offering telenursing services. The skills required are communication and computer skills." — Informant 01

"……Mentally, you need to prepare yourself, trust your abilities, and know that you can manage the situation and provide care." — Informant 02

"……Nurses offering telenursing must prepare mentally and physically, along with the knowledge needed for the patient. We must ensure that we provide education to patients, as this helps resolve issues." — Informant 03

"…….You need to prepare yourself first, and mentally you have to be ready to face the consequences and challenges ahead." — Informant 04

"…….We must always be cheerful, happy, and appear joyful. From a mental perspective, we need to be professional and separate personal matters from work when providing care." —

Informant 05Thus, a combination of both material knowledge and mental skills is essential for nursing students to apply telenursing effectively. Nursing students' readiness to provide nursing care through telenursing is influenced by self-efficacy, self-confidence, and personal competence. An individual's readiness is closely related to their self-efficacy, and both are equally important. According to research, the majority of students have high levels of self-efficacy, which boosts their self-esteem and personal potential (Akhmad et al., 2019). The author asserts that two essential components that enable people to accomplish their objectives and intended results in any activity are self-efficacy and preparation. This idea is supported by the study's findings, which demonstrate that students' preparedness and self-efficacy are critical components that promote their future capacity to deliver nursing care via telenursing. The study's nursing students reported strong levels of self-efficacy and confidence in their capacity to overcome difficulties and find solutions when providing care via telenursing.

The results of this study corroborate these conclusions, demonstrating that student preparedness and self-efficacy are critical elements bolstering their future capacity to deliver nursing care via telenursing. The study's nursing students reported strong levels of self-efficacy and felt competent to handle problems and overcome obstacles when delivering care via telenursing. As students get ready to enter a field of healthcare that is becoming more and more impacted by technology, they must have self-efficacy (self-belief), readiness, skills, and other pertinent characteristics.

According to Khraisat, Al-Bashaireh, and Alnazly's (2023) study, expertise, age, and internet usage patterns are significant determinants of telenursing practice. Another research found that attitudes toward telenursing tend to be significantly more positive among individuals who have telenursing experience, clinical practice observation, and have taken part in learning activities about telenursing (Mun et al., 2024). Therefore, student readiness, both in terms of skills and experience, is crucial for providing nursing care through telenursing. Students should have learning experiences related to telenursing, possess technological skills, and be physically and mentally prepared. Knowledge and skill required for clinical practice in telenursing can be developed through education in telenursing. This readiness will influence intentions, attitudes, and the quality of telenursing services provided to patients in the future.

CONCLUSION

Self-efficacy and readiness play crucial roles in students' ability to provide nursing care through telenursing. Students with a high self-efficacy are prepared to adapt associated with telenursing and provide future nursing services. Most students also demonstrate good readiness, including knowledge, technological skills, and the ability to handle telenursing challenges. Strong self-efficacy positively impacts their readiness to enter the workforce, especially in a field increasingly integrated with technology. In addition to self-efficacy, students need to continually develop technological skills and understanding of telenursing practices to provide effective nursing care. This research has direct implications for the integration of nursing students in hospitals and community health centers. Hospitals need to prepare digital clinical orientation and supervision programs, while community health centers can utilize students as agents of digital literacy and community service innovation. This way, students can gain real-world experience, while healthcare services strengthen the transition to digital-based nursing. Furthermore, this research enriches the international literature to real-life clinical technology practices. For the Health 5.0 era curriculum, this means shifting from adding technology modules in nursing to designing learning experiences that build confidence, technical competence, ethics, and adaptability so that graduates are not just tech-savvy, but also prepared to use it safely, effectively, and humanely.

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