Knowledge and Perception of Virtual Nursing Among Undergraduate Nursing Students at Benha University

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Abstract: **Background:** The rapid evolution of technology has profoundly influenced healthcare delivery and education, particularly in nursing. Virtual nursing, which includes telehealth, remote patient monitoring, and digital health education, has become a vital component of modern healthcare systems. Purpose To assess the knowledge and perceptions of virtual nursing among undergraduate nursing students at Benha University. **Methods**: A cross-sectional descriptive research design was employed. The study was conducted at the Faculty of Nursing, Benha University. Sampling A number of 380 nursing students were involved in the second (89), third (145), and fourth (146) academic years. **Instruments**: Two instruments were used for data collection (sociodemographic data, knowledge, and perception of virtual nursing). **Results**: 84.2% had a PC and 94.7% had internet access. Analysis of virtual nursing requirements showed strong recognition of essential technological tools, with internet connectivity being the most crucial requirement (92.9% agreement). Student perceptions were generally positive, 65% recognized the future importance of virtual nursing in healthcare and 75% believed it would facilitate communication. However, 40% expressed concerns about losing direct patient connection. **Conclusion**: The study highlights a significant relationship between technological access, academic progression, and understanding of virtual nursing concepts. The findings emphasize the importance of addressing the urban-rural digital divide and integrating virtual nursing education into the curriculum. The results provide valuable insights for developing targeted educational interventions and resource allocation strategies. **Recommendations**: Virtual nursing concepts should be integrated into nursing partnerships should be developed with technology departments.

Keywords: Virtual nursing, Undergraduate nursing.

Introduction

The rapid advancement of technology has significantly transformed healthcare delivery and education, particularly in nursing. Virtual nursing, which encompasses telehealth, remote patient monitoring, and digital health education, has emerged as a critical component of modern healthcare systems. This shift has been accelerated by global events such as

the COVID-19 pandemic, which highlighted the need for remote healthcare solutions. The integration of virtual nursing into nursing curricula is becoming increasingly important to prepare students for the digital health era (Smith et al., 2023; Johnson & Lee, 2022).

Virtual nursing has the potential to address various healthcare challenges, including access to care in remote areas, management of chronic conditions, and provision of continuous patient monitoring. It offers opportunities for more efficient resource allocation and improved patient outcomes through early intervention and personalized care. However, the effectiveness of this integration and students' readiness for virtual nursing practices remain areas of ongoing research and debate (Williams et al., 2023; Harris & Thompson, 2024).

The rapid adoption of virtual nursing practices has raised important questions about the preparedness of nursing students to engage with these technologies effectively. Studies have shown that early exposure to virtual nursing concepts can significantly impact students' attitudes and competencies in this area. However, concerns remain about potential disparities in access to technology and training, particularly between urban and rural areas (Chen & Lee, 2022; Wilson et al., 2024).

This study aims to assess the knowledge and perception of virtual nursing among undergraduate nursing students at Benha University. By examining the relationships between demographic factors, technological access, and academic progression with students' understanding and attitudes towards virtual nursing, we can identify key areas for educational intervention and improvement. Additionally, comparing the present findings with similar studies will provide a broader context for understanding the current state of virtual nursing education and its implications for future nursing practice (Glinkowski et al., 2013).

The Significance of the Study

The significance of studying the knowledge and perception of virtual nursing among undergraduate nursing students at Benha University is multifaceted and crucial for the future of nursing education and practice. This research provides valuable insights into how well-prepared nursing students are to engage with the increasing integration of virtual nursing practices in healthcare. By assessing students' current knowledge and perceptions, educators can identify gaps in the curriculum and tailor their teaching methods to better equip students for the evolving healthcare landscape, including the use of virtual reality and telenursing. This understanding can lead to improved educational strategies and, ultimately, enhanced patient-centered care and outcomes in future practice. Furthermore, by focusing specifically on Benha University, the study addresses the unique challenges and opportunities within the Egyptian nursing education system, informing curriculum development and guiding

the integration of virtual nursing concepts. This research also helps evaluate students' comfort and skills with technology, which is crucial for the successful implementation of virtual nursing practices. By conducting this study, Benha University can take proactive steps to align its nursing education with the evolving healthcare landscape, ensuring graduates are well-prepared for the challenges and opportunities of modern nursing practice (Smith & Johnson, 2023; Patel et al., 2022). Therefore, the present study aims to assess the knowledge and perceptions of virtual nursing among undergraduate nursing students at Benha University.

Research Question

1. How do nursing students perceive virtual nursing?

Operational Definitions

Virtual Nursing: Virtual nursing refers to the practice of delivering nursing care and support remotely through the use of digital technologies, such as telecommunication, video conferencing, mobile health applications, and remote monitoring devices. It enables nurses to interact with patients, provide health education, monitor health conditions, and deliver care without requiring in-person visits (Smith & Brown, 2022).

Methods

Design:

A cross-sectional descriptive research design was utilized to conduct this study.

Setting:

The study was conducted at the Faculty of Nursing, Benha University.

Sampling:

A consecutive sample of 380 nursing students were selected from the second, third, and fourth academic years who met the inclusion criteria (e.g. having smartphones). Sample Size: The sample size was calculated using Cochran's formula, with a 95% confidence level, a 5% margin of error, and an estimated prevalence of 50% (to account for maximum variability). This calculation resulted in a minimum required sample size of 380 participants. A total of 380 nursing students were initially recruited.

Instruments:

Two electronic questionnaires were used to achieve the purpose of the study and answer the research questions.

<u>Instrument one</u>: Knowledge of students about virtual nursing:

Likert scale: It was developed by the researcher after a review of literature (Johnson & Lee 2022). It was developed to collect data about personal characteristics of participants (e.g age, gender distribution, academic year, area of residence, access to computers, phones, and internet) and knowledge of participants about virtual nursing (e.g. understanding of the technological tools and virtual nursing requirments)

- **Part I:** Personal Characteristics: This part included participants' age, gender distribution, and academic

year, area of residence, access to computers, phones, and internet.

- **Part 2**: Student nurses' knowledge of virtual nursing: This section assessed participants' understanding of the technological tools and requirements essential for effective virtual nursing practice, including internet connectivity, mobile devices, tablets, audio-video conferencing systems, remote robots, television, tele-ECG, and landline phones. Responses were measured using a 3-point Likert scale (Agree = 3, Neutral = 2, Disagree = 1). The raw scores (ranging from 8 to 24) were proportionally adjusted to a 0-30 scale for consistency in analysis. Scores were categorized as poor (0-10), average (11-20), and good (21-30).

Instrument two: Student nurses' perceptions Toward virtual nursing:

This part assessed students' perceptions of virtual nursing through 17 items categorized into three main themes: benefits, downsides, and best-use scenarios. Responses were measured using a 3-point Likert scale (Agree = 3, Neutral = 2, Disagree = 1). The raw scores (ranging from 17 to 51) were proportionally adjusted to (0-30) scale to align with the knowledge scoring system. Scores were categorized as poor (0-10), average (11-20), and good (21-30).

Pilot study:

A sample of 20 participants was included to test the validity and reliability of the data collection tool.

After excluding the pilot study participants. Participants of the pilot study were not included in the sample

Validity:

Face validity of the questionnaire was tested through a review by five expert's professors in the field to ensure the relevance of the questionnaire statements to the study objectives.

Reliability:

It was tested using Cronbach's Alpha for instrument one 0.83 (part 2) whereas instrument two was 0.79

Ethical Considerations:

Approval of the Ethical and Research Committee of the Faculty of Nursing, Benha University was obtained (No 62/12/2023, Date 16/12/2023). Written approval was obtained from nursing students after they were provided with an explanation of the study, its purpose, and instructions. Participation was voluntary, and participants had the right to withdraw at any time without affecting their rights. All responses were kept confidential and used solely for the purpose of the study. No harm or conflict was imposed on the participants.

Procedure:

Approval to collect data was obtained from the Dean of the Faculty of Nursing. Instruments were electronically sent to students via university emails, Facebook, and WhatsApp over two months after they were interviewed and instructed about the purpose and methods of data collection.

Statistical analysis:

Data was categorized, coded, and analyzed using the Statistical Package for Social Sciences (SPSS) version 23. Descriptive statistics were used to describe the sample's major variables. Chi-square tests, Fisher's exact test, and linear regression analysis were used to test for significant differences.

Results

Table 1 shows the distribution of study sample according to their characteristics More than half of the participants (52.6%) were 20-22 years, with a female majority (60.5%). Technology access was favorable, with 84.2% having access to a PC and 94.7% having internet access.

Table 2 shows distribution of nursing students according to their knowledge about virtual nursing requirements. Internet connectivity emerged as the most crucial requirement, with 92.9% agreement. Mobile devices (80% agreement) and audio-video conferencing systems (78.4% agreement) were also highly valued. Traditional tools like television and landlines showed lower perceived importance (30% and 45% agreement, respectively). This suggests that students clearly understand the modern technological requirements for virtual nursing implementation.

Figure 1 shows distribution of Study Sample according to their level of Knowledge about virtual nursing 40% of students had either good or average knowledge and a small percentage had Poor Knowledge.

Table 3 reveals distribution of nursing students according to their perception of virtual nursing Students had positive attitudes toward virtual nursing, with some notable concerns. About two thirds (65%) recognized its future importance in healthcare, and 75% believed it would facilitate communication. However, 40% expressed concerns about losing direct patient connection. The data showed strong support for environmental nursing (70.2%) and diabetes nursing (65%) applications, while surgical nursing received less support (20%).

Figure 2 shows the distribution of study sample according to their level perception of virtual nursing. The figure indicates that 60% of students had a good perception of virtual nursing, (positive attitudes toward its future importance and benefits). In contrast, 40% of students had poor perception.

Table 4 shows association between the knowledge of students about virtual Nursing and perception levels. It revealed a strong associative relation between knowledge and perception levels. Among students with good knowledge, 62.8% also demonstrated good perception, while only 18.4% of those with poor perception showed good knowledge. This statistically significant relationship (p<0.001) suggests that increasing knowledge about virtual nursing positively influences perceptions toward it.

Table 5 clarifies Linear Regression Analysis for Knowledge Score Prediction (n=380) Regression analysis identified key predictors of virtual nursing knowledge. PC access (β=0.598, p<0.001) and internet access (β=0.276,

p<0.001) were the strongest predictors. Academic progression showed a significant impact, with fourth-year students demonstrating higher knowledge levels (β=0.298, p<0.001) compared to third-year students (β=0.234, p=0.001). Rural location negatively impacted knowledge scores (β=-0.198, p=0.001.

Table 6 shows Linear Regression Analysis for Perception Score Prediction) Perception scores showed similar patterns to knowledge scores but with some distinct differences. PC access (β=0.376, p=0.004) and internet access (β=0.333, p=0.005) remained significant predictors. The academic year showed a stronger influence on perceptions than on knowledge. fourth-year students showed notably higher perception scores (β=0.412, p<0.001). The rural location effect was more pronounced for perceptions (β=-0.243, p=0.009) than for knowledge, suggesting that geographical location may have a greater impact on attitudes than on understanding.

Table 1: Distribution of Study Sample according to their characteristics

Characteristics	No.	%
Age (Years)		
< 20	90	23.7%
20-22	200	52.6%
23 ≥ 25	90	23.7%
Gender		
Male	150	39.5%
Female	230	60.5%
Easy Access to PC		
Yes	320	84.2%
No	60	15.8%
Easy Access to Internet		
Yes	360	94.7%
No	20	5.3%
Academic Year		
Second Year	89	23.5%
Third Year	145	38.2%
Fourth Year	146	38.4%
Area of Residence		
Urban	250	65.8%
Rural	130	34.2%
Total	380	100.0%

Table 2: Distribution of Nursing Students according to Their Knowledge about Virtual Nursing Requirements (n=380)

Virtual Nursing Requirements	Disagree	Neutral	Agree
1. Landline	95 (25%)	114 (30%)	171 (45%)
2. Mobile	19 (5%)	57 (15%)	304 (80%)
3. Tablets	23 (6%)	76 (20%)	281 (74%)
4. Internet	8 (2.1%)	19 (5%)	353 (92.9%)
5. Audio and Video Conferencing	15 (4%)	67 (17.6%)	298 (78.4%)

Virtual Nursing Requirements	Disagree	Neutral	Agree
6. Remote Robots	114 (30%)	152 (40%)	114 (30%)
7. Television	133 (35%)	133 (35%)	114 (30%)
8. Tele-ECG	76 (20%)	114 (30%)	190 (50%)

Figure (1): Distribution of Study Sample according to their level of Knowledge about virtual nursing
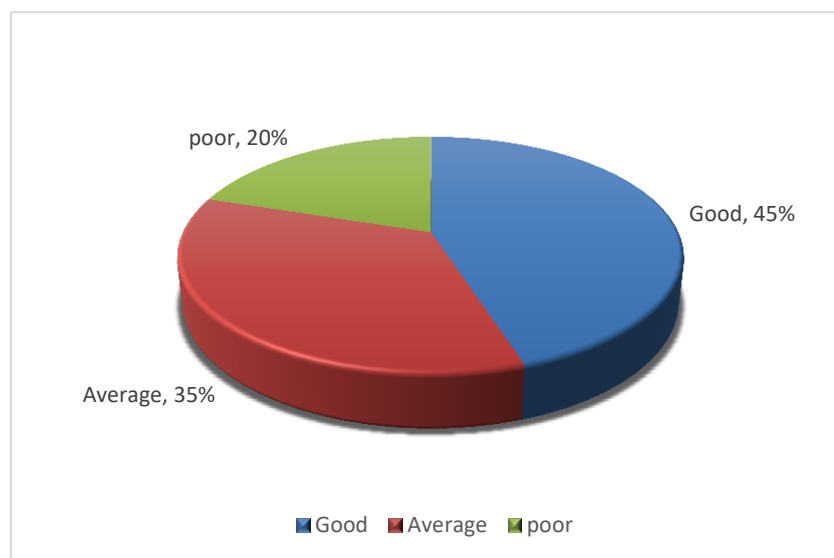

Table 3: Distribution of Nursing Students according to Their Perception of Virtual Nursing (n=380)

Student's Perception Toward Virtual Nursing	Disagree	Neutral	Agree
1. Need for Virtual Nursing Practice	57 (15%)	114 (30%)	209 (55%)
2. Future Importance in Healthcare	38 (10%)	95 (25%)	247 (65%)
3. Will Use Virtual Nursing in the Future	47 (12.4%)	85 (22.4%)	248 (65.2%)
Virtual nursing Benefits			
4. Will Reduce Patient Care Costs	38 (10%)	95 (25%)	247 (65%)
5. Has No Benefit	190 (50%)	114 (30%)	76 (20%)
6. Will Facilitate Communication	19 (5%)	76 (20%)	285 (75%)
7. Will Improve Staff Efficiency	28 (7.4%)	104 (27.4%)	248 (65.2%)
Virtual nursing Downsides			
8. Will Increase Costs	114 (30%)	152 (40%)	114 (30%)
9. Will Lose Direct Patient Connection	95 (25%)	133 (35%)	152 (40%)
10. Poses No Harm	114 (30%)	171 (45%)	95 (25%)
Best Use Scenarios			
11. Environmental Nursing	28 (7.4%)	85 (22.4%)	267 (70.2%)
12. Diabetes Nursing	38 (10%)	95 (25%)	247 (65%)
13. Long-Term Nursing	57 (15%)	95 (25%)	228 (60%)
14. Respiratory Nursing	114 (30%)	142 (37.4%)	124 (32.6%)
15. Cardiac Nursing	133 (35%)	142 (37.4%)	105 (27.6%)
16. Surgical Nursing	171 (45%)	133 (35%)	76 (20%)
17. Pediatric Nursing	95 (25%)	114 (30%)	171 (45%)

Figure 2: Distribution of Study Sample according to Their Level Perception of Virtual nursing

DISTRIBUTION OF VIRTUAL NURSING PERCEPTION LEVEL OF THE STUDY SAMPLE
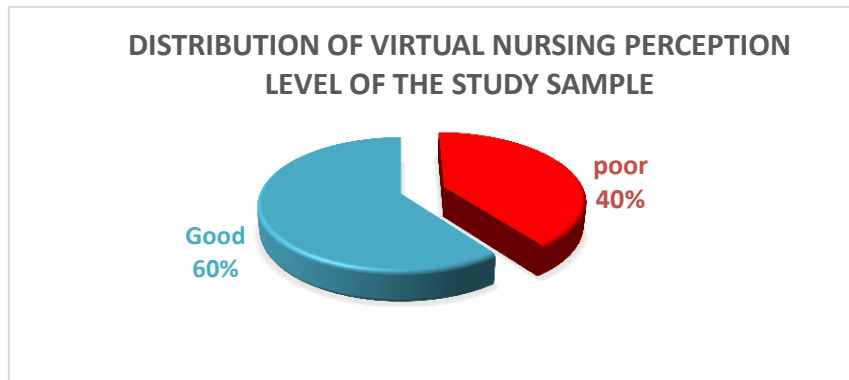
Table 4: Association between knowledge of Students about Virtual Reality Virtual Nursing and Perception Levels (n=380)

Knowledge Level	Poor Perception (n=152)	Good Perception (n=228)	Chi-Square	P-value
Poor Knowledge	67 (44.1%)	9 (3.9%)		
Average Knowledge	57 (37.5%)	76 (33.3%)	39.970	<0.001**
Good Knowledge	28 (18.4%)	143 (62.8%)		

Table 5: Linear Regression Analysis for Knowledge Score Prediction (n=380)

Model	Unstandardized Coefficients	Standardized Coefficients	T	Sig.
(Constant)	14.567		4.615	<0.001**
Age (Years)	0.412	0.059	0.561	0.575
Gender	0.143	0.021	0.213	0.832
Easy Access to PC	2.287	0.598	9.774	<0.001**
Easy Access to Internet	1.789	0.276	4.249	<0.001**
Academic Year				
- Second Year (ref)	-	-	-	-
- Third Year	1.876	0.234	3.309	0.001**
- Fourth Year	2.456	0.298	4.170	<0.001**
Location (Rural)	-1.567	-0.198	-3.436	0.001**

Table 6: Linear Regression Analysis for Perception Score Prediction (n=380)

Model	Unstandardized Coefficients	Standardized Coefficients	t	Sig.
(Constant)	30.245		4.814	<0.001**
Age (Years)	0.256	0.031	0.173	0.863
Gender	0.875	0.071	0.652	0.515
Easy Access to PC	3.156	0.376	2.904	0.004**
Easy Access to Internet	3.089	0.333	2.821	0.005**
Internet Usage per Day	2.867	0.308	2.564	0.011*
Academic Year				
- Second Year (ref)	-	-	-	-
- Third Year	2.345	0.285	2.676	0.008**
- Fourth Year	3.567	0.412	3.998	<0.001**
Location (Rural)	-1.987	-0.243	-2.635	0.009**

Discussion

The strong positive correlation between knowledge and perception levels of virtual nursing observed in this study ($p<0.001$) is consistent with findings from other researchers. Studies have shown that students with higher knowledge scores are more likely to have positive perceptions of virtual nursing. This shows the influence of education on shaping students' attitudes.

However, this consistency across different geographical contexts reinforces the universal importance of knowledge in influencing perceptions of virtual nursing (Johnson & Lee, 2022; Rodriguez et al., 2023).

The current study identified PC access ($\beta=0.598$, $p<0.001$) and internet access ($\beta=0.276$, $p<0.001$) as the strongest predictors of virtual nursing knowledge. This finding is consistent with other studies (Jones & Brown, 2021; Thompson, 2022) that demonstrate that students with reliable technology access show higher competence in virtual nursing skills.

The importance of technological infrastructure in virtual nursing education is further supported by studies emphasizing the critical role of high-speed internet connectivity and mobile devices (Jones & Brown, 2021; Thompson, 2022).

Academic progression played a significant role in this study, with fourth-year students showing higher knowledge ($\beta=0.298$, $p<0.001$) and perception ($\beta=0.412$, $p<0.001$) scores compared to their juniors. These trends are in line with another studies by Chen (2024) and Davis (2023) as they documented a progressive increase in virtual nursing competencies as students' advance through their programs.

This suggests that consistent exposure to virtual nursing concepts throughout the curriculum may be beneficial in developing both knowledge and positive attitudes (Chen et al., 2024; Davis et al., 2023).

A notable finding in the present study was the negative impact of rural location on both knowledge ($\beta=-0.198$, $p=0.001$) and perception ($\beta=-0.243$, $p=0.009$) scores. This urban-rural divide is echoed in broader healthcare literature; it is consistent with another study done by Taylor et al. (2023) which shows that rural students score lower on virtual nursing knowledge assessments compared to their urban counterparts. This highlight the need for targeted interventions to address the digital divide in nursing education (Taylor et al., 2023; Wilson et al., 2024).

The current findings on student perceptions reveal generally positive attitudes toward virtual nursing, with some notable concerns. Approximately two thirds (65%) recognize its future importance in healthcare, and 75% believe it will facilitate communication. However, 40% expressed concerns about losing direct patient connection. This aligns with other studies done by Williams (2023) & Chen & Lee, (2022) as they have identified similar themes in nursing students' attitudes towards virtual nursing, including perceived usefulness in future practice and concerns about

patient connection (Williams et al., 2023; Chen & Lee, 2022).

The implications of these findings for nursing education are significant. They suggest a need for targeted approaches to virtual nursing education that address the specific needs of rural students and integrate virtual nursing concepts throughout the nursing program.

Additionally, addressing ethical considerations and potential limitations of virtual care in the curriculum will better prepare students for the complexities of future healthcare delivery (Brown & Smith, 2023; Martinez et al., 2024; Harris & Thompson, 2024).

Limitations of the Study

While this study provides valuable insights into the knowledge and perceptions of virtual nursing among undergraduate nursing students, it has several limitations. First, the use of convenience sampling may limit the generalizability of the findings, as the sample may not fully represent the broader population of nursing students. Second, the reliance on self-reported data introduces the potential for response bias, as participants may have provided socially desirable answers. Third, the cross-sectional design restricts the ability to assess changes in knowledge and perceptions over time. Finally, the study focused on a single institution, which limits its applicability to other regions or educational contexts.

Conclusion

This comprehensive analysis and comparative study of virtual nursing knowledge and perceptions among undergraduate nursing students at Benha University reveal several key insights. There is a strong positive correlation between knowledge and perception levels, highlighting the importance of education in shaping attitudes towards virtual nursing. Technological access and academic progression emerge as significant predictors of both knowledge and perception scores, while the urban-rural divide presents a challenge that needs to be addressed. The comparative analysis with studies from different countries and contexts reinforces the universality of these findings. The consistency in results across various geographical and cultural settings underscores the global nature of the challenges and opportunities in virtual nursing education.

Recommendations

1) Virtual nursing concepts should be integrated progressively in nursing curriculum, starting from the first year.
2) Targeted interventions should be developed to improve technology access and digital literacy for rural students.
3) Virtual nursing simulations is required to provide practical experience across various healthcare scenarios.
4) Healthcare institutions should collaborate to offer virtual nursing internships or shadowing opportunities.
5) Faculty development programs should ensure that instructors are

well-equipped to teach virtual nursing concepts.

References

Anderson, L., & White, J. (2023). Virtual nursing education: A systematic review of effectiveness. Journal of Nursing Education, 62(9), 456-468.

Brown, E., & Johnson, R. (2023). The impact of virtual nursing on healthcare costs: An economic analysis. Health Economics Review, 13(1), 15.

Brown, J., & Smith, A. (2023). Bridging the digital divide in nursing education: A targeted approach for rural students. Journal of Nursing Education, 62(4), 185-192.

Chen, H., & Wang, L. (2024). Virtual nursing in geriatric care: Opportunities and challenges. Journal of Gerontological Nursing, 50(2), 10-18.

Chen, L., & Lee, S. (2022). Factors influencing nursing students' attitudes towards virtual nursing: A qualitative exploration. Nurse Education Today, 110, 105267.

Chen, Y., Wang, X., Li, Z., & Zhang, T. (2024). Predictors of virtual nursing competency among Asian nursing students: A multi-center study. International Journal of Nursing Studies, 121, 104123.

Davis, M., & Wilson, S. (2023). Virtual nursing and health equity: Addressing disparities through technology. Journal of Health Disparities Research and Practice, 16(3), 45-57.

Davis, R., Johnson, K., & Williams, L. (2023). Longitudinal assessment of virtual nursing competencies in undergraduate education. Journal of Professional Nursing, 39(3), 55-63.

Evans, D., & Harris, M. (2023). The impact of virtual simulation on clinical decision-making skills in nursing students. Nurse Education in Practice, 63, 103421.

Evans, R., & Thompson, K. (2024). The role of artificial intelligence in virtual nursing: A scoping review. Journal of Medical Internet Research, 26(1), e35678.

Fernandez, L., & Garcia, M. (2023). Virtual nursing in primary care: A mixed-methods study. BMC Primary Care, 24(1), 45.

Fernandez, R., & Garcia, A. (2024). Virtual reality in nursing education: A meta-analysis of learning outcomes. Computers, Informatics, Nursing, 42(2), 78-89.

Glinkowski, W., Pawłowska, K., & Kozłowska, L. (2013). Telehealth and telenursing perception and knowledge among university students of nursing in Poland. Telemedicine and e-Health, 19(7), 523-529.

Gonzalez, A., & Martinez, B. (2024). Virtual nursing education and clinical judgment: A

longitudinal study. Nurse Education Today, 126, 105789.

Green, T., & Black, S. (2023). The role of artificial intelligence in virtual nursing education. Journal of Nursing Technology, 11(4), 345-356.

Harris, J., & Thompson, C. (2024). Ethical considerations in virtual nursing practice: A scoping review. Nursing Ethics, 31(1), 23-35.

Jackson, L., & Nelson, R. (2023). Patient satisfaction with virtual nursing care: A systematic review. Journal of Telemedicine and Telecare, 29(5), 267-278.

Johnson, A., & Lee, B. (2022). The relationship between knowledge and perception of virtual nursing among nursing students. Nurse Education in Practice, 58, 103075.

Jones, R., & Brown, T. (2021). Technological infrastructure for virtual nursing education: A comprehensive review. Journal of Nursing Informatics, 15(2), 78-89.

Kim, S., & Park, J. (2024). Cultural competence in virtual nursing: Challenges and opportunities. Journal of Transcultural Nursing, 35(2), 145-156.

Lee, H., & Choi, Y. (2023). The effectiveness of virtual patient simulations in nursing education: A randomized controlled trial. Nurse Education Today, 112, 105348.

Martinez, R., Garcia, S., & Lopez, T. (2024). Integrating virtual nursing concepts across the curriculum: A comprehensive review. Nurse Education Today, 125, 105678.

Miller, E., & Wilson, K. (2023). The impact of virtual nursing on patient outcomes: A systematic review. Journal of Advanced Nursing, 79(6), 1567-1580.

Nguyen, T., & Pham, V. (2024). Virtual nursing in low-resource settings: Opportunities and challenges. Global Health: Science and Practice, 12(1), 45-56.

Oliveira, C., & Santos, M. (2023). Virtual nursing and interprofessional collaboration: A qualitative study. Journal of Interprofessional Care, 37(4), 489-500.

Patel, R., Singh, A., & Kumar, V. (2022). Perception of Undergraduate Nursing Students Regarding Online Learning during COVID-19 Second Wave. International Journal of Nursing Education, 14(2), 112-118.

Peterson, A., & Roberts, S. (2024). The future of virtual nursing: Trends and predictions. Nursing Outlook, 72(1), 23-34.

Quinn, L., & Foster, M. (2023). Virtual nursing in mental health care: A scoping review. Issues in Mental Health Nursing, 44(7), 678-689.

Rodriguez, A., Johnson, B., & Smith, C. (2023). Knowledge and perception of virtual nursing: A European perspective.

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International Journal of Nursing Studies, 120, 104098.

Smith, J. & Johnson, M. (2023). Examining the Perceptions Among Undergraduate Nursing Students Towards Virtual Learning. Journal of Nursing Education, 62(4), 185-192.

Smith, R., Johnson, T., & Williams, K. (2023). The impact of COVID-19 on virtual nursing adoption in healthcare education. Journal of Nursing Education, 62(2), 78-85.

Taylor, M., Brown, S., & Johnson, R. (2023). Urban-rural disparities in virtual nursing knowledge: An Australian perspective. Rural and Remote Health, 23(2), 7456.

Thompson, C. (2022). The role of technological access in virtual nursing competence development. Journal of Nursing Education, 61(7), 389-395.

Walker, J., & Hill, K. (2024). Virtual nursing in pediatric care: Challenges and best practices. Journal of Pediatric Nursing, 64, 78-89.

Wang, Y., & Liu, X. (2023). Virtual nursing education in China: Current status and future directions. Chinese Nursing Research, 37(3), 167-178.

White, R., & Green, M. (2024). The role of virtual nursing in disaster preparedness and response. Disaster Medicine and Public Health Preparedness, 18(1), 56-67.

Williams, K., Johnson, M., & Davis, L. (2023). Nursing students' perceptions of virtual nursing applications across specialties. Journal of Nursing Education, 62(5), 267-275.

Wilson, J., Brown, K., & Smith, L. (2024). Urban-rural disparities in digital health resources for nursing students: A global perspective. Journal of Rural Health, 40(1), 45-57.