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Bridging the Practice Gap with the Virtual Learning -Awareness and Readiness among the New Nursing Graduates

Mohammed Ghitan Alessa[1], Jalwi Fawaz AlQahtani[2], Sami Mohammed Khormi[3], Emad Salman Alamri[4] and Mathar Mohideen Nagoor Thangam[5*]

[1-4]Faculty of Nursing, University of Tabuk, Tabuk, Kingdom of Saudi Arabia
[5]Department of Medical Surgical Nursing, Faculty of Nursing, University of Tabuk, Tabuk, Kingdom of Saudi Arabia

Author Designation: [1,2,3,4]Nursing Graduate, [5]Assistant Professor

*Corresponding author: Mathar Mohideen Nagoor Thangam (e-mail: mthangam@ut.edu.sa).

Abstract **Background:** The Saudi Arabia Vision 2030 focuses on advancing the nursing profession with an increasing number of Saudi nurses. New nurses face challenges with clinical competency during their transition phase. Virtual simulation is essential resource in nursing for a smooth transition into a practical setting. It enhances their confidence, competency, decision-making and critical thinking skills in clinical care. In KSA, the process of virtual simulation is at the beginning phase. Objective: The major goal of this study was to evaluate the awareness and readiness towards virtual learning among new nursing graduates. **Methods:** A cross-sectional descriptive study was conducted among the new nurses who graduated from the University of Tabuk, Saudi Arabia. The sample size was 156. A structured validated questionnaire was used to assess the awareness and readiness in Virtual simulation learning. **Results:** The participants reported high awareness of virtual simulation learning as the teaching method (Mean-84.92±12.68), Mean readiness score was (58.58±10.01). 71.5% of them reported high awareness, whereas only half of them (50.6%) of them were ready for the practice. Age, GPA, prior information, preference to apply and working area were significantly associated with awareness and readiness for the application of virtual simulation as part of clinical learning. **Conclusion:** Virtual learning is a promising tool, which helps to develop independent learning among the new nurses. The results of this study highlighted that the nurses are aware of the process and benefits of virtual learning. However, the readiness to apply in their practice is lacking. It is essential to identify the novice nurses expectations in successful implementation of this technology.

Key Words Virtual Simulation, Virtual Learning, New Nurses, New Nursing Graduate, Practice Gap

INTRODUCTION

The Kingdom of Saudi Arabia is making strides in educational enhancement in line with international benchmarks. A vital aspect of Vision 2030 is the improvement of healthcare through technology and increasing the number of Saudi nursing professionals. Recent progress in nursing education globally emphasizes the need to advance nursing curricula to meet national objectives. Virtual simulation is a contemporary innovation rooted in educational theory. Virtual Simulation (VS) refers to a form of clinical simulation delivered via computer, the Internet, or a digital learning environment that can accommodate either individual or multiple participants [1]. Various terms in past studies have been used interchangeably with virtual reality.

The rapid evolution of technology underscores the potential for implementing VS in nursing practice before actual hands-on experience. It offers a novel clinical strategy that addresses the limitations of traditional teaching methods. The COVID-19 pandemic forced educational institutions to replace physical classrooms with virtual ones, impacting students' creative thinking and problem-solving skills [2]. In nursing education, VS has been employed for an extended period under different names, such as Virtual reality and Virtual gaming. However, the pandemic has created new opportunities for innovation and transformation in VS due to increased familiarity with digital tools.

Virtual simulation enhances students' attention, engagement, confidence, motivation and creativity, assisting them in translating theory into practice at their own pace. A Norwegian revealed that the majority of students found the virtual clinical experiences to be valuable and realistic; nonetheless, approximately one-third encountered

challenges in understanding and utilizing the American vSim for Nursing program. These students require additional support and guidance from educators regarding the effective use of virtual learning resources. This research highlighted the necessity for proper preparation for both students and teachers in virtual educational settings [3]. A study from a university in the Southeastern United States pointed out that there is no difference between in-person experience in pediatric wards and virtual simulation. In this study the scores of both groups are similar. It indicates that virtual learning also plays a much more important role than personal learning [4]. Kuwait study indicates that the virtual learning of phlebotomy performance is the same as the performance of learners in the traditional method [5].

Clinical virtual simulation increases knowledge retention and clinical reasoning over time and it improves the nursing student's satisfaction with the learning experience, however, it needs supplementation of other strategies of teaching such as briefing, simulation and debriefing [6]. The clinical virtual simulation uses the following elements such as gaming, problem-based learning and interactive and dynamic three-dimensional strategies [6]. New nurses can practice all kinds of scenarios, especially uncomfortable scenarios without any problem. It adds advantages for the client's safety and privacy. Virtual learning allows the learners to practice anytime and anywhere.

VS is a Web-based platform used to simulate nursing scenarios with opportunities for client interaction and feedback on their performance. Most of the students from a study in the USA reported VS for future use. Virtual simulation has a wide range of applications and warrants further exploration [7]. VS bridge the gap between theory and practice in nursing. The user's perception and experience of Virtual Simulation (VS) is important to support the learning needs and assessment mechanism in nursing. Better learning outcomes are linked to virtual patients, especially in the areas of communication, cooperation and decision-making, which are nontechnical abilities. The difficult and rare clinical scenarios can be practiced safely with VS.

The transition from an academic to a real-world setting is characterized by high stress and reality shock, which contributes to a high turnover rate during the first year of practice [8,9]. Khan *et al.* [9] revealed that novice nurses faced different challenges during the first year of their career including workload, lack of confidence, lack of communication skills, little knowledge about different procedures, time management and low competency level in performing certain clinical skills. New nurses face many struggles and challenges during transition time, the challenges include the complexity of the conditions, lack of qualified mentors, diversity in the workforce and anxiety [10]. VS aids in assessing the success of each student, identifying particular areas of weakness and providing targeted remediation to enhance their readiness for practice [11]. This study recommended that novice nurses need to be well-prepared before entry into the hospitals and they need a strong foundation.

Immersion in virtual reality has the potential to boost learning outcomes, help with skill acquisition, foster engagement with nursing students, offer opportunities for perspective-taking and boost self-confidence [12]. Any new technology used to teach can only be as successful with the proper creation, design and implementation. Given the rapid evolution of VR, there will be a continuous need for educational opportunities and research, as well as nursing faculty confidence in using this medium with learners [11,12]. Clinical simulations are a component in nursing curricula worldwide; however, with ongoing technological advancements in virtual reality-based education, it is crucial for nursing programs to find effective ways to unite students and faculty to enhance competency-based results [13].

It is important to identify their awareness and readiness to learn virtual simulation during the transition phase. The new graduate nurses experience a theory and practice gap, which results in a lack of clinical competence and confidence. This can lead to unsafe clinical practices. The client's care is at risk in this situation. It is necessary to find a solution for the new graduate nurses. The best choice available for them is to increase their confidence and competence in clinical skills through Virtual learning. Virtual reality simulation education could play a significant role in equipping nursing students for a smooth transition to actual clinical practice [14,15].

During Covid -19 pandemic the Nursing program made a difficult decision to withdraw the students from the clinical area. The program was immediately switched to Blackboard with online learning. However, the nursing program faced difficulty in managing the clinical courses. So, VS provides excellent opportunities for the nursing institutions and nurses in such situations and also this can supplement and boost the regular learning process. This research area is on technology advancement, principles of self-learning and advancement to keep the profession with international standards.

Nursing educators need to engage in creation of Virtual Reality meaningful design to ensure that they are consistent with best practices and program outcomes. Educational institutions need to invest in VR infrastructure for nursing. It is essential to identify the novice nurses expectations in successful implementation of this technology. This research finding serves as the basis for the nursing programs in the implementation of virtual-based clinical learning in the nursing curriculum.

Primary Objectives

- To identify the student's awareness and readiness in the Virtual simulation

Secondary objectives

- To identify the new graduate awareness about virtual learning
- To examine their readiness to participate in virtual learning
- To find the relationship between the awareness and readiness in virtual learning
- To find the association between the baseline characteristics and readiness in virtual learning

METHODS

This Cross-sectional descriptive study was conducted among the new nursing graduates from the University of Tabuk at the selected hospitals from July 2023 to December 2023. Using Rao soft, the calculated sample size was 156, with a 95% confidence interval and 5% margin error. Using a Convenience sampling method, the new nursing graduates from the University of Tabuk were selected. This study included new graduates who are currently working were included. The participants working at study sites and willing to participate were the inclusion criteria. The nurses who were not employed for this study and who have experience of more than 1 year were excluded from the study. The data was collected through the electronic questionnaire from the nursing graduates. The University of Tabuk Local Research Ethics Committee (LREC) approved this study (UT-287-136-2023). The researchers thoroughly described the study's aim and the benefits of the study outcomes to the participants.

The research questionnaire includes 3 sections. The first section with demographic items, second section with an awareness scale with 20 items on a Likert scale from strongly agrees to strongly disagree. The awareness section was divided into Concepts of VS, Pre preparation, Advantage, Execution, Post simulation debriefing and Safe practice environment. The final response was categorized into Low, Average, Moderate and High. The readiness scale was on 5-point Likert scale with 15 items from Very Unfavorable to Very favorable. It was categorized into three sections: Application to practice, Self-learning and Structured learning. The questionnaire was validated and pilot-tested before the main study. The response time for the questionnaire was 15 minutes. The overall exhibited an internal consistency, assessed through Cronbach's alpha, with a value of 0.81 on the awareness scale and 0.87 on the readiness scale.

The data were examined utilizing Statistical Package for the Social Sciences (SPSS) version 26. Sample characteristics were described using frequency and percentage. Awareness and readiness scores were computed with mean, standard deviation, range and Mean percentage and Pearson's correlation test was used to identify the relationship between awareness and readiness in a virtual simulation. T-tests and ANOVA were employed to determine the differences between groups concerning awareness and readiness in a virtual simulation. A post-hoc analysis is conducted to determine the specific groups that show differences from one another.

RESULTS

A total of 156 new nurses, ranging in age from 21 years to 24 years and above, with the majority of them interested in VS to update their nursing skills. More than half of them (55.13%) were female and their main qualification for entering their job was a Bachelor's in nursing. Three- fifths of them completed their internship and started working in the clinical units. Less than half of the participants (48.08%) had no earlier exposure to virtual learning such as workshops or seminars. 27.56% of the participants were working in medical and surgical units (Table 1).

Figure 1 shows the Mean, SD and mean% of virtual learning awareness among the new nursing graduates. The

Table 1: Frequency and percentage wise distribution of the new nursing graduates according to their baseline characteristics

	n = 156	
Demographic variables	f	%
Age in years		
21-22	34	21.79
22-24	85	54.49
More than 24	37	23.72
Gender		
Male	70	44.87
Female	86	55.13
Current clinical experience		
Less than 6 months	63	40.38
6 months-1 year	93	59.62
GPA		
4.5-5	33	21.15
4-4.49	50	32.05
3.5-3.99	59	37.82
3-3.49	14	8.97
Pre information on VS		
Yes	75	48.08
No	81	51.92
Current area of working		
Emergency Ward	21	13.46
ICU	21	13.46
Pediatric Ward	11	7.05
Maternal Units	14	8.97
Health centers	13	8.33
Medical and surgical ward	43	27.56
Other units	33	21.15
Prefer Virtual simulation to update nursing skills		
Yes	139	89.10
No	17	10.90

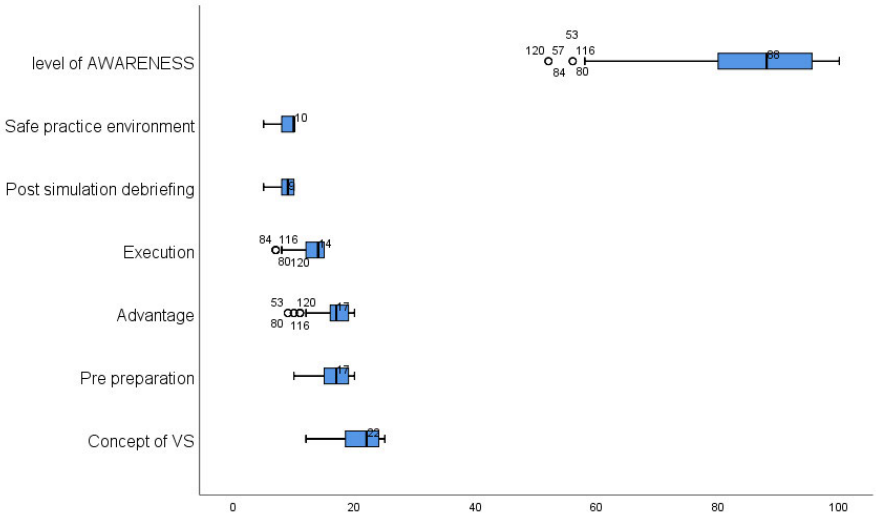

Figure 1: Mean, SD and mean% of virtual learning awareness among the new nursing graduates

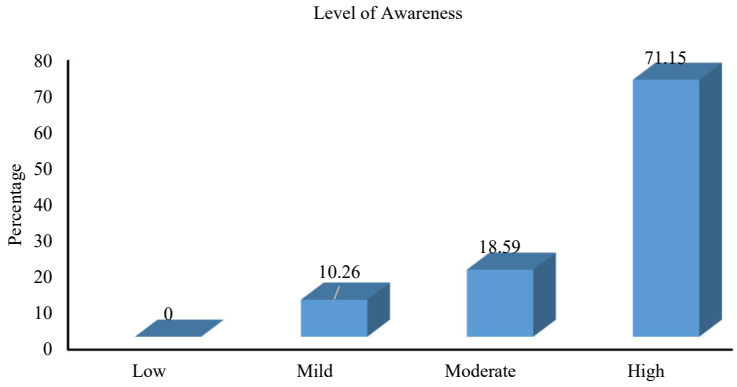

Figure 2: Level of awareness of Virtual Simulation among the new nursing graduates

Table 2: Overall wise Mean, SD and mean% of virtual learning readiness among the new nursing graduates

Parameters	Max. score	Range	Mean	SD	Mean (%)
Application to practice	25	20-8	16.41	3.03	65.54
Self-learning	25	25-9	20.78	3.72	83.14
Structured learning	25	25-8	21.39	3.92	85.56
Overall	75	70-27	58.58	10.01	78.11

overall Mean was 84.92±12.68. The average mean percentage score showed high on the "Virtual simulation learning provides safe practice environment before the actual practice" category (88.6%), followed by "Execution of VS" (86.2%), "Post simulation debriefing" (84.8%), "Advantage of using VS" (84.6%), "Concept of VS" (84.52) and "preparation" (83%). The mean scores on the sub-sections indicate the necessity of emphasis on educational intervention on the concepts and pre-preparation needed for VS.

Table 2 identified the mean scores of the virtual learning readiness among the participants. The overall mean percentage of the readiness scale was lower than the awareness scale responses (58.58±10.01). Especially, the items regarding Application to practice scored lower than the other two categories16.41±3.03.

Figure 2 shows that, 71.15 % of the participants were highly aware of virtual learning. Nearly one-fourth of them were aware of virtual learning (18.59%). Only of them had average awareness. These results indicate that the participants are aware of virtual learning and its importance in the clinical area.

Figure 3 shows the participant's readiness in engaging virtual learning. Only half of them had a favorable response towards virtual learning. More than one-third of them were on moderately factorable virtual learning and Less than one-tenth of them had somewhat unfavorable (37.82%).

A significant difference in awareness was found between the participants who preferred and did not prefer VS was their skills development ($p<0.001$). Significant difference in awareness was noted among age groups ($p<0.001$), GPA

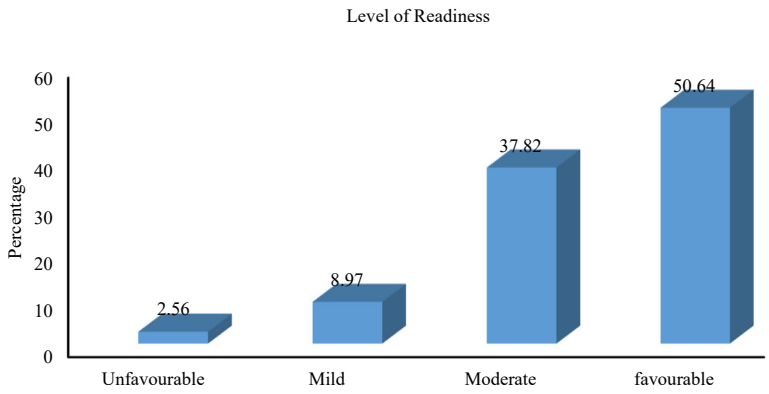

Figure 3: Percentage of the new nursing graduate's regards to level of readiness in virtual learning

Table 3: Association between virtual learning awareness and selected baseline characteristics

Baseline characteristics	Awareness score				F/'t'-value	p-value
	n	%	Mean	SD		
Age in years						
21-22	34	21.79	90.06	11.87	F = 15.934 (df = 2, 153)	p<0.001*** HS
22-24	85	54.49	86.85	9.98		
More than 24	37	23.72	75.78	14.55		
Gender						
Male	70	44.87	86.53	10.57	t = 1.431 (df = 154)	0.155 NS
Female	86	55.13	83.62	14.11		
Current clinical experience						
Less than 6 months	63	40.38	81.78	13.82	t = 2.595 (df = 154)	0.01* S
6 months-1 year	93	59.62	87.05	11.45		
GPA						
4.5-5	33	21.15	96.42	4.48	F = 79.266 (df = 3, 152)	p<0.001*** HS
4-4.49	50	32.05	89.28	8.03		
3.5-3.99	59	37.82	80.78	9.54		
3-3.49	14	8.97	59.71	7.06		
<3	0	0	0	0		
Pre information on VS						
No	75	48.08	80.41	13.54	t = 4.533 (df = 154)	p<0.001*** HS
Yes	81	51.92	89.10	10.27		
Prefer virtual simulation to update nursing skills						
Yes	139	89.10	86.44	11.42	t = 4.527 (df = 154)	p<0.001*** HS
No	17	10.90	72.53	15.88		

*p<0.05 significant, ** p<0.01, ***p<0.001 highly significant

(p<0.001), Significant difference was identified between the participant's with 6 months and more than 6 months experience (p-0.01), Significant difference was identified between the participant's with 6 months and more than 6 months experience(p<0.001). Pre-information regarding VS as well as GPA also significantly influence the awareness among the participants (p<0.001) (Table 3).

Age (p<0.001), preference in VS (p-0.002), GPA (p<0.001) and pre-information on VS (p<0.001) were significant with the readiness score among the participants (Table 4)

Figure 4 identified the significant correlation between the awareness and readiness for virtual learning among the participants (r-0.838, p<0.001***(HS)).

DISCUSSION

An influential educational tool with considerable, yet untapped, potential is virtual simulation. By placing new nurses in realistic digital environments, this technology enables them to gain the knowledge and skills necessary for their future professional roles. To better understand how new nursing graduates are acquiring technical and non-technical skills, this study looked at participant awareness and readiness of VS related to their practice. A strong correlation was found between the awareness and readiness to practice VS among the study participants (r-0.83, p<0.001). This indicates the necessity of emphasizing the awareness, orientation and training programs in VS for the new nurses.

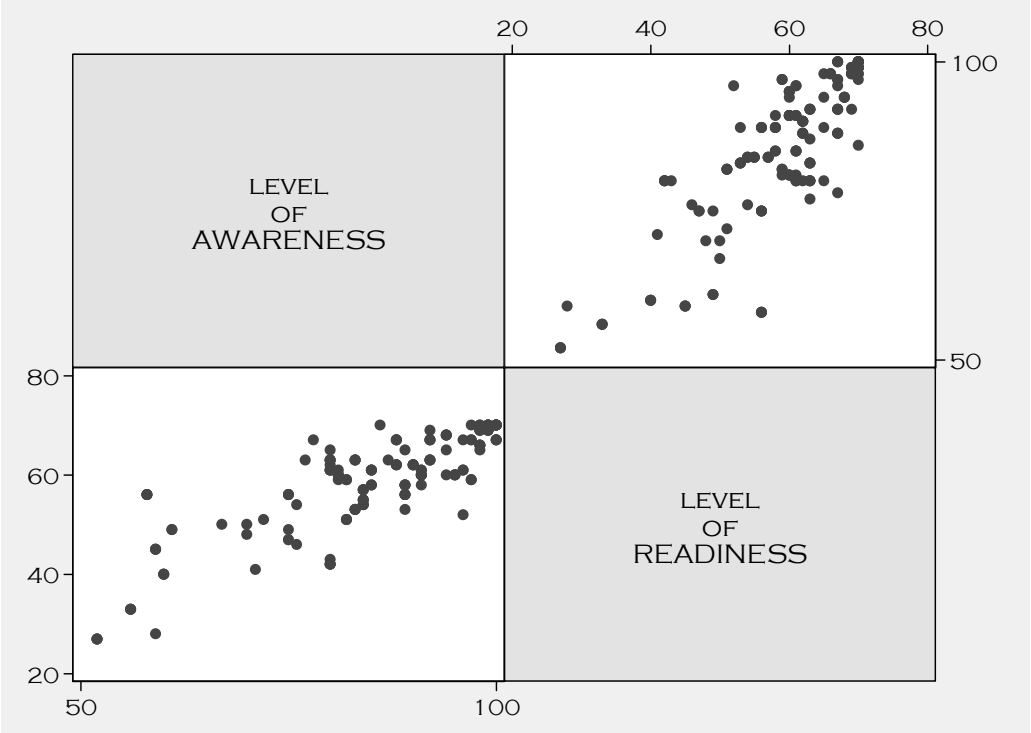

Figure 4: Correlation between awareness and readiness among the new nursing graduates

Table 4: Association between readiness for Virtual Simulation and selected baseline characteristics

Baseline characteristics	Readiness score				F/'t'-value	p-value
	n	%	Mean	Scheffe test		
Age in years						
21-22	34	21.79	62.91	6.95	F = 12.149 (df = 2, 153)	p<0.001*** HS
22-24	85	54.49	59.55	8.85		
More than 24	37	23.72	52.41	12.06		
Gender						
Male	70	44.87	59.39	8.53	t = 0.895 (df = 154)	0.372 NS
Female	86	55.13	57.94	11.08		
Current clinical experience						
Internship	63	40.38	57.59	9.26	1.03 (df = 154)	0.305 NS
Working	93	59.62	59.27	10.48		
GPA						
4.5-5	33	21.15	66.36	4.24	F = 51.624 (df = 3,152)	p<0.001 HS
4-4.49	50	32.05	62.26	6.84		
3.5-3.99	59	37.82	55.42	7.82		
3-3.49	14	8.97	40.50	9.94		
<3						
Pre information on VS						
No	75	48.08	53.99	11.41	t = 6.147 (df = 154)	p<0.001*** HS
Yes	81	51.92	62.85	5.95		
Preferences of virtual simulation						
Yes	139	89.10	59.47	8.94	't' = 3.225 (df = 154)	0.002** HS
No	17	10.90	51.41	14.86		

*p<0.05 significant, ** p<0.01, ***p<0.001 Highly significant

The findings of this study are congruent with a mixed study from Spain; previous experience has a significant impact on knowledge acquisition, although there were marked differences between the knowledge levels before and after the tests [16].

A study from the University of Lleida reported high levels of satisfaction among the participants in VS. Students acknowledge the positive effects of this method on their learning and virtual clinical simulation effectively enhances knowledge acquisition while promoting satisfaction [16]. Integrating VR simulation with conventional teaching methods in nursing clinical courses can enhance nursing students' satisfaction, boost their self-confidence and improve their performance in clinical environments, while

also managing physiological indicators [14,15]. Similarly in this current study also most of the new nurses are aware of VS (71.15%). Therefore, virtual simulation contributes to the training of proficient medical professionals. This study demonstrated high awareness among 71.15% of the graduates whereas readiness was noted among only 50.64% of the participants. The nursing graduates possessed a general understanding of the Virtual Simulation (VS), but only about half demonstrated confidence in its usability. Contrastingly, a significant portion of participants reported feeling satisfied or very satisfied with their overall experience in VS from a pan-Canadian study [17].

During educational training, the main goal was consistently identified as becoming a "safe" practitioner by meeting the fundamental competencies necessary for entry-level practice environments. The simulation was recommended as one of the various methods to improve the readiness of nursing students, as it offers a controlled setting to refine clinical skills and related decision-making in a safe environment [18]. In this research, graduates demonstrated a strong understanding of the importance of safe practices before engaging in real-world situations (Mean- 8.86, SD-1.47, Mean Percentage-88.6). Graduates believe that virtual reality provides a safe environment for education and reflection.

In healthcare, certain cases can be particularly challenging for providers, such as dealing with violent patients, mental health issues and dementia. It is thought that virtual reality technology could be particularly beneficial in these scenarios to enhance the safety of healthcare providers. Rather than facing these situations and endangering themselves in real life, this technology allows them to practice how to handle specific situations using a "trial and error" approach [19]. Majority of the participants from this study reported VS provides safe environments, before the real practice (88.6%). The VS is well appreciated by the nursing students in the practice without the fear of consequences and it allows the students to make mistakes and correct them [20].

The majority of nurses participating in this study were convinced that a comprehensive orientation before Virtual Simulation (VS) would help lessen anticipatory anxiety related to unfamiliar equipment or software. In this study, most of the students are aware that the preparation phase covers learning goals, established guidelines, ways to interact with the simulation and technological requirements (83%). In parallel, research from Korea indicated that it would be more beneficial for an instructor to provide students with a pre-preparation orientation to clarify the use of VS, give a brief overview of VS scenarios and offer advice on pertinent study topics [8]. The nurses in this study emphasized that the debriefing session following the simulation is an essential component of the virtual simulation (84.8%). Similarly, a study from Korea highlighted the importance of that proposed with engaging of small group discussion in debriefing sessions [18].

The study revealed a significant distinction between graduates who had experience with VS and those who lacked it. Participants in the VS group reported high levels of satisfaction with their training in a study focused on the disaster-specific skill of decontamination [21]. The results highlighted that students perceived the VS method as both self-directed and structured learning. However, lower average scores were recorded concerning the application of VS in nursing practice. In the future, the effectiveness of VS can be assessed for achieving learning outcomes. Discrepancies were observed in various studies regarding the effectiveness of VS. In this study age, GPA, pre-information regarding VS and preference for VS had a significant impact on awareness and readiness. Nurse educators and administrators need to look into these factors on the implications of virtual learning as the key supportive environment for nursing graduates.

CONCLUSIONS

Virtual simulation serves as a robust educational resource with significant, though relatively untapped, possibilities. The results of the study highlighted that the new nurses are aware of the importance of virtual simulation learning. However, the readiness to apply in their practice is lacking. The result of this study helps nurse educators formulate strategies and training programs to enhance their readiness to apply this practice to improve clinical outcomes. Nursing institutions and educators need to explore various elements of virtual simulations, particularly focusing on integration into the nursing curriculum. Sequencing of the phases of virtual simulation is essential to adequately prepare learners for practical application. Careful planning and application of simulation pedagogy are mandatory with the ongoing advancements in technology. The incorporation of virtual simulation into nursing education seems promising, but additional research is required to validate its effectiveness.

Limitations

This study was conducted at selected hospitals, which limits the generalization of the findings. The inclusion of various institutions with an increased sample size will increase the generalizability. This study relied on the self-reported data. Experimental and comparison studies in the near future will help to identify the effectiveness. This study focused on the nursing profession only, studying healthcare professionals will benefit the healthcare industry in the future.

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Conflicts of Interest

The authors declare no conflicts of interest.

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