

Nursing Students' Attitudes Toward Simulation Technology in Nursing Education

<https://doi.org/10.3991/ijet.v14i14.10571>

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Abstract—This paper investigates the usefulness of simulation technology in nursing education from the students' point of view. A quantitative method for data collection has been used. Participants were recruited from three nursing grads, covering six semesters. Twenty percent of the whole participants in each course and semester were randomly selected to be the sample of the study. The initial sample consisted of 150 students. Grade one students (N=141) were excluded as they do not use simulation in their curriculum. The study was conducted in the College of Nursing/the University of Mosul during the period from January 2019 to March 2019. KidSim ATTITUDES questionnaire was conducted as a tool to assess students' attitudes towards using simulation technology in Nursing Education. Data management and analysis were performed by using the SPSS 25. Statistical significance was analyzed using analysis of variance and t-tests as appropriate. Significance levels were set at the 1% level using the student t-test. The finding suggests that most of the student show positive attitudes towards using simulation technology in Nursing education (42%-48.9%) expressed about their (agreed-strongly agreed regarding Relevance of Simulation in nursing. In general, this study has found that Mosul Nursing students has positive attitudes towards using simulation in their teaching and training.

Keywords—Attitudes; Nursing, simulation

1 Introduction

Education plays an important role in the globalization era. Competition in the education sector is increasing. Thus, each college/university needs to have added values to compete with other colleges/universities and win the competition. In order to achieve this goal, they have to increase the capabilities to meet the demands of the society for formal education. Higher education is a strategic sector that can generate high quality human resources. [1] Integration of information technology is of an important essence for modern educational systems as it acts as an effective tool for delivery of education to its users. Education and research complements technology,

which in return provide innovations in learning methods. Information technology has accelerated processes: broaden scope and apt access to education. The usage of information technology (IT), systems and applications have gone through tremendous growth in the last decade [2-3]. Twenty-one century is characterized with remarkable expansions in information technology. The past twenty years have seen increasingly rapid advances in the field of Nursing education. Teachers and nurses face great difficulties and challenges in bridging the gap between laboratory teaching, simulations, and the transfer of information and skills to be applied in the practice for providing direct nursing care to patients. It is clear that the simulation system provides good educational opportunities, but from the point of view of many, the place of direct clinical trials should not be replaced. [4-9]. Simulation is a rising subject recently, along with the methods and application techniques of simulation researching deeply, with digital computer the simulation to practice system or imaginary system has been more and more recognized. Due to high and new techniques that have progressed such as net technique, graphics and image technique, multimedia, software engineering, information processing and auto-control etc., these have expedited the progressing step of simulation technique [8]. There are many questions that are constantly raised about the simulation positive impact on the outputs of education, and if there is any evidence research that confirms the expected benefits of simulators in training of nursing students [6-9]. Simulation is an actually influential instruction method that motivated students and obliges them to thinking logically and use of critical thinking approach, and offers a prospect for insightful education and mixing of the student's knowledge and practice [10-14]. World Health Organization categorized simulations levels into three types that frequently used: High fidelity which is closer to the real setting, moderate fidelity, and low fidelity simulation [15]. Simulation is not a technology, it is an approach, that is used to construct a planned capability to aid in attaining essential skills and safeguard patients and well-being [16-18]. Recently, increased interest in simulation as a means of training and development of skills and ways of thinking among nursing students and this concern came with the idea of developing curricula and adapting to the strategies of learning and to meet the need of scholars [19-20]. Furthermore, simulation was found to have significant impact on different instructive output like self-confidence, information gaining, and clinical skills [21]. Although the literature stated simulation had a good effect on many education outputs, several nursing students perceived simulation as not matching the real practice setting, and uneasy technique to learn [22]. Like these negative opinions may inhibit the process of education & effect student's engagement and the fidelity of simulation. [23-25]. In order to develop effective nursing education programs, the perceptions, attitudes, and feelings of nursing students towards the use of simulation in their education should be studied.

2 Aims of the Study

This paper aims to investigate the effectiveness of simulation technology on nursing education from the point of view of student themselves.

3 Review of Literatures

Simulation has been used widely in the clinical training of health-care students and professionals. It is a valuable strategy for teaching, learning and evaluating clinical skills at different levels of nursing and midwifery education: undergraduate, postgraduate and lifelong education [26-27]. Simulation has a positive impact on students, educators, and the individuals, groups and communities they care for, as well as on education and health organizations. The principal aims of simulation as a teaching method are to improve quality of care and ensure patient safety. The simulation techniques were evaluated through the perceptions of nursing students in the Prince et.al. study [28], which used typical scenarios about Medical-surgical cases. A pre-posttest questionnaire was completed by 52 students. The results of the study indicated positive attitudes towards the use of simulation technology in nursing education and indicated that it helped them to use critical thinking in solving problems. Leonard and others [29] assessed the perceptions of 48 nursing students about using simulation in their studies. Students' answers to the study tool indicated that the simulation provided an appropriate learning environment for teaching nursing practices. Another study was conducted by Wotton et al. [30] on nursing students in their third year of study aimed at evaluating their perceptions and attitudes about simulation technology in teaching nursing practices. Analysis of the students' responses indicated that the simulation is fun and the ability to face challenges and deal with confusion as a natural component in the training phase. Nursing students' perceptions of simulations were also evaluated and compared according to the stages of the study. Eighty-six students were randomly assigned to groups, and they solved a patient problem using a high-fidelity simulator, a static costume, or a paper-pencil suit. Data analysis indicated the satisfaction of nursing students with the use of scenarios regardless of the simulated methods used [31]. The attitudes and perceptions of Jordanian nursing students toward simulation as an educational strategy, was investigated by Gharaibeh et al. [32] a convenience sample of 413 Jordanian nursing students completed The Arabic translated version of KidSIM ATTITUDES scale. The total attitude score was encouraging with significant differences between first, second- and third-year students. Post hoc analyses showed the lowest attitude mean score occurring in the second-year nursing students.

4 Methods

4.1 Ethical considerations

This study was approved by the council of College of Nursing at the University of Mosul, Iraq. Study participants were not exposed to harm in any ways whatsoever. Anonymity, privacy and dignity of student were prioritized. No any conflicts of interests and no any advantages were given to the student. Formal consent was obtained from the students before the study and the protection of their identities were ensured.

4.2 Study design

By employing quantitative descriptive modes of enquiry, the authors attempt to illuminate the attitudes of the Nursing students towards using simulation in nursing education as a dependent variable. It also investigated the extent to which these trends are influenced by the student's gender, grade, semesters in which the student is enrolled as independent variables.

4.3 Study sample

The target population of the study is the College of Nursing students at the University of Mosul for the academic year (2018-2019). The total number is (671) divided into six Courses: (Fundamentals of Nursing (141); Adult Nursing II (218) students, Pediatric Nursing (74) students, Maternal and Child Health Nursing (81) students, Community Health Nursing (75) students, and Mental Health Nursing (82) students). Participants were recruited from three nursing grads, covering six semesters. Twenty percent of the whole students in each Course and semester were randomly selected, the initial sample consisted of 150 students. Grade one students (N=141) were excluded as they do not use simulation in their curriculum.

4.4 Setting

This study was conducted in a College of Nursing in the University of Mosul during January 2019 to March 2019. Currently, the total number of students enrolled in the different programs offered in the College of Nursing is about 712 undergraduate nursing students.

4.5 Research tool

KidSim ATTITUDES questionnaire: It was a 30-item questionnaire prepared by Sigalet et al. [33] as a tool to evaluate student's attitudes toward using of simulation technology in Nursing Education the time required to complete the scale is approximately 15 minutes. a five option Likert-type scale that range from 1 = strongly disagree, to 5 = strongly agree; were used to answer on questionnaire statements and the total score ranged between 30 and 150. there is no reverse coding. The questionnaire was translated into Arabic and translated to English again.

The socio-demographic sheet: The student's demographic characteristics measured in this study were self-reported (gender, age in years, grade, previous exposure to simulation. Validity and Reliability of the scale: face validity was determined through submitted a copy of scale to panel of (10) faculty member and experts in the field of the study (Nursing Education, Educational psychology, biostatistics). Reliability was measured through application of test-retest approach on 10 students who's randomly selected and then they were excluded for the original study.

Statistical analysis: Data management and analysis were performed using SPSS 25 (2018). Statistical significance was analyzed using analysis of variance and t-tests as appropriate. Significance levels were set at the 1% level using the student t-test.

5 Results

As can be seen from the table (1), (77.8 %) of nursing students shows their agreement about “Relevance of Simulation”. The total mean score for IPE and communication were (3.46) (3.39) respectively, which reveals that the student has neutral opinion. (Table 2) (Table 3). The Chi-square test show significant association in relation to roles and responsibilities of simulation in education, the overall mean scores response to this sub-scale questions was (4.21), that explore (84.2%) of students has very strongly agreement, Table (4). When the participants were asked about “Situation Awareness”, the majority responses (68%) shows that positive attitudes. Interestingly, the female students show more positive attitudes than male students and then senior student more than joiner.

Table 1. Mean, Standard deviation, and percentage of student attitudes on Relevance of Simulation subscale

	Relevance of Simulation	N	Mean	SD	%	Scores weight
1.	“Simulation is a good environment for learning with other health care professionals	150	3.99	0.9	79.8	Agree
2.	Simulation supports opportunities to change attitudes	150	3.81	1.13	76.2	Agree
3.	Opportunities to practice teamwork can help students learn about inter-professional roles	150	4.01	1.16	80.2	Agree
4.	Opportunities to learn with other health care professionals has increased my understanding of their roles	150	3.9	1.24	78	Agree
5.	Simulation is a good tool for practicing team decision-making skills	150	3.8	1.26	76.6	Agree
6.	Deliberate practice can improve clinical decision-making skills	150	3.82	1.24	76.4	Agree
	Total	150	3.9	1.1	77.8	Agree
Chi-Sq = 11.792, DF = 20, P-Value = 0.923						

Table 2. Mean, Standard deviation, and percentage of student attitudes on Opportunities (IPE) subscale

	Opportunities (IPE)	N	Mean	SD	%	Scores weight
1.	Learning with other professionals is important to collaboration	150	3.66	1.27	73.2	Agree
2.	Opportunities to learn with other professionals should be a priority in my education	150	3.17	1.54	63.4	Neutral
3.	I want more opportunities to learn with other professionals	150	3.78	1.37	75.6	Agree
4.	Shared learning with other team members will improve my ability to understand clinical problems	150	3.56	1.47	71.2	Agree
5.	Attitudes about teamwork can change through opportunities to work with other professionals in simulation	150	3.42	1.42	68.4	Agree

6.	Learning with other health care professionals before qualification is important for the development of future inter-professional relationships	150	3.28	1.58	65.6	Neutral
7	Inter professional opportunities for learning will improve patients' outcomes	150	3.38	1.45	67.6	Neutral
	Total	150	3.46	1.4	69.2	Neutral
Chi-Sq = 20.809, DF = 24, P-Value = 0.650						

Table 3. Mean, Standard deviation, and percentage of student attitudes on communication subscale

No	Communication	N	Mean	SD	%	Scores weight
1	All students should learn how to work in the context of health care teams	150	3.6	1.23	72	Agree
2	Team leaders should provide frequent patient updates to other team members	150	3.11	1.47	62.2	Neutral
3	Team leaders should encourage team members to ask questions	150	3.62	1.39	72.4	Agree
4	Communication within the team is as important as technical skills	150	3.54	1.46	70.8	Agree
5	Team members providing immediate patient care management should verbalize their activities aloud	150	3.37	1.38	67.4	Neutral
6	Team members should paraphrase or repeat back instructions to clarify their understanding	150	3.24	1.56	65.4	Neutral
7	Communication in teamwork is important to patient safety	150	3.36	1.43	67.2	Neutral
8	The roles of non-leading members of the team are just as important for good team functioning as the role of the leader	150	3.25	1.46	65	Neutral
	Total	150	3.39	1.44	67.8	Neutral
Chi-Sq = 22.288, DF = 28, P-Value = 0.768						

Table 4. Mean, Standard deviation, and percentage of student attitudes on Roles and Responsibilities subscale

No	Roles and Responsibilities	N	Mean	SD	%	Scores weight
1	Teamwork practice will provide me with feedback to enhance my ability to provide optimal patient care	150	4.27	1.1	85.4	Strongly agree
2	Monitoring what each team member is doing is important to optimize patient safety	150	4.17	1.16	83.4	Agree
3	Will enhance other team members understanding of my role in patient health care	150	4.15	1.12	83	Agree
4	Teamwork practice will help me recognize how best to help other team members complete their tasks	150	4.34	1.08	86.8	Strongly agree
5	It is important for team members to ask for assistance if they need support in completing a task	150	4.1	1.14	82	Agree
6	Teamwork practice allows for flexibility in roles during times of crisis	150	4.2	1.1	84	Strongly agree
7	Total	150	4.21	1.12	84.2	Strongly agree
Chi-Sq = 4.563, DF = 20, P-Value = 1.000						

Table 5. Table (5) Table (4) Mean, Standard deviation, and percentage of student attitudes on Situation Awareness subscale

No	Situation Awareness	N	Mean	SD	%	Scores weight
1	I will speak up if I perceive a problem regardless of who might be affected	150	3.47	1.61	69.4	Agree
2	Patient care is improved when all team members have a shared understanding about the assessment and treatment	150	3.37	1.61	67.4	Neutral
3	Team leaders should provide frequent summaries of patient findings to keep team members oriented to patient needs"	150	3.35	1.57	67	Neutral
Total		150	3.4	1.6	68	Agree
Chi-Sq = 99.304, DF = 8, P-Value = 0.000						

Table 6. Comparison between student attitudes according to tier gender

Subscales	Male		Female		t	P
	Mean	SD	Mean	SD		
Relevance of Simulation	25	1.2	27	1.4	2.4	0.5
Opportunities (IPE)	31	0.9	33	0.3	3.1	0.5
Communication	36	1.7	39	1.9	2.9	0.5
Roles and Responsibilities	31	2.1	34	1.2	3.7	0.5
Situation Awareness	12	0.4	14	0.1	3.8	0.5
Total	66.3	6.9	70.4	4.3	4.2	0.5

Table 7. One way analysis of variance opfr the difernces between student attitudes according to thier garde

KidSim subscale	Source of variance	Sum of Squares	df	Mean Square	F	Sig.
Relevance of Simulation	Between Groups	51.899	2	25.949	0.527	0.592
	Within Groups	7244.394	147	49.282		
	Total	7296.293	149			
Opportunities (IPE)	Between Groups	14.075	2	7.038	0.455	0.635
	Within Groups	2272.385	147	15.458		
	Total	2286.460	149			
Communication	Between Groups	21.543	2	10.772	0.985	0.376
	Within Groups	1607.817	147	10.938		
	Total	1629.360	149			
Roles and Responsibilities	Between Groups	140.678	2	70.339	1.262	0.286
	Within Groups	8192.822	147	55.733		
	Total	8333.500	149			
Situation Awareness	Between Groups	6.481	2	3.240	0.193	0.825
	Within Groups	2465.259	147	16.770		
	Total	2471.740	149			
Total scores	Between Groups	2.030	2	1.015	0.623	0.538
	Within Groups	239.543	147	1.630		
	Total	241.573	149			

6 Discussion

In recent years, Iraqi nursing education has witnessed significant progress and development. This may be due to several factors. The most prominent of these was the adoption of Iraq a national strategy for nursing and midwifery development sponsored by the World Health Organization, which led to a comprehensive modernization of Nursing education curricula and methods of teaching. In harmony with this strategy, the educational laboratories have been developed and the simulation technology has been used in the nursing education.

This study was conducted for the purpose of measuring the attitudes of nursing students towards simulation technology in nursing education. The study offers some important insights into nursing education modes. The most interesting finding was that majority of the participating students had positive attitudes toward the simulation system in teaching nursing skills. The students believed that the simulation technology provided them with opportunities to develop their skills before applying caring the patients in real practice and they also believed that the simulation offer Opportunities to learn with other health care professionals and increased understanding of their roles.

As mentioned in the literature review, the results of this study were agreed with several other studies conducted on nursing students. Franc-Law's et al's study, [34] reveals that the overall medical students' satisfaction a with simulated based curriculum was high (8 of 10 on a Likert scale). Traynor et al [35] and Ennen & Satin, [36] who reported that students gain knowledge and confidence during simulation sessions for clinical practice and improves communication and team work in emergency situations.

Another study carried out by Chakravarthy et al in 2011 [37] on the students of the medical school who were trained in the course of emergency medicine and used the simulation technology, they showed high progress in the level of knowledge and gain leadership skills and improve their level of satisfaction.

In 2006, a comparative study was conducted at the University of California, which concluded that students who received simulation training were showed better knowledge than practice-based learning [18].

Furthermore, a study revealed high student agreement scores for material taught with simulation compared with more traditional modalities such as Power Point lecture, self-study session, and group discussion [38-40]. These studies concluded that the use of simulation in the training of nursing students was positively reflected in the promotion of students' practices and their ability to acquire new skills and develop their ability to brainstorming, reasoning and critical thinking in solving problems. In addition, some studies confirmed that students who were trained by simulation showed less clinical errors in the clinical setting and were abler to make clinical decisions [41-42].

Indeed, many studies shows that that good preparation, pragmatism, and interrogation sessions are vital to successful clinical simulations that endorse practical and non-practical skill attainment, enhanced levels of self-reliance, teamwork, and patient safety [43-44].

Generally, the students' positive attitudes toward simulation technology were found more among female students than male students, and this may be due to the fact that females have a higher level of anxiety than males during training in nursing skills, especially on patients directly. Simulations also enhance self-confidence.

These results were consistent with those of some previous studies. It was observed that the favorable perception toward SBL was significantly higher ($p = 0.04$) among female Indian students as reported by Joseph et al. [45].

In particular, has focused on the in another study conducted to evaluate medical students' satisfaction with Simulation based learning (SBL) strategy at the College of Medicine, King Saud bin Abdul-Aziz University for Health Sciences, Riyadh, Saudi Arabia, it was noticed that the female third year medical students were significantly ($p = 0.03$) more satisfied with the SDL compared with the males (54 ± 7 vs. 50 ± 9). [46] Nursing education is based on three important pillars: knowledge, practice, and attitudes. Nursing students receive extensive theoretical information in the classroom and are trained to practice care in educational laboratories. [46]

The emotional aspect of caring for patients and moral and legal issues cannot be overlooked because man is the highest value in society [47-49]. Similarly, Baxter et al [50] Kiat et al [51] determined in their study that when theoretical education is combined with practice, simulation technology becomes a fun way to teach, and the skills of students become more efficient and unusual, and they become aware of what he is doing differently. In the same way a study conducted by Wotton et al [30] on the third-grade students used advanced manikin showed that most students had positive attitudes about the use of high-fidelity simulation manikin.

The nursing students revealed a high positive attitude toward the simulation experience in all grades. Unlike results were shown in Mould et. al. [52] and Baillie & Curzio, [53] where the students knowledgeable an improvement in nursing competence, confidence and increased skill post the simulation experience. In Sullivan Mann et. al., [54], the results revealed that the trial contributors showed improved score level in critical thinking. Likewise, another study conducted by Kiat et al [51], on the second-graders nursing students showed that they learned from their mistakes and their self-esteem increased. Correspondingly a previous study showed that simulation technology is useful and valuable in training students and providing minimum technical skills [55-67].

7 Conclusion

The ability to simulate patients has become more sophisticated with great technological advances and virtual reality has become fairly real in terms of education and training. Nursing education and training is progressing remarkably and requires a high level of attention in assessment methods, such as problem solving and critical thinking. The simulation offers opportunities for education and training in a safe and secure environment. Current research is not enough to support the idea that simulation replaces clinical education, but simulation remains an excellent bridge between theoret-

ical framework and application. This study has found that generally, Mosul Nursing students has positive attitudes towards using simulation in their teaching and training.

8 Recommendation

Nursing educators should be familiar with the ways in which simulation technology can be used as an important learning tool, being aware of its benefits and how to motivate students to master it. The use of appropriate scenarios may be of great benefit to the understanding and considerate of the skills of students in solving problems. Therefore, the nursing teachers should be very careful in the adoption of the means of student's assessment needs and implement course plan and evaluation the outcome

9 Conflict of Interest

I declare that I DO NOT have any conflicts of interest.

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11 Acknowledgement

I would like to express my special thanks of gratitude to deanship of Nursing College at University of Mosul as well as Nursing Students who agreed and gave me the golden opportunity to do this wonderful work.

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Article submitted 2019-03-30. Resubmitted 2019-05-05. Final acceptance 2019-05-06. Final version published as submitted by the authors.