

## Simulation-Based Education during COVID-19 Pandemic: Effect on Communication Skills and Clinical Competence of Maternity Nursing Students

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### Abstract

**Background:** Simulation is a teaching strategy that may help the nursing educators prepare the future nurses to practice in a real environment. It is a teaching strategy that provides students with artificial representation of a complex real-life for enabling them to learn in a safe environment. Based on its degree of realism; it ranges from low to high fidelity. Simulation played a critical role during COVID-19 pandemic. With resources limitation, presented safety concerns and the need for social distancing, simulation became a vital tool that provided solutions to challenges faced by students and staff during clinical training. **Purpose:** assess the effect of simulation-based education during COVID-19 on communication skills and clinical competence of maternity nursing students. **Methods:** A quasi-experimental design (study & control group) was used. Sample: A purposive sample was used in conducting the study. Sample size: was 100 students from third academic year students at Faculty of Nursing, Menoufia University. Instruments: three instruments were used for data collection (1) Semi-structured interviewing questionnaire, (2) Communication skills measurement tool and (3) Clinical competence measurement tool. **Results:** communication skills and clinical competence scores of the study group were higher than the control group after the intervention. **Conclusion:** The current study findings supported the study hypothesis.

**Keywords:** Simulation, COVID-19, Communication skills, and Clinical Competence

### Introduction

The COVID-19 pandemic prompted many institutions to rethink simulation training, which went from being just another strategy to the strategy of choice as institutions made the necessary adjustments to adapt to the pandemic. Simulation programmes were modified to meet health needs in order to ensure that students would be able to adapt to the crisis, as this teaching strategy improves student learning **Brydges et al (2020).**

Although the use of simulation in nursing education has increased during the last two decades in general; maternity nursing simulators had old roots. In the 18th century Paris,

Grégoire father and son developed an obstetrical mannequin made of human pelvis and a dead baby bone. The phantom, as the mannequin was named, enabled obstetricians to teach delivery techniques which resulted in a reduction of maternal and infant mortality rates **Debrayhgyalle (2018).**

Simulation in nursing education at any level offers several advantages. It enables students to train without the stress of patient harm or treatment error. It allows for larger numbers of students to experience controlled learning situations than is possible in actual clinical environments. It can be used to accommodate the presence of male students who face cultural rejection at actual situations. Finally, it improves students' knowledge base,

communication skills and allows clinical competence **Sauls (2018)**.

In the area of maternal and newborn health nursing, in particular, there is more difficulty than in other fields in obtaining real clinical practice. Due to unpredicted progress of labor, unexpected factors interfering with learning opportunities are common and emergency situations frequently occurred during delivery. Thus, nursing students often don't have the opportunity to provide direct nursing care to the women who are in labor. In addition, because of concerns for the safety of the mother and fetus and for the mother's privacy, it is difficult for students to observe and perform the nursing process steps **Como, Kress & Lewental (2018)**.

Maternity nursing students experienced anxiety and fear of establishing relationships with laboring woman due to lack of professional knowledge about labor and needed skills to take care of the woman. Anxiety in undergraduate nursing students in the clinical setting is caused by many factors the main is fear of harming woman or her baby. This issue has negative effects which include compromised student learning, decreased clinical competence, and increased risk for woman or baby harm. The issue of student anxiety in the clinical setting must be managed by nurse educators **Yeboah-Asiamah et al (2016)** to overcome these problems and to achieve the learning objectives of the maternal and newborn health nursing, the use of simulation as a new teaching and learning method is required **Shellenbarger & Edwards (2017)**. Normally, in the labor room, there are the women along with each woman's husband and some of her family members. Thus; effective communication skills are therefore needed as well as clinical skills **Malmi et al (2017)**. Communication skills are associated with higher laboring woman satisfaction and better health outcomes. Hence, it is necessary for students to master such skills. To attain this goal students, need training and evaluation in communication skills so this can become one of their areas of competence **Blum, Borglund & Parcells (2018)**.

Clinical competence refers to the nursing student's essential skills related to maternity nursing performance. International Council of Nurses calls for the need of professional competence as a professional responsibility and public concern **Movember (2017)**.

### **Significance of the study**

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During the last 10 to 15 years, simulation-based education has emerged as an effective method of teaching maternal and newborn health nursing. Because of possible risks involved in having undergraduate nursing students provide care to laboring woman simulators provide a safe and effective means of preparing student nurses for practice **Polit (2017)**.

The period of COVID-19 presents a unique challenge especially in healthcare educational institutions and settings which traditionally gather learners together in face-to-face settings to practice skills.<sup>2</sup> COVID-19 pandemic presents main challenge; how do the educational process continue to provide a positive learning experience and sense of community for learners, while they are unable to be trained effectively without patient contact. Thus, simulation was suggested to replace real patient-contact and provide sense of community for learners **Brydges et al (2020)**.

Limited studies highlighted the effect of simulation-based education during COVID-19 pandemic on maternity nursing students' communication skills and clinical competence specially in caring for maternity women.

So, the researchers used simulator-based education utilizing available simulator at Maternal Health Nursing Department on Faculty of Nursing Menoufia University, to examine the effect on students' communication skills and clinical competence in caring of laboring women.

**Purpose of the Study:** The purpose of the current study was to assess the effect of simulation-based education during COVID-19

on communication skills and clinical competence of maternity nursing students.

### Hypothesis

1. Students who will receive simulation-based education regarding care of women in normal labor will have higher communication skills score than the control group.

2. Students who will receive simulation-based education regarding care of women in normal labor will have a higher clinical competence score than control group.

### Methods

#### Design

A quasi-experimental design (study & control group) was used in carrying out this study **Polit (2017)**.

#### Settings:

The present study was conducted at Faculty of Nursing, Menoufia University. The faculty offers academic degrees of bachelor (BNSc), master (MNSc) and doctorate (DNsc) in different nursing specialties. The data collection was processed at the “integrated skill lab” which is dedicated to train maternity nursing students on different skills. The used simulator was “NOELLE® S550.100 - Maternal and Newborn Care Patient Simulator Package”, (Package: S550.100.PK) is a childbirth patient simulator designed for training skills in labor and delivery, postpartum hemorrhage, and neonatal resuscitation. The NOELLE® simulator provides capabilities in obstetrics, and neonatal resuscitation protocols. It helps develop learners' caring abilities in tension-free environment before they can face real labor situation.

#### Participants:

The target population of this study was 300 third year students. The accessible population of interest was volunteer students willing to participate in this study and fulfilling the inclusion criteria.

#### Inclusion criteria:

The study was conducted during the academic year, so the inclusion criteria were: third year students and have attended theoretical and clinical lectures covering prenatal and labor care.

#### Sampling Technique:

A purposive sample was used in the present study.

#### Sample size calculation:

The sample size was calculated using Epi Info (2000) program based on the results of **Young et al (2012)**. The sample size was calculated at: Power 80%, confidence level 95% and margin of error 0.05. Accordingly, the calculated minimum sample size required was 100 participants with cases to control ratio 1:1 so (50) students in experimental group and (50) students in control group.

#### Instruments of data collection

**Instrument I: Semi Structured interviewing questionnaire:** Was designed by the researchers and submitted to validity and reliability tests and used to collect main data including name, age, mobile number and previous experience with simulation. The tool was submitted to five scholastic nursing experts in the field of maternity nursing to test its content validity. The required modifications were performed based on recommendations of experts. The reliability was assessed using test and retest reliability.

**Instrument II: Communication skills measurement tool:** This instrument was adapted from **Yoo (2001)** to evaluate nursing students' ability to communicate. E-mail approval was granted from the original author for using the instrument. The instrument contains a total of nine questions with a 3-point scale: five questions to determine professional attitude as a nurse and four questions to determine whether sufficient explanation was provided during the nursing care to laboring

woman by the student. Validity and reliability of this tool was ascertained by Lee (2001), Cronbach's  $\alpha$  of this tool was .89. Scoring system of the instrument: Each question was evaluated according to 3-point scale. 0=not done, 1=done incompletely, 2=done completely. The total score was 18, (0:6) poor, (7:12) accepted and (8:18) was considered good.

**Instrument III: Clinical competence measurement tool:** This instrument was adapted from Yang & Park (2004). E-mail approval was granted from the original author for using the instrument. The researchers only rephrased some questions from the instrument after the pilot study to be more clear. The instrument contains 4 domains with a 3-point scale. Domain (1) the nursing process skills of nursing students, domain (2) the ability to perform direct nursing interventions to laboring woman, domain (3) psychosocial nursing ability and domain (4) education for laboring woman. Validity and Reliability of the tool was ascertained by Yang & Park (2004), Cronbach's  $\alpha$  of this tool was .86. Scoring system of the instrument: Each question was evaluated according to 3-point scale, 0= not done, 1=done incompletely, 2=done completely the higher the score, the more competent nursing intervention a student done.

### **Ethical consideration**

IRB approval was obtained as an official step from the authors affiliation. The Faculty of Nursing, Menoufia University is the researchers' main affiliation. The Faculty has its own institution review board with the name of "Research and Ethics Committee". The board role is to examine each research proposal by any researcher before starting the data collection process. Agreement of the board means that the research is considering the ethical issues regarding the participants. Permission to conduct the study is taken from the board after an oral presentation by researchers detailing the research proposal. This research was agreed on by the IRB at 11-7-2018.

### **Pilot Study:**

Piloting was conducted to ensure the applicability of the instruments, the feasibility of the study and estimate the time needed for collecting the data. It was conducted on 10% of the total sample (10). Based on pilot study results; the researcher set the final fieldwork schedule. Sample of the pilot study was excluded from the main sample.

### **Field work and data collection**

**The preparatory phase:** An extensive review related to the study area was done including electronic dissertations, available books and articles. A review of literature to formulate knowledge base relevant to the study area also was done. The review of literature section was tested by plagiarism checker software and the result was "low probability of plagiarism in paper:

**The implementation phase:** The researcher applied the implementation phase in the following steps: **Step 1:** The researcher introduced self to students and purposively select the sample from the available population. Purpose of the study was explained to students and they were assured that participation would not affect their semester work or grades. Selected sample was divided into 2 groups. Study group (1): (simulation group: received simulation-based education), control group (2): (traditional learning: had regular traditional learning at lab during maternity nursing course and the researchers only scheduled a timetable for making a revision for this group using traditional learning). At this step, the first instrument was used to collect students' basic data. **Step 2:** At first a timetable of hospital visits was scheduled but for students' safety and due to COVID-19 pandemic, it was difficult to carry-out the timetable later on it was replaced by labor simulator "NOELLE" at the integrated skill lab at Faculty of Nursing, Menoufia University. NOELLE® S550.100 - Maternal and Newborn Care Patient Simulator Package, "Package: S550.100.PK" is a childbirth patient simulator designed for training skills in labor and delivery, postpartum hemorrhage, and neonatal resuscitation. The NOELLE® simulator provides capabilities in obstetrics, and neonatal resuscitation protocols. It helps develop learners' caring abilities in tension-free environment before they can face real labor situation. A timetable of integrated lab visits

was scheduled, a pre-test measurement of communication skills and clinical competence was done by instruments II and III using labor simulator for study group. **Step 3:** After that the main study intervention was conducted. The study group was divided into sub-groups of 10 students. Simulation-based education was conducted in the nursing lab over a period of 3 weeks and consisted of 3 sessions, for a total of 9 hours. Session one: orientation and labor management, two: simulation of normal delivery scenarios and three: simulation of high-risk delivery scenarios. Sessions were scheduled by the researcher to be 3 days per week to cover all sub-groups over 2 weeks for each session. **Session I:** "orientation and labor management" the session took about 3 hours (repeated 5 times). **Session Objective:** To increase students' knowledge about labor process and its management: **Session Outline:** Revision on normal labor, signs and symptoms, factors affecting normal labor, mechanism, stages of normal labor, nursing management. **Teaching Methods:** Group discussion: **Teaching Aids** Data show presentation. **Session II:** "simulation of normal delivery scenarios". The session took about 3 hours (repeated 5 times). The scenarios were 5 in number one for each sub-group and were covering all stages of normal labor. Scenarios were prepared by the researcher using different textbooks and programed to the simulator by the lab technician. **Session Objective:** To train students' how to give competence-based nursing intervention to women during normal labor using the simulator. To promote students' communication skills during managing normal labor using the simulator. **Teaching Methods:** Demonstration and redemonstration. **Teaching Aids:** Simulation. **Session III:** "simulation of high-risk delivery scenarios". The session took about 3 hours (repeated 5 times). The scenarios were 10 in number two for each sub-group and were covering most common high-risk deliveries. Scenarios were prepared by the researcher using different textbooks and programed to the simulator by the lab technician. **Session Objective:** To train students' how to give competence-based nursing intervention to women during high-risk delivery using the simulator, to promote students' communication skills during managing high-risk delivery using

the simulator. **Teaching Methods:** Demonstration and redemonstration. **Teaching Aids:** Simulation. **Step 4:** The control group: students had regular traditional learning at lab for the same skills (normal delivery management). The researchers scheduled a timetable for making a revision for this group using traditional learning at the same time with the study group. **Evaluation phase:** A post-test measurement of communication skills and clinical competence was done again using instruments II and III through labor simulator. After finishing the field work, students were thanked and handed a gift card.

### Statistical analysis

Upon completion of data collection, the collected data were organized, tabulated; each answer sheet was coded and scored. The researcher coded the data into a coding sheet so that data could be prepared for computer use statistically analyzed using SPSS software (statistical Package for the Social Sciences, version 19, SPSS Inc. Chicago, IL, USA).

### Limitations of the Study

Students clinical training at hospitals was replaced by lab sessions due to COVID-19 pandemic. As a result, data collection plan was totally changed to be done at lab instead of real labor cases at hospital. It was difficult to sit a timetable for the study sessions because of students' class time.

### Results

Table 1 shows the socio demographic characteristics of the studied sample. It shows that there was no statistically significant difference between groups regarding their age, gender or residence ( $P= 0.275, 0.190$  and  $0.315$  respectively).

Table 2 displays the communication skills among the study group participants at the pre and post intervention stages of the study. It is clearly noticed that there was a highly statistically significant difference between scores of "Professional attitudes" and

“Sufficiency of explanation given during nursing care” before compared to after the intervention. Moreover, the total communication score also was highly increased after the intervention.

Table 3 shows the communication skills among the control group participants at the pre and post intervention stages of the study. It is showed that there was no statistically significant difference between scores regarding any item.

Figure 1 displays a comparison between study and control group regarding communication skills at the pre and post intervention phases. The figure shows that there was a highly statistically significant difference between two groups regarding total score of communication skills after the intervention compared to before.

Based on the results shown in tables 2, 3 and figure 1; the first study hypothesis is accepted. It is noticed that Students who received simulation based education regarding care of women in normal labor was higher score in communication skills than control group”.

Table 4 represents a comparison between study and control group regarding clinical

competence score before and after intervention. It shows a highly statistically significant difference between groups score of all items after the intervention as compared to before. The clinical competence score of the study group is higher than the control group after intervention.

Based on the results shown in table 4; the second study hypothesis is accepted. It is noticed that Students who received simulation based education regarding care of women in normal labor was higher score in clinical competence than control group .

Table 5 represents the correlation between communication skills and clinical competence among the study group after intervention. It shows that there is highly a strong positive correlation between communication skills and clinical competence ( $r = 0.725$ ). This means the higher the clinical competence score, the higher communication skills the student has.

Table 6 represents the correlation between communication skills and clinical competence among the control group after intervention. It shows no correlation was found between communication skills and clinical competence ( $r = 0.155$ ).

**Table 1: Socio demographic characteristics of the studied groups**

Socio demographic characters	Study group		Control group		X2	P value
	No.	%	No.	%		
<b>Age / years</b>						
20	12	24.0	12	24.0	2.58	0.275
21	16	32.0	23	46.0		
22	22	44.0	15	30.0		
<b>Gender</b>						
Male	18	36.0	12	24.0	1.71	0.190
Female	32	64.0	38	76.0		
<b>Residence</b>						
Urban	25	50.0	20	40.0	1.01	0.315
Rural	25	50.0	30	60.0		

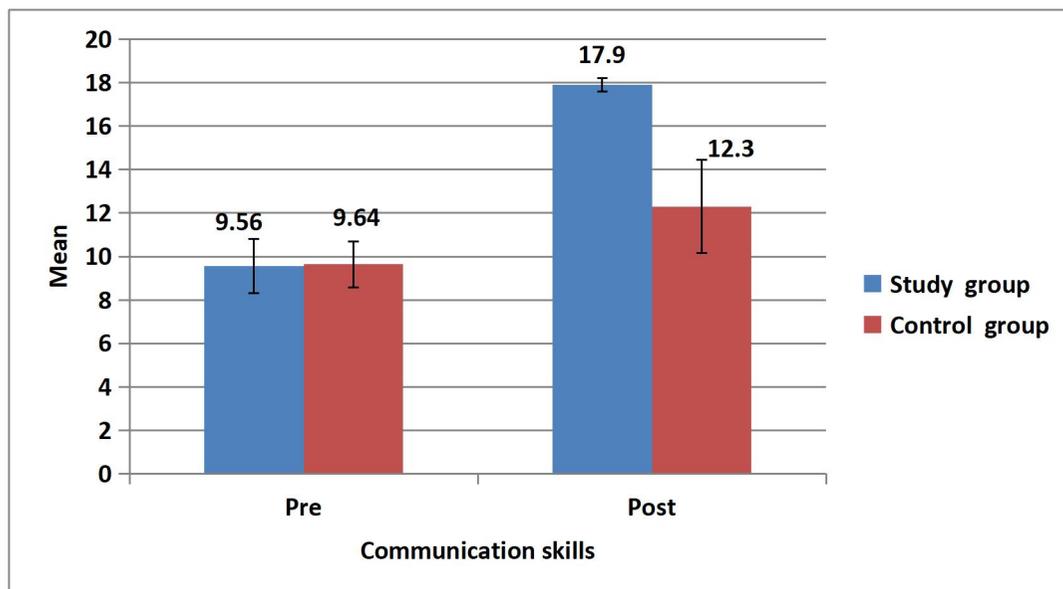
Table 2: Communication skills among the study group pre and post intervention

Communication skills	Study group		Wilcoxon test	P value
	Pre	Post		
	Mean±SD	Mean±SD		
<b>Professional attitude of the nursing student</b>				
The student introduce herself to simulated laboring woman and greeting her	1.28±0.45	2.00±0.00	5.29	<b>0.001**</b>
The student has eye contact to the simulated laboring woman	0.64±0.94	2.00±0.00	5.29	<b>0.001**</b>
The student talks face to face with the simulated laboring woman	1.60±0.80	1.92±0.27	2.34	<b>0.019*</b>
Student politely answer the simulated laboring woman's questions	2.00±0.00	2.00±0.00	0.00	1.00
The student explains technical terms to the simulated laboring woman	0.40±0.75	1.94±0.23	5.44	<b>0.001**</b>
<b>Sufficiency of explanation given during nursing care</b>				
The student gives the simulated laboring woman chance to ask questions	0.72±0.94	1.94±0.23	4.76	<b>0.001**</b>
Student explains to the simulated laboring woman that the contraction could be painful	0.52±0.88	1.92±0.27	5.20	<b>0.001**</b>
The student uses understandable words and talks simply with the simulated laboring woman	1.62±0.49	1.92±0.27	2.50	<b>0.012*</b>
The student explains what she is doing to the simulated woman and why	0.78±0.50	1.90±0.30	5.68	<b>0.001**</b>
<b>Total communication</b>	<b>9.56±1.26</b>	<b>17.9±0.30</b>	<b>9.08</b>	<b>0.001**</b>

\*\* High significant \*significant

**Table 3: Communication skills among the control group pre and post intervention**

Communication skills	Control group		Wilcoxon test	P value
	Pre Mean±SD	Post Mean±SD		
<b>Professional attitude of the nursing student</b>				
The student introduce herself to simulated laboring woman and greeting her	1.60±0.49	1.66±0.47	1.00	0.317
The student has eye contact to the simulated laboring woman	1.48±0.86	1.54±1.00	3.30	0.337
The student talks face to face with the simulated laboring woman	1.20±0.98	1.40±0.92	1.89	0.059
Student politely answer the simulated laboring woman's questions	2.00±0.00	2.00±0.00	0.00	1.00
The student explains technical terms to the simulated laboring woman	0.89±0.60	0.92±1.00	4.02	0.429
<b>Sufficiency of explanation given during nursing care</b>				
The student gives the simulated laboring woman chance to ask questions	1.50±0.96	1.60±0.80	4.58	0.546
Student explains to the simulated laboring woman that the contraction could be painful	0.92±1.00	1.20±0.98	1.80	0.071
The student uses understandable words and talks simply with the simulated laboring woman	1.40±0.92	1.60±0.80	1.66	0.096
The student explains what she is doing to the simulated woman and why	0.74±0.48	0.88±0.55	3.20	0.576
<b>Total communication</b>	<b>9.64±1.06</b>	<b>12.3±2.14</b>	<b>5.18</b>	<b>0.921</b>

**Figure 1: displays a comparison between study and control group regarding communication skills at the pre and post intervention phases**

**Table 4: Comparison between study and control group clinical competence score before and after intervention**

Studied variables		Study group	Control group	Mann Whitney test	P value
		Mean±SD	Mean±SD		
Nursing process skills	Pre	0.84±0.95	0.84±0.99	0.063	0.950
	Post	2.52±0.86	1.08±0.89	6.59	<b>0.001**</b>
Ability to perform direct nursing interventions to simulated laboring woman	Pre	29.11±5.49	29.1±3.98	0.194	0.846
	Post	45.7±1.73	34.1±3.65	8.61	<b>0.001**</b>
Psychosocial nursing ability	Pre	8.02±2.15	8.06±2.76	0.634	0.347
	Post	16.8±1.17	9.88±2.70	8.58	<b>0.001**</b>
Education for simulated laboring woman	Pre	18.5±3.72	19.5±2.63	0.749	0.454
	Post	34.8±1.57	22.1±2.60	8.65	<b>0.001**</b>
Total clinical competence	Pre	58.3±3.95	62.5±3.27	0.600	0.458
	Post	99.9±2.30	67.2±3.96	8.64	<b>0.001**</b>

\*\* High significant

**Table 5: Correlation between communication skills and clinical competence among the study group after intervention**

Studied variable	Communication skills	
	r	P value
Clinical competence	0.725	<b>0.001**</b>

\*\*High significant

**Table 6: Correlation between communication skills and clinical competence among the control group after intervention**

Studied variable	Communication skills	
	r	P value
Clinical competence	0.155	0.283

\*\*High significant

## Discussion

Simulation is a potential tool that may help the nursing educators, prepare the future nurses to practice in a real environment. It is a teaching strategy that provides students with artificial representation of a complex real-life for enabling them to learn in a safe environment. Based on the degree of realism; it ranges from low to high fidelity. The aim of the current study was to evaluate the effect of using simulation on communication skills and clinical competence among maternity students.

The findings of the current study are discussed in the following sequence: Sociodemographic characteristics of the studied

groups, effect of simulation on communication skills, effect of simulation on clinical competence of studied groups and finally relations and correlations.

### Sociodemographic characteristics of the studied groups

The studied participants were college age students at their third academic year and nearly half of them were around twenty-two at both groups. **Choi et al (2020)** conducted a study on Korean nursing students with the same age group about “efficacy of the computer simulation-based on nursing students”. They reported that two thirds of participants were female and only one third was male. This is reflecting the fact that male to female ratio at nursing field is still unequal. This finding is

consistent with an Egyptian study by **Galal, Soad & Hend (2018)** about "Effect of simulation on maternity nursing students' perception, satisfaction and self-confidence" who reported unequal male to female ratio of the studied group.

#### **Effect of simulation on communication skills**

The effect of simulation on communication skills was the core of the first study hypothesis. "Students who will receive simulation-based education regarding care of women in normal labor will have a higher communication skills score than the control group". The study findings revealed an improvement in the communication skills of the study group regarding care of women in normal labor and as compared to the control group. The study group participants were given multiple educational sessions which played an important role in improving their communication skills.

Four recent studies were harmonious with this finding but the uniqueness of the current study is that it was targeting both male and female nursing students and dealing with labor experience while others were targeting female students only and simulation used for any patient not laboring woman.

First, **Choi et al (2020)** conducted a recent study examining the efficacy of the computer simulation-based interactive communication education program for nursing students and found that simulation-based learning had positive impact on the participant's cognitive, affective, and psychomotor domains of learning, including acquisition of communication knowledge and skills. Second, **Qureshi and Zehra (2020)**, studied simulated patient's feedback to improve communication skills of clerkship students and reported a significant improvement in communication skills after receiving feedback from simulated patients. Third, **Elyzeed, Elnehrawy & Mahmoud (2020)** who studied "Effect of educational program on nursing school students' communication skills used with hospitalized patients" and concluded that there were

statistically significant differences before and after the program regarding all items of students' communication skills. Fourth, **Frawly (2018)**, who studied "The effect of inter professional simulation on communication among pre licensure baccalaureate nursing students" and concluded that inter professional education through simulation and the underpinning framework show a great improvement in communication skills.

#### **Effect of simulation on clinical competence of studied groups**

The effect of simulation on clinical competence was the core of the second study hypothesis. "Students who will receive simulation-based education regarding care of women in normal labor will have a higher clinical competence score than control group".

The study findings revealed an improvement in the clinical competence score of the study group regarding care of women in normal labor and as compared to the control group. The study group participants were given multiple educational sessions which played an important role in improving their clinical competence.

Clinical competence was subdivided into: nursing process skills, the ability to perform direct nursing interventions to laboring woman, psychosocial nursing ability, education for laboring woman about pain management and breathing technique

Nursing process skills was the first component of the clinical competence. The present study reported an improvement in this sub score. The training sessions were targeting nursing process skills as a chief role of nursing students. This was supported by **Lambie, Schwend & Andrea (2018)** who studied "Utilization of simulation to foster clinical reasoning and nursing process" and reported that post-simulation nursing process score was significantly improved. Similar result was reported by **Son (2020)** who studied "Effects of simulation-based learning on nursing student competences and clinical performance" and

reported that simulation-based learning could improve students' knowledge and abilities within the nursing process. Similar result was reported by **Karakoc et al (2019)** who studied "Effects of nursing process-based simulation for child emergency nursing care on knowledge, attitude, and skills of clinical nurses" and stated that nursing process-based simulation training for clinical nurses showed improvement in nursing process skills.

The ability to perform direct nursing interventions to laboring woman was the second component of the clinical competence. The present study clearly proved that there was an improvement in students' ability to perform direct nursing interventions to laboring woman after intervention. This can be linked to the training session's role in increasing students' ability to directly provide care for laboring woman.

Similar results were recently reported by **Son (2020)** who studied "Effects of simulation problem-based learning on attitude, metacognition, and critical thinking of nursing students" and published that there was a difference between study and control group regarding their ability to provide direct nursing intervention during labor from phase 1 to phase 4. Moreover; **Karakoc et al (2019)** who studied "The effects of simulation-based education on initial neonatal evaluation and care skills" reported similar findings.

As regard to psychosocial nursing ability; it was the third component of clinical competence. The present study reported that there was a notable improvement in psychosocial nursing ability score after involving the study participants in the training sessions. This finding is agreed upon by **Gerace (2020)** who studied "A simulation-based teaching strategy to achieve competence in learners" and reported that the study group had a significant improvement in psychosocial nursing ability after the intervention compared to before and control group.

Contradicting this result was **Meyer et al (2017)** who studied "The effect of simulation on

clinical performance" and reported that psychosocial nursing ability scores of students who attended simulation sessions over two weeks were not statistically improved as a result of simulation. The aforementioned study's authors self-criticize their study suggesting that improvement in psychosocial nursing ability could have been evaluated with a more sensitive measurement tool than that used.

As for the education for laboring woman about pain management and breathing technique; it was the fourth component of the clinical competence. The present study reported an improvement in this score among study group participants after the intervention compared to before and control group. Being a main nursing role and intervention during labor; these points were stressed on during the training sessions.

The current finding is in agreement with **Reynolds et al (2018)** who studied "Impact of labor and delivery simulation classes among undergraduate medical students" and reported that the study group had a significant improvement in participants' abilities to educate laboring women about pain management and correct breathing technique.

This was further supported by **Hall (2018)** who studied "The effectiveness of high-fidelity simulation in ensuring clinical success for senior maternity nursing students in a baccalaureate program" and found a significant difference between the simulator group and the non-simulator group regarding ability to provide nursing education.

### **Conclusion:**

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The current study findings showed an improvement in communication skills score of the study group after the intervention as compared to before and as compared to the control group. This supports the first research hypothesis: "Students who will receive simulation-based education regarding care of women in normal labor will have a higher communication skills score than the control group."

The current study findings also showed an improvement in clinical competence score of the study group after the intervention as compared to before and as compared to the control group. This supports the second research hypothesis: "Students who will receive simulation-based education regarding care of women in normal labor will have a higher clinical competence score than control group".

### Study Recommendations:

Integrating simulator-based education with traditional clinical lab training to enhance students' communication skills and clinical competence. Formulating varied scenarios for normal and abnormal labor to be intervened using simulators as a training before being in contact with real cases. Allocating a theoretical lecture for explaining effective communication skills to be used with laboring woman. Specifying lab sessions for training students how to communicate effectively with laboring woman. Replication of the study with larger sample to verify or reject the effect simulation-based education on communication skills and clinical competence.

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