Effectiveness of Simulation-Guided by Intervention on Nurses' Performance Regarding Basic Life Support

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Abstract

Background: Nurses' competency level in performing Basic Life Support is critical to improving the survival rate of cardiac arrest patients. As advanced technology and learning ways like simulation continue to evolve, it is vital for new as well as old nurse educators worldwide to have effectiveness in their teaching skills and abilities. Thus, Simulation is an evidence-based learning method and is widely used in the nursing educational field. **Study aim**: To determine the effectiveness of simulation-guided intervention on nurses' performance regarding basic life support. **Study design**: A quasi-experimental research design was used. **Setting**: The study was carried out in Critical Care and Emergency Nursing skill laboratories at the Nursing faculty, at Mansoura University. **Study Subject**: Convenience samples of 50 nurses were included from the previously selected settings that worked at intensive care and emergency units. **Data collection tools**: **Tool** I: structured interview questionnaire which included two parts related to personal data and nurses' knowledge regarding basic life support, and **Tool** I: nurses' practice regarding basic life support. **Results**: Showed that there were observed improvements in nurses' total knowledge and practice post implementation of simulation-guided by intervention regarding basic life support compared to pretest with statistically significant differences. **Conclusions**: **Conclusion**: Simulation- guided by intervention improved nurses' knowledge and performance in the field of basic life support. According to the results, integrating conventional training with simulation-guided intervention can be effective in learning basic life support among nurses as an active learning strategies to develop nurses' performance in applying clinical skills. **Recommendations**: The latest guidelines of CPR should be available inwritten format in critical care units and emergency units. In-service educationand training programs regarding CPR should be taught to all nurses. The use of educational resources such as simulator manikins allows participants to experience an emergent critical situation, take action, and review the consequences of choices. Repeat this research on a large sample size and in different settings for generalization.

Keywords: Basic life support, Nurses' performance, and Simulation- guided by intervention

Introduction:

The nurses are vital members of the healthcare teams that are involved in the client's care plan, including the provision of emergency and critical care. Heart arrest is a common occurrence among patients in emergency and critical care units, and it can happen to healthy individuals as well (**Diwakar et al., 2021**). Basic Life Support (BLS) includes defibrillating an automated external defibrillator (AED), performing cardiopulmonary resuscitation (CPR), and recognizing the symptoms of sudden cardiac arrest (SCA), heart attack, stroke, and foreign-body airway obstruction (FBAO). Every member of the community must be knowledgeable about basic life support to save lives and improve the standard of community health. Lastly, it is anticipated that medical professionals, such as doctors, nurses, and paramedics, be knowledgeable about BLS because they will likely encounter life-threatening situations and find it useful (**Beauchamp et al., 2019**).

The need for both new and experienced nurse educators to possess flawless teaching skills and abilities is growing due to the constant evolution of modern technologies and learning methods like simulation. Therefore, simulation

is a highly effective and extensively utilized teaching and learning method based on evidence in nursing education (**Duff et al., 2020).**

Early condition recognition, emergency response system activation, early CPR, and rapid defibrillation comprise the primary resuscitation sequence identified by BLS, which serves as the foundation for CPR care. Interventions for ALS patients involve basic support measures to promote spontaneous circulation, pharmaceutical therapy, enhanced airway management, and physiological monitoring using tools and devices. Post-CPR treatment can improve neurological evolution and survival once spontaneous circulation returns (**Gabriel et al., 2019)**.

Essential resuscitation training for laypeople and medical teams alike involves learning and practicing basic life support (BLS) as well as external chest compressions (ECC) within the BLS protocol. The purpose of the study was to assess how learning styles affected BLS performance and determine if Peyton's four-step approach for BLS training adequately met the needs of all learner types (**Duff et al., 2020).**

Because of the current changes in technology, society, and politics, nurses must be not just culturally competent but also well-informed and connected. Additionally, as healthcare facilities have advanced, several life-saving techniques have been developed to help lower mortality and avoid morbidity. Thus, knowledge of basic life support (BLS) remains one of the most powerful instruments, with the potential to save millions of lives globally. Basic life support, or BLS, involves the maintenance of the airway while promoting breathing and circulation (**Fluharty et al., 2019**).

Maintaining breathing, circulation, and airway with no assistance other than basic airways is known as basic life support or BLS. It is composed of four parts: airway maintenance, expired air ventilation, chest compression, and initial assessment. CPR is a set of evaluations and actions rather than a singular skill, as has long been understood. Several Committees and National Conferences have agreed upon global requirements of basic life support these days. **(Al Kandary et al., 2017)**.

As the patient's primary care provider from the moment the acute event happens until their discharge, nurses around the world are essential to the management of cardiac arrest. The nurse is typically the one who notices a cardiac arrest. A nurse's role in the resuscitation process is crucial, and they are required to possess a wide range of skills and expertise that they must apply quickly, effectively, and promptly. As an illustration, the nurse assesses the ABC and handles cardiac massage assessment, artificial ventilation evaluation, and medication administration **(Daniele, 2019)**. Therefore, nurses must understand the principles and techniques of CPR as providing effective care can raise a patient's chances of survival and promote healing. Therefore, a nurse's ability to perform CPR is essential to a patient's recovery from cardiac arrest **(Sankar et al., 2021).**

Survival rates are still poor despite the established value of CPR, primarily because it is not administered properly. The standard of CPR provided in clinical settings is frequently subpar, and poor results for patients experiencing cardiac arrest have been linked to nurses' and doctors' inadequate training in basic life support (BLS) and advanced life support (ALS). Therefore, improving one's CPR abilities ought to have a significant effect on mortality **(Sodhi et al., 2019)**

Over the past 20 years, there has been evidence of poor knowledge and skill retention among nursing and medical professionals following cardiopulmonary resuscitation training (**AL-Ghamdi et al., 2018**). If CPR is not performed or updated regularly, CPR knowledge and abilities decay dramatically. Several studies have looked into nurses' resuscitation abilities, and the results show that nurses are generally not very good at doing BLS and have low general ability. There is overwhelming evidence that nurses have a poor recollection of CPR skills (**Nori et al., 2021**).

In the clinical nursing education program, simulation is one of the best teaching strategies (9). Simulation is not the same as traditional teaching techniques like lectures when students sit through and listen (**Everett-Thomas et al., 2021**). By establishing a secure and regulated atmosphere, simulation can enhance patient safety (**American Heart Association, 2020**). Additionally, nursing students' performance,

knowledge, and abilities can all be enhanced by the application of the simulation approach. Without putting the patient's health at risk, they can develop high critical thinking levels and pick up new professional skills (**Guetterman et al., 2019**).

Creating an instructional scenario, providing feedback, or conducting a debriefing are required for simulation-based interventions. The objectives of the program and/or institutional missions should be adhered to in each scenario. Additionally, the student, instructor, educational program, and quantity of instruction all have a direct impact on how well CPR skills are retained. There are conflicting results about the impact of simulation education on the improvement of knowledge and performance in the field of CPR (**Kose et al., 2019).**

The need for both new and experienced nurse educators to possess flawless teaching skills and abilities is growing due to the constant evolution of modern technologies and learning methods like simulation. Therefore, simulation is a highly effective and extensively utilized teaching and learning method based on evidence in nursing education (**Hayden et al., 2019**).

Early condition recognition, emergency response system activation, early CPR, and rapid defibrillation comprise the primary resuscitation sequence identified by BLS, which serves as the foundation for CPR care. Interventions for ALS patients involve basic support measures to promote spontaneous circulation, pharmaceutical therapy, enhanced airway management, and physiological monitoring using tools and devices. Post-CPR treatment can improve neurological evolution and survival once spontaneous circulation returns (**American Heart Association, 2020).**

The study of theory and practice are the main goals of nursing education. Because it is intended to mimic real-life situations and enable the integration of theoretical information into practice, simulation is regarded as an innovative teaching method in the skill-learning process. Nursing students have validated the benefits of clinical simulation in teaching and learning, making it a highly appreciated experience. Students' acquisition and retention of skills and information can be improved by providing basic life support based on simulation training (**Eyikara & Baykara, 2019).**

Additionally, it raises students' attitudes toward cardiac resuscitation training as well as their level of satisfaction and confidence. Nursing students' practices and knowledge have improved as a result of the BLS training program. However, in terms of learning and memory retention (**Demirtas et al., 2021**)

Due to their early encounters with patients experiencing cardiac arrest and their ability to act quickly, nurses are essential members of the resuscitation team. The treatment and survival of patients experiencing cardiac arrest may be hampered by registered nurses with inadequate BLS training and expertise (**Rajeswaran et al., 2018**).

Significance of the study

Even among nurses with extensive training, several studies have shown that hospital nursing staff members lack basic CPR abilities. Thus, deficiencies in methodological training techniques, a lack of training, or a progressive decline in CPR knowledge and abilities could be the main causes of resuscitation performance issues (**Taha 2022**). Eighty percent of the nurses lacked sufficient CPR knowledge, according to **(Nascimento et al., (2020).** A crucial part of professional development in nursing education programs is the acquisition of new knowledge and abilities. Developing and maintaining CPR knowledge and abilities is essential to ensuring that nurses can assist patients experiencing cardiac arrest in a timely and efficient manner.

One strategy to deal with the apparent and real complexity of CPR is through education. Moreover, several worldwide resuscitation organizations have stressed the need for education in doing high-quality CPR and enhancing cardiac arrest survival (**Bhanji et al., 2020).**

Additionally, the use of simulation can overcome challenges such as the shortage of clinical situations and raise the number of nursing students. Students expect their instructors to use interactive educational methods reflecting the real clinical world. Nursing students as adult learners are self-

directed, and internally motivated to learn those related to their social and professional roles, and they explore immediate implications for the knowledge gained. They can achieve these aims and expectations through practice in simulated environments (14). **So, the researchers aimed to** determine the effectiveness of simulation-guided intervention on nurses' performance regarding basic life support.

Aim of the Study

To determine the effectiveness of simulation guided by intervention on nurses' performance regarding basic life support through:

1. Assess nurses' knowledge regarding basic life support
2. Assess nurses' practice regarding basic life support
3. Develop and implement simulation-guided intervention for nurses based on their actual needs.
4. Evaluate the effect of implementing a simulation-guided intervention regarding basic life support on nurses' knowledge and practice.

Research Hypotheses

- There will be a significant difference between posttest knowledge scores compared to the pretest knowledge scores following simulation guided by intervention implementation.
- There will be a significant difference between post-test skill scores compared to the pretest practice scores following the implementation of the teaching program.
- A positive correlation will be found between nurses' knowledge and practice post-simulation-guided by intervention implementation.

Subjects & Methods

Research design

A quasi-experimental research design was used (one grouppre-test post-test).

Setting:

The study was carried out in Critical Care and Emergency Nursing skill laboratories at the Nursing faculty, at Mansoura University.

Sample:

Convenience samples of 50 nurses were included from the previously selected settings that worked at intensive care and emergency units.

Data collection tools:

Tool I: structured interview questionnaire which included two parts related to personal data and nurses' knowledge regarding basic life support, **it** consisted of a multiple choice pre/post-test tool. This tool was developed by the researcher after reviewing the literature to assess the knowledge level of critical care nurses regarding basic life support.

Part I: Personal data of studied nurses which include: age, sex, educational level, years of experience, and previous training program.

Part II: Nurses' knowledge regarding basic life support which included multiple choice questions related to anatomy and physiology of the heart, cardiac arrest, and basic life support covering the following topics as knowledge about anatomy and physiology of the heart, cardiac arrest, Nursing care during CPR and its complications, Nursing care for airway and ventilation using abag-mask device.

Nurses' Knowledge Scoring System*:*

A score value of 1 was awarded to each correct answer and zero was allotted for the wrong answer. The total score of nurses' knowledge was calculated & classified as follows: 75% and more were considered satisfactory and less than 75% and more were considered unsatisfactory.

Tool II: Nurses' practice regarding basic life support Instrument of assessment: The observational checklist that makes up this tool. This instrument was used to evaluate nurses' competence after being incorporated from the (**American Heart Association Guidelines, 2020**) for Cardiopulmonary Resuscitation (**American Heart Association, 2020**).). The tool included every step involved in providing nurse care for patients experiencing cardiac arrest. The following 29 steps made up the observational checklist:

Ten steps comprise the CPR process.

- Six steps are involved in upper airway suctioning.

The oropharyngeal airway insertion procedure consists of four phases.

Five processes are involved in bag-mask ventilation.

Nurses' practice Scoring system*:* The final score for each step was 54, with the following scoring systems applied: (2) for correctly

completed steps, (1) for incorrectly completed steps, and (0) for not completed steps.

A nurse's practice was evaluated based on a total score, with a score of 75 percent or more being competent and a score of less than 75 percent or more deemed incompetent.

Method

Validity and reliability:

Five professionals in the field of critical care and emergency nursing evaluated the content validity and made revisions to the tools to improve their extensiveness, clarity, relevance, and applicability. Using Cronbach's alpha coefficient test, the internal consistency reliability was found to be as follows: tool I had a reliability score of 0.942, and tool II had an acceptable score of 0.892.

Ethical considerations

The university's nursing department's research committee granted ethical approval for this study to be conducted. A formal letter from the dean of Sohag University's nursing faculty was used to secure authorization. The managers of the settings that had been previously chosen were contacted by the researchers to explain the goal of the study and to obtain their cooperation in carrying it out.

After explaining the purpose and advantages of the current study, nurses gave their informed consent to participate in it. The nurses under study were advised by the researchers that they might leave the trial at any time. They also received assurances that the information they provided would be kept private.

Pilot study

The pilot study was completed. Ten percent of the sample (5 nurses) was involved in the test to ensure that the generated tools were simple, feasible, clear, and applicable. The necessary revisions were made. The pilot study was taken out of the study's overall sample.

Field of work

The Sohag University Hospital's director gave his approval. The study was carried out between the first of September 2023 and the last day of February 2024. The researchers greeted each nurse, gave a brief introduction, and described the purpose and design of the study at the start of the interview. Before the software was run, a pre-test step was completed. Following the sample's classification into groups, the simulation application led by intervention is used in the implementation phase. A nurse will work with each of the four groups for ten weeks, one session per week, lasting between thirty and forty-five minutes. As a resource, each nurse can use illustrative images, authentic films, simulated re-demonstration, and handouts that are appropriately tailored for nurse education. The post-test phase lasted for a month post implementing simulation guided by intervention.

Phases of the study: The study was conducted through the following four phases:

I-preparatory Phase

- After outlining the purpose of the study, permission to carry it out was granted by the hospital's relevant authorities. After outlining the goal of the study, nurses gave their consent for voluntary participation.

-The study was approved by the local ethical council and adhered to the standard ethical guidelines for clinical research. Before the program, each nurse was interviewed to gather information about their characteristics using an instrument (I) part (1). Tool (I) part (2) and tool II were used to evaluate the knowledge and practice of nurses.

II. Planning phase:

To address the practical demands of the nurses as well as their knowledge gaps regarding basic life support, the objectives, priorities, and predictable outcomes were formulated based on the results of the preceding phases. The researchers designed five sessions for the nurses under study—two theoretical and three practical.

Constructing the educational program:

The investigator created the instructional plan after examining pertinent scholarly works. To create the program, the following procedures were followed:

Defining the overall and targeted goals of the campaign.

Planning the program: in addition to the initial one, the curriculum was divided into four teaching sessions.

The program's material was divided into two sections: Cardiopulmonary resuscitation (also known as basic life support) and its nursing management.

Adherence to the protocols necessary for performing cardiopulmonary resuscitation, or basic life support.

Included in the theoretical section was

The physiology and anatomy of the cardiovascular system:

♣ Signs and symptoms, causes, classification, management, and definition of sudden cardiac arrest (SCA).

The definition, advantages, "Chain of Survival," part of Basic Life Support (BLS), 2010 adult BLS recommendations for lay rescuers and medical professionals, and problems of BLS (cardiopulmonary resuscitation) are all covered in this article.

Including the practical section

Procedure for suctioning the upper airways
The process of inserting an oral airway.
The process of bag-mask ventilation
Tightness in the chest.

Environment for learning:

The training was held in the CPR unit of the faculty of medicine's development center and the chief nurse's office at the hospital.

Teaching strategies ♣ Using audiovisual tools for lectures and discussions

The researcher created a PowerPoint presentation and pamphlet in Arabic after analyzing relevant material.

Videos covering bag-mask ventilation, upper airway suctioning, oral airway insertion, and basic life support (BLS) in cardiopulmonary resuscitation, adapted from CPR Training - ProCPR.org (2010 AHA Guidelines), Megacode from AHA, & Code Blue Simulation. (ProCPR.org)

- Two techniques for basic life support were listed on the poster: bag-mask ventilation and chest compression.

Explanation and recap of the Ambu Man CPR Manikin demonstration.

Scenarios for providi n g CPR practice.

Arranging the subgroup:

The total sample was divided into ten subgroups including five nurses each session for better performance and understanding.

Construction of the teaching program

The simulation-guided by the intervention was developed by the researcher based on the previous assessment of nurses' knowledge and skills, available resources, and review of relevant literature

General objective of the program

The overall objective of the developed teaching program is to improve and determine the effectiveness of simulation-guided intervention on nurses' performance regarding basic life support.

The specific objective of the program

By the time the training ended, nurses had the following knowledge and comprehension abilities:

Determine the heart's anatomical structure.
Understand the heart's physiology.
Describe a heart attack.
Enumerate cardiac arrest causes.
Identify the signals that signify cardiac arrest.
Define basic life support, sometimes known as cardiopulmonary resuscitation.
Cardiopulmonary resuscitation's state goal.
List each step involved in cardiopulmonary resuscitation.
Enumerate the Oropharyngeal Airway indications and contraindications.

Intellectual skills

Categorize different kinds of cardiac arrest.
Identify the distinctions between a heart attack and a cardiac arrest.
Provide a summary of the 2010 adult basic life support recommendations for medical professionals.
Combine the "Chain of Survival." Adults only
Arrange the essential elements of basic life support.
Give the components of basic life support the highest priority.

Professional skills

Identify cardiac arrest
Show off your mouth-suctioning skills.
Place the oropharyngeal airway in place.
Apply the chest compression technique.
Use a bag-mask device to demonstrate the positive pressure ventilation technique.
Evaluate the risk associated with cardiopulmonary resuscitation.

General and transferable skills

Effectively communicate in a team setting.
Preserve the CPR unit's manikin and apparatus.

The study was conducted through three

phases:

III. Implementation phase:

The researchers began each session by asking for feedback regarding the prior one, and they concluded each session with a summary.

*Three days a week, from 9 a.m. to 1 p.m., the researchers were accessible in the study settings. Using the previously indicated study techniques, each nurse was interviewed on an individual basis.

*After evaluating the relevant literature and determining the real needs of the nurses under study, a simplified booklet was created and distributed to nurses in the Arabic language. It included every topic about knowledge and practice.

The use of various teaching techniques, including lectures, discussions in small groups, brainstorming sessions, photographs, and demonstrations and re-demonstrations with the use of simulation manikins that were available in a faculty clinical lab to apply for a simulated education program. A variety of instructional resources were employed, including figures, PowerPoint, handouts, flipcharts, and animated films.

Knowledge was evaluated twice in the manner described below:

Pretest evaluation was conducted once at the start of the study to serve as baseline data for a subsequent comparison with a post-test.

To determine the program's impact on nurses' knowledge, a second questionnaire administration was conducted following its adoption.

Evaluate the nursing profession

Before and following the training, the researcher watches the nurses in action twice while they use the practice evaluation instrument.

The BLS program was developed by the researchers, and it included theoretical lectures and practical training. The training started with a theoretical lecture for 2 hours that was followed by practical training. The assigned researcher demonstrated each step of the procedure, and then, each participant was asked to apply and repeat the steps of the procedure until it was performed correctly.

Before the start of the training, the pre-test was conducted, and after the end of the training, the post-test was conducted, the participants continued to practice various basic life support roles including heart compression, artificial respiration, the recovery position, airway management, foreign body airway obstruction, Administer first aid to an unconscious patient, and use of the Automated External Defibrillator. Each participant practiced BLS stages for 5 min and at least 20 min in each group after practicing on mannequins under the supervision of the trainers. Each subject is practiced independently and taught as a critical skill. The training was mainly based on simulation, with all groups implementing the same training methods.

IV-Evaluation phase:

One month after completing the simulation guided by the intervention program successfully, the participants were asked to fill out the knowledge part of the questionnaire again using the previously mentioned tools. Each participant was asked to apply the basic life support procedure on the manikin for a second time. During the participant's performance, the assigned researcher evaluated the nurses' practice using the nurses' practice checklist to determine the effectiveness of simulation-guided intervention on nurses' performance regarding basic life support.

Statistical analysis:

Data were translated, coded, and tabulated into a form that was specifically created to be input into a computer. SPSS version 22 was utilized for data entry and analysis. The Excel program was used to help make the graphics. The same group's pretest and posttest results were compared using t-tests, which were used to analyze quantitative data presented as mean and SD. Quantitative data was expressed as numbers and percentages. Pearson correlation was used to explain the link between quantitative variables that were normally distributed. To assess qualitative variables between the before and after groups, the chi-square test was used. A P-value of 0.05 was used to calculate the significance in the following manner: • A P-value of less than 0.05

was regarded as statistically significant. • A highly statistically significant P-value was defined as being less than or equal to 0.001.• A statistically significant P-value was defined as less than 0.05.

Results:

Table 1: Displays the personal data of the nurses under study. It was discovered that 90% of them were female and that 62% of them were in the under-25 age range. In terms of education, 52% of the nurses had a three-year nursing diploma. Additionally, 58% of nurses had more than five years of experience. 94% of them had never received any prior CPR training, according to the table regarding their prior training.

Table (2): Illustrates that there were highly statistically significant differences post-simulation guided by intervention regarding knowledge compared to pre-simulation guided by intervention **regarding basic life support**.

Table 3: __Reveals that there were improvements in mean and SD post-simulation-guided by intervention regarding knowledge about basic life support compared to pre-simulation-guided by intervention with statistically significant differences.

Figure (1): Portrays that there were statistically significant improvements in all items of nurses' total knowledge about basic life support pre and post-simulation-guided by intervention. Additionally, it demonstrates that 29 of them had a satisfactory knowledge level regarding basic life support pre-simulation-guided by intervention which increases to 89% post-simulation-guided by intervention.

Table (4) Presents the total score of nurses' practices pre and post-simulation guided by intervention. It was observed that there were statistically significant differences between nurses' practice items indicating improvements post-simulation guided by intervention, compared with poor practices before the teaching program

According to **Table 5**, there was a statistically significant difference regarding the mean score in nurses' practices pre and post-simulation-guided by intervention regarding basic life support.

Figure (2): Portrays that there were statistically significant improvements in all items of nurse's total practice pre and post-simulation-guided by intervention. Additionally, it demonstrates that 20 of them had a competent practice level regarding basic life support pre-simulation-guided by intervention which increases to 90% post-simulation-guided by intervention.

Table (6) shows that, before simulation-guided intervention, there was no association between the nurses' total score knowledge and practices. However, following simulation-guided intervention, a substantial favorable association was discovered between the total score of nurses' knowledge of CRR practices.

Table 7 demonstrates that the work department, overall nursing knowledge, and overall nursing practice before and during the simulation-guided intervention were found to be highly statistically positively correlated. Nurses' age, total knowledge, and total practice after simulation-guided intervention were found to be strongly statistically positively correlated with each other compared to before simulation-guided intervention. Additionally, high statistically positive correlations were discovered between nurses' education, their total knowledge, and their entire practice before simulation-guided intervention, in contrast to high statistically positive correlations for nurses' knowledge and their practice following simulation-guided intervention. If not, statistically significant positive correlations were discovered between the experience of nurses and their overall practice after being led by an intervention during simulation and before being guided by an intervention during simulation.

Table (1): Personal data of the studied nurses (n=50)

Scio-demographic data	No. (n= 50)	%
Age		
< 25 years	31	62.0
≥ 25 years	19	38.0
Mean ± SD	23.55 ± 3.23	
Gender		
Female	45	90.0
Male	5	10.0
Level of education		
3 Years of Nursing Diploma	26	52.0
5 Years of Nursing Diploma	5	10.0
Technical Health Institute	12	24.0
Technical Institute of Nursing	7	14.0
Experience		
< 5 years	21	42.0
≥ 5 years	29	58.0
Training courses		
Yes	3	6.0
No	47	94.0

Table (2): Total Nurses' correct Knowledge level pre and post-simulation-guided by intervention regarding basic life support (n=50)

Nurses' Knowledge	Pre simulation-guided by intervention		Post simulation-guided by intervention		P-value
	No.	%	No.	%	
					0.000*
Anatomy and physiology of the heart	15	30.0	48	96.0	
					0.000*
Cardiac arrest:	16	32.0	47	94.0	
					0.000*
Nursing role during CPR and complications	20	40.0	46	92.0	
					0.000*
Nursing role for oropharyngeal airway and ventilation	20	40.0	45	90.0	

* *Statistical significant difference (P < 0.05)* *Chi-square test*

Table 3 Knowledge mean score pre and post-simulation-guided by intervention

Knowledge mean score	Mean	SD	P-value
Pre simulation-guided by intervention	06.16	1.97	
Post simulation-guided by intervention	09.19	1.04	**<0.001**

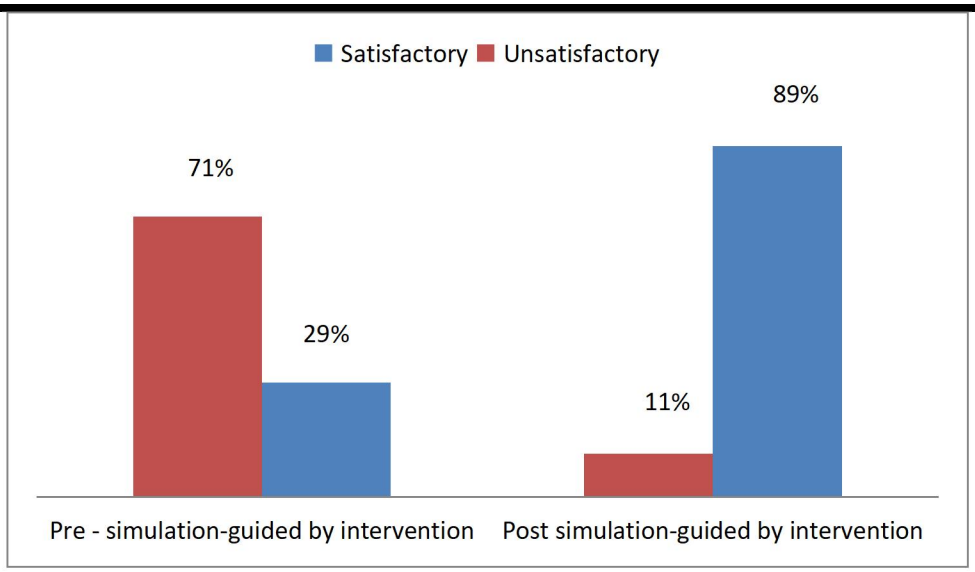

Figure 1: Total knowledge means score pre and post-simulation-guided by intervention regarding basic life support

Table (4): Total Nurses' correct practice level pre and post-simulation-guided by intervention regarding basic life support **(n=50)**

Nurses' practices	Pre simulation-guided by intervention		Post simulation-guided by intervention		X^2	P-value
	No.	%	No.	%		
Practices of CPR						0.000*
	21	42.0	46	92.0	38.09	
Practices of upper airway suctioning						0.000*
	22	44.0	43	86.0	30.84	
Practices for oral airway insertion						0.000*
	23	46.0	40	80.0	15.67	
Practices for bag-mask ventilation						0.000*
	24	48.0	45	90.0	24.14	

** Statistical significant difference (P < 0.05)* *Chi-square test*

Table 5. Comparison of the mean of nurses' practices pre and post-simulation-guided by intervention regarding basic life support (n=50)

Items	Pre simulation-guided by intervention	Post simulation-guided by intervention	P-value
	Mean±SD	Mean±SD	
Nurses' practices	5.43 ± 3.01	17.78 ± 1.91	P <0.001

*Significant P< 0.05 **Highly Significant P< 0.001.

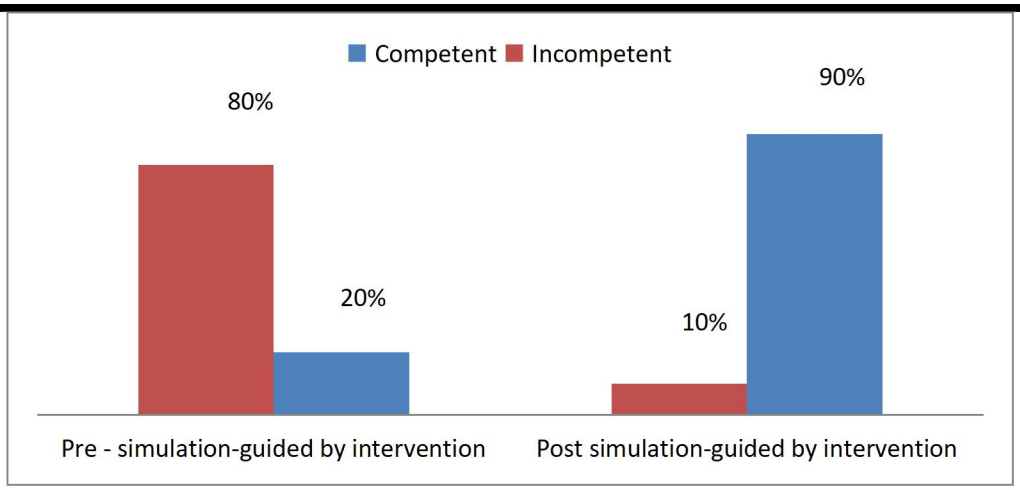

Figure 2: Total practice means score pre and post-simulation-guided by intervention regarding basic life support

Table (6): Correlation between total nurses' knowledge with practices pre and post-simulation-guided by intervention regarding basic life support (n=50)

Practices		Total knowledge	
		Pre simulation-guided by intervention	Post simulation-guided by intervention
CRR practices	r-value	0.167	**0.574**
	P-value	0.284	**0.000***
Upper airway suctioning practices	r-value	0.271	-0.087
	P-value	0.077	0.502
Oral airway insertion practices	r-value	0.088	0.022
	P-value	0.587	0.887
Bag-mask ventilation practices	r-value	0.182	0.175
	P-value	0.245	0.258

** Statistical significant difference (P < 0.05)* *Pearson test*

Table (7): Correlation between total nurses' personal data, knowledge, and practices pre and post-simulation-guided by intervention regarding basic life support (n=50)

Items		Pre		Post	
		Total Knowledge	Total practice	Total Knowledge	Total practice
Gender	R	-0.164	-0.118	0.182	0.174
	P value	0.226	0.382	0.182	0.203
Work Department	R	0.513	0.528	0.597	0.633
	P value	.000**	.000**	.000**	.000**
Age	R	0.079	0.052	0.564	0.542
	P value	0.569	0.713	0.000**	0.000**
Education	R	0.689	0.687	0.394	0.452
	P value	0.000**	0.000**	0.003*	0.000**
Experience	R	.103	.044	-.097	.002*
	P value	.457	.768	.475	.986
Training	R	.092	.247	.225	.214
	P value	.513	.068	.103	.119

** Statistical significant difference (P < 0.05*

Discussion:

A dynamic approach that correlates real-world clinical conditions in a secure setting and supports nurses in developing their resuscitation knowledge and skills is simulation training. As far as we are aware, no prior research has examined the impact of BLS training on nurses' expertise. It has been said that BLS is a dynamic problem requiring training that is simultaneous and ongoing. Cardiopulmonary resuscitation (CPR) outcomes are correlated with BLS knowledge and nursing practice **(Requena-Mullor et al., 2021).**

According to **Adcock et al. (2020),** nurses are frequently the first medical professionals to treat victims of cardiac arrest. A key factor in determining whether a victim of cardiac arrest survives is the reaction of a knowledgeable and experienced rescuer. According to **Nascimento et al. (2020**), there is evidence that nursing students' BLS psychomotor skills were subpar. Accordingly, it is critical to enhance the curriculum to incorporate learning strategies based on research that supports the teaching of life-saving interventions (**Onan et al., 2019**). In this environment, high-fidelity simulation has emerged as a key teaching method **(Wheeler & Dippenaar, 2020).** In keeping with this, the (**American Heart Association, 2020**) that simulation-based BLS training has a positive effect on trainers' learning outcomes. So, the study aims to determine the effectiveness of simulation-guided intervention on nurses' performance regarding basic life support**.**

The current study demonstrated that, regarding the nurses' prior CPR training, the findings show that the majority of them had not received any prior instruction. This suggests that immediate action is required to improve nurses' BLS proficiency. These findings were consistent with those of **Al-Janabi & Al-Ani (2019**), who found that the majority of the sample lacked formal training in cardiopulmonary resuscitation and had inadequate knowledge of cardiac arrest and CPR.

The current study showed that, when comparing pre- and post-simulation-guided intervention knowledge on basic life support, there were highly statistically significant differences. The majority of them have nursing diplomas, the bulk of books are written in English, and they learn Arabic, thus these factors may be connected. This makes it difficult for them to learn. Another reason for their ignorance is that the majority of them had no prior CPR instruction. The technical nurses involved in this study are ignorant of the most recent CPR standards, and previous students were taught pre-hospital CPR more so than in-hospital CPR.

The lack of in-service CPR training and course as well as pre-employment orientation sessions, may also be to blame for this ignorance. Furthermore, autonomous self-learning was not used by Egyptian nurses. Another reason for nurses' weariness and lack of understanding is their increased workload, which may make it more difficult for them to read and stay current on their expertise.

The authors included a control group in further experimental tests to compare the efficacy of simulation-based training vs traditional lectures and training with static mannequins. Numerous studies have shown that high CPR training is more effective at acquiring knowledge than traditional training. Students who got high simulation training shortly after training outperformed students in the traditional training group in knowledge and performance scores. Three months following training, high simulation training had a noteworthy impact on knowledge retention as well **(Habibli et al., 2021).**

Aqel and Ahmad (2019) Conversely, in the research conducted by **Akhu-Zaheya et al. (2019)**, no noteworthy distinction was found in the acquisition and retention of knowledge and skills between students enrolled in the simulation training group and those engaged in traditional training. Possible explanations for the discrepancies in research findings include differences in how simulation training is implemented. For instance, **Akhu-Zaheya et al. (2019)** only allotted a brief simulation session, which did not allow students to practice the skill multiple times during training. Bloom's taxonomy indicates that students who received simulation-based and traditional classroom instruction gained comparable levels of cognitive knowledge.

The results of this study were corroborated by a study by **Hamed, (2019**) titled The study also revealed that most nurses in both units held a secondary diploma, that most of them were untrained, and that most of them knew insufficiently about CPR.

The results of the study showed that the use of simulation-based training improved the nurses' knowledge. These results align with past research demonstrating a noteworthy impact of CPR instruction on comprehension and application. A study among Thai undergraduate nursing students revealed that knowledge and chest compression techniques were significantly and immediately improved by the training. A different study that contrasted the knowledge and abilities of staff nurses with undergraduate nurses revealed that both groups' knowledge and abilities increased with training **(Habibli, 2020).**

The results showed that, as compared to pre-simulation-guided intervention, there were statistically significant differences in the mean and SD of knowledge about basic life support after the intervention. **Demirtas et al., (2021); Kose et al., (2019); and Requena-Mullor et al., (2021**) discovered noteworthy impacts of simulation-based training on students' BLS, which is consistent with the findings of the current study.

The results of the current study revealed that, both before and after the simulation-guided intervention, there were statistically significant gains in the nurses' total knowledge of basic life support across all items. Furthermore, it showed that, before simulation-guided intervention, less than one-third of them had a sufficient level of knowledge of basic life support, which rises to the majority of them after simulation-guided intervention.

This outcome might be the consequence of simulations improving and developing critical thinking abilities, improving nursing education, and improving skill performance. for a notable increase in nursing staff members' knowledge following the implementation of the CPR training program. This improvement may be attributed to the emphasis on in-hospital CPR and the offering of instructional materials such as booklets and posters regarding the most recent CPR guidelines. Additionally, the program's unique objectives will be understood and achieved through the use of the group discussion teaching style and ongoing feedback.

This outcome is consistent with research done by **Sankar et al., (2021**) on the Impact of a Cardiopulmonary Resuscitation Training Module on the Knowledge and Skills of Pediatric Nursing Staff. He reported that the new teaching program has increased the knowledge and abilities of pediatric nursing staff members assigned to acute care settings.

The study findings demonstrated that the total nursing practices score both before and after the intervention-guided simulation. When comparing the nurses' practice items showing improvements following the intervention-guided simulation to the poor practices before the instruction program, statistically significant differences were found. According to the researcher, nurses can benefit much from simulation in their practice, and it is often a creative instructional tool that helps them perform better on skills and feel more satisfied with their learning.

This study's findings were consistent with those of (**Sankar et al., 2021**) [who reported improvements in skills scores immediately following training, and (**Maurya et al., 2020)** who reported improvements in post-test scores for the simulation instruction group and reported a rise in the research respondents' competence scores.

The results of the current study revealed that there was a statistically significant difference between the mean score of nurses' pre- and post-intervention simulation-guided practices for basic life support. The ability to learn and practice in a setting that mimics a real-world clinical setting is provided by simulation, which is crucial for helping students apply their newly acquired knowledge and abilities (**Wheeler & Dippenaar, 2020**). Knowledge and skill learning may also benefit from repeated practice of the skill that the simulation offers (**Akhu-Zaheya et al., 2019; Wheeler & Dippenaar, 2020**). Nurses can enhance their knowledge and motor abilities in resuscitation by participating in simulation

teaching, an active process that correlates real clinical events in a safe environment.

The results illustrated the no association between the nurses' total score and their pre-intervention simulation-guided practices. After simulation-guided intervention, a noteworthy positive association was seen between the overall score of nurses' knowledge concerning CRR practices. Similarly, **Taha (2016**) demonstrated that while nurses need to maintain a high standard of nursing knowledge and practice, they also need to acquire knowledge before entering the field to be efficacious.

These findings are in line with those of **Elazazay et al. (2018), Ashonee et al. (2019), and Aly (2020),** who found a significant correlation between total knowledge and practice scores and a positive significant correlation between nurses' performance and knowledge related to CPR before and one month after the training program in question. These results were in direct opposition to **Mahrous, (2023**) report, which claimed that diploma nurses' knowledge and practice did not correlate.

These findings of the current study demonstrated that the work department, total nursing knowledge, and overall nursing practice before and during the simulation-guided intervention were found to be highly statistically positively correlated. Nurses' age, total knowledge, and total practice after simulation-guided intervention were found to be strongly statistically positively correlated with each other compared to before simulation-guided intervention. Additionally, high statistically positive correlations were discovered between nurses' education, their total knowledge, and their entire practice before simulation-guided intervention, in contrast to high statistically positive correlations for nurses' knowledge and their practice following simulation-guided intervention. If not, statistically significant positive correlations were discovered between the experience of nurses and their total practice after simulation guided - intervention.

Conclusion:

Based on the results of this study, it can be concludedthat:

Simulation- guided by intervention improved nurses' knowledge and performance in the field of basic life support. According to the results, integrating conventional training with simulation-guided intervention can be effective in learning basic life support among nurses as an active learning strategy to develop nurses' performance in applying clinical skills. There was a correlation found between knowledge and practice scores obtained by nurses receiving simulation-guided intervention.

Recommendations:

These recommendations are made in light of the current study's findings:

- Emergency rooms and critical care units should have written copies of the most recent CPR guidelines available.
- CPR instruction should be part of all nurses' in-service education and training programs.
- Using instructional tools like simulator manikins, which let participants engage in an emergent critical scenario and consider the effects of their decisions, is one method.
- This study suggests that a further way to improve training retention is to integrate distance learning techniques with simulation-based education.
- Conduct similar studies with a larger sample size and in various environments to enable generalization.

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