

Impact of Pregnant Advanced Cardiopulmonary Resuscitation Training Program on Maternity Nurses' knowledge, Attitude and Practice in Beni-Suef City

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Abstract

Background: Maternal Mortality Rate (MMR) is the major universal concern. Emergency care should be done by nurses with a high quality of chest compressions and rapidly advanced airway management in cardiopulmonary resuscitation (CPR) for pregnant women. The ability to respond quickly and effectively to cardiac arrest situation rests on health care team and maternity nurses being competent in the emergency lifesaving procedure of cardiopulmonary resuscitation.

Aim: Assess the effect of pregnant advanced cardiopulmonary resuscitation learning package on maternity nurses' knowledge, attitude, and practice.

Methods: Quasi-experimental research design was used in this study composed of 85 nurses from all maternity departments in the Beni-Suef University Hospital and General Hospital. Data were collected using a structured interview to assess nurses' knowledge, attitude and practice pre/post learning package of cardiopulmonary resuscitation for pregnant women.

Results: The study findings demonstrate statistically significant improvement in nurses' knowledge, attitude and practice scores. However, the post-knowledge score reported high score (84.7%), the attitude modified about (87.1%) with high level and almost (92.9%) were met the CPR practice technique.

Conclusion: Overall, the majority of nurses' knowledge, attitude and practices toward cardiopulmonary resuscitation in Beni-Suef city were neither sufficient nor favorable. All of the studied participants didn't practice CPR. After implementation the program, overall, the majority of participants had a positive attitude about CPR.

Recommendation: The study is recommended that a training program should be conducted and a simple manual of guidelines of advanced cardiopulmonary resuscitation for pregnant women should be made available in all maternity units to be provided to newly employed nurses.

Keywords: Enhancing, knowledge, attitude, practice, Advanced Cardiopulmonary Resuscitation

INTRODUCTION

Maternal Mortality Rate (MMR) is the major universal concern that affects family and thus society, the population division, world population prospects 2012, WHO, UNICEF, UNFPA and the world bank estimates 2013, reported the annual number of births in Egypt is 1,640,339 and the annual number of maternal deaths is 860 [1, 2]. However immediately advanced Cardiopulmonary Resuscitation (CPR) is very important to apply to pregnant women. Despite the overall decline in the MMR, the distribution of causes hasn't changed dramatically, unfortunately,

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Hemorrhage, both antepartum hemorrhage (APH) and postpartum hemorrhage (PPH) continuous to be the major cause of maternal deaths in Egypt as in many other countries [3].

Emergency care should be done by nurses and physician with a high quality of chest compressions and rapidly advanced airway management in cardiopulmonary resuscitation (CPR) for pregnant women [4]. According to European Resuscitation Council (ERC), 2010, guidelines recommend implementing manual displacement of the uterus with left lateral tilt (LLT) to aortocaval decompression during CPR in late pregnancy moreover, the optimal degree between 15° and 30° [5]. In addition, the maternal cardiac arrest commonly occurs at delivery room or emergency room and several methods are available to achieve the LLT position, whereas the operating table is used in the operating room [6-8].

A research studied the difference in mortality between pregnant and non-pregnant women after cardiopulmonary resuscitation, and found among 5,923 women received inpatient CPR annually the mortality rates after CPR were lower among pregnant women than non-pregnant women [9]. Unfortunately, many causes of cardiac arrest in pregnancy are amniotic fluid embolism, hemorrhagic shock, eclampsia, pulmonary thromboembolic events, sepsis, anaphylaxis, trauma, congenital, and acquired cardiac diseases [10, 11]. Furthermore, the cesarean section is increasing as an immediate solution to survive mother/fetus or both, as well as successful and early CPR if selected can be achieving optimal outcome [12]. The correct and fast resuscitator leads to optimal survival rates for both mother and fetus, however, early restoration of the mother circulation can increase the survival rate of the fetus [13]. Moreover, little is known about outcomes of cardiopulmonary resuscitation in pregnancy, although, further studies are needed [14].

SIGNIFICANT OF THE STUDY

Cardiopulmonary resuscitation is an important medical and nursing procedure which is performed in an effort to manually preserve intact brain function until further measures are taken to restore normal spontaneous blood circulation and breathing in a person in cardiac arrest. It is a combination of rescue breathing and chest compression, which is delivered to the victims who are thought to be in cardiac arrest [15]. As nurses comprise the greatest group of health-care providers and are the ones responsible for the quality of care provided to the patients, their perspectives on the effectiveness of their care are very important. However, nurses possess a wide variety of holistic skills and there is evidence of nursing interventions that are proving to be valuable in saving cardiac arrest [16-18].

Being important members of the health-care team; maternity nurse is deemed to pass the basic skills and expertise which are needed to perform CPR. The management of cardiac arrest in the pregnancy is considering an important task in the emergency department and delivery room, however, all medical staff especially nurses should be applying CPR for pregnant women skillfully and following general advanced cardiac life support guideline [19]. The pregnant women have various anatomical and physiological changes and the cardiopulmonary resuscitation is considering a challenging operation [20]. The ability to respond quickly and effectively to cardiac arrest situation rests on health care team and maternity nurses being competent in the emergency life saving procedure of cardiopulmonary resuscitation [21].

OPERATIONAL DEFINITION

Cardiopulmonary Resuscitation: An emergency procedure in which the heart and lungs are made to work by compressing the chest over lying the heart and forcing air into the lungs. CPR is used to maintain circulation when the heart has stopped pumping on its own [22].

Knowledge: Respondent who answers $\geq 60\%$ total knowledge question have sufficient knowledge and $< 40\%$ has insufficient knowledge about CPR [21].

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Attitude: Manner of acting or social or clinical psychology a relatively stable and enduring predisposition to behave or react in a certain way toward people, objects, institutions, or issues [22]. In our study, it refers to correct response of studied participants regarding CPR for selected emergencies to the structured attitude questionnaire prepared by the investigator for study [21].

Practice: It refers to the academic application of knowledge and skills on CPR [21].

AIM OF THE STUDY

Assess the effect of pregnant advanced cardiopulmonary resuscitation learning package on maternity nurses' knowledge, attitude, and practice.

Research Questions: What are the maternity nurses' knowledge, attitude, and practice regarding advanced cardiopulmonary resuscitation?

Hypotheses: The research hypothesis was that the knowledge, attitude, and practice of the maternity nurses, who attend the educational program, will have an improvement better knowledge, attitude and practice towards advanced cardiopulmonary resuscitation.

METHODS

Design: Quasi-experimental research design was used in this study.

Setting: The study was conducted at the antenatal outpatient clinic and inpatient obstetric ward, emergency delivery department in Beni-Suef University Hospital and General Beni-Suef Hospital.

Sampling: A convenient sample consist of all nurses were working at maternal emergency department and antenatal outpatient clinic, prenatal inpatient ward (n=85 nurses), from January to May 2016. All questionnaires were distributed by researchers, and interview completed with nurses in 30 minutes during their hospital shifts.

TOOL OF DATA COLLECTION

Interviewing structured questionnaire was used to collect data. It designed by the researcher based on the related literature, it tested for validity on ten nurses who excluded from the study sample. It entitled two main parts:

Structured interview questionnaire form: This tool was used to collect background data about nurses (Age, years of experience, level of education, shifts, and unit of work).

Pre-post-test: The study tool divided into three parts and covered the following items; questionnaire designed by researchers based on the literature review to assess knowledge first part (14 questions), the second part to evaluate the attitude (6 questions) however the scoring and third part to measure the level of practice (24 steps) Scoring system: The total knowledge score for total knowledge and attitude questions divided as (Low – Medium – High-Very high) and for practice satisfactory and unsatisfactory.

Operational Design

During this phase, the researcher worked on explaining the learning package to nursing staff and distributed booklets containing the Knowledge regarding the advanced CPR for pregnant women and the procedure of advanced CPR in Arabic with pictures so the process could be easily understood by the nurses to apply. Once the nurses were ready to start the program arranging for a proper time to all nurses attained the educational course in one session for theory and one session for practice, researchers collected pre-test before the program started. The learning Package total duration was thirty minutes.

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Administrative Design

Formal letters were issued from the Faculty of Nursing, Beni-Suef University to the medical director of the study-settings. The researcher met with nurses and explained the aim and the process of the study. Nurses' Verbal consents were obtained. Complete confidentiality of any obtained information was ensured. The researcher also assured the administration that the study would not affect the work in the study settings. The results of the study will be provided to the hospitals' authorities to maximize its benefits.

Statistical Design

Statistical analysis was done using SPSS 22.0 statistical software packages. Data were presented using descriptive statistics in the form of frequencies and percentages, and means and standard deviations for quantitative variables. Quantitative continuous data were compared using student t-tests in case of comparisons between two groups. Paired t-tests were used for pre-post comparisons of the same patients.

RESULTS

The socio-demographic characteristics of nurses in the study sample are described in **Table 1**. The age distribution was reported two-thirds were less than 25 years old (84.7%). Education level was mostly diploma degree approximately half of study sample (50.6%) and the years of experience ranged from less than 5 years to more than 20 years and about one quarter reported between 15 to 20 years. As for their working shifts around (70%) were rotated between all shifts and the table shows that about 30% working at the obstetric emergency department.

Table 1. Socio- Demographic Characteristics of the Study Sample (n = 85)

Characteristics	No	%
Age in years:		
< 25	72	84.7
≥ 20	13	15.3
Education:		
Secondary school	43	50.6
Technical Institute	25	29.4
BNS	16	18.8
Master	1	1.2
Experiences years		
Less 5 years	31	36.5
5 : <10	10	11.8
10 : >15	16	18.8
15: < 20	20	23.5
≥ 20	8	9.4
Shift		
Morning	4	4.7
Evening	6	7.1
Night	60	70.6
All Shifts by Rotation	15	17.6
Workplace		
Operation Room	21	24.7
Antenatal	10	11.8
Postnatal	28	32.9
Emergency	26	30.6

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Figure 1 illustrates the changes scores pre-post learning package of advanced cardiopulmonary resuscitation. It demonstrates statistically significant improvement in nurses' knowledge, attitude and practice scores. Moreover, the post-knowledge score reported high score (84.7%), the attitude modified about (87.1%) with high level and almost (92.9%) were met the CPR practice technique.

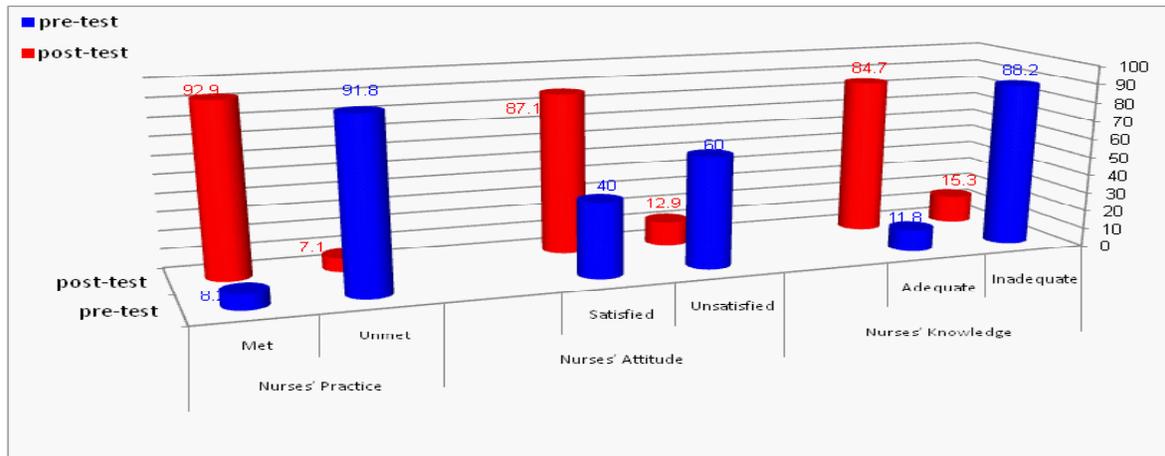


Fig1. pre-post nurses' knowledge, attitude and practice

Table3 describes the pre-post knowledge, attitude, and practice as assessed among nurses in the study sample. It points to statistically significant increases in scores of knowledge, attitude, and practice, $p = 0.000$.

Table3. The correlation between Nurses' knowledge, attitude and practice and pre-post learning of CPR.

	pre-post	95% Confidence Interval of the Difference		t-test	P
		Lower	Upper		
Knowledge	- 0.729 + 0.44	- 0.82581	- 0.63302	-15.048	0.000***
Attitude	- 0.47+56	- 0.59327	- 0.34790	-7.628	0.000***
Practice	- 0.84+0.36	- 0.92515	- 0.76896	-21.569	0.000***

(***) highly statistical significant difference ($P \leq 0.001$)

Table4 shows the best fitting multiple regression models for post learning package for Knowledge, attitude, and practice and nurses' experience years. It demonstrates that the statistically significant independent predictors of post-practice score improvement were nurses' experience years was a negative predictor and as indicated by its lowest standardized beta coefficient. As the r-square value indicates, the model explains 96% of improvement in practice score after application of learning package

Table4. Best fitting linear regression model for post learning package of Knowledge, attitude, and practice and Nurses' Experience years.

Model	Unstandardized Coefficients		Standardized Coefficients	t	P
	B	Std. Error			
(Constant)	6.572	1.488	- 0.001	4.415	0.000***
Post-Knowledge	- 0.006	0.424	- 0.182	- 0.014	0.989
Post-Attitude	- 0.768	0.451	- 0.239	-1.705	0.092
Post-Practice	-1.320	0.591	- 0.001	-2.233	0.028*

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(*) Mild statistical significant difference ($P \leq 0.05$) (***) highly statistical significant difference ($P \leq 0.001$)

Predictors: (Constant), Post-practice, Post-attitude, Post-know

r-square=0.93 Model ANOVA: $F=2.76$, $P = 0.000$

The correlation between pre-post knowledge, attitude, practice and the Nurses' education level and years of experience are displayed in **Table 5**. It shows a statistically significant positive correlation between the level of education (Diploma, Technical Institute, BSN, Master degrees) and Post-Practice Scores i.e. as the level of education increases the post-practice scores. The nurses' years of experience was negatively and statistically correlated with Post-Practice, i.e. as the years of experience, increase the post-practice scores decrease.

Table 5. *The correlation between pre-post knowledge, attitude, practice and the nurses' education level and years of experience*

		pre-knowl- edge	post-knowl- edge	pre-atti- tude	post- attitude	pre-prac- tice	post- practice	Experi- ence	Educa- tion
pre-knowl- edge	Pearson Cor- relation	1	0.155	0.075	0.141	- 0.109	0.101	- 0.174	- 0.003
	Sig.		0.156	0.498	0.199	0.319	0.359	0.111	0.981
post-knowl- edge	Pearson Cor- relation	.155	1	0.080	0.128	- 0.229	0.138	- 0.058	0.128
	Sig.	.156		0.466	0.242	0.035*	0.207	0.599	0.242
pre-atti- tude	Pearson Cor- relation	.075	0.080	1	0.100	0.017	- 0.150	0.041	0.030
	Sig.	.498	0.466		0.362	0.874	0.171	0.712	0.787
post-atti- tude	Pearson Cor- relation	.141	0.128	0.100	1	0.116	0.031	- 0.189	0.033
	Sig.	.199	0.242	0.362		0.293	0.781	0.083	0.763
pre-prac- tice	Pearson Cor- relation	-0.109	- 0.229	0.017	0.116	1	0.083	- 0.031	- 0.103
	Sig.	.319	0.035*	0.874	0.293		0.453	0.776	0.350
post- practice	Pearson Cor- relation	.101	0.138	- 0.150	0.031	0.083	1	- 0.244	0.240
	Sig.	.359	0.207	0.171	0.781	0.453		0.024*	0.027*
Experi- ence	Pearson Cor- relation	-0.174	- 0.058	0.041	- 0.189	- 0.031	- 0.244	1	- 0.560
	Sig.	.111	0.599	0.712	0.083	0.776	0.024*		0.000***
Educa- tion	Pearson Cor- relation	-0.003	0.128	0.030	0.033	- 0.103	0.240	- 0.560	1
	Sig.	.981	0.242	0.787	0.763	0.350	0.027*	0.000***	

(*)Mild statistical significant difference ($P \leq 0.05$) (**)Moderate statistical significant difference ($P \leq 0.01$)

(***) A highly statistical significant difference ($P \leq 0.001$)

DISCUSSION

Unexpected maternal cardiac arrest and emergencies occur during routine maternity care without professionally trained staff for such cases may increase maternal mortality care and decrease the quality of care moreover

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increase liability risks of anxiety among maternity nurses and other healthcare providers. To improve the training for nurses in the obstetrics departments the researchers of this study developed advanced life support for pregnant women. This skill- enhancing course is designed to improve quality and availability of maternity care for emergency maternal cases.

Cardiopulmonary resuscitation is a lifesaving procedure, performed to preserve patients' life until further management is going to follow. Having basic knowledge of CPR will be a crucial task of medical care providers [21]. This study was done to evaluate knowledge, attitude, and practice of maternity nurses after implementation of an educational program about cardiopulmonary resuscitation. In the present study, a total of 85 nurse's attendees reported a significant improvement in all scores of the knowledge, attitude, and practice. This result is quite close to study done by Belton et al. (2010) who reported improvement of skills and knowledge after maternity emergency carecourse [23]. Aforementioned present study findings are in the agreement with Cohen et al. (2008) who have assessed the knowledge regarding cardiopulmonary resuscitation of pregnant women and concluded that knowledge of important basic concept including of left uterine displacement and potential of early cesarean delivery during cardiac arrest, moreover reported inadequate knowledge among health care providers [24].

Analyses of the results of the present study have shown differences in the level of education and years of experiences affecting the post-practice after learning package received. This is in the agreement of the recent study done by García et al. (2015) and found a higher level of CPR knowledge (6.7%) among hospital nursing staff. Nevertheless, this level of knowledge turns out insufficient [25]. The international approval since (2010) sponsored by American Heart Association (AHA) and all organizations are currently in charge of reviewing the clinical guides and protocols established globally. Furthermore, the last update took place in 2010 when important modifications were added in the sequence and the quality of maneuvers to be performed [26, 27]. The cardiopulmonary arrest is proportional to the training of the professionals, studies exist that assess the knowledge of health providers on hospital protocol in case of cardiorespiratory arrest, which concludes on the need for CPR updates due to the low theoretical knowledge of the professionals [28-33].

The extent of our knowledge, unfortunately, no references were found for studies assessing knowledge on basic CPR and advanced CPR in hospital emergency units. In the same line of our study, recent studies recommended to designing a training course for both theory and practice of new technologies on CPR[34]. According to the results of the current study, more than half (50.6%) of the study sample had a secondary level of nursing education and the most (88.2%, 91.8% & 60.0%) of them had inadequate knowledge, unmet practices and unsatisfied attitude toward CPR before participation in the program. This is in agreement with the findings of Farag (2012) who found 3 types of nursing education relating to three types of nurses in Egypt today. The first level is carried out in high schools for nursing education akin to a sort of vocational education that takes place in lieu of high school (referred to as secondary level school in Egypt). The second level is carried out within a technical institute of nursing education (two-years of after high school nursing education). The third or highest level is attained via a University college of nursing (students are trained over four years plus a one-year internship within a post-secondary school education or technical institute of nursing [35, 36].

The health sector in Egypt suffers from a severe shortage of qualified nurses (nurses with at the least technical institute, or 2 years of post-high school nursing education). The shortage has implications both for the quality of healthcare as well as the efficiency of the production of health services. The majority of nurses in Egypt (approximately 90%) are high school level nurses reflecting an inadequate/insufficient quality of nursing education not only by internationally but even by the region's local standard. The current approach by the Ministry of Health and Population is to upgrade the standard of quality of nursing education in Egypt to eliminate high school level nursing education in the future; this seems to be the right approach[37].

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If nurse lacks professional knowledge, she should be given appropriate instruction and training. Hence, it is implied that the health care institution must develop comprehensive continuing educational programs[38]. Previous studies reinforced the association between nurses' knowledge and their educational level as well as years of experiences [35, 39]. Our study finding emphasize on the effect of nurses' education level and years of experience in the knowledge, attitude and practice regarding advanced CPR, this is in contradiction with Citolino, et al (2015) studied the factors affecting the quality of cardiopulmonary resuscitation in inpatient units: perception of nurses and found the professional experience length of time and the shift of nurses didn't influence the perception regarding to CPR application [40]. The more recent research assessed the impact of CPR training program among nurses found a statistically significant increase in mean knowledge level and overall performance before and after the formal certified CPR training program ($P=0.000$) [41].

Clinical experience alone doesn't enable healthcare providers to maintain and increase competency in CPR and advanced cardiac life support, however level of education of registered nurses and years of experience are very important as important variables that might affect skill retention and performance of practice [42, 43]. Whereas, the aforementioned study concerning the effect of application a learning package of advanced CPR on pregnant significantly correlated with the level of nurses' practice is in agreement with Saramma et al. (2016) found the teaching program enhanced nurses' knowledge, skill, attitude and overall confidence as well as helped boost up their morale [41].

CONCLUSION

Based on the results of our present study, it can be concluded; overall, the majority of nurses' knowledge, attitude, and practices toward cardiopulmonary resuscitation in Beni-Suef city were neither sufficient nor favorable. All of the studied participants didn't practice CPR. After implementation the program, overall, the majority of participants had a positive attitude about CPR. So, training course about advanced cardiopulmonary resuscitation on pregnant women for nurses working in the obstetric department is very important. This study showed that application of such course enhanced and improved nurses' knowledge, attitude and practice. We strongly believe that training program with evaluation increases the knowledge and practice of resuscitation process and motivate the nurses to apply latest guidelines laid down by international institutions.

RECOMMENDATION

Based on the results of the current study, it is recommended that:

1. The developed continuous educational program of maternity advanced CPR for nurses should be implemented on a wider scale and evaluated for further improvement.
2. A simple manual of guidelines of advanced cardiopulmonary resuscitation for pregnant women should be made available in all units to be provided to newly employed nurses.
3. Further research is needed to assess the long-term effects of such program.

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Citation: Safaa Soliman Ahmed, Nahed Mousa Saber, Hanan Elzeblawy Hassan, Eman Hessien Heggy "Impact of Pregnant Advanced Cardiopulmonary Resuscitation Training Program on Maternity Nurses' knowledge, Attitude and Practice in Beni-Suef City". *American Research Journal of Nursing*. 2017; 3(1): 1-11.

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