Impact of Training Neonatal Resuscitation Program uponNurse'sPractices in Operation Room

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Abstract:

The study aims to training program will be conducted to improve nurse practical skills toward neonatal resuscitation and find the relationship between the nurses' knowledge and their demographic characteristics.

A Quasi experimental study was carried out in 4 teaching hospitals (Al-Yarmouk Teaching Hospital, Al-Karama Teaching Hospital, Al-karkh Hospital for Deliver, and Al-Kadhimiyia Teaching Hospital) in Baghdad City from the 14th August 2011 to 15th of May 2012. The sample of (40) nurses who are working in the maternal operation room and who are doing caesarean section in these hospitals. The data was collected through using constructed questionnaire which comprises (46) items and using specially constructed questionnaire, which comprises two parts. The first one is demographic characteristics and the second part for nurses' practices, the questionnaire used in pre test before application of the program and post test 1 immediately after the application of the program and post test 2 after (2) months and post test 3 application after (6) months later.

The reliability of the questionnaire was determined through a pilot study and validity through a panel of experts. The data were analyzed through the application of descriptive statistic frequency, percentage, and the application of inferential statistical procedures, which include Pearson correlation coefficient and chi-square.

Key wards: *Nurses' Practices, Neonatal Resuscitation*

الخلاصة:

أجريت دراسة شبه تجريبية لتحديد اثر برنامج تدريبي لإنعاش الوليد على ممارسات الممرضات في غرفة العمليات النسائية وممن يشاركن في العمليات القيصرية، وإيجاد العلاقة بين ممارستهن والصفات الديموغرافية للفترة من 14آ ب 2011 إلى الخامس عشر من أيار 2012 .

دراسة شبه تجريبية أجريت على ممرضات العمليات النسائية وممن يشاركن في عمل العمليات القيصرية في المستشفيات التعليمية (مستشفى اليرموك، مستشفى الكرامة، مستشفى الكرخ للولادة ومستشفى الكاظمية) في مدينة بغداد للفترة من 14 أب 2011 لغاية 15 أيار 2012. اختيرت عينة غير عشوائية (غرضية) تتكون من (40) ممرضة ممن يعملن في صالة العمليات النسائية / الولادات القيصرية.

جمعت المعلومات من خلال استبانة مصممة ومكونة من 46 فقرة. جمعت المعلومات من خلال استعمال استمارة اختبار الممارسات قبل أعطاء البرنامج تجاه إنعاش الوليد وبعد إعطاء البرنامج تم تحديد الثبات للاستبانة من خلال الدراسة الاستطلاعية وحددت مصداقيتها من قبل مجموعة من الخبراء. تم تحليل البيانات من خلال استخدام الإحصاء الوصفي الذي يتضمن التكرارات والنسب المئوية واستخدام الإحصاء ألاستبياني الذي شمل معامل ارتباط بيرسون ومربع كاي.

أشارت نتائج الدراسة بأن اغلب الممرضات ممن يعملن في صالة الولادة لديهم ممارسات قليلة عن إنعاش الوليد في صالة الولادة .

أوصت الدراسة بتحسين معارف الممرضات حول إنعاش الوليد في صالة الولادة وذلك بإقامة برنامج تثقيفي وتدريبي عن إنعاش الوليد في صالة الولادة.

Introduction:

More than 100 million babies are born annually world-wide. Resuscitation of the newly born presents a different set of challenges than resuscitation of the adult or even the older infant. The transition from a fluid-filled environment in which the placenta severs as the gas–exchange organ for the fetus (intrauterine environment), to spontaneous breathing of air requires dramatic physiological change to the newly born within the first minutes to

hours after birth represent the challenge for the newborn to continue the life[1].

Approximately 5% to 10% of the newly born population requires some degree of active resuscitation at birth (e.g., stimulation to breath), and approximately 1% to 10% born are required assisted ventilation and state that the goals of resuscitation of newborns are to assist adaptation to extra-uterine life by:
•Inflating lungs, establishing oxygenation and ventilation
•Establish adequate pulmonary blood flow
•Support cardiovascular function [2].

More than 5 million neonatal deaths occur worldwide each year. It has been estimated that birth asphyxia account for 19% of these deaths, suggesting that the outcome might be improved for more than 1 million neonatal per year through implementation of simple resuscitation techniques [3].

The national Neonatal Resuscitation Program (NRP), started in 1987, provided training the nurses in the maternal operation room to standardize knowledge and skills to reduce neonatal morbidity and mortality and increase successful resuscitation during the first few critical minutes after birth [4, 5].

Ten million or more newborns worldwide each year need some type of resuscitation assistance. More than 1million babies die annually from the complication of birth asphyxia. It is estimated that more than 4 million neonates worldwide die each year, 98% of them in the developing world.

Approximately 19% of these deaths are due to birth asphyxia. Successful neonatal resuscitation should prevent a large proportion of these deaths. For this reason, the nurses are involved in the delivery must possess the skills required to perform neonatal resuscitation [6].

The Apgar score is an objective method of quantifying the newborn's condition and is useful for conveying information about the newborn's overall status and response to resuscitation. The Apgar score quantifies and summarizes the response of the newly born infant to the extrauterine environment and to resuscitation. The three elements, respirations, heart rate, color will use to decide how and when to resuscitate, two additional elements, muscle tone and reflex irritability, reflect neurologic status [7].

Nurses trained in the basic skills of resuscitation at birth should be in attendance at every delivery. Ideally, at least two nurses should be responsible solely for the care of the neonate at birth. A nurse should trained in advanced life support techniques for the newly born which should be available for all deliveries considered at high risk for neonatal resuscitation [8]. In [9] mentioned that the resuscitation of a severely depressed newly born infant requires at least two nurses, one to ventilate and intubate if necessary and another to monitor heart rate and perform chest compressions if required.

A team of 3 or more nurses with designated roles is highly desirable during an extensive resuscitation including medication administration. The nurses responsible for neonatal resuscitation should be good skills and experienced is best achieved through regular effective training.

In[10] mentioned that the sequential steps in resuscitation:
• Maintain body temperature (dry infant and put under radiant warmer).
• Clear airway and initiate ventilation.
• Cardiac compressions, if needed.
• Attach ECG leads, pulse oximeter and CO_2 monitor and insert OG tube.
• Catheterize umbilical artery/vein and measure blood pressures.
• Give resuscitation drugs as needed.
• Assign Apgar scores at 1 and 5 min and q5 min until score is ≥ 7.

Methodology:

Quasi experimental study was conducted on nurse who works in maternal

operation room (caesarean section) from the 14th August 2011 to 15th of May 2012. The study was conducted at four teaching hospitals (Al-Yarmouk Teaching Hospital, Al-Karama Teaching Hospital, Al-karkh Hospital for Delivery, and Al-Kadhimiyia Teaching Hospital). The sample of (40) nurses who are working in the maternal operation room or children born through caesarean section only.

The education level of nurses who are involved in the study which are midwifery school, secondary nursing school graduate and institute graduate only. The data will be collect through using specially constructed questionnaire, which comprises two parts.

The first one is demographic characteristics and the second part for nurses' practices, the questionnaire used pre test before application of the program and post test (1) immediately after the application of the program, post test (2) after 2 months and post test (3) after 6 months later.

Part I: Demographic Characteristics:

The demographic Characteristics for the nurses include nurses' age, level of education (the nurses, marital status, number of years of employment in nursing, years of experience in the maternal operation room and number of training courses.

Part II: Nurses' Practices:

This part is concerned with data related to the nurses' practices and comprised of (46) items, have been rated and scored according to the three point likert scale for nurses' practices and score as (always, sometimes, never) the level of the scale were scored as (3 for always, 2 for sometimes, 1 for never the items Therefore to estimate the nurses practices are divided to three grades Poor less than(200), Acceptable (200-249) Good (=>250). The validity of the questionnaire determine through a panel of (10) experts the reliability of the questionnaire will determine through a pilot study.

The data will analyze through the application of descriptive statistic frequency, percentage, and the application of inferential statistical procedures, which include Pearson correlation coefficient and chi-square.

Results and Findings:

Ttable-1 shows that most of nurse's age group (30%) was of age (30-39 years), (40%) Secondary nursing school graduate, (65%) of nurses are married, (77.5%) were lived in center of Baghdad, (37.5%) years of practice in maternal operation room were (1-5years), and (23.5%) of them had (6-10) years of employment in nursing, (70%) of nurses had no training neonatal resuscitation program (NRP), (65%) theory training of NRP, (100%) inside country training of NRP, and (92.5%) have information on NRP, (40%) source of information on NRP from workshops.

Table -1: Sample distribution, according to their demographic characteristic

No.	Demographic characteristics	F	Percentage %
1	Age (years)		
	Less than 20	3	7.5
	20---29	7	17.5.0
	30---39	12	30.0
	40---49	10	25.0
	50 and more	8	20.0
	Total	40	100
2	Level of education		
	Midwifery school	9	22.5
	Secondary nursing school graduate	16	40.0
	Institute of graduate	15	37.5
	Total	40	100
3	Marital status		
	Single	8	20.0
	Married	26	65.0
	divorced	3	7.5
	Widowed	3	7.5
	Total	40	100
4	Residence		
	Center of Baghdad	31	77.5
	Others	9	22.5
	Total	40	100
5	Years of practice in maternal operation room		
	Less than 1year	3	7.5
	1 - 5	15	37.5
	6 – 10	10	25.0
	11 – 15	6	15.0
	16 years and more	6	15.0
	Total	40	100
6	Years of employment in nursing		
	Less than 1 year	2	5.0
	1 - 5	10	25.0
	6 – 10	13	32.5
	11 – 15	5	12.5
	16 and more	10	25.0
	Total	40	100
7	Training of Neonatal Resuscitation Program		
	Yes	12	30.0
	No	28	70.0
	Total	40	100
7.1	Type of NRP training.		65.0
	Theory	26	35.0
	Practice	14	100
	Total	40	
7.2	Place of NRP training		
	Inside country	40	100
	Outside country	0	0
	Total	40	100
8	Have information on NRP		
	Yes	37	92.5
	No	3	7.5
	Total	40	100
9	Source of information on NRP		
	Medical publication & Books	11	27.5
	Workshops	16	40.0
	Academy study	5	12.5
	Video & Films	5	12.5
	Internet	3	7.5
	Total	40	100

Figure-1 represents distribution of nurses' practices toward neonatal care score according to educational program period.

Figure-2 shows that the nurses' practices toward neonatal resuscitation supplies and equipment in pretest and increase in post-test1, post 2 after 2 months and low in post 3.

Figure-3 shows that the nurses' practices toward Apgar score was 25.18% and post-test1 elevated to 35.35%, post 2 was 33.27%, but lowest in post-test3 to 28.92%.

Figure-4 shows that the means score for nurses' practices toward steps of neonatal resuscitation was 59.95 in pretest and increase to 84.72 in post 1 test, but decrease gradually to 77.85 in post 2, 70.88 in post 3 after 6 months.

Figure-5 shows that the nurses' practices toward endotracheal intubation of neonatal in pretest and increased in post1, post 2 and low more in post 3 after 6 months.

Figure-6 shows that the nurses' practices toward the chest compression of neonatal in resuscitation program in pretest was 8.90% and increased in post-test1 to 12.62%, post 11.65% and lowest in post3 after 6 months to 10.40%.
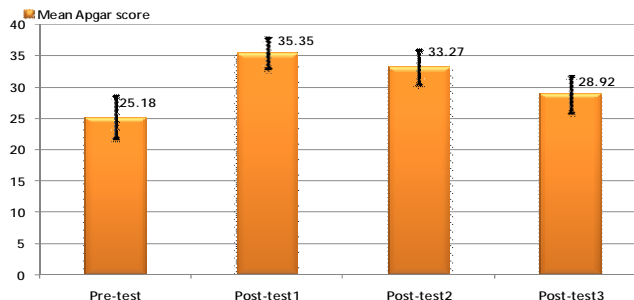
In Figure-7, the boxes represent test scores immediately after the program and represent test scores at post 2 and follow-up post 3 after 6 months later.
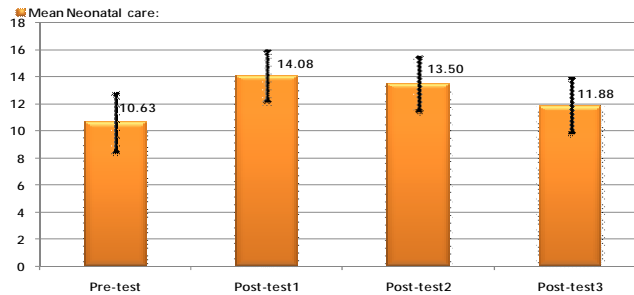
Figure-1: Mean of score of neonatal care
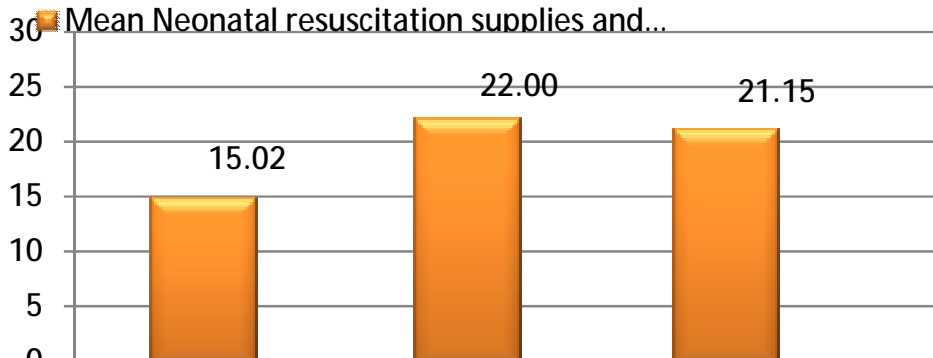
Figure-2:   Mean of scores for nurses' practices toward neonatal resuscitation supplies and equipment

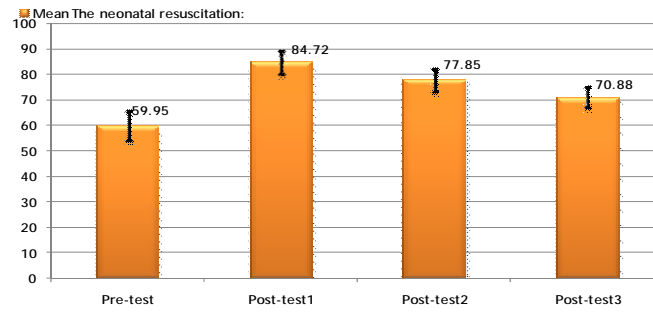**Figure-3: Mean of scores for nurses' practices toward Apgar score.**

Figure-4: The mean of scores for nurses' practices toward steps of neonatal resuscitation
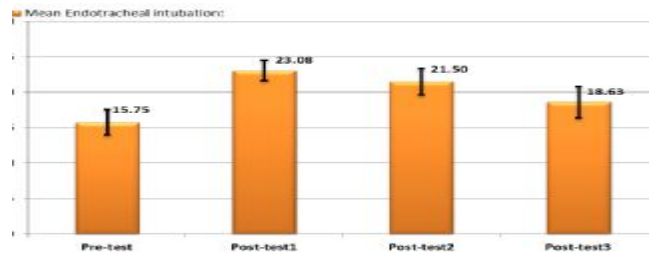

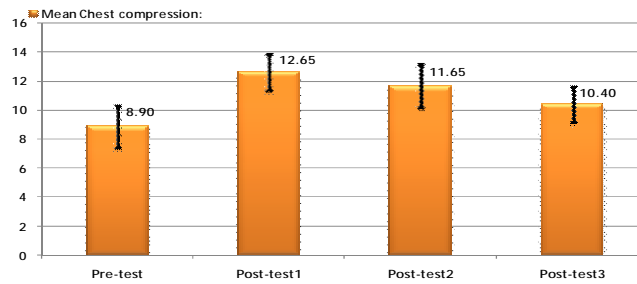**Figure -5: Mean scores of nurses' practices toward endotracheal intubations**

Figure -6: Mean scores of nurses' practices toward. chest compression
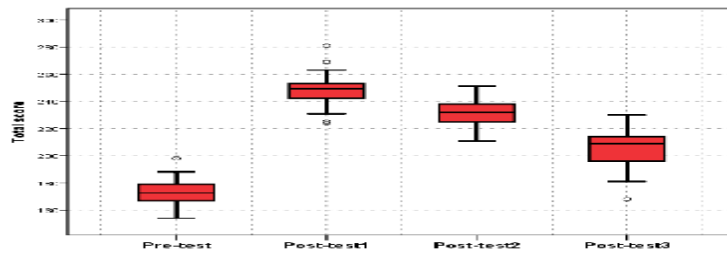

Figure-7: Comparison Box Plots of Baseline and Follow-up Neonatal Resuscitation Program.

Table-2 shows that the levels of nurses' practices are considered acceptable for post 1, post 2& post-test study shows that the neonatal mortality is 23 per 1000 live births [11].

Table-2: Frequency (F) and percentages (%) of nurses' practices in pretest and post1, post 2 and post 3 toward neonatal resuscitation.

Items		Pre-test		Post-test1		Post-test 2		Post-test3	
		F	%	F	%	F	%	F	%
1.Neonatal care: 5 items	P	32	80.0	8	20.0	14	35.0	15	35.0
	A	7	17.5	15	37.5	15	37.5	20	50.0
	G	1	2.5	17	42.5	11	27.5	5	15.0
Total		40	100	40	100	40	100	40	100
2. Neonatal resuscitation supplies and eqpuipment:9 items	P	36	90.0	2	5.0	7	17.5	9	20.0
	A	4	10.0	19	47.5	19	47.5	28	70.0
	G	0	0	19	47.5	14	35.0	3	10.0
Total		40	100	40	100	40	100	40	100
3.Apgar score: 6 items	P	34	85.0	0	0	2	5.0	17	42.5
	A	1	2.5	1	2.5.0	4	10.0	12	30.0
	G	5	12.5	39	97.5.0	34	85.0	11	27.5
Total		40	100	40	100	40	100	40	100
4. Steps of neonatal resuscitation:22 items	P	37	92.5.0	0	0	0	0	8	20.0
	A	3	7.5.0	18	45.0	38	95.0	32	80.0
	G	0	0	22	55.0	2	5.0	0	0
		40	100	40	100	40	100	40	100
5. Endotracheal intubation: 8 items	P	27	65.0	0	0	1	2.5.0	18	45.0
	A	10	25.0	16	40.0	28	70.0	21	52.0
	G	3	10.0	24	60.0	11	27.5	1	2.5.0
Total		40	100	40	100	40	100	40	100
6. Chest compression: 3 items	p	33	82.5	1	2.5	7	17.5	24	60.0
	A	7	17.5	39	97.5	33	82.5	16	40.0
	G	0	0	0	0	0	0	0	0
Total		40	100	40	100	40	100	40	100
7. Medication administration: 1 items	P	30	75.0	1	2.5	7	17.5	20	50.0
	A	7	15.0	21	52.5	29	72.5	20	50.0
	G	3	10.0	18	45.0	4	10.0	0	0
Total		40	100	40	100	40	100	40	100
Total score: 46 items	P	30	80.0	0	0	10	15.0	5	10.0
	A	5	10.0	18	48.0	29	80.0	25	70.0
	G	5	10.0	22	52.0	1	5.0	10	20.0
Total		40	100	40	100	40	100	40	100

Level of nurses' practices:
P= Poor, A= Acceptable. G= Good, F= Frequency, %= Percentages.

Discussion:

The results of this study show that, after the neonatal resuscitation program (NRP) course, significantly improved nurses' knowledge, but their performance on clinical simulation remained low. Neonatal mortality rate per 1000 live births varies from less than 5 in developed countries to 48 in the least developed countries. In Iraq, a recent, as birth asphyxia is responsible for a large part of these deaths, the education of the nurses in neonatal management at birth is crucial.

The nurses have a very important role for training in neonatal resuscitation. The efficacy of the NRP has been previously evaluated in developed countries, but there is limited information regarding the impact of this teaching program in developing countries [12, 13].

Throughout the finding of the present study table (1) indicated that most of nurses age group (30%) were of age (30-39 years), (40%) graduated of inter-mediate, (65%) of nurses are married, (77.5%) were lived in center of Baghdad, (37.5%) years of practice in maternal operation room were (1-5years). In relation to the nurses' years of employment in nursing, that greater percentage of them had more than (5-10) years experience and accounted (23.5%), (70%) of nurses had no training neonatal resuscitation (NR), (66.7%) theory training of NR. Training session consider an important to improve nurses' practices in operation room it is appositive effect and supportive for nurses' practices for neonatal resuscitation, (100%) inside country training of NR, and (100%) have information on NR, (40%) source of information on NR from workshops. The result of the study revealed that there is no significant association between nurses' practices and there demographic characteristics table-1.

The NRP course is designed to teach resuscitation of newborn infants during the critical few minutes during and immediately following delivery so that nurses can develop optimal knowledge and skill [14].

Figures-1, 2, 3, 4, 5 and 6 shows that the nurses' practices toward the all items of neonatal in resuscitation program are poor in pretest and highly significantly in post-test1, post 2 and lowest in post-test after 6 months. The nurses' practices increases at the end of the educational program but the nurses' practices is still at acceptable level but some aspect of the nurses' practices change and affected by the education program.

Figure-7 shows the comparison Box Plots of Baseline and Follow-up Neonatal Resuscitation. This boxes represent test total scores in pre-test and immediately after the program, and the boxes represent test of total scores at post 2aftre two months and follow-up (post test 3) after six months later agree with study of neonatal resuscitation [13, 14].

Kattwinkel,*et,al*.2010[15] mentioned that the nurses who were trained in the basic skills of resuscitation at birth should be in attendance at every delivery and must have good information about the steps of neonatal resuscitation.

Forty six items of the question-naire used to assess nurses' practices for nurses at maternal operation room in table-2, this table shows that there are differences in their scores, frequencies between pretest and post-test 1, post 2and post 3 of nurses 'practices toward neonatal resuscitation.

Petty, 2010[16] mentioned that the nurse should be assigned Apgar scores at delivery of newborn by an objective observer may be used to indicate the stability of the neonate and Apgar scores will have demonstrated no evidence of fetal distress prior to delivery.

Gelbart, 2010[17] indicated that at all deliveries there should be a nurse responsible for neonatal resuscitation and must know the basic steps in neonatal resuscitation including endotracheal intubation and chest compression at obstetric operation room in all caesarean sections delivery.

Recommendations:

The study recommended that:

1- Increasing health education of the nurses working in the maternal operation or delivery room about neonatal resuscitation through regular training workshop.

2 - The Neonatal Resuscitation Program (NRP) recommends that at least two nurses should be skilled in initiating

resuscitation and capable of performing all steps of the resuscitation process.

3 - The nurses who are working on the maternity unit should be qualified.

4 - Availability of resuscitation equipment and drugs in all care setting to facilitate rapid resuscitation of the neonate.

5 - All nurses in charge working in the labour unit and obstetric operation room must receive trained on resuscitation equipment and maintain familiarity with that equipment through regular use or checking them regular.

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