

Effectiveness Of An Educational Program On Nurses' Practices About Blood Exchange Transfusion Procedure In Neonatal Intensive Care Unit In Al – Ramadi Teaching Hospital For Maternity And Children

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Abstract

Background : Newborn jaundice accounts for about 10 percent -35 percent of hospital admissions and it consider one of the most common causes of fetal morbidity and mortality. It is a worldwide disease that occurs in the week of first life in up to 80% of preterm and 60% of term neonates. Neonatal jaundice can lead to encephalopathy and even death during the neonatal period. The most common causes of neonatal jaundice is ABO incompatibility. When the baby has blood group A or B and his mother has blood group O, maternal-fetal ABO incompatibility occurs. Approximately 15-20 per cent of all births. This disorder occurs. Around 10% of incompatible neonates with ABO and anemia, hemolytic disease (1). The study aimed to assess the nurses' practices about blood exchange transfusion procedure, to determine effectiveness of an education program on nurses' practices about blood exchange transfusion procedure in neonatal intensive care unit in Al- Ramadi Teaching Hospital for Maternity and Children, to identify the relationship between nurses' Practices and their demographic characteristics such as age, sex, education level, employment, and training session. A quasi experimental study was carried out in neonatal intensive care unit in al- Ramadi teaching hospital for maternity and children started from 10th of January 2021 until 25th of juley 2021 . A purposive sample of (60) nurses who work in neonatal intensive care unit in al- Ramadi teaching hospital for maternity and children. A purposive sample of (60) nurses who work in neonatal intensive care unit in al- Ramadi teaching hospital for maternity and children , the data were collected through a constructed questionnaire, with two parts , the first part is concerned with nurses demographical characteristics , the second part is concerned with nurses' practices about blood exchange transfusion procedure . An observation method was used to full the questionnaire format.

Introduction:

Blood exchange transfusion is emergency procedure for severe neonatal hyperbilirubinemia in the world. Exchange transfusion has been performed via a central umbilical venous catheter, concerns for procedures it need a medical continued expertise for this life-saving intervention and nursing care for pre and during and post procedures (2) . Exchange blood transfusion (EBT) is performed to manage a high or rapidly rising bilirubin not responsive to intensive phototherapy or IVIg or for severe anemia. EBT is mainly used in the treatment of HDN to prevent bilirubin encephalopathy by removing the antibody-coated red cells and excess bilirubin. It may also be required for neonatal hyperbilirubinaemia due to other causes, such glucose-6-phosphate dehydrogenase (G6PD) deficiency (3). The first intervention successfully tried for the treatment of severe hyperbilirubinemia (SHB), aimed at preventing kernicterus, was neonatal exchange transfusion (NET). Neonatal exchange transfusion has been shown to minimize neurological morbidity for neonates with SHB, such as kernicterus and bilirubin mediated neurological impairment (BIND) with multiple neurodevelopmental. It also provides additional benefits for SHB management, including the removal of anti-body-coated red blood cells (RBCs), hemolytic anemia correction, decreased circulating maternal antibody titers, and increased albumin content (resulting in enhanced bilirubin binding). It has been used mainly for immune mediated and non-immune hemolytic jaundice control (4) . Exchange transfusion is the replacement of blood from newborn infants with elevated bilirubin level in their blood stream with donor blood containing normal bilirubin levels. Exchange transfusion is a treatment that Louis Diamond and a group of surgeons founded at the Children's Medical Center in Boston, Massachusetts, during the 1940. A doctor passes a plastic tube called a catheter into the umbilical vein of the child during the exchange transfusion to slowly drain the infant's blood and substitute replace it with donor blood. The first definitive treatment for hyperbilirubinemia in the US was exchange transfusion, which helped reduce the occurrence of kernicterus a form of brain damage caused by elevated bilirubin levels (5).

There are many types of jaundice involves physiologic, breastfeeding, breast milk and pathologic. The most common Physiological jaundice considered benign form and through proper testing can be separate from serious and ongoing cases. The baby's limited ability to excrete bilirubin in the first days of life can be viewed as normal and may be called physiological jaundice (6). ECT complications may be elevated by the amount of blood exchanged. Most of these complications, such as extreme thrombocytopenia, apnea, hypocalcemia, epilepsy, bradycardia, catheter failure, hyperkalemia, and necrotizing enter colitis, were asymptomatic and temporary, occurring within seven days of the exchange (7). Nurses play an integral role in implementation universal screening for elevated levels of bilirubin in the newborn . Nurses should be evaluate the family's level of understanding and educated about the causes of bilirubin elevated levels such as the administration of supplemental water. Health

care providers should promote and support breastfeeding as successful breastfeeding helps to decrease elevated bilirubin levels (8). Equipment's of neonatal blood exchange transfusions involves Resuscitation trolley nearby, exchange transfusion record sheet, and Blood specimen tubes/sampling syringes. Ensure packed red cells prescribed, Calcium Gluconate 10% ampoules, sterile gloves, gown, head cap, syringes different sizes, normal saline, mask, urine bag, povidone and catheters tube (9). Double volume exchange removes about 85% of the infant's red blood cells. At the end of the exchange blood transfusion the bilirubin should be about 50% of pre exchange level. Double-volume exchange is more effective than single-volume exchange at removing total bilirubin mass from the infant's tissues(10). Severe unconjugated hyperbilirubinemia is conventionally treated by intensive phototherapy (PT). Light energy (emission range 400-525 nm, peak emission: 450- 460 nm) is absorbed by UCB as it circulates in skin capillaries, resulting in the converse of insoluble bilirubin into water-soluble photo isomers that can be eliminated into the bile without the need of liver conjugation, or at smaller rate into the urine(11). Phototherapy has been recommended for the treatment of neonatal hyperbilirubinemia, to avoid the possible toxicity of bilirubin. In addition, neonates with hemolytic hyperbilirubinemia are given intravenous immunoglobulin (IVIG) and albumin (IVALB). IVALB can be useful in preventing hyperbilirubinemia-related complications, including neuronal developmental abnormalities and blood transfusions (12).

Methodology:

A quasi - experimental study was carried out in neonatal intensive care unit in al- Ramadi teaching hospital for maternity and children started from 10th of January 2021 until 25th of July 2021. A purposive sample of (60) nurses who work in neonatal intensive care unit in al- Ramadi teaching hospital for maternity and children, the data were collected through a constructed questionnaire, with two parts, the first part is concerned with nurses demographical characteristics, the second part is concerned with nurses' practices about blood exchange transfusion procedure. An observation method was used to fill the questionnaire format. The validity was determined through a panel of experts. While the reliability the reliability of the instrument was determined through the computation of Alpha Cornbrash's test (Alpha Correlation Coefficient); internal consistency method was used for determining the reliability. The data were analyzed by using descriptive and inferential statistical measures by using the statistical package of social science (SPSS) version (24).

Results:

The findings of the study showed that nurses have poor practices about blood exchange transfusion procedure (43.80 %), after implemented educational program alter nurses' practices to good level (62.40 %). Findings of the study revealed that (63.7%) within ages between (20-24) years, majority of the study

sample from Male (20) from (30) nurses, and (10) nurses share in the specialist courses (8) inside Iraq, while (2) from nurses share in special courses outside Iraq.

Conclusion:

The study comes to the following conclusions: Shortage of Staff Nurses female in Neonatal intensive Care Unit , Staff Nurses gender and qualification have no influence on their Practices , Concerning the Availability of marriage Services like, Blood group, HIV, Rh in Critical level , Staff Nurses not wear the personal protective equipment during deal with Neonates , Practices of Staff Nurses working in NICU are in Critical Level before intervention , Only (33%) of the study sample share in specialist courses about blood exchange transfusion procedure in NICU. The result of the study shows that nurse' practices before blood exchange transfusion procedure in the study group is presenting fair to good level of practices. The result of the study shows that nurses' practices during blood exchange transfusion procedure in the study group is indicating fair to good level of practices. There is high significant relationship (positive strong) between nurses' practices in the study group and their age also there is significant relationship (positive) between nurses' practices in the study group and their gender, while there is no noteworthy relationship has been reported between nurses' practices and their marital status and years of experiences in NICU. There is no significant relationship has been reported among nurses' practices and their qualification in nursing, while there is significant relationship (positive) between nurses' practices in the study group and their years of experiences in nursing.

Recommendations:

The study recommends that continues education programs is important to improve nurses' knowledge and practices , educational programs concerning nursing care for children with blood exchange transfusion procedure . Providing scientific booklet, publication and journal about blood exchange transfusion procedure.

Key words: Effectiveness, Nurses' Practices, Blood exchange, Blood exchange transfusion procedure.

Finding and discussion:

Table (4-5): Overall Assessment of Nurses' Practices regarding Blood Exchange Transfusion Procedure for Children at NICU among Study and Control Group

Levels of practices	Study Group (N= 30)												Control Group					
	Pre-test				Post-test I				Post-test II				Pre-test				Post-test I	
	F	%	M	S.D	f	%	M	S.D	F	%	M	S.D	F	%	M	S.D	f	%
Poor	2	6.7	43.80	4.781	0	0	62.40	1.754	0	0	60.50	4.424	8	26.3	38.73	9.523	8	26.3
Fair	28	93.3			0	0			0	0			22	73.3			22	73.3
Good	0	0			30	100			30	100			0	0			0	0
Total	30	100			30	100			30	100			30	100			30	100

f: Frequency, %: Percentage, M: Mean of total score, SD Standard deviation of total score

Poor= 0 – 24, Fair= 25 – 49, Good= 50 – 74

This table displays the overall assessment of nurses' practices regarding blood exchange transfusion procedure for children; the table shows that nurses in the study group are showing fair level of practices during the pre-test time (93.3%) while their practices are increased to good level during the post-test 1 and 2 times after the application of educational program (post-test 1= 100% and post-test 2= 100%).

The nurses in the control group are showing fair level of knowledge over the three times of test; pre-test, post 1, and post 2 (pre= 73.3%, post 1= 73.3%, and post 2= 90%).

Table (4-5) shows that nurses in the study group are showing fair level of practices during the pre-test time (93.3%) while their practices are increased to good level during the post-test 1 and 2 times after the application of educational program (post-test 1= 100% and post-test 2= 100%). This result may be due to from the fact most of the study sample graduated from secondary nursing schools. This result supported by Firas, (2018) he talked that (57.6%) are graduated from secondary nursing school . Also most sample no participate in training session ,this result agrees with fatima , (2012) in her studies (Effectiveness of an educational Health Program on Pediatric Nurses' Knowledge and Practices toward Children under Mechanical Ventilation in Pediatric Teaching Hospitals at Baghdad City) she talked that (56.5 %) of the study sample had no training session . Also the researcher focused on the important role of continuous nursing education program for hospital NICU unit . This is due to fact that training courses teaching the nurses the right methods and practices based on scientific background which prevent the nurses from performing poor and bad practices and become more competent.

Table (4-6): Repeated Measure Analysis of Variance (RM-ANOVA) Test for Effectiveness of Educational Program on Nurses' Practices regarding Blood Exchange Transfusion Procedure for Children at NICU among Study Group (N=30)

Descriptive		Within-Subjects Effect					
Practices	Mean (S.D)	Source	Type III Sum of Squares	Df	Mean Square	F	P
Pre-test Post-test I Post-test II	43.80 (4.781) 62.40 (1.754) 60.50 (4.424)	Time	Sphericity Assumed	5357.600	2	2678.800	159.671
			Greenhouse-Geisser	5357.600	1.419	3774.357	159.671
			Huynh-Feldt	5357.600	1.471	3640.958	159.671
			Lower-bound	5357.600	1.000	5357.600	159.671
		Error(Time)	Sphericity Assumed	973.067	58	16.777	
			Greenhouse-Geisser	973.067	41.165	23.638	
			Huynh-Feldt	973.067	42.673	22.803	
			Lower-bound	973.067	29.000	33.554	

S.D: Standard Deviation, df: Degree of Freedom, f: F-statistics, P-value: probability value, Sig: Significance, H.S: High Significant

This table displays that analysis of RM-ANOVA test indicate that educational program was highly effective on nurses' practices among the study group evidenced by high significance associated with "Greenhouse-Geisser" correction at p-value=0.001. It is clear out of descriptive the noticeable increasing of mean score on nurses' practices during post-test 1 and 2 that indicate the effectiveness of educational program.

This table (4-6) displays that analysis of RM-ANOVA test indicate that educational program was highly effective on nurses' practices among the study group evidenced by high significance associated with "Greenhouse-Geisser" correction at p-value=0.001. This result agrees with study done by shehab,(2016) he mentioned that his educational program was very effective on teachers staff . The researchers point that scientific lectures and health education and booklets help in increased practices and scientific knowledge.

Table (4-7): Repeated Measure Analysis of Variance (RM-ANOVA) Test for Nurses' Practices regarding Blood Exchange Transfusion Procedure for Children at NICU among Control Group (N=30).

Descriptive		Within-Subjects Effect					
Practices	Mean (S.D)	Source		Type III Sum of Squares	Df	Mean Square	F
Pre-test Post-test I Post-test II	38.73 (9.523) 38.77 (9.659) 38.77 (9.726)	Time	Sphericity Assumed	.289	2	.144	.642
			Greenhouse-Geisser	.289	1.457	.198	.642
			Huynh-Feldt	.289	1.514	.191	.642
			Lower-bound	.289	1.000	.289	.642
		Error(Time)	Sphericity Assumed	13.044	58	.225	
			Greenhouse-Geisser	13.044	42.239	.309	
			Huynh-Feldt	13.044	43.901	.297	
			Lower-bound	13.044	29.000	.450	

S.D: Standard Deviation, df: Degree of Freedom, f: F-statistics, P-value: probability value, Sig: Significance, H.S: High Significant

This table (4-7) reveals that there is no significance has been associated with “Greenhouse-Geisser” correction. The descriptive shows no differences in mean score of nurses' practices in the control group during pre-test, post-test 1, and 2 that indicate no change in practices of nurses who are not engaged in educational program. This result comes from the fact control group are not engaged in educational program and they less of training session . This findings supported with study conducted by Fatima,(2012) she stated that (56.5%) of the study sample had no training session. Also the researcher point that training session and educational program consider an important to improve nurses' knowledge and their practices in (NICU) unit it is a positive effect and supportive for nurses' knowledge and practices for children they needs blood exchange transfusion procedure.

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