

Original Article

Impact of an Educational Program on Nurses' Knowledge Regarding the Care of Newborns with Respiratory Distress Syndrome in Neonatal Intensive Care Units

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Nurses' Knowledge Regarding the Care of Newborns with RDS

ABSTRACT

Objective: To assess the impact of an organized educational intervention on the knowledge of nurses working in the neonatal Intensive care unit on newborns with respiratory distress syndrome.

Study Design: A quasi-experimental study

Place and Duration of Study: This study was conducted at the intensive care units of Babylon Maternity and Children Teaching Hospital and Al-Noor Hospital in Al-Hilla, Babylon Province, Iraq between 1st April 2025 and 30th August 2025.

Methods: The study was conducted at the 50 neonatal involving 50 nurses working in Babylon Maternity and Children Teaching Hospital neonatal intensive care unit (study group n=25) and Al-Noor Hospital neonatal intensive care unit (control group n=25). The knowledge of the nurses was measured by the use of a validated questionnaire with 5 domains related to the respiratory distress syndrome at pre- and post-test.

Findings: The percent of high knowledge level of the study population was 80 percent as opposed to the 24 percent of the control group ($p=0.001$). The effect of the study group (1.50 ± 0.09 to 1.72 ± 0.07) was significant, whereas in the control group, the effect was minimal (1.54 ± 0.12 to 1.59 ± 0.12). The only demographic variable that was significantly ($p<0.05$) related to knowledge was educational level.

Conclusion: The educational intervention was effective in enhancing the understanding of respiratory distress syndrome among nurses in neonatal intensive care units. The most important factor of understanding was the educational level, which once again demonstrates the need to implement standardized and evidence-based education to enhance neonatal outcomes.

Key Words: Educational program, Nursing knowledge, Neonatal intensive care unit, Respiratory distress syndrome

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INTRODUCTION

Respiratory Distress Syndrome (RDS), which is mainly brought about by a lack of surfactant in pre-term babies is one of the most prevalent and severe illnesses in the Neonatal Intensive Care Units (NICUs) across the world. RDS is a major contributor of neonatal morbidity and mortality, protracted hospital stay, escalated healthcare expenditures, and neuro-developmental complications in the long run. The World Health Organization (WHO) approximates that upto one million deaths of newborn babies world-

wide each year are caused by prematurity complications, and RDS is a significant cause of these deaths.^{1,2}

Pathophysiology of RDS entails poor production of surfactant which causes collapse of the alveoli, reduction of the gas exchange, hypoxemia, excess carbon monoxide, and respiratory failure. Prompt implementation of evidence-based measures—including continuous positive airway pressure (CPAP), assisted mechanical ventilation, and administration of exogenous surfactant—plays a crucial role in optimizing respiratory outcomes, are needed by the management, which require advanced clinical judgment and close monitoring.³

The biggest and most stable group of medical workers in NICUs is composed of nurses. The scope of their work is more than the regular monitoring to prevent complications like pneumothorax and bronchopulmonary dysplasia, respiratory support strategies, prevention of complications, and adherence to evidence-based practice, which implies that the quality of neonatal outcomes is directly dependent on

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knowledge, skills, and adherence to the evidence-based practice by nurses.^{4,5}

Regardless of the importance of nurses, several studies have reported a considerable gap in the knowledge of nurses regarding neonatal RDS, especially in fast emerging fields such as ventilation practices and surfactant administration.^{6,7} some of the reasons that led to these gaps are heavy workloads, absence of organized orientation, insufficient continuing education and compliance to outdated practices.⁸

Formal education programs based on evidence are one of the possible ways to fill such knowledge gaps. Well-designed, multimodal, and context-specific educational interventions have been observed to increase knowledge, confidence, and clinical decision-making of nurses in complex neonatal environments. Nevertheless, there is limited empirical data on the effectiveness of these programs in enhancing RDS-related knowledge in nurses working at the NICU, especially low- and middle-income nations. Hence, the purpose of the research was to determine the impact of a structured educational initiative on the knowledge of nurses in respect to managing newborns with Respiratory Distress Syndrome in Neonatal Intensive Care Units.

METHODS

The location of the quasi experimental study that was carried out was Babylon Maternity and Children Teaching Hospital and Al-Noor Hospital in Al-Hilla, Babylon Province, Iraq between 1st April 2025 and 30th August 2025 in accordance with the letter No. 81 dated 24/3/2025. A total of 98 nurses were used to recruit a convenience sample of 50 NICU nurses. Participants were purposely drawn to a study group (n=25) and a control group (n=25). Age, sociodemographic data, education, NICU experience, and RDS training before recorded. Knowledge test: 30 questions of multiple choices in five domains of RDS. Scores ranged from 30

to 60. They were also confirmed by 15 nursing experts in five Iraqi universities, and it is evident that their content validity is confirmed. The reliability test gave a Cronbachs alpha of 0.811. The program was founded on the knowledge requirements, evidence-based recommendations, and practices of RDS care. It was provided to the study group alone. The analysis of data was done with the help of SPSS v23. Descriptive statistics was used to describe variables and t-tests, Mann-Whitney U, and Chi-square were used. The p value ≤0.05 was taken as significant.

RESULTS

The distribution of the nurses was normal as depicted by table 1. Table 2 depicts that a majority of the participants in control group and (52) in study group were between (20-25) years (mostly). When it came to level of education of nurses, (48) in the control group and (44) in the study group graduated nurses institute. In terms of training on the pediatric respiratory distress syndrome, (36) in control group and (20) in study group were engaged in training on the RDS, lastly, (56) and (64) in control and study group respectively with 5 years experience in PICU.

The mean of the control group is highest with item (causes of RDS in the babies is (except):) value of 1.88 and the least with item (endotracheal tube suctioning should be done to neonatal child). In terms of to study group, the maximum mean in study group is 1.92 with the item (characteristics of a newborn child are:) and the minimum mean is 1.08 with the item (before a newborn is fed for the first time, they must be assessed) [Table 3].

Table No. 1: Tests of normality

Nurse’s knowledge RSD in neonate	Shapiro-Wilk		
	Statistic	df	Sig.
	.976	100	.071

Table No. 2: Distribution of the study samples' sociodemographic attributes

Sociodemographic characteristics		Control		Study		P value
		No.	%	No.	%	
Age (years)	20-25	11	44.0	13	52.0	.267 N.S
	25-30	3	12.0	6	24.0	
	30-35	4	16.0	3	12.0	
	> 35	7	28.0	3	12.0	
Educational level	Nursing school graduated	4	16.0	3	12.0	.538 N.S
	Nursing institute graduated	12	48.0	11	44.0	
	College of nursing graduated	9	36.0	11	44.0	
Training regarding pediatric respiratory distress syndrome	No	16	64.0	20	80.0	.212 N.S
	Yes	9	36.0	5	20.0	
Years of experience in PICU (years)	5	14	56.0	16	64.0	.445 N.S
	6-10	4	16.0	5	20.0	
	>10	7	28.0	4	16.0	

Table No. 3: Responses of nurses toward knowledge of respiratory distress syndrome in neonate

Questionnaire	Control		Study	
	Mean	SD	Mean	SD
A newborn child is	1.80	.374	1.80	.408
Characteristics of a newborn child are:	1.76	.436	1.92	.277
The common problems of a newborn child are:	1.56	.507	1.76	.436
It is essential to evaluate a newborn thoroughly prior to initiating the first feeding:	1.28	.458	1.08	.277
Respiratory distress syndrome is:	1.12	.332	1.32	.476
Early signs/symptoms of RDS (Except):	1.76	.436	1.52	.510
Late signs & symptoms of RDS (Except):	1.60	.500	1.64	.490
Early feeding a newborn child is better to prevent to:	1.80	.408	1.88	.277
Causes of RDS in the babies is (Except):	1.88	.332	1.48	.510
Babies are at risk for RDS (Except):	1.24	.436	1.20	.408
The first assessed of respiratory distress by:	1.24	.436	1.20	.408
Gavage feeding in a newborn is contraindicated in the following situations:	1.72	.458	1.76	.436
An important goal of lung protective mechanical ventilation for RDS is to:	1.24	.436	1.20	.408
Occlude end of endotracheal tube, and administer surfactant as a single aliquot over:	1.48	.510	1.20	.408
A nurse is required to dispose a suction catheter	1.72	.458	1.80	.408
It is recommended to change humidifiers	1.28	.458	1.20	.408
Insertion of suction catheter into endotracheal tube	1.52	.510	1.60	.500
Dusting of respiratory and bedside equipment with antiseptic should be done	1.36	.490	1.36	.490
Head of the bed elevation should be ranging from	1.64	.490	1.44	.507
A nurse caring a ventilated neonatal child is required to wear sterile gloves during	1.48	.510	1.84	.374
Maintenance of a high nurse to neonatal child ratio in critical care setting is associated with	1.76	.436	1.76	.436
Continuous education to PICU nurses on prevention of infection is associated with	1.28	.458	1.24	.436
It is recommended to perform chest physiotherapy due to the following reason	1.48	.510	1.28	.458
Type of air way humidifier	1.52	.510	1.72	.458
Frequency of ventilator circuit changes	1.44	.507	1.40	.500
Endotracheal tube suctioning in a neonatal should be performed	1.16	.374	1.24	.436
While caring for a ventilated neonate, it is essential to ensure that endotracheal tube cuff pressure is maintained	1.72	.458	1.32	.476
Nurses knowledge about the complications of respiratory distress syndrome of the newborn	1.60	.500	1.28	.458
Respiratory distress syndrome of a newborn child may lead to:	1.36	.490	1.40	.500
Unexpected removal of the endotracheal tube can leads to:	1.80	.408	1.60	.500

Table No. 4: Overall nurse’s knowledge toward respiratory distress syndrome in neonate

Questionnaire		Control		Study		P value
		No.	%	No.	%	
The nurse's knowledge of the characteristics of a newborn child	Low	3	12.0	2	8.0	.143
	Moderate	12	48.0	7	28.0	
	High	10	40.0	16	64.0	
Nurse’s knowledge of physiological changes, signs and symptoms associated with respiratory distress syndrome newborn	Low	5	20.0	4	16.0	
	Moderate	8	32.0	9	36.0	
	High	12	48.0	12	48.0	
Nurses knowledge about the causes and risk factors leading to respiratory distress syndrome in newborn	Low	3	12.0	9	36.0	
	Moderate	12	48.0	10	40.0	
	High	10	40.0	6	24.0	
Nurses knowledge about treatment and nursing care for a newborn baby with respiratory distress syndrome.	Low	1	4.0	4	16.0	
	Moderate	21	84.0	20	80.0	
	High	3	12.0	1	4.0	
Nurses knowledge about the complications of respiratory distress syndrome of the newborn	Low	2	8.0	4	16.0	
	Moderate	17	68.0	17	68.0	
	High	6	24.0	4	16.0	
Overall nurses knowledge toward respiratory distress syndrome in neonate	Low	2	8.0	1	4.0	
	Moderate	17	68.0	23	92.0	
	High	6	24.0	1	4.0	
Mean ± SD		1.54±0.12		1.50±0.097		

Independent sample t-test, N.S = no significant, p-value=0.05

Table No. 5: Overall nurse’s knowledge toward respiratory distress syndrome in neonate

Questionnaire		Control		Study		P value
		No.	%	No.	%	
The nurse's knowledge of the characteristics of a newborn child	Low	3	12.0	-	-	.001
	Moderate	11	44.0	1	4.0	
	High	11	44.0	24	96.0	
Nurse’s knowledge of physiological changes, signs and symptoms associated with respiratory distress syndrome newborn	Low	2	8.0	1	4.0	
	Moderate	10	40.0	5	20.0	
	High	13	52.0	19	76.0	
Nurses knowledge about the causes and risk factors leading to respiratory distress syndrome in newborn	Low	3	12.0	-	-	
	Moderate	8	32.0	5	20.0	
	High	14	56.0	20	80.0	
Nurses knowledge about treatment and nursing care for a newborn baby with respiratory distress syndrome	Moderate	19	76.0	7	28.0	
	High	6	24.0	18	72.0	
Nurses knowledge about the complications of respiratory distress syndrome of the newborn	Low	2	8.0	-	-	
	Moderate	15	60.0	13	52.0	
	High	8	32.0	12	48.0	
Overall nurses knowledge toward respiratory distress syndrome in neonate	Low	2	8.0	-	-	
	Moderate	17	68.0	5	20.0	
	High	6	24.0	20	80.0	
Mean ± SD		1.59±0.12		1.72±0.07		

Independent sample t-test, N.S = no significant, p-value=0.05

Table No. 6: An association between demographic profiles of nurses who are working in NICU and knowledge regarding respiratory distress syndrome in neonate

Sociodemographic characteristics		Knowledge
Age	X ² Calculate	5.417
	X ² table	7.82
	Sig.	N.S
Educational level	X ² Calculate	7.955
	X ² table	7.82
	Sig.	Sig.
Having pediatric respiratory distress syndrome training	X ² Calculate	1.563
	X ² table	3.84
	Sig.	N.S
Years of experience in PICU	X ² Calculate	2.708
	X ² table	5.99
	Sig.	N.S

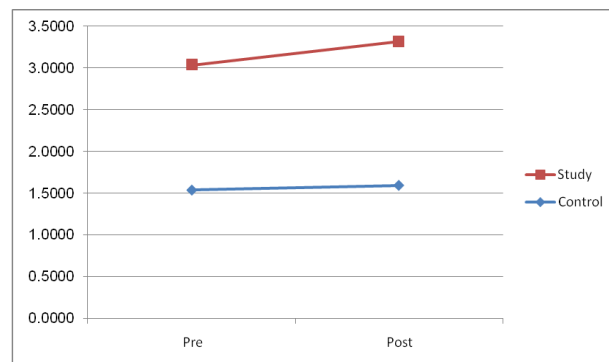


Figure No. 1: Differences in nurse’s knowledge toward respiratory distress syndrome in Neonate in pre-post test across the tow group

68% in control group were having a moderate knowledge towards respiratory distress syndrome in neonate and (80) in study group having a high knowledge towards respiratory distress syndrome in neonate (Table 5, Fig. 1).

There was a significant association between demographic characteristics of the working nurses in NICU and knowledge on Respiratory Distress Syndrome in Neonate at p-value =0.05 or less in relation to (Educational level) except (Age, Training, and Years of experience in PICU) which had a non-significant correlation (Table 6).

DISCUSSION

The results of this research evidenced that structured education program made significant progress toward enhancing the knowledge of nurses on how to attend to newborns with Respiratory Distress Syndrome in the NICUs. The high knowledge levels of 4 to 80% that have been significantly enhanced in the study group accentuate the effectiveness of the intervention. The fact that no substantial improvement of the control group was observed allows concluding that the gains observed could be explained by the educational program, and not by external factors or repeated testing. These results are consistent with other studies that have found that evidence-based interventions in the education of neonatal nurses can significantly improve their knowledge and competence.⁸⁻¹¹

It is worth noting that the only significant predictor of knowledge was the educational level. This criticizes the years of experience as a traditional measuring rod of clinical competence and highlights the significance of formal education and ongoing professional growth.

Findings like these have been demonstrated in recent publications, pointing to the fact that experience does not guarantee current knowledge in a rapidly developing clinical specialty, including neonatal care.¹²⁻¹⁵

CONCLUSION

The structured educational program significantly improves nurses' knowledge regarding the management of respiratory distress syndrome in neonatal intensive care units. The knowledge competence was mainly determined by the level of education instead of the number of years of experience and the use of standardized evidence-based education programs is critical to increasing the readiness of nurses and improve the outcomes of newborns with this potentially fatal condition.

Author's Contribution:

Concept & Design or acquisition of analysis or interpretation of data:	Salim Amir Yousef, Khamees Bandar Obaid
Drafting or Revising Critically:	Salim Amir Yousef, Khamees Bandar Obaid
Final Approval of version:	All the above authors
Agreement to accountable for all aspects of work:	All the above authors

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