
Quality of Nursing Care for Neonates with Respiratory Distress Syndrome at Neonatal Intensive Care Unit in Teaching Hospitals in Erbil City

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ABSTRACT

Background and Objective: Quality of nursing care has an important role in providing the highest care to neonates in the neonatal intensive care unit. Improvement in the quality of nursing care is a main goal of the nurses. The study aimed to assess the quality of nursing care for neonates with Respiratory Distress Syndrome.

Methods: A descriptive cross-sectional study was conducted on 50 nurses at neonatal intensive care units in teaching hospitals (Rapareen Teaching Hospital for Children and Maternity Teaching Hospital) in Erbil city. A convenience sampling technique was used to collect the data.

Two tools were used to collect the data which was developed by the researcher: the first tool was a self-administered questionnaire which contained two parts (socio-demographic characteristics, and questions related to neonatal respiratory distress syndrome), and the second tool was an observational checklist that was used to assess the quality of nursing care for NRDS. The Statistical Package for Social Science was used to analyze the data (version 23) presenting descriptive and inferential statistics, including the chi-square test, Fisher exact test, frequency, and percentage.

Results: More than half (54%) of the nurses were within the age group of 25-34 years. 62% of the nurses graduated from the college of nursing, 58% of the nurses were female, and the majority (88%) of the nurses were married. The highest percentage (64%) of the nurses had a good level of knowledge, while the highest percentage (74%) of the nurses had a fair level of quality nursing care. A highly significant association was found between the quality of nursing care with educational level and the duration of the training course. Also, there was a weak positive correlation between the level of nurses' knowledge and the quality of nursing.

Conclusion: Based on the study findings of the present study, it was concluded that the highest percentage of the nurses had a good level of knowledge, and the high percentage of the nurses had a fair level of quality nursing care.

Keywords: Quality of Nursing Care; Neonates; NICU; NRDS.

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INTRODUCTION

Neonatal Respiratory Distress Syndrome (NRDS) is a potentially fatal condition caused by underdeveloped lungs and small alveoli in preterm infants that results from a surfactant deficiency and a decreased alveolar surface area available for gas exchange [1]. Respiratory distress syndrome affects neonates born before 34 weeks of gestational age, and the most common causes of mortality rate among neonates in the first hours after birth are RDS, prematurity and low birth weight [2]. Respiratory distress syndrome can injure a preterm infant's lungs, which increases their chance of developing bronchopulmonary dysplasia [14]. In the neonatal intensive care unit, nurses play an important role in the care of neonates with RDS. Also with technical skills, the care of the neonate with RDS requires a high degree of interpersonal skills, and nursing services are the basis of the healthcare system [10]. Within a few minutes after delivery, the symptoms of respiratory distress syndrome appear like the bluish of the skin (cyanosis), grunting, nasal flaring, deep respiration, use of the chest muscles, dyspnea, and apnea. At that time, the preterm neonates need emergency treatment in neonatal resuscitation healthcare [3]. Neonatal respiratory distress syndrome affects about 50% of newborns which born between 26 and 28 weeks of pregnancy, although fewer than 30% of preterm newborns are born between 30-31 weeks of pregnancy [3]. Respiratory distress syndrome is the main cause of admission of neonates to the Neonatal Intensive Care Unit (NICU), the incidence rate of NRDS is approximately 7.8% among neonates. Also, respiratory distress syndrome was the main leading cause of mortality among 50% of premature neonates [4]. In Iraq, about 42% of infants die within the 28th day of life [5]. The incidence of NRDS decreases as the gestational age increases

[6]. Nurses have a critical role in decreasing the mortality rate among neonates with RDS, through physical examination, assessing the respiratory rate, observing for grunting, suctioning, using CPAP, using ventilator machines, and assessing the severity of RDS. Respiratory distress syndrome is more common in newborns born before 34 weeks of gestation. A family history of respiratory distress syndrome, neonates born by cesarean section, neonates with diabetic mothers, cold stress, hypoxia, and premature birth are the main attributed causes of NRDS [7].

There were studies carried out in non-developed countries, such as Egypt, Turkey, and Saudi Arabia, that discovered that nurses had weak knowledge and practice, and were responsible for providing care for premature neonates with RDS [8,9]. The study aims to assess the quality of nursing care in NICUs at Rapareen Teaching Hospital for Children (RTHC) and Maternity Teaching Hospital (MTH), furthermore, until the quality of nursing care given to neonates with RDS is evaluated, nurses do not know how well they are doing. Good nurses' knowledge and practice reduce their mortality and improve their outcomes [3]. Previous studies regarding care for neonates with RDS had ignored important practices and procedures like suctioning, oxygen therapy, control of infection, and using CPAP machines. Neonatal respiratory distress syndrome is a significant factor in newborn mortality around the world [13]. Invasive respiratory support methods like nasal continuous positive airway pressure (CPAP) or non-invasive intermittent positive airway pressure (nCPAP) are used to treat NRDS. Other methods including mechanical ventilation, oxygen therapy, and surfactant therapy are used to treat NRDS.

METHODS

A descriptive cross-sectional study was conducted on 50 nurses, 20 nurses from the NICU in RTHC, 11 nurses from the Pediatric Intensive Care Unit (PICU) in RTHC, and 19 nurses from the NICU in MTH in Erbil city/ Kurdistan Region, from 1st November 2021 to 1st November 2022. A non-probability/convenience sampling technique was used to collect the data. The Scientific and Ethics Committee of the College of Nursing at Hawler Medical University gave its approval to the study (code 113) on 7/10/2021 before starting the research. The formal consent form was obtained from the General Directorate of Health in Erbil, Rapareen Teaching Hospital for Children and Maternity Teaching Hospital to conduct the study. The result of Cronbach's alpha was 0.92 for the first group of nurses, and 0.87 for the second group of nurses which was statistically adequate. These results reflected the reliability of the tools. A relevant questionnaire and observational checklist were developed and designed based on a relevant literature review. Two tools were used for data collection: The first tool was a self-administered questionnaire, which consisted of two parts. The first part was composed of socio-demographic and professional data of the nurses, including age, gender, place of work, educational level, attending training courses, and marital status. The second part consisted of 24 questions related to nurses' knowledge regarding NRDS. It was divided into eight domains as follows: definition (1 question), cause (1 question), risk factors (3 questions), signs and symptoms (3 questions), complications (2 questions), surfactant(3), prevention(2 questions), and nurses' knowledge regarding nursing care(9 questions). Regarding rating and scoring of the scales, the nurses' knowledge was scored

based on the Likert scale as the follows the correct answer was rated (2), and the incorrect answer was rated (1). The level of nurses' knowledge was scored by calculating the total score of 24 items related to nurses' knowledge as follows: low scores (24-32) represent a poor level, an average score (33-40) represent a fair level of knowledge, and high scores (41-48) represent a good level of the nurses' knowledge. The second tool was an observational checklist; it was developed based on the usual nursing care that nurses should offer in the NICU. This part consists of 63 items, which were divided into 14 domains as follows: assessment (6 items), oxygen therapy administration (6 items), suctioning (7 items), pulse oximetry (5 items), intravenous administration (6 items), cannulation (10 items), infection control (7 items), chest physiotherapy (1 item), incubator care (5 items), maintaining thermoregulation (2 items), psychological support (1 item), nasogastric tube insertion (8 items), NG tube feeding (6 items), and documentation (1 item). Regarding rating and scoring the quality of nursing care based on the Likert scale. It was scored as the follows the completely done was given the score (3), the incompletely done was given the score (2), and the not done was given the score (1). The calculation of overall items regarding the quality of nursing care was categorized into three levels: low scores (63-104) represent a poor level of quality of nursing care, an average score (105-146) represents a fair level of quality of nursing care, and scores (147-189) represents a good level of quality of nursing care. The total score of each domain related to nurses' knowledge was calculated by the mean of the score and classified into three levels as follows: a low mean score (1-1.33) represents a poor level, an average mean score (1.34-1.66) represents a fair level, and high mean score (1.67-2)

represents a good level. The total score of each domain related to the quality of nursing care was calculated by the mean of the score and classified into three levels as follows: A low mean score (1-1.66) represents a poor level, an average mean score (1.67-2.33) represents a fair level, and a mean score (2.34-3) represents a good level. Nurses who agreed to participate in the study and who worked in NICUs for at least six months were required inclusion criteria. Volunteer nurses who worked in the NICU were among the study's exclusion criteria and were also nurses with less than six months of experience. The data were analyzed using IBM's Statistical Package for Social Sciences (SPSS) version 23. Initially, to summarize numerical data, the mean was computed, and proportions were computed for categorical variables. To find out the association between the level of nurses' knowledge, and practice with socio-demographic characteristics, the chi-square test was used. In cases, where 20% or more of the cells had less than five, Fisher exact tests were used, and Spearman's rank correlation coefficient was used to find out the direction and correlation between the level of nurses' knowledge and the quality of nursing care.

RESULT

Table 1 shows that more than half (54%) of the nurses were within the age group of 25-34 years the mean and standard deviation for the age range were 37.4 ± 8.3 . The highest percentage (62%) of the nurses graduated from the college of nursing, while more than half (58%) of the nurses were female, and the majority (88%) of the nurses were married. Also, table 1 shows that a high percentage (58%) of the nurses had the experience of 1-10 years in nursing, less than half (44%) of the nurses participated in training courses regarding care for neonates, and more than half (59.1%)

of the nurses participated in the training courses for more than 1 week.

Table 1: Socio-demographic characteristics of the nurses

Items	(n*= 50)	
	Variables	No.** (%)***
Places of work	NICU- RTHC	20 (40)
	NICU-MTH	19 (38)
	PICU-RTHC	11 (22)
Age group (years)	25-34 yrs.	27 (54)
	35-44 yrs.	11 (22)
	45-54 yrs.	10 (20)
	≥55	2 (4)
Educational Level	Nursing School Graduate	0 (0)
	Preparatory Nursing School	6 (12)
	Nursing Institute graduate	13 (26)
	Nursing College Graduate	31 (62)
Gender	Male	21 (42)
	Female	29 (58)
Marital Status	Single	6 (12)
	Married	44 (88)
Are you satisfied with your Income	Yes	26 (52)
	No	24 (48)
Years of experience in nursing	1-10 yrs.	29 (58)
	11-20 yrs.	12 (24)
	21-30 yrs.	5 (10)
	≥31 yrs.	4 (8)
Years of Experience in NICU	1-5 yrs.	22 (44)
	6-10 yrs.	19 (38)
	11-15 yrs.	5 (10)
	≥16 yrs.	4 (8)
Training Course	Yes	22 (44)
	No	28 (56)
If yes: Duration of Course	< 1week	9 (40)
	>1week	13 (59)
Total		50 (100)

- = Number of the study samples
- ** = Frequency
- *** = Percentage

Table 2 shows the nurses' knowledge regarding NRDS. It shows that a high percentage (94%) of the nurses had a good level of knowledge regarding the definition of NRDS, and there was a high total mean (1.94). Also regarding the causes, more than one-third (68%) of the nurses had a good level of knowledge. And there was a high total mean (1.86). Less than three-quarters (64%) of the nurses had a good level of knowledge regarding the risk factors of NRDS, there was a high mean (1.83). The majority (92%) of the nurses had a good level of knowledge regarding signs and symptoms of NRDS ; there was a high

mean score (1.82), while less than three-quarters (70%) of the nurses had a good level of knowledge regarding the complications of NRDS, and there was a high total mean (1.83). Less than half (42%) of the nurses had a fair level of knowledge regarding surfactants; there was an average total mean (1.55). Also, less than (48%) of the nurses had a fair level of knowledge regarding the prevention of NRDS, there was an average total mean (1.64). Regarding nursing care knowledge in the study a high percentage (64%) of the nurses had a fair level of knowledge, there was an average total mean (1.53).

Table 2: Domains of Nurses' Knowledge regarding NRDS

Domains of Nurses'	Poor No. (%)	Fair No. (%)	Good No. (%)	Total M.	Evaluation
Define	3 (6)	0 (0)	47 (94)	1.94	Good
Causes	16 (32)	0 (0)	34 (68)	1.86	Good
Risk factor	6 (12)	12 (24)	32 (64)	1.83	Good
Sign and symptoms	0 (0)	4 (8)	46 (92)	1.82	Good
Complications	2 (4)	13 (26)	35 (70)	1.83	Good
Surfactant	15 (30)	21 (42)	14 (28)	1.55	Fair
Prevention	9 (18)	29 (48)	12 (28)	1.64	Fair
Nursing care	3 (6)	32 (64)	15 (30)	1.53	Fair
Total nurses' knowledge	0 (0)	18 (36)	32 (64)	1.75	Good

Cut-off point: (1-1.33)= Poor, (1.34-1.66)= Fair, (1.67-2)=Good

Table 3 demonstrates that most (70%) of the nurses had a poor level of quality of nursing care regarding the assessment of the neonates with RDS; there was a low total mean score (1.43). Less than half (44%) of the nurses had a fair level of quality of nursing care regarding oxygen therapy administration, there was an average total mean of scores (2.13). Concerning suctioning, less than half (40%) of the nurses had a fair level of quality of nursing care, there was an average total mean (1.92). Also, nearly three-quarters (74%) of the nurses had a poor level of quality of nursing care regarding the use of pulse oximetry, there

was a low total mean score (1.52). As regards infection control, half (50%) of the nurses had a fair level of quality nursing care, and there was an average total mean of scores (1.92)., More than half (54%) of the nurses had a fair level of quality of nursing care regarding intravenous administration, and there was an average total mean of scores in this domain (2.12). Regarding cannulation, around half (52%) of the nurses had a fair level of quality nursing care, there was an average total mean of scores (2.23). Also, concerning NG feeding, a high percentage (42%) of the nurses had a fair

level, and there was an average total mean (2.01). physiotherapy, a high percentage (90%) of the nurses had a poor level of quality of nursing care, there was a low total mean (1.12). Concerning incubator care more than one-third (68%) of the nurses had a poor level of quality nursing, and there was a low total mean

of scores (2.03). As regards psychological support, a high percentage (56%) of the nurses had a poor level of quality of nursing care; there was a low total mean of scores (1.56), regarding documentation, a high percentage (46%) of the nurses had a fair level of quality of nursing care; there was an average total mean (1.68).

Table 3 :Domains of quality of nursing care regarding NRDS

Domains of quality of nursing care	Poor	Fair	Good	Total	Evaluation
	No. (%)	No. (%)	No. (%)	M.S	
Assessment	35 (70)	15 (30)	0 (0)	1.43	Poor
O2 Therapy	12 (24)	22 (44)	16 (32)	2.13	Fair
Suctioning	16 (32)	20 (40)	14 (28)	1.92	Fair
Pulse Oximetry	37 (74)	11 (22)	2 (4)	1.52	Poor
IV administration	2 (4)	28 (54)	20 (40)	2.12	Fair
Cannulation	4 (8)	26 (52)	20 (40)	2.23	Fair
Infection Control	16 (32)	25 (50)	9 (18)	1.92	Fair
Incubator care	34 (68)	14 (28)	2 (4)	2.03	Fair
Maintain Thermoregulation	14 (28)	21 (42)	15 (30)	2.06	Fair
NG Feeding	9 (18)	21 (42)	20 (40)	2.01	Fair
Documentation	23 (46)	20 (40)	7 (14)	1.68	Fair
Psychological support	28 (56)	15 (30)	7 (14)	1.56	Poor
Chest physiotherapy	45 (90)	4 (8)	1 (2)	1.12	Poor
Total	12 (24)	35 (70)	3 (6)	1.82	Fair

Cut-off point: (1-1.66)= Poor, (1.67-2.33)= Fair, (2.34- 3)=Good

Figure 1 shows the levels of overall nurses’ knowledge regarding neonates with RDS. The highest percentage (64%) of the nurses had a good level of knowledge

regarding NRDS, and more than one-third (36%) of the nurses had a fair level of knowledge regarding NRDS.

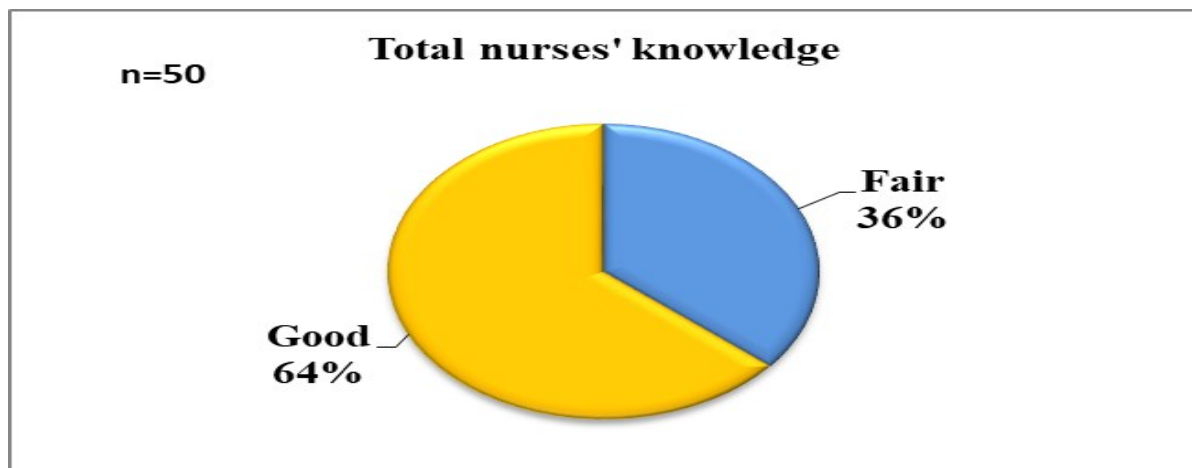


Figure 1: Overall nurses’ knowledge regarding NRDS

Figure 2 shows overall the levels of quality of nursing care for NRDS. Less than three-quarters (70%) of the nurses had a fair level of quality of nursing care, 24% of the

nurses had a poor level of quality of nursing care, and a minority (6%) of the nurses had a good level of quality of nursing care.

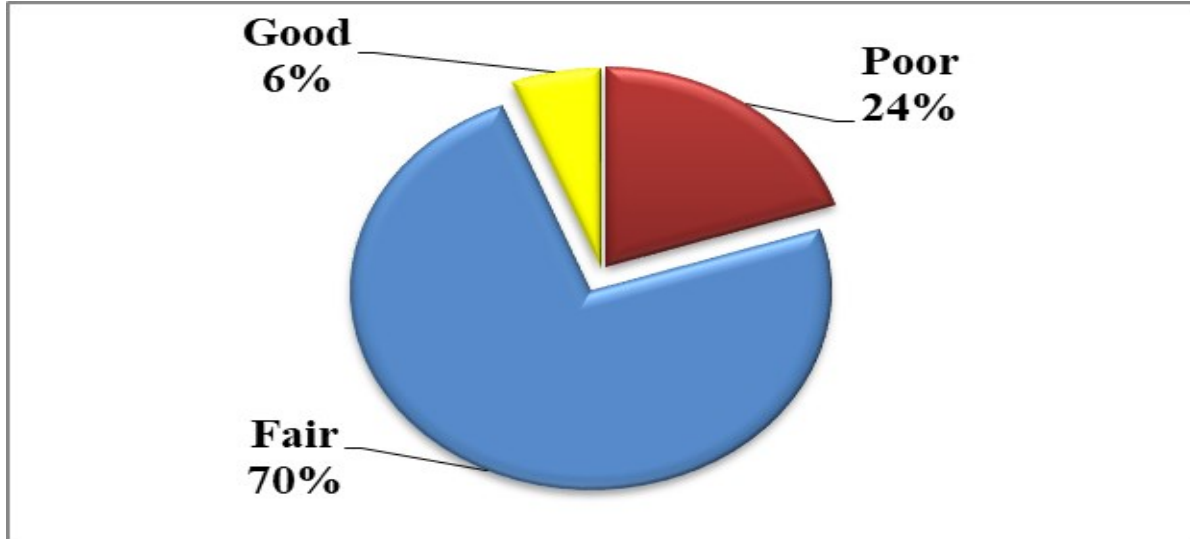


Figure 2: Overall levels of quality of nursing care for NRDS.

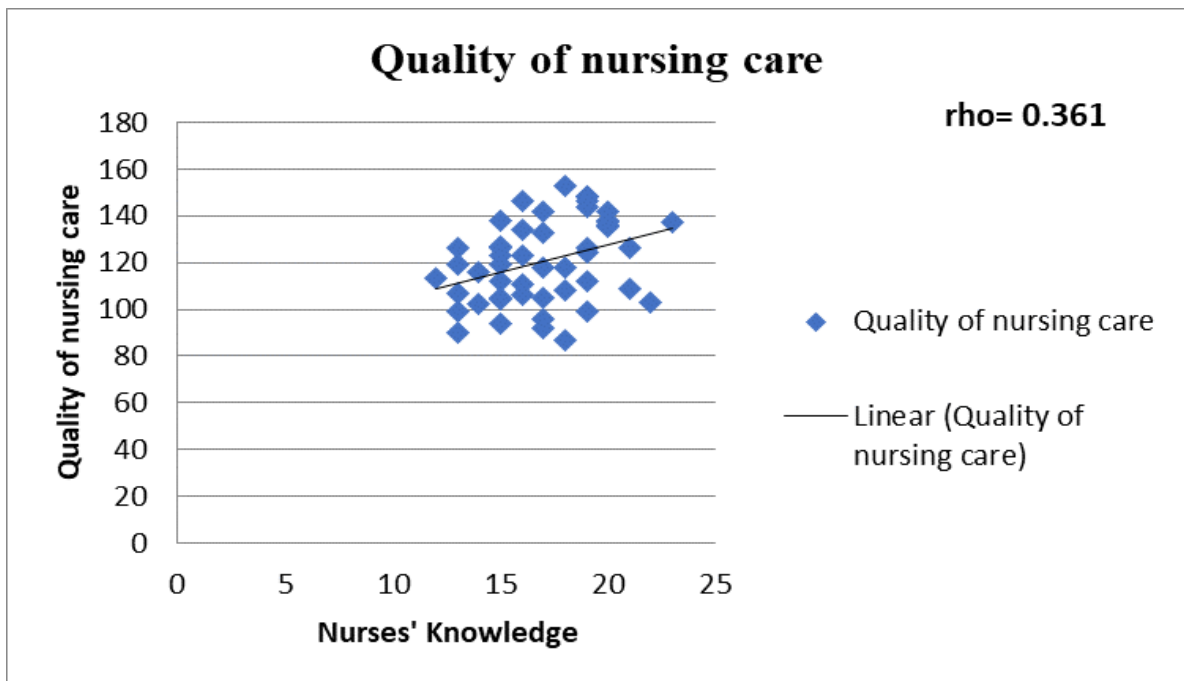


Figure 3: Correlation between the levels of nurses' knowledge and the quality of nursing care for NRDS

Table 4 shows that there was a statistically non-significant association between the level of quality of nursing care and places of work, gender, marital status, educational level, experience in nursing, experience in the NICU and participation in training courses (p=0.110)(p=0.880)(p=1.000) (p=0.526)(p=0.091)(p=0.794)(p=0.468). Also, table 4 shows that there was a statistically highly significant association between the quality of nursing care and the

age group of the nurses, Almost all (100%) of the nurses who had a good level of quality nursing care were in the age group 25-34 years (p=0.005). Also, there was a highly statistically significant association between the quality of nursing care and educational level (p=0.001). And there was a statistically significant association between the quality of nursing care and the duration of training courses (p=0.050).

Table 4: Association between the quality of nursing care and demographic characteristics

Variables	Poor	Fair	Good	Total	P-Value	Sig.
	No. (%)	No. (%)	No. (%)	No. (%)		
Places of work						
NICU in RTHC	5 (25)	15 (75)	0 (0)	20 (100)	0.110*	N.S
NICU in MTH	5 (26)	13 (68.4)	1 (05.3)	19 (100)		
PICU in RTHC	0 (0)	9 (81.8)	2 (18.2)	11 (100)		
Gender						
Male	5 (23.8)	15 (71.4)	1 (4.1)	21 (100)	0.880*	N.S
Female	5 (17.2)	22 (75.9)	2 (6.9)	29 (100)		
Age group						
25-34 yrs.	1 (3.7)	23 (83.2)	3 (11.1)	27 (100)	0.005*	H.S
35-44 yrs.	3 (27.3)	8 (72.7)	0 (0)	11 (100)		
45-54 yrs.	6 (60)	4 (40)	0 (0)	10 (100)		
≥55 yrs.	0 (0)	2 (100)	0 (0)	2 (100)		
Marital status						
Single	1 (16.7)	5 (83.3)	0 (0)	6 (100)	1.000*	N.S
Married	9 (20.5)	32 (72.7)	3 (06.8)	44 (100)		
Educational levels						
Preparatory nursing school	5 (83.3)	1 (16.7)	0 (0)	6 (100)	0.000*	VHS
Nursing institute graduate	5 (38.5)	8 (68.5)	0 (0)	13 (100)		
Nursing college graduate	0 (0)	28 (90.3)	3 (9.7)	31 (100)		
Socioeconomic status						
Satisfy with income	4 (15.4)	21 (80.8)	1 (3.8)	26 (100)	0.526*	N.S
Unsatisfied with income	6 (25.0)	16 (66.7)	2 (8.3)	24 (100)		
Experience in nursing						
1-10 yrs.	2 (06.9)	24 (82.8)	3 (10.3)	29 (100)	0.091*	N.S
11-20 yrs.	4 (33.3)	8 (66.7)	0 (0)	12 (100)		
21- 30 yrs.	2 (40)	3 (60)	0 (0)	5 (100)		
≥31 yrs.	2 (50)	2 (50)	0 (0)	4 (100)		
Experience in NICU						
1-5 yrs.	4 (18.2)	16 (72.7)	2 (9.1)	22 (100)	0.794*	N.S
6-10 yrs.	3 (15.8)	15 (78.9)	1 (05.3)	19 (100)		
11-15 yrs.	1 (20)	4 (80)	0 (0)	5 (100)		
≥ 15 yrs.	2 (50)	2 (50)	0 (0)	4 (100)		
Participation in the training course						
Yes					0.468*	N.S
No	3 (13.6)	17 (77.3)	2 (9.1)	22 (100)		
Duration of course						
<1 week	7 (25)	20 (71.4)	1 (3.6)	28 (100)	0.050*	S
>1 week	3 (33.3)	5 (55.6)	1 (11.1)	9 (100)		
	0 (0)	12 (92.3)	1 (7.7)	13 (100)		
Total	10 (20)	37 (74)	3 (6)	50 (100)		

N.S= Non-significant, S= significant H.S= highly significant VHS= very highly significant *=by fishers exact test

DISCUSSION

The nurses in the NICU are frontline healthcare workers who provide care and prevention for neonates with RDS. The ability of the nurses to react to respiratory problems depend on their knowledge and practice. To find out the best understanding, this is the first study conducted in Erbil city to demonstrate nurses' knowledge and quality of nursing care for NRDS. We conducted this study to fill a gap in the quality of nursing care and literature related to knowledge and quality of nursing care for NRDS. The findings of the present study show that more than half of the nurses were in the age group 25-34 years. The result of the present study was similar to a study done by Ali et al, conducted in Jordan, which found that most of the nurses were within the age group of 23-33 years old [17]. Regarding the distribution of the study sample according to their hospitals and departments, the highest percentage of the nurses were from the NICU in RTHC, more than one-third of them were from the NICU in MTH, and a minority of them were from the PICU in RTHC. The highest percentage of nurses graduated from the college of nursing. The findings of the current study were supported by a study conducted in Egypt by AL-Ziady et al. who found that a high percentage of nurses graduated from the college of nursing [18]. A high percentage of the nurses were female, this result was supported by a cross-sectional study done in Iraq by Alridh et al who found that the majority of the study samples were female [19]. A high percentage of the nurses had experience in nursing for 1-10 years, the findings of the present study agreed with a study done in Al-Nasiriyah in Iraq by Aziz and Mansi; they found that the majority of the nurses had experience 1-10 years [21]. More than half of the nurses did not

participate in the training courses, which may be due to a lack of training courses regarding care for neonates. This result was similar to a study done at Zagazig University Children's Hospital in Egypt by Mohamed et al, who revealed that more than half of the study participants did not participate in the training courses [20]. Also, the result of the current study shows that among nurses who participated in training courses more than half of the study nurses participated in the training courses for more than one week, while less than half of them participated for less than one week. The findings of the present study disagree with a cross-sectional study done in Iraq by Alridh et al, who found that a high percentage of the nurses participated in training courses several times [19]. The result of the present study shows that the nurses had a good level of knowledge regarding the definition of NRDS. The result of the present study agrees with a cross-sectional study done in Sudan by Ahmad, which found that more than three-quarters of the nurses had a good level of knowledge regarding the definition of NRDS [14]. The result of the present study disagrees with a cross-sectional study done in Port Said city in Egypt by Loutfy et al, which found that the majority of the nurses didn't know the definition of NRD [28]. Regarding causes of NRDS, the result of the present study revealed that most of the nurses had a good level of knowledge. However, the result of the present study was inconsistent with the result of the study done by Elsayed et al, conducted in Saudi Arabia, who found that less than half of the nurses had unsatisfied knowledge regarding causes of NRDS [29]. The result of the study shows that less than two-thirds of the nurses had a good level of knowledge regarding the risk factors of NRDS. The result disagreed with the result of the study done at Khartoum State in

Sudan by Alfadil MA and Elnageeb MM, who found that less than two-thirds of the nurses had a poor level of knowledge regarding the risk factors of NRDS [22]. Regarding the sign and symptoms, the result of the present study shows that the majority of the nurses had a good level of Knowledge. The result disagreed with the result of the study done by Elsayed et al, who found that more than half of the nurses had unsatisfied knowledge regarding NRDS [9]. The findings of the present study show that less than half of the nurses had a fair level of knowledge regarding prevention and Surfactant. This result was supported by the results of the study conducted in Saudi Arabia by Elsayed et al who found that most of the nurses had unsatisfactory knowledge regarding the prevention of NRDS and surfactant [9]. Regarding the knowledge of the nurses about nursing care for neonates with RDS, the result of the study revealed that more than two-thirds of the nurses had a fair level of knowledge. This result agrees with the result of the cross-sectional study done by Alfadil MA, conducted in Sudan, who found that more than one-third of the nurses had a fair level of knowledge regarding nursing care [22]. Overall levels of nurses' knowledge regarding NRDS; a high percentage of the nurses had a good level of knowledge, which may be due to the high number of nurses who graduated from the college of nursing and participation in training courses regarding neonates. The result of the study was similar to a study done in Iraq by Alridh et al, who found that a high percentage of the nurses had a good level of knowledge regarding NRDS [19]. The findings of the present study demonstrate that more than two-thirds of the nurses had a poor level of quality of nursing care regarding the assessment domain for NRDS, which may be due to a large number of patients, and a

limited number of nurses. The result was similar to a study done in the Kurdistan region/Iraq by Jamshir KM, who mentioned that the nurses had a poor level of quality nursing care for the assessment of neonates [28]. As regards oxygen therapy administration, less than half of the nurses had a fair level of quality nursing care. The result of the study agrees with a study done by Alfadil and Elnageeb, who found that the majority (76%) of the nurses had provided oxygen therapy as needed [22]. Concerning suctioning, less than half of the nurses had a fair level of quality nursing care. The result of the current study was supported by the study done in Egypt by Elsayed, who found that more than half of the nurses had incompetent practice regarding suctioning [9]. Also, nearly three-quarters of the nurses had a poor level of quality of nursing care regarding the use of pulse oximetry, the result of the study was inconsistent with a study done by Masood [23]. As regards infection control, half of the nurses had a fair level of quality nursing care. This result was supported by the results of the study done in Egypt by Mohamad et al in 2019 who found that more than half of the nurses had satisfied practice regarding infection control [24]. The nurses had a fair level of quality nursing care regarding the intravenous administration of medication, and the result of the present study was supported by the result of the study carried out by Aziz and Mansi, conducted in Al-Nasriyah in Iraq, who found that the majority of the nurses know the way to administer the medication as prescribed [21]. Regarding cannulation, more than half of the nurses had a fair level of practice, and only less than one-quarter of the nurses wash their hands after cannulation, which may be due to the unavailability of the washbasin in the NICU. Also, concerning NG feeding, 42% of the nurses had a fair level; this result

disagrees with a study done by Osti et al [25]. As regards chest physiotherapy high percentage of the nurses had a poor level of quality nursing care; this result was similar to the result of the study done by Elsayed[9]. Concerning incubator care more than one-third of the nurses had a poor level of quality nursing care; The result of the current study was inconsistent with a study done by Mohamed et al [24]. As regards psychological support, a high percentage of the nurses had a poor level of quality nursing care. Concerning documentation, a high percentage of the nurses had a fair level of quality nursing care. These findings disagree with a study done by Elnageb [22]. Figure 2 shows the overall levels of quality of nursing care for NRDS. Less than three-quarters of the nurses had a fair level of quality of nursing care, a minority of the nurses had a good level of quality of nursing care and 24% of the nurses had a poor level of quality of nursing care. The result of the present study agrees with a study conducted by Elsayed et al, who found more than two-thirds (69.2%) of the nurses had an incompetent level of practice for NRDS [9]. Also, the result of the present study shows that there was a statistically significant association between nurses' knowledge and (participation in the training course, and the duration of training courses). It was evident that a majority of the nurses who participated in the training course had a good level of knowledge. These findings disagree with a study done by Alridh et al, who found that there was a non-significant association between the level of nurses' knowledge and participation in training courses and the duration of training courses [19]a. Regarding the association between quality of nursing care and socio-demographic characteristics, the result of the present study shows that there was a statistically non-significant

association between the level of quality of nursing care and place of work, gender, marital status, experience in nursing, socio-economic status, experience in the NICU, and participation in the training course. The result of the current study revealed that there was a statistically significant association between the quality of nursing care and age group ($p < 0.05$). These findings disagreed with a study done by Abdullatif AL, who found that there was a non-significant association between the quality of nursing care and a group of nurses [8]. Also, there was a very highly significant association between the quality of nursing care and the educational level of the study nurses ($p = 0.00$). These results agree with the results of the study by Aziz and Mansi (2017), who found that there was a significant association between nurses' practice and the educational level of the nurses [21]. There was a statistically significant association between the quality of nursing care and the duration of training courses. The results were supported by the results of Aziz and Mansi, who found that there was a non-significant association between nurse practice and the number of training courses [21]. Concerning the correlation between the total level of knowledge and the total level of quality of nursing care of the study participants about the care of neonates with respiratory distress syndrome; the result of the present study shows that there was a significant positive correlation between nurses' knowledge and the quality of nursing care ($\rho = 0.361$). This result agrees with the result of a study done in Egypt by Hegazy (2019), who found that there was a positive correlation between nurses' knowledge and nurses' practice [27].

CONCLUSION

In the present study's findings, it was concluded that the highest percentage of the nurses had a good level of knowledge, and a high percentage of the studied nurses had a fair level of quality nursing care. There was a statistically significant association between nurses' knowledge with participation in the training course and the duration of the training course. There was a highly significant association between the quality of nursing care with educational level and the duration of the training course. There was a positive correlation between the level of nurses' knowledge and the quality of nursing care.

CONFLICT OF INTEREST

There are no conflicts of interest.

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