Nursing Care Provided for Neonates with Respiratory Distress Syndrome in the Neonatal Intensive Care Units at Makkah Al-Mukarramah in Saudi Arabia

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Abstract: Background: Neonatal respiratory distress syndrome (RDS) is a major cause of illness and death for premature infants. RDS or Hyaline Membrane Disease (HMD) is defined as a syndrome caused by developmental insufficiency of surfactant production and structural immaturity in the lungs at birth results in decreased compliance of the lung. Lung maturation is usually inadequate to sustain extra uterine life. **The aim** of this study was to assess the nurses' knowledge and performance regarding their care provided for neonates with respiratory distress syndrome in the Neonatal Intensive Care Units (NICUs). **Study design:** It was a descriptive study. **Subjects and Methods**: The study was carried out in the Neonatal Intensive Care Units at Al-Noor Specialist Hospital and Heraa General Hospital in Makkah Al-Mukramah. A convenient sample composed of 50 nurses who were working in the NICUs and providing the care for the neonates with RDS, whereas 25 nurses were taken from each hospital. Data were collected through using two tools: The first tool was Self-Administered Questionnaire that used to assess the nurses' knowledge regarding the Neonatal RDS and the second tool was an Observation Checklist to assess the nurses' performance regarding their care provided for the neonates with RDS. **Results:** The current study revealed that most of nurses had unsatisfactory knowledge regarding the neonatal respiratory distress syndrome, meanwhile the majority of them were competent in their performance regarding the care provided for the neonates with RDS. **Conclusion:** the current study concluded that nurses' knowledge in both hospitals at Al-Noor Specialist Hospital and Heraa General Hospital at Makkah Al-Mukarrama had unsatisfactory knowledge regarding the neonatal RDS meanwhile the majority of them had competent performance regarding their care provided for neonates' with RDS. **Recommendations**: Educational training program is needed for improving nurses' knowledge and performance about their care for neonates with RDS in the NICUs.

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Key words: Respiratory Distress Syndrome RDS) , Neonatal Intensive Care Units (NICUs).

1. Introduction:

Neonatal respiratory distress syndrome (RDS) is most commonly seen in premature infants. The condition makes the neonate's difficult to breathe. Neonatal RDS occurs in infants whose lungs have not yet fully developed. The disease is mainly caused by lack of a protective substance called surfactant, which helps the lungs inflate with air and keeps the air sacs from collapsing. Acute respiratory distress syndrome is a sudden, progressive form of respiratory failure characterized by severe dyspnea, hypoxemia and diffuse bilateral infiltrates. It is a life threatening lung disorder that commonly affects premature infants (**Joyce, .et al, 2008, Beaufils. et al, 2009 and Dorothy, et al, 2010).**

Neonatal RDS is caused by genetic problems with the neonate's lung development. Factors that increase the risk for neonatal RDS; including prematurity, diabetic mother, multiple pregnancy, rapid labor and cesarean delivery that reduce blood flow to the baby. The earlier a baby is born, the less developed lungs and the higher chance of neonatal RDS **(Behrman, et al, 2007 and Joyce, et al, 2008).** The symptoms of RDS usually appear within minutes after births which includes cyanosis, apnea, decreased urine output, nasal flaring, rapid breathing, shortness of breath and grunting sounds while breathing, unusual breathing movement drawing back of the chest muscles with breathing. Therefore, high-risk and premature infants require prompt attention by a neonatal resuscitation team **(Behrman, Et al, 2007).**

RDS is estimated at more than 150,000 cases of RDS annually. Despite supportive therapy the mortality rate from acute respiratory

distress syndrome is approximately 50%. It is affected 16,268 infants born alive in the United States (**Joyceetal, 2008).** However, 60% -70% mortality rates is reported in children with RDS. Sepsis and multiple organ systems dysfunctions contribute the most to the high mortality and morbidity. Sepsis is not only the most common cause of acute respiratory distress syndrome, but infant with acute respiratory distress syndrome may be six times more susceptible to infection than infant without acute respiratory distress syndrome (**Redding and Dorothy 2009).**

Nursing care given for the neonates with RDS is observe and assesses the infant's response to respiratory therapy. Continuous monitoring and close observation are mandatory because a neonatal status can change rapidly. A breathing machine can be lifesaving, especially for babies with high levels of carbon dioxide, low blood oxygen in the arteries and low blood PH (acidity). However, continuous positive airway pressure (CPAP) can keep the airways open, so it is important that all babies with RDS receive excellent supportive care which include; gentle handling, maintaining body temperature and careful fluid management. The nurses have a key role to play in the care of high-risk and preterm infants, whereas nurses working in the NICU should be qualified and trained through ongoing education program. Therefore, it is necessary to assess the nurses' knowledge regarding neonate's RDS to improve their knowledge and prevent the RDS complications among those neonates **(Marylyn, and Hockenberry, 2008. Dorothy, Et al, 2010, Cloherty, et al., 2010**)

Treatment of RDS is usually begins as soon as the baby is born, sometimes in the delivery room. Most neonates who show signs of RDS are quickly moved to a special intensive care unit called NICU, there, they receive treatment from a group of health care professionals who specialized in treating premature infants. The NICU is designed to limit stress on the baby and meet basic needs of warmth, nutrition, and protection. However, preventing prematurity is the most important way to prevent neonatal RDS throughout good prenatal care that results in healthier babies and fewer premature births. Additionally, avoiding unnecessary or poorly timed CS can also reduce the risk of RDS **(Paret, 2008, Ricci, and & Kyle, 2009 and Dorothy, et al. 2010).**

Nurses play an important role in caring for neonates with RDS including physical examination, count respiratory rate and watch for grunting, assess the severity of respiratory distress syndrome. The nurse carefully assesse the infant's respiratory status to determine the degree of respiratory distress, assess the infant's cardiac rate & rhythm; count the apical pulse for one minute, note if irregularities in the rate or bounding pulses, also observing the infant's general activity and promoting adequate gas exchange, additionally the nurse should prepare emergency equipments available for use in the event of cardiac or respiratory arrest **(Behrman,. Et al, 2007, Redding, and Dorothy 2009, Luis,. et al 2012).**

Nurses have a key role in the care of high-risk and preterm infants to decrease neonatal mortality and morbidity. Nursing management for neonates with RDS through assist newborn with ET intubation, maintain mechanical ventilation as indicated, measure oxygen concentration , continuous monitoring of the SaO_2, observe the infant's response to oxygen .Suctionnig as needed because the gag reflex is weak and cough is ineffective. Moreover, promoting adequate nutrition and hydration is important (**Jacqueline, and Bilotta. 2006, Julia, et al, 2006, Timmons, 2008 and Hay, et al, 2009).**

A crucial nursing goals includes maintenance of normothermia, prevention of infection, maintenance of fluids and electrolyte balance and promotes adequate nutrition via gavages feeding, supportive and closely monitor respiratory and cardiovascular status .Also, comfort measures such as hygiene and positioning as well as maintenance of nutrition are also key of nursing intervention. Successful nursing care requires careful monitoring and attention to mucous plugging that can occur in neonates placed on a ventilator after surfactant administration therefore, close observation for adequate lung expansion are critical. Moreover, psychological support to the family as well as education about NICU procedures will be especially important **(Gupta, 2007, Marylyn, & Hockenberry, 2008, American Lung Association 2009 and Greene, 2009)**.

Preventing prematurity is the most important way to prevent the neonatal RDS, however good prenatal care results in healthier babies and fewer premature births. Avoiding unnecessary or poorly timed CS, also steroids accelerate maturation of fetal lungs by stimulating type II pneumocytes that produce the phospholipids necessary for surfactant production and help to speed up the lung maturity, this therapy can reduce the rate and

severity of neonatal RDS **(Rotta, et al, 2003**, **Greene, 2009 and Lissauer, and Clayden 2012).**

Strategies to prevent preterm birth include maternal cervical cerclage, bed rest, treatment of infections, and administration of tocolytic medications. Tocolytic drugs are used in an attempt to inhibit preterm delivery by relaxing the uterine muscles, whereas their main purpose is to delay delivery for at least 48 hours while maternal steroids are administered. Additionally, prevention of neonatal cold stress, birth asphyxia, and hypovolemia reduces the risk of neonatal RDS **(Stoll & Kliegman. 2008, Morton P. and Fontaine, D., (2009) and Hay, etal, 2009)**.

Significance of the Study

Respiratory distress syndrome in children reported with 60% -70% mortality rates, this condition makes infant difficult to breathe. The neonatal mortality rate (NMR) is declining gradually in the world, nonetheless, it accounts for 48% of deaths among children under 5 years of age (**Timmons,. 2008**). Respiratory disorders are the leading cause of early mortality (0-7 days of age). In descending order the top six causes of death are respiratory distress syndrome, asphyxia at birth, meconium aspiration syndrome, other respiratory problems, intrauterine hypoxia, and congenital pneumonia. Respiratory health conditions for newborns require care in NICU**s (Ricci, and Kyle, 2009)**.Therefore, correct diagnosis and management of neonatal respiratory distress is extremely important (**Luis, et al, 2012).**

Aim of the Study:

The aim of this study was to assess the nurses' knowledge and performance regarding their care provided for neonates with respiratory distress syndrome in the Neonatal intensive care units (NICUs).

Research question:

What are the nurses' knowledge and performance regarding their care provided for neonates with Respiratory distress syndrome?

2. Subjects and Methods:

A. Research Design:

The study design was a descriptive study.

B. Research Settings:

This study was conducted in the Neonatal Intensive Care Units (NICUs) at Al-Noor Specialist Hospital and Heraa General Hospital in Makkah Al-Mukkaramah

C. Research subjects:

-Sample Size and Characteristics:

A convenient sample composed of 50 nurses who are working and providing care for the neonates with respiratory distress syndrome in the previously mentioned hospitals, whereas 25 nurses were taken from each hospital.

Tools of data collection:

Data were collected through using the following tools:

1. Self-Administered Questionnaire:

-It was designed in simple Arabic language by the researchers after reviewing the relevant literature to assess the nurses' knowledge about the Neonatal RDS which consists of two parts:

- **Part I:**It was concerned with the Socio-demographic characteristics of the studied nurses as regards; their age in years, gender , level of education, social statues, years of experience in NICUs, and their attendance for training programs.

- **Part II: It was concerned with** the nurses' knowledge regarding the Neonatal RDS which includes: definition, causes, risk factors, function of surfactant, signs & symptoms, diagnostic test, methods of prevention, and nursing intervention for the neonatal RDS. Questions were in the form of open, close ended and multiple choices. Time consumed to fill the questionnaire by the nurse was around 15-20 minutes according to nurses' physical, mental readiness and circumstances of the work units..

Scoring System:

Knowledge obtained from nurses was scored and calculated. According the answers, their responses were evaluated using the model key answer sheet prepared by the researchers. Each question was ranged from 0-1 grades. Whereas, correct and complete answer scored 1 grade and score zero for incorrect, incomplete and unknown response. The total score level of the questionnaire for the nurses' knowledge was 80 grades (equal 100%) , when the total nurses' score was above 60% is considered satisfactory knowledge, while below 60% was considered unsatisfactory knowledge.

2. Observation checklist: It was adopted from (**Bowden, and Smith, 2003 and MacDonald, & Ramoseth, 2002)**. It was used to assess the actual nurses' performance regarding their care provided to the neonates with RDS, as regards incubator care, oxygen therapy, oral and nasal suction & nasogastric feeding, anthropometric measurement, chest physiotherapy. The necessary modifications were done by the researchers to suit the nature of the current study.

Scoring System:

The total number of the procedures were (10), each procedure scored of ten to twenty grades according to the steps of each checklist that make the total score of 140 (equal 100 %) for all procedures. Accordingly, the scoring system of actual nurse's performance was classified into two category: **Competent (more than 80%), and Incompetent (less than 80%).**

- **Procedures**
- **Preparatory phase:**

A. Validity and Reliability:

The researchers reviewed the past, current regional and items of the instruments were adequately represent what are supposed to measure by presented it to experts for review and validation. To measure the stability of the responses from the same nurse is form of test retest reliability. The researchers performed two separate assessments at two different times; these two data sets from the same researchers and then compared with each other.

B. Pilot Study:

A pilot study carried out on 10 nurses of study sampling at the previously mentioned settings, chosen randomly from Al-Noor Specialist Hospital, and Heraa General Hospital at Makkah Al-Mukarramah, the pilot study was used to test the study tools for clarity, validity and time require filling the tool. The necessary modifications were done through adding or omission of unneeded data collection according to the pilot study results. The subjects included in the pilot study were excluded from the study subjects.

C. Field Work:

The actual filed work was carried out from 15-10-2012 to 22-12-2012 for data collection. The researchers were available three days per week in Saturday, Monday and Wednesday, five hours per day from 10am to 3pm. The number of nurses that were taken per week were ranged from 4 to 6 in both hospitals.

D. Administrative Design

An official approval to conduct the study was obtained from the dean of the Faculty of Nursing at Umm Al- Qura University and from the managers of both hospitals at AL-Noor Specialist Hospital and Heraa General Hospital.

E. Statistical Analysis:

Descriptive measures such as mean, standard deviation were used to assess the nurses' knowledge regarding care for neonates' respiratory distress syndrome. Data were collected; revised, coded, tabulated and analyzed using the numbers and percentage distribution. Chi-square analysis was carried out to bring out the association between nurses' knowledge regarding the neonatal RDS and their demographic characteristics. Statistical significant differences was considered when p. value was less than 0.05 and highly statistical significant differences when p. value was less than 0.01.

Ethical Considerations:

The ethical research considerations in this study were included the following:

- An official permission was obtained to through the appropriate channels before research e study using text implementation.
-The objectives and the aim of the study were explained to the participants.
-The researchers maintained anonymity and confidentiality of the subjects.
-Subjects are allowed to choose to participate or not and they had the right to withdraw from the study any time without penalty.

Limitations of the Study:

- Three Hospitals were determined to collect the data & conduct the study, one hospital from the determined hospitals refused to perform the study.

3. Results:

In relations to socio-demographic characteristics, table (1) clarified that nearly half of nurses (48%) their ages ranged from 30 years to less than 40 years and the minority (6%) of them were from 40 years to less than 50 years. According to their gender, it was found that nearly three quarter (78%) of them were female nurses. Regarding the educational level, it was reported that 60% of nurses had diploma and 34% of them had bachelor degree, while very few of them (6%) had technical nursing institutes. This table also illustrated that 44% of the studied nurses their years of experiences was less than 5 years and the minority of them(6%) their years of experiences were from 15 years to less than 20 years. Regarding their attendance for training program, it was observed that 82% of nurses had not attended any training program**.**

Table (2) clarified that nearly two thirds (64%) of the studied nurses had satisfactory knowledge about definition of neonatal RDS, meanwhile in relation to the causes and signs & symptoms of RDS, it was found that 58% of them had unsatisfactory knowledge. This table also illustrated that 72% of studied nurses had unsatisfactory knowledge regarding nursing intervention for caring the neonates with RDS, while 70% and 72% of studied nurses had unsatisfactory knowledge regarding to nursing

intervention during surfactant therapy and methods of prevention of RDS respectively.

As regards the nurses' performance for their actual care to neonates with RDS, Figure (1) revealed that 100%, 100%, 92, 82%, 92% and 96% of nurses had competent performance in Oxygen therapy, nasal and oral Suctioning, nasogastric feeding, chest physiotherapy, incubator daily care and anthropometric measurement respectively .

As regards the total score level of nurses' knowledge about care of neonates with RDS, Table (3) illustrated that 62% of nurses had unsatisfactory knowledge and the rest of them (38 %) of them had satisfactory knowledge.

Regarding the total score level of nurses' performance about their actual care for neonates with RDS. Table (4) reported that 92% of nurses' had competent performance, while the minority of them (8%) had incompetent performance.

Table (5): Regarding the relation between the total score level of nurses' knowledge and their age, this table illustrated that there was no statistical significant differences (X^2 = 0.91, at p>0.05) between total nurses' knowledge and their ages.

Table(6): In relation to the total score level of nurses' knowledge and their years of experience, it was found that there was no statistical significant differences (X2 = 0.85, p>0.05) between total nurses' knowledge and their years of experiences.

Table(7): As regards the differences between nurses' performance and their level of education, it was illustrated that there was no statistical significant differences (X^2 = 0.28 , p>0.05), whereas 100% of diploma nurses had competent performance, while 88% of bachelor nurses had competent performance.

Table (1): Distribution of Nurses according to their Socio-demographicCharacteristics (No.=50).

Nurses' characteristics.	Total number = 50 (100%)				Total No. = 50 (100%)	
	Al-Noor Hosp. No.=25		Heraa General Hosp. No. =25			
	No.	%	No.	%	No.	%
1-Age in years						
20 to < 30	13	52	10	40	23	46
30 < 40	10	40	14	56	24	48
40 to ≤50	2	8	1	4	3	6
Mean					31.1	
SD					±6	
2-Gender						
Male	10	40	1	4	11	22
Female	15	60	23	92	39	78
3-Social statues						
Married	10	40	14	56	24	48
Single	11	44	9	36	20	40
Divorced	4	16	1	4	5	10
Widow	0	0	1	4	1	2
4-Educational level						
Diploma	13	52	17	68	30	60
Bachelor	12	48	5	20	17	34
Technical nurse institution	0	0	3	12	3	6
5-Years of experiences						
Less than 5 years	13	52	9	36	22	44
5 to < 10 years	8	32	12	48	20	40
10 to <15 years	2	8	3	12	5	10
15 to ≤20 years	2	8	1	4	3	6
6-Attendence in training program						
Yes	5	20	4	16	9	18
No	20	80	21	84	41	82

Table (2): Distributions of Nurses' Assessment Knowledge Regarding Neonatal RDS, No.=(50).

Items	Al-Noor Hosp. No. =25				Heraa General Hosp. No =25				Total No. = 50			
	Satisfactory		Un satisfactory		Satisfactory		Un satisfactory		Satisfactory		Un satisfactory	
	No	%	No	%	No	%	No	%	No	%	No	%
Definition of RDS	10	40	15	60	8	32	17	68	18	36	32	64
Causes	11	44	14	56	10	40	15	60	21	42	29	58
Risk Factors	12	48	13	52	11	44	14	56	23	46	27	54
Signs & symptoms	10	40	15	60	11	44	14	56	21	42	29	58
Investigations	11	44	14	56	11	44	14	56	22	44	28	56
Medical treatment	12	48	13	52	10	40	15	60	22	44	28	56
Function of Surfactant	11	44	14	56	10	40	15	60	21	42	29	58
Nursing intervention for Neonatal RDS	10	40	15	60	4	16	21	84	14	28	36	72
Nursing intervention during surfactant therapy	11	44	14	56	4	16	21	84	15	30	35	70
Methods of prevention of RDS	12	48	13	52	2	8	23	92	14	28	36	72
Mean SD											30.9 ±3.54	

Table (3): Distribution of Total Score Level of Nurses' Knowledge Regarding Neonatal RDS No.=(50)

Total Nurses' Knowledge	No.=50	%
• Satisfactory	31	38
• Unsatisfactory	19	62

Table (4): Distribution of Total Score Level of Nurses' Performance Regarding their Actual Care for Neonates with RDS No.=(50)

Total Nurses' Performance	No. =50	%
• Competent	46	92
• Incompetent	4	8

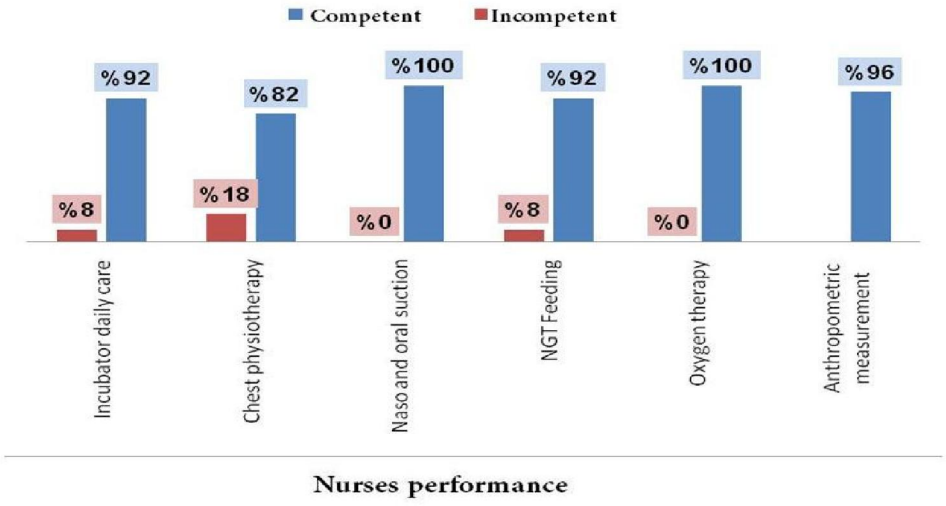

Figure (1): Distribution of Nurses' Assessment Performance Regarding their Actual Care for Neonates with RDS, No.=(50).

Table (5): Relation between Total Score Level of Nurses' Knowledge Regarding Neonatal RDS and their Ages/Years. NO. = (50).

Years of Experience	Total knowledge No.=50	Al-Noor Hosp. No. =25				Heraa General Hosp. No. =25				Total No. = 50				P-value
		Satisfactory		Un satisfactory		Satisfactory		Un satisfactory		Satisfactory		Un satisfactory		
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
<5	22	7	54	6	46	3	33	6	67	10	45	12	55	0.49
5: <10	20	3	38	5	63	4	33	8	67	7	35	13	65	
10: <15	5	1	50	1	50	1	33	2	67	2	40	3	60	
15: ≤20	3	0	0	2	100	0	0	1	0	0	0	3	100	P>0.05 not sig.
Mean		2.75		3.5		2		4.25		4.75		7.75		
S. D		±3.1		±2.4		±1.8		±3.3		±4.6		±5.5		

***Insignificant Statistical Differences (P>0.05)**

Table (6): Correlation between Nurses' Knowledge Regarding RDS and their Years of Experience, No. = (50).

Years of Experience	Total knowledge No.=50	Al-Noor Hosp. No. =25				Heraa General Hosp. No. =25				Total No. = 50				P-value
		Satisfactory		Un satisfactory		Satisfactory		Un satisfactory		Satisfactory		Un satisfactory		
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
<5	22	7	54	6	46	3	33	6	67	10	45	12	55	0.49
5: <10	20	3	38	5	63	4	33	8	67	7	35	13	65	
10: <15	5	1	50	1	50	1	33	2	67	2	40	3	60	
15: ≤20	3	0	0	2	100	0	0	1	0	0	0	3	100	P>0.05 not sig.
Mean		2.75		3.5		2		4.25		4.75		7.75		
S. D		±3.1		±2.4		±1.8		±3.3		±4.6		±5.5		

***Insignificant Statistical Differences (P>0.05)**

Table (7): Correlation Between Nurses' Performance Regarding RDS and their Level of Education, No. =(50).

Level of Education	Nurses' Performance	AL-Noor Hsp. No. =25				Heraa General Hosp. No. =25				Total No. =50				P-value
		Competent		In Competent		Competent		In Competent		Competent		In Competent		
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
Diploma	30	13	100	0	0	17	100	0	0	30	100	0	0	0.16
Bachelor	17	11	83	1	17	4	80	1	20	15	88	2	12	
Nurse Institute	3	0	0	0	0	2	67	1	33	2	67	1	33	
Total	50	24	96	1	4	23	92	2	8	47	94	3	6	P>0.05
Mean		12		0.5		11.5		1		23.5		1.5		
SD		±9.8		±0.6		±10.1		±.8		±19.4		±1.3		

***Insignificant Statistical Differences (P>0.05)**

4. Discussion

Respiratory Distress Syndrome (RDS) or Hyaline Membrane Disease(HMD) is one of the most common problems of premature babies. It can cause babies to need extra oxygen and help breathing. The course of illness with RDS depends on the size and gestational age of the baby, the severity of the disease, the presence of infection; whether or not the baby needs mechanical help to breathe. RDS typically worsens over the first 48 to 72 hours **(Marylyn. and Hockenberry, 2008 and Dorothy, et al, 2010).** So that**,** the current study aimed to assess nurses' knowledge and performance regarding their care provided for neonates with respiratory distress syndrome in the Neonatal Intensive Care Units.

As regards the socio demographic characteristics of the studied nurses, the result of the present study revealed that nearly half of nurses their ages ranged from 20 years to less than 30 years, these findings were in agreement with the study findings of **Ahmed (2005).** Who studied the nurses' knowledge and practice regarding infection control in pediatric critical care units and their result showed that about 68% of nurses age ranged from 20-30 years.

Concerning the level of education of the nurses working in the NICUs in both hospitals at AL-Noor specialist and Heraa General Hospitals, it was found that more than half of nurses had diploma and nearly one third of them had bachelor degree, these findings were similar to the finding of **Hassan, etal.,(2004)** who found that most of nurses were diploma nurses. Moreover, regarding the attendance of nurses in training program, the present study revealed that the majority of them were not attending training program, these findings were contradicted with **(Aita and Goulet (2009)** who stated that nurses should be exposed to training program to raise their awareness and the training program should be regularly, updated in view of changing knowledge and work practice.

In relation to the total score level of nurses' knowledge regarding the neonatal RDS in the NICUs, the result of the present study revealed that approximately two thirds of studied nurses had unsatisfactory knowledge regarding RDS in both hospitals at AL-Noor Specialist Hospital and Heraa General Hospital, these findings were similar with the study findings of **Gomes, (2010)** who assessed the knowledge of intensive care nurses on evidence based guidelines for prevention of ventilator pneumonia and he concluded that there is a lack of nurses' knowledge working in the ICUs as regards to their knowledge in the evidence based guidelines for prevention of pneumonia. Moreover, these findings in accordance with **Robbin, E. (2007) and Stoll, & Kliegman (2008)** who pointed out that there is a lack of nurses' knowledge regarding CPR.

Concerning the total score level of nurses' performance about their actual care provided for neonates with RDS in the NICUs, the current study illustrated that most of nurses had competent performance, while the minority of them had incompetent performance, these findings were contradicted with the study findings of **Parajulee, (2011)** who assessed the nurses' knowledge and performance about care given to newborn NICU and concluded that there was lack in nurses' performance for care given to newborns in NICU.

As regards the differences between total score level of nurses' knowledge regarding neonatal RDS and their ages per years, the present study concluded that there was no statistical significant differences between total knowledge of nurses and their ages at (X^2 = 0.91 p>0.05),these findings were in accordance with the study findings of **Gomes (2010)** who assessed the knowledge of intensive care nurses on evidence based guidelines for prevention of ventilator pneumonia and he concluded that there was no correlation between nurses' age and their knowledge on the evidence based guidelines for prevention of pneumonia.

Regarding the attendance of the studied nurses for training program, the current study revealed that the majority of nurses had not attended training program and hospitals had lack of providing training for the nurses'. This could be due to that the hospitals does not perform training program for continuous updating information and instructions for their neonatal staff nurses and this reflected the results of the present study that revealed unsatisfactory of nurses' knowledge regarding RDS. Based on this, the researchers can prepare the self instructional module on newborn's respiratory distress syndrome which will be helpful for many staff nurses to manage with this condition**.**

The present study revealed that there was no statistical significant differences between the total score level of nurses' knowledge and their socio demographic characteristics (p>0.05), These results were similar to the study of **Awad, and El-Jedi (2010)** who assessed the health care providers' adherence to infection prevention and control protocols in the NICUs in Gaza

Governorate Hospital affiliated to the Ministry of Health (MOH) and the results showed that there were no statistically significant relationship between the health care providers' knowledge and practice in relation to their years of experience, and gender.

As regards the relationship between the total score level of nurses' performance and their level of education, the result of the current study revealed that nurses with diploma nurse had higher performance than the bachelor degree nurses. These findings were contradicted with the study of **Young, et al (1991)** who studied the effect of education on the practice of nursing and their result showed that baccalaureate nurses perform high skill function more often.

Accordingly, the children of today are the adults of tomorrow. They deserve to inherit a safer, fairer and healthier world. There is no task more important than safeguarding their environment. The cause such morbidity & mortality are the various child hood diseases. Consequently, nursing care should be initiated at the right time which in turn can bring down the morbidity & mortality by preventing complications of RDS in neonates. RDS is a leading cause for seeking health care advice and life threatening lung disorder that commonly effects on children. Therefore, nurses should be knowledgeable regarding caring for neonates with RDS **(Costa and Itayra, 2009).**

Conclusion:

The current study concluded that approximately two thirds of nurses had unsatisfactory knowledge in both hospitals at Al-Noor Specialist Hospital and Heraa General Hospital at Makkah Al-Mukarrama compared with most of them had competent performance. There was no statistical significant differences between the nurses' knowledge and their ages and years of experiences.

Recommendations:

Based on the findings of the current study the researchers recommended the followings:

- Nurses working in the NICUs need periodical training program to improve their knowledge and performance about care of neonates with RDS.
- Further studies should be conducted to improve nurses' knowledge and performance regarding care of neonates with RDS in the NICUs in other hospitals at Makkah A l-Mukkaramah.
- Standardized nursing procedures and guidelines should be available to guide the nurses in dealing with high risk neonates in the NICUs.
- Providing updating booklets, pamphlets and boosters for nurses to upgrading their knowledge about neonatal RDS.

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