

Effect of using Clinical Pathway on Clinical Outcomes of Neonates with Respiratory Distress Syndrome

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Abstract :

Background: Clinical pathway is the best way to manage neonates with respiratory distress syndrome.

Aim of this study was to evaluate the effect of using clinical pathway on clinical outcomes of neonates with respiratory distress syndrome.

Subjects and Method: Quasi-experimental research design was used forty nurses working at Neonatal Intensive Care Unit of Tanta University Hospital and providing direct care for neonates, fifty neonates with respiratory distress syndrome, all health team and neonate's mothers. Three tools were used to collect data: **Structured questionnaire schedule** about demographic characteristics of nurses, neonates and nurse's knowledge about respiratory distress syndrome. **Clinical Pathway Checklist of respiratory distress syndrome and Infant's Record related neonatal clinical outcomes.**

Results: There was a statistical significance differences in nurse's knowledge before and after clinical pathway. The total score of nurse's practice using clinical pathway in 4 days were unsatisfactory before clinical pathway and become satisfactory after it.

Conclusion: There was an improvement of nurse's knowledge and practice about respiratory distress syndrome after application of clinical pathway by decreasing daily requirement frequency of oxygen, suctioning, IV fluid and length of hospital stay of study group.

Recommendations: Advanced in-service training program based on new technology and new trends should be conducted periodically for teaching the nurses and all health care team the new clinical skill such as clinical pathway.

Key words: clinical pathway, clinical outcomes, respiratory distress syndrome.

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I. Introduction

Neonatal period is defined as the first four weeks subsequent to birth. It is considered very critical period because neonates are highly vulnerable to any condition that makes their live in a danger. Respiratory distress syndrome (RDS) is one of the most common health problems in neonates and called hyaline membrane diseases. It can be defined as acute lung disease present at birth and usually affects preterm neonate whose birth weight is less than 2.5 kg and their gestational age is between 28-37 weeks. It is due to a deficiency of surfactant in the neonate's lung ⁽¹⁻²⁾.

Signs and symptoms can appear within minutes of birth. Major manifestation includes shallow respiration, Tachypnea, chest retraction, cyanosis, nasal flaring and expiratory grunting .crackles and wheezy chest are commonly audible with auscultation ^(8, 9). The basic aim of management for neonates with RDS is to observe and monitor neonate closely .This include pulse rate, oxygen saturation, respiratory rate and temperature ⁽¹¹⁾. The nurse must maintain the oxygenation of the blood level and keep body temperature and biochemical status within normal limits as possible ^(11, 12). Other items should be maintained is adequate fluid and electrolyte balance and providing an adequate nutrition. As well change newborn positions every two hours (prone supine, fowler) to facilities their breathing ⁽³⁻⁵⁾.

Recovery from this disease depends on all health team. Multidisciplinary management is the best way to achieve standard of care and enhances the quality of care. This care known as clinical pathway, which means co-operation between all health staff members to improve clinical outcome of neonates with RDS It can be defined as a structured multidisciplinary care plans that outlines the main clinical interventions that carried out by health services. It used as a guide to plan, co-ordinate, deliver, monitor, review and document of care.

Clinical pathway is developed through collaborative efforts of clinicians, case managers, nurses, pharmacists, physiotherapists and other health care professionals with the aim of improving the quality of care⁽⁶⁻⁸⁾.

Management of neonates with respiratory distress syndrome using clinical pathway is an important issue to enhance quality of care. It includes doing standard of care with a timeline, with categories and continuity of care or interventions, intermediate and long term outcome. The map of this care includes all physical assessment, way of nutrition, suction, nebulizer therapy, maintaining a good position and following universal precaution of infection control in all procedures⁽⁹⁾.

II. Aim of the study

Evaluate the effect of using clinical pathway by nurses on clinical outcomes of neonates with respiratory distress syndrome.

III. Subjects and Method

3.1 Study design: A quasi-experimental research design was used in the present study.

3.2 Study hypotheses: Neonates with respiratory distress syndrome who were exposed to clinical pathway were expected to have less daily frequency requirement of oxygen therapy, suction, intravenous fluid and less lengths of hospital stay. They also have less readmission and enhanced quality of care than those who receive routine care.

3.3 Study setting: The study was conducted at Neonatal Intensive Care Unit of Tanta Main University Hospital

3.4 Subjects:

Subject of the study included the following

- All available nurses working in the above previously mentioned setting were selected and fifty neonates with respiratory distress syndrome were selected randomly having the following criteria: Gestational age more than 32 weeks and less than 37 weeks of both sexes, Respiratory distress which manifested by (Tachypnea more than 60 c/m, Chest retraction (sub costal, intercostals, sternal and suprasternal) and noisy respiration in the form of grunting. Neonates with respiratory distress syndrome were divided into two equal groups. Control group was consisted of 25 neonates exposed to hospital routine care and study group was consisted of 25 neonates exposed to clinical pathway.
- Mothers of neonates with respiratory distress syndrome
- All health team working in the previously mentioned setting they accounted

3.5 Tools of the study: Three tools were used for data collection

Tool (I): A Structured Questionnaire Schedule: It was developed by the researcher after reviewing the related literature and comprised of two parts

Part I: a- Demographic characteristic and medical history of neonate with respiratory distress syndrome: as sex, gestational age, birth weight, weight at the beginning of the study, age when admitted to hospital.

b- Demographic characteristic of nurses: as age, educational level and years of experience.

Part II: Nurse's knowledge about respiratory distress syndrome It includes ten questions about respiratory distress syndrome as definition, causes, sign and symptoms and nursing intervention as administration of oxygen, performing suction, maintain neutral thermal environment, maintain adequate nutrition, maintain fluid and electrolyte balance, maintain adequate position and prevent infection.

The nurses were asked to respond to this question with only one correct response for each question before and after clinical pathway application. Total score was calculated as less than 60% was considered poor knowledge. From above 60% to less than 75% was considered fair knowledge. Above 75% to 100% was considered good knowledge

Tool (II): Clinical Pathway Checklist Of Care Of Respiratory Distress Syndrome: The clinical pathway outcome was developed by the researcher implemented and evaluated to assess nursing and other health team care given to neonates by using Clinical Pathway. Total scores of 10 items ranged from 0-20, the score was classified as scores from 0-12 were considered as having unsatisfactory practice of care while scores from 13-20 were considered having satisfactory practice.

Tool III: Infant's Record related to Neonatal Clinical Outcomes: This tool was used to record frequency of daily requirements of oxygen, suction, I.V fluids and length of neonate's hospital stay for four successive days before and after clinical pathway.

Method

- 1- Official permission for data collection was obtained from the administrators responsible for Neonatal Intensive Care Unit at Tanta University Hospital after explanation of the aim of the study
- 2- Tools development: Three tools were developed by the researcher based on recent literature
- 3- Content validity: Experts in the field of pediatrics tested tools of the study for content validity. It was 0.992
- 4- Reliability of tools was done by using coefficient reliability and it was .0995.
- 5- Ethical considerations: Nurses were informed about the confidentiality of the information obtained from them and nature of the study. Nurse's consent was obtained after explanation of the aim of the study.
- 6- A pilot study: A pilot study was carried out on a sample of 10% nurses to test the clarity and applicability of the study tools then the necessary modification was done. This pilot was excluded from the study.

Implementation of the study: Phases of clinical pathway application: The study was conducted on four phases:

Assessment Phase: It was carried out by the researcher for all study subjects to collect data about the neonates who meets the inclusive criteria of this study and assess nurses for basic data and their knowledge about respiratory distress syndrome (**Tool I**). The researcher was available in the study setting for four days per week consecutively at morning and afternoon shifts. The researcher to all hospital staff and explain the aim of this study. To the researcher assessed routine care provided by nurse and other health team to neonates in control group (before application of clinical pathway) (**Tool II**). The current study was carried out from April 2017 to February 2018 for data collection.

Planning phases: 1- Setting objectives. 2- Preparation of the content, which was, covered the reasons behind the application of the session 3- Preparing of a suitable media as lectures, PowerPoint for teaching the nurses about respiratory distress syndrome and clinical pathway.

Implementation Phase which included the following steps:

- The studied nurses were divided into four groups and each group was consisted of ten nurses. Other health team was considered one group.
- Clinical pathway was carried out for each group separately through conduction of successive sessions.
- Clinical pathway was conducted in six sessions, twice / week. The time of each session was about from 30-60 minutes including periods of discussion according to the nurses' progress and feedback.
- Different methods of teaching were used including lectures, group discussion, demonstration, and media.
- Each group of nurses and other health team was attended the following sessions:

The First Session: It was focused on the following items: definition of RDS, predisposing factors to RDS, manifestation and complication. This session continued for 30 min

The Second Session: It was focused on diagnosis of disease and nurses' role in management. This session continued for 60 minutes

The Third Session: It was concentrated on clinical pathway regarding definition, aim and indicators of diagnosis selection. It takes about Minutes

The Fourth Session: It was focused on teaching nurses about Steps of Clinical Pathway Development.

The Fifth Session: It was focused on how to apply clinical pathway. The content presented to nurses through discussion and power point. This session continued for 60 min.

The Sixth Session: It was concentrated on how to apply clinical pathway related to other health team. The content presented to other health team through discussion and power point related concepts. It takes about 60min.

Evaluation Phase:

- Nurses and other health team began to apply clinical pathway after one week from sessions.
- Nurses and other health team practice were evaluated immediately after using clinical pathway and compare with routine care. (**Tool II**).
- Clinical outcomes of neonate's requirements as daily requirement of oxygen, suction, I.V fluids and length of hospital stay were evaluated before and after clinical pathway (**tool III**).

Statistical analysis:

Collected data were organized, tabulated and statistically analyzed using SPSS software (Statistical Package for the Social Sciences, version 20, SPSS). For quantitative data, the range, mean and standard deviation were calculated. For qualitative data, which describe a categorical set of data by frequency, percentage or proportion of each category, comparison between two groups and more was done using Chi-square test (χ^2). For comparison between means of two groups of parametric data of independent samples, student t-test was used. For comparison between means of two groups of non-parametric data of independent samples, Z value of Mann-whitney test was used. For comparison between means of two related groups (pre and post-test) of parametric data, paired t-test was used. For comparison between more than two means of parametric data, F value of ANOVA test was calculated. Significance was adopted at $p < 0.05$ for interpretation of results of tests of significance.

IV. Results

Table (1) shows distribution of the studied nurses regarding their demographic characteristics. It was observed that all of nurses were a female. More than one third of the nurses (40%) had 31 years to less than 40 years old with mean age \pm SD 29.45 \pm 6.12. Regarding their education, nearly three quarter of them (72.5%) had a Baccalaureate degree. Regarding their years of experiences inside neonatal intensive care unit, it was found that half of them (50%) had from 6-11 years of experiences with mean age \pm SD 8.56 \pm 2.51.

Table (2) represents characteristics and medical history of the studied neonates with respiratory distress syndrome. It was observed that more than half of the neonates (58%) were females. As regard gestational age, it was found that the mean of gestational age of the studied neonates was 34.46 kg. It was found that the mean value of weight at the beginning of the study was 2.34 and mean value of age when admitted to hospital was 2.00 days.

Table (3) illustrates distribution of total scores of nurse's Knowledge regarding respiratory distress syndrome before and after clinical pathway. It was observed total scores of 37.5% of nurse were good, 50% of them were fair and the rest of them were poor before clinical pathway application. While the total score of 100% of nurses were good after clinical pathway application.

Table (4) shows distribution of studied nurse's practice regarding care of RDS before and after using clinical pathway in 4 days. There were a statistical significant differences with increase in the nurse's practice regarding daily preparation, respiratory system management and maintain fluid and electrolyte balance ($p=0.0001$, $p=0.010$ and $p=0.0001$) respectively before by using routine care and after by using clinical pathway. There was no statistical significant difference in the nurse's practice regarding daily care of incubator, assessment of neonate, providing adequate nutrition, giving medication, doing lab investigation and radiological examination, observing level of activity and awareness of improvement of neonate before and after using clinical pathway

Figure (1) represents distribution of Frequency of daily requirements of oxygen by the studied neonate in control and study group over four successive days before and after using clinical pathway. It was found that daily requirement of oxygen in four days in study group was less than daily requirement of oxygen in four days in control group but with no a statistical significant difference between Frequency of daily requirements of oxygen in four days in control and study group

Figure (2) represents distribution of Frequency of daily requirements of suction by the studied neonate in control and study group over four successive days before and after using clinical pathway. It was found that no a statistical significant difference between Frequency of daily requirements of suction in four days in control and study group

Figure (3) shows distribution of Frequency of daily requirements of I.V fluid by the studied neonate in control and study group over four successive days before and after using clinical pathway. It was found that a statistical significant difference in first and second day between study and control group by decreases frequency of daily requirements of I.V fluids. On the other hand, there was no statistical significant difference in third and fourth day between study and control group.

Figure (4) shows distribution and mean value of Length of hospital stay in control and study group. It was observed that there were no a statistical significant difference in control group during four days. It was found that there was decrease in Length of hospital stay between control and study group. As 52.5 % of neonates stay in hospital between 10-15 day in control group, while in study group the same percentage (52.5%) of neonates stay between 5-10 days in hospital

Table (1): Distribution of the studied nurses regarding their demographic characteristics

Demographic characteristics of the studied nurses	(n=40)	
	No	%
Age years:		
20-<31	15	37.5
31-40	16	40.0
>40	9	22.5
Mean ±SD	29.45±6.12	
Sex:		
Females	40	100
Education level:		
Diploma	9	22.5
Secondary education	2	5.0
BSC (Baccalaureate)	29	72.5
Experience years:		
1-<6	10	25.0
6-<11	20	50.0
≥11	10	25.0
Mean ±SD	8.56±2.51	

Table (2): Characteristics and medical history of the studied neonates with respiratory distress syndrome

Characteristics and medical history of the studied neonates	(n=50)	
	No	%
Sex:		
Females	29	58.0
Males	21	42.0
Gestational age (weeks):		
Range	33.00-36.00	
Mean±SD	34.46±1.15	
Birth weight (kg)		
Range	1.10-3.70	
Mean±SD	2.14±0.67	
Weight the beginning of the study (kg):		
Range	1.40-4.00	
Mean±SD	2.34±0.70	
Age when admitted to hospital (days):		
Range	1.00-3.00	
Mean±SD	2.00±0.63	

Table (3): Distribution of total scores of nurse's Knowledge regarding respiratory distress syndrome before and after using clinical pathway

Total scores of nurse's Knowledge regarding respiratory distress syndrome before and after using clinical pathway	Before clinical pathway		after clinical pathway	
	No	%	No	%
Poor	5	12.5	0	0
Fair	20	50	0	0
Good	15	37.5	40	100

*Statistical Significant (at level P<0.05)

Table 4: Distribution of studied nurses' practice regarding care of Respiratory Distress Syndrome before and after using clinical pathway in 4 days

Distribution of studied nurses' practice regarding Respiratory Distress Syndrome before and after using clinical pathway in 4 days	(n=40)												χ^2	P
	nurses' practice before clinical pathway (routine care)						nurses' practice after clinical pathway over four day							
	Done completely		Incomplet done		Not done		Done completely		Incomplet done		Not done			
Role of cared nurse	No	%	No	%	No	%	No	%	No	%	No	%		
Daily preparation	3	7.5	16	40.0	21	52.5	21	52.5	2	5.0	17	42.5	24.810	0.0001*
Daily care of incubator	26	65.0	1	2.5	13	32.5	31	77.5	4	10.0	5	12.5	5.790	0.055
-Assessment of vital signs														
Temperature	23	57.5	1	2.5	16	40.0	23	57.5	1	2.5	16	40.0	0.000	1.000
Respiratory rate	12	30.0	0	0	28	70.0	15	37.5	0	0	25	62.5	0.220	0.636
Pulse rate	32	80.0	1	2.5	7	17.5	34	85.0	1	2.5	5	12.5	0.390	0.821
Weight	21	52.5	1	2.5	18	45.0	21	52.5	2	5.0	17	42.5	0.360	0.834
Skin color and chest	13	32.5	0	0	27	67.5	15	37.5	0	0	25	62.5	0.050	0.815
Total assessment of vital signs (mean frequency)	18	45.0	1	2.5	21	52.5	20	50.0	1	2.5	19	47.5	0.210	0.902
-Respiratory system management:														
Oxygen	13	32.5	0	0	27	67.5	31	77.5	9	22.5	0	0	43.360	0.0001*
Nebulizer therapy	16	40.0	2	5.0	22	55.0	25	62.5	1	2.5	14	35.0	4.090	0.129
Suction	10	25.0	5	12.5	25	62.5	20	50.0	3	7.5	17	42.5	5.360	0.069
Position	25	62.5	5	12.5	10	25.0	30	75.0	3	7.5	7	17.5	1.480	0.476
Total respiratory system management (mean frequency)	16	40.0	3	7.5	21	52.5	27	67.5	5	12.5	8	20.0	9.140	0.010*
Providing adequate nutrition	29	72.5	3	7.5	8	20.0	32	80.0	0	0	8	20.0	3.150	0.207
Maintaining of fluid and electrolyte	13	32.5	2	5.0	25	62.5	26	65.0	14	35.0	0	0	38.330	0.0001*
Medication	22	55.0	5	12.5	13	32.5	27	67.5	2	5.0	11	27.5	1.960	0.374
Laboratory investigation and radiological examination	22	55.0	2	5.0	16	40.0	27	67.5	0	0	13	32.5	2.820	0.244
Level of activity	11	27.5	0	0	29	72.5	11	27.5	0	0	29	72.5	0.000	1.000
Improve expected outcome	10	25.0	0	0	30	75.0	11	27.5	0	0	29	72.5	0.060	0.799

*Significant (at level P<0.05)

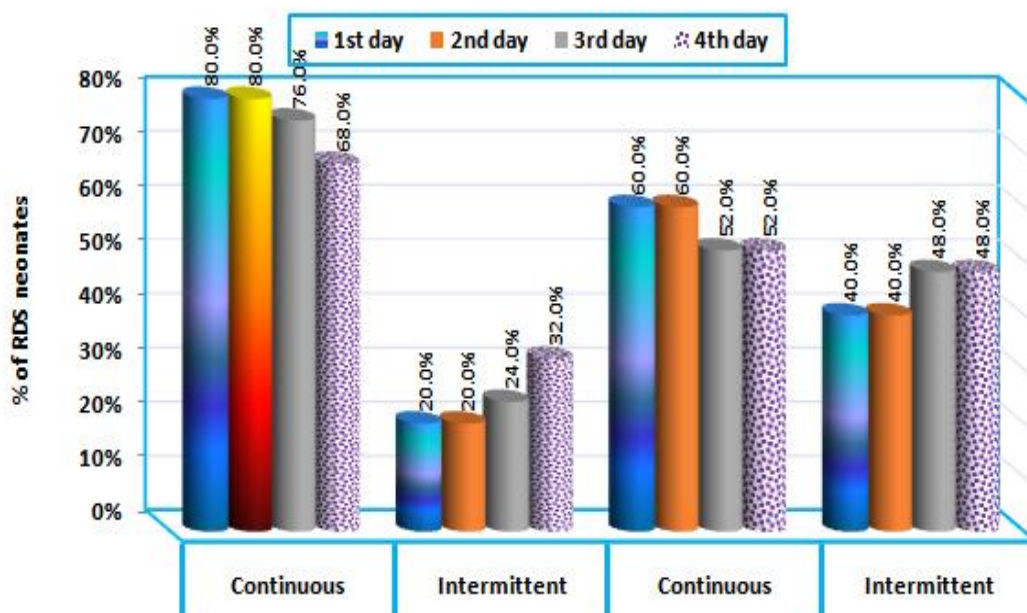


Figure (1): Distribution of studied neonates over four successive days related to daily requirements of oxygen before and after using clinical pathway

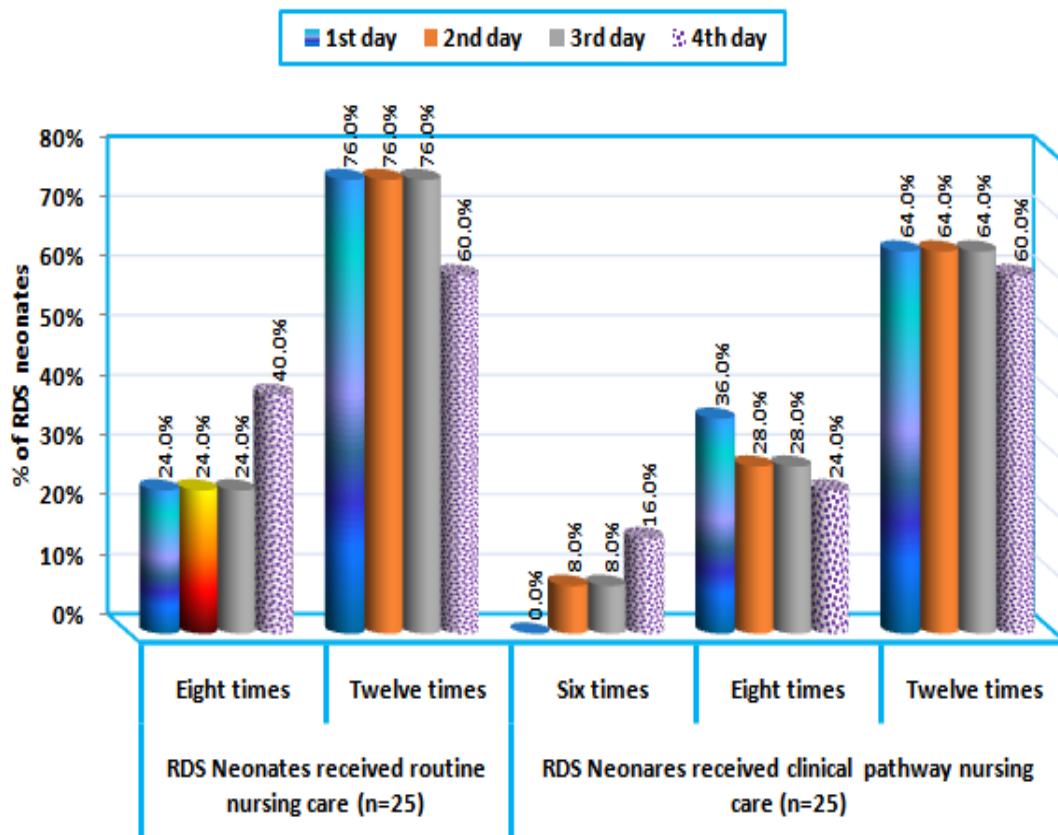


Figure (2): Distribution of studied neonates over four successive days related to daily requirements of suction before and after using clinical pathway

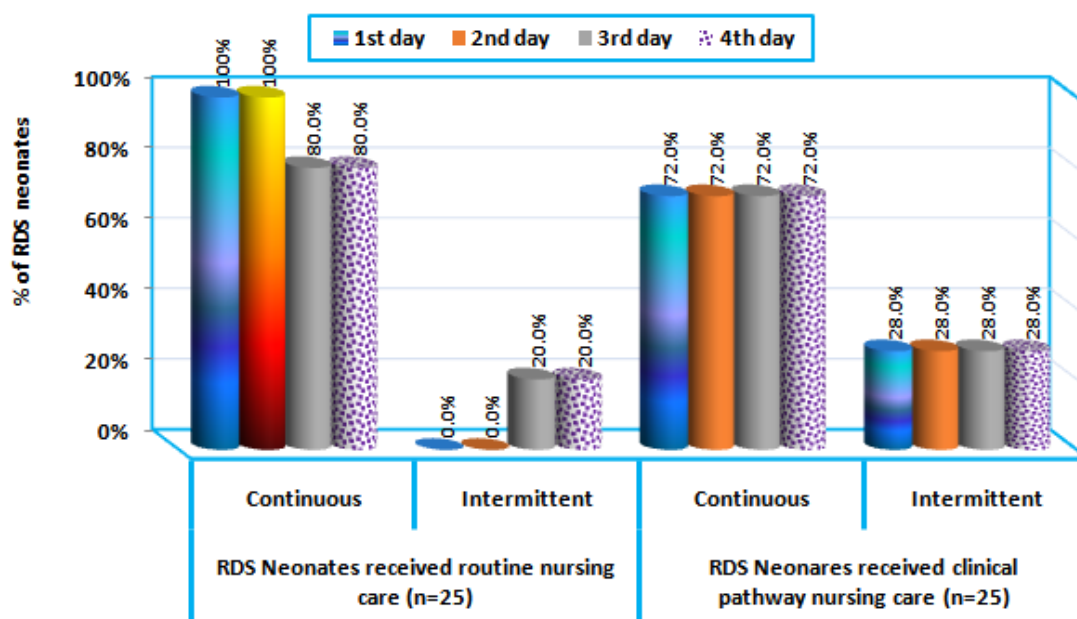


Figure (3): Distribution of studied neonates over four successive days related to daily requirements of I.V fluids before and after using clinical pathway

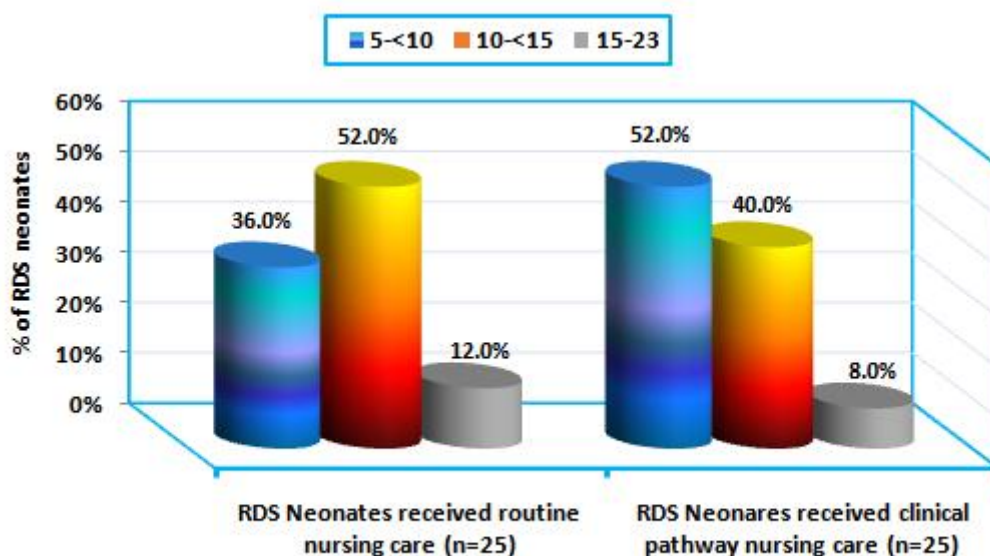


Figure (4): Distribution of studied neonates over four successive days related to length of hospital stay before and after using clinical pathway

V. Discussion

Neonatal respiratory distress syndrome is a condition of pulmonary insufficiency that in its natural occurs at or shortly after birth and increases in severity over the first 2 days of life. It is the most common condition found and managed in neonatal intensive care units .It also called hyaline membrane diseases. It can be defined as acute lung disease due to developmental insufficiency of pulmonary surfactant production and structural immaturity in the lungs. Multidisciplinary management is the best way to achieve standard of care, enhances the quality of care and supports the routine care of patients with similar needs during a specified period. This care named as clinical pathway, which include co-operation between all health staff members to improve clinical outcome of neonates⁽¹⁰⁾.

The present study revealed that nearly three quarter of the studied nurses had fair and poor knowledge about respiratory distress syndrome before clinical pathway application. This level was increased as all nurses had good knowledge after clinical pathway application. The improvement of nurse's knowledge may be due to their ease of assimilation of information where nearly three quarter of them had a baccalaureate degree. In baccalaureate degree there are a course named pediatric nursing which respiratory distress syndrome was one of it's content and it is important of presence of highly educated nurses in neonatal intensive care unit to maintain high quality of care as it consider a critical care unit and nurse must have updating, advanced knowledge and skills. This result was in agreement with Desoky (2012) who found that the majority of studied nurses had a good knowledge post intervention⁽¹¹⁾.

As regard nurse's practice, the current study revealed that there was an improvement in nurse's practice regarding beginning preparation, respiratory system management and maintain fluid and electrolyte balance after application of clinical pathway. This may be reflecting their understanding that the clinical pathway differs from routine care and will lead to improvement in neonate's condition and this also may be due to half of them had from 6-11 years of experiences spent in the care of neonates with respiratory distress syndrome play an important role. The finding of the present study with in line with Suchitra and Lakshmi (2007) whom mentioned that education, has a positive effect on nurse's knowledge and practices and also Meihuan (2017) who found significant lower nursing error rate after application of Clinical Nursing Pathway^(12,13).

The present study revealed that there was no improvement in nurse's practice regarding assessment of temperature before and after clinical pathway. This may be due to overload of working on nurses and ignorance of important of temperature measurement. This result was in contrast with Tamburlaine and Kambarami (2008) whom found that practice of nurses about thermal control of the newborn was insufficient before education and enhanced after it⁽¹⁴⁾.

The result of the current study was in line with Mahmoud and Abd-ElSadik (2013) whom observed that there was a highly significant difference of the mean score of nurses' performance pre and post clinical pathway

guidelines implementation. Refai (2011) who found that there was an improvement in nurses' practice scores after application of clinical pathway also supported the present study^(15,16).

The present study revealed that the majority of nurses not done practice related to beginning preparation, assessment of neonates, maintain fluid and electrolyte balance, observe level of activity and expected outcomes before clinical pathway application. This may be due to overload of working on nurses. This result was in congruent with El-sayed L et al(2013) whom mentioned that majority of nurses' had competent performance related to the actual care of neonates with RDS, while the minority of them had incompetent performance in assessment phase⁽¹⁷⁾. The present study was in harmony with Parajulee (2011) who assessed the nurses' knowledge and practice about care given to newborn in neonatal intensive care unit and found that there was lack in nurses' performance for care given to newborns in assessment phase⁽¹⁸⁾.

Clinical outcomes are the main indicator on improvement of neonates after applying clinical pathway. They are including daily requirement of oxygen, suction, intravenous fluids and length of hospital stay. Regarding daily requirement of oxygen it was found that daily requirement of oxygen in four days in study group was less than daily requirement of oxygen in four days in control group with no a statistical significant difference . This may be due to improvement of nurse's practice regarding respiratory system management.

The present study was in agreement with Harry and Perlstein et al (2009) whom mentioned that practice guideline for managing bronchiolitis was highly successful in modifying care and there were significant reductions in the use of all respiratory therapies, after implementation of the guideline.⁽¹⁹⁾ Regarding daily requirements of suction, there was no a statistical significant difference between Frequency of daily requirements of suction in four days in control and study group. This may be due to wrong belief of nurses about time of suction and Lack of awareness about clinical indicators of it. This result was in contrast with Garin et al(2011) who found that application of pneumonia clinical pathway improve clinical outcomes of care regarding decrease daily requirement of suction⁽²⁰⁾.

Regarding daily requirements of I.V fluids, the present stud revealed that there was a decrease in frequency of daily requirements of I.V fluids in third and fourth day after application of clinical pathway. This may be due to improvement of respiration of neonates and this lead to the possibility of gavage or bottle feeding

In agreement with the present study, Cheney and Jackson et al (2005) whom found that administration of supplemental fluids and the use of inappropriate therapies was significantly lower in the pathway group . In the same line, Brown and James et al (2008) whom supported this result as they found that there was decrease requirement of neonates to received adequate glucose infusions in neonatal intensive care unit after clinical pathway^(21,22).

Regarding length of hospital stay, the present study revealed that there was a decrease in length of hospital stay between control and study group after clinical pathway. This may be deu to improvement of health status of neonates deu to effect of clinical pathway. Similarly, Stephen and Wilson et al (2009) were found that implementation of a clinical pathway may be an effective means in maintaining or improving all aspects of quality of care and length of hospital stay⁽²³⁾. On the same line, Anderson et al (2007) whom found that there is association with a statistical significance difference between quality of care and length of hospital before and after programe as well as with readiness for discharge and this in the line of present study⁽²⁴⁾.

The finding of this study was in consistent with Rotter and Thomas et al (2010) whom found that clinical pathways has an effect on professional practice, children's outcomes, length of stay and hospital costs. This finding was in line with Pickkers (2017) who mentioned that clinical pathway had an important effect on decrease hospital stay, improve quality of care , improve clinical outcome without any side effects^(25,26). Weihua L et al (2016) and Menga (2016) whom found that implementation of values of clinical nursing pathway improved the clinical outcome and the length of hospital stay in study group with statistically significant difference^(27,28).

VI. Conclusion

Based on the results of the present study, it can be concluded that there were an improvement on nursing staff knowledge and practice after using clinical and it is effective in improving clinical outcomes of neonates with respiratory distress syndrome. This was manifested by decreasing daily requirement frequency of oxygen, suctioning and IV fluid and finally decreasing LOS of study group

Recommendations:

Based on the findings of the present study, the following recommendations are suggested:

- 1- Application of Clinical pathway should be the trend of care for neonates with respiratory distress syndrome in different hospitals settings.
- 2- Re- application of the study on a larger and different group of nurses and neonates with other diseases to be generalizes the results of current study.

- 3- Advanced in-service training program based on new technology and new trends should be conducted periodically, and regularly for teaching, the nurses and all health team the new clinical skills as clinical pathway.

References

- [1]. Brooksid A. *Obstetrics and Newborn Care II: Medical Education Diversion*. 2nd ed. Philadelphia: Mosby Co., 2013; 20.
- [2]. Bollard C. Global Regional, National perinate and Neonate Mortality. *pemao Journal* . 2011; 25(7):10-12.
- [3]. Tenore A. European master course in pediatrics, royal college of pediatrics and child health: St louise Co., 2011;19(3):25
- [4]. Wong's D. *Nursing Care of Infants and Children* .7th ed. London: Mosby Co., 2014; 259.
- [5]. Tolomea C. *Nursing Care in Pediatric Respiratory Disease* .3rd ed . London: Mosby Co., 2012; 30.
- [6]. Rutter.N. *Textbook of Neonatology*. 4th ed . Elsevier: Churchill Livingstone Co., 2008; 274 .
- [7]. Williams I. *Pediatric Nursing Procedures*. 3rded. kluger Business New york: St louise Co.,2012 ;606.James I. *Advanced Pediatric Emergency Care* .6th ed. prentice hall Co., 2010; 42-3.
- [8]. World Health Organization. *Clinical Procedures unit department of essential health technologies*.2009.Available from www.who.int/surgery
- [9]. Hertz D. *Care of The Newborn: A handbook for Primary Care*. 3rd ed. Philadelphia: Lippincott Williams and Wilkins Co., 2009; 68-70.
- [10]. Desoky S. *Nursing care of children undergoing bone marrow transplantation*, Unpublished Doctorate thesis, Faculty of Nursing, Ain Shams University. 2012: 98-112.
- [11]. Suchitra J and Lakshmi N. Impact of education on knowledge, attitudes and practices among various categories of health care workers. *Indian medical microbial journal* .2007; 25(3):181-7.
- [12]. Meihuan X. *Nursing pathway in the classification diagnosis and treatment of patients with emergency dyspnea*. *Iran J Public Health*. 2017; 46(4): 574–576.
- [13]. Tamburlini G and Kambarami R. Thermal control of the newborn: knowledge and practice of health professionals. *Journal of European Academy of Pediatric Societies*. 2008; 86 (6):645-50.
- [14]. Mathai S, Kanitkar C. *Management of Respiratory Distress in the Newborn*. New Delhi: Southern Command Co., 2007; 269-72.
- [15]. Rutter.N. *Textbook of Neonatology*. 4th ed . Elsevier: Churchill Livingstone Co., 2008; 274.
- [16]. Mahmoud, F.S. and B.R. Abd-ELSadik, 2013. Effect of clinical pathway regarding promoting qualitynursing care of children with meningitis exposed toinvasive procedures. *Journal of American Science*, 9(8): 383-393.
- [17]. Refai, A. Impact of a designed nursing clinical pathway guidelines on acute myocardial infection patients' outcome doctorate thesis, faculty of nursing, Banha University.2011; 55.
- [18]. Meherali S, Parpio T and Javed N. Nurses' knowledge of evidence-based guidelines for prevention of ventilator-associated pneumonia in critical care areas: a pre and post test design. *Journal of Ayub Med Coll Abbotta bad*.2011; 23(1): 146-149.
- [19]. Elsayed L, El-Nagger N, and Aly S.Nursing care provided for neonates with respiratory distress syndrome in the neonatal intensive care units at Makkah Al-Mukarramah in Saudi Arabia. *Life SciJ2013*;10(1):3403-3412
- [20]. Parajulee, S. *Assess Knowledge of Nurses Towards Cardio-Pulmonary Resuscitation in NICU at Bharatpur Nepal University Hospital*. Degree Master of Medical Sciences Bharatpur, Nepal University. 2011; 76-80.
- [21]. Harry D, Michael K, Paul H and Perlstein R. Evaluation of an evidence-based guideline for bronchiolitis. *Journal of American Academy of Pediatrics*. 2009; 104(6):545-49.
- [22]. Garin S. Harbarth M and Rochat O. Critical pathway for community-acquired pneumonia. *Rutschmann. Rev Med Suisse*. 2011; 292 (7): 917-21.
- [23]. Cheney L, Jackson M et al. A Clinical pathway for bronchiolitis is effective in reducing readmission rates. *Journal of Pediatrics*. 2005; 147(5):622-62.
- [24]. Brown K, James M, Dina J and Kathleen M. Effectiveness of a clinical pathway for the emergency treatment of patients with inborn errors of metabolism. *Journal of American Academy of Pediatrics*. 2008; 122 (6):88-92.
- [25]. Stephen D, Wilson M, Barbara B, Dahl M and Robert D. An evidence-based clinical pathway for bronchiolitis safely reduces antibiotic overuse. *American Journal of Medical Quality*.2009; 104(6):44-47.
- [26]. Anderson M. The association between clinical pathways and hospital length of stay. *Journal of Medical Systems*.2007; 31(1):79-83.
- [27]. Rotter A, Thomas T and Kinsman L. Clinical pathways: effects on professional practice, patient outcomes, length of stay and hospital costs .*Journal of Cochrane Database of Systematic Reviews*. 2010; 9(3):160-63
- [28]. Pickkers P. Implementation and evaluation of clinical pathway for pancreoticto duodenectomy procedure. *Journal of gastrointestinal surgery*. 2017; 21(9):1428-41.
- [29]. Weihua L et al. Application values of clinical nursing pathway in patients with acute cerebral hemorrhage. *Experimental and Therapeutic Medicine Journal*. 2015; 11(2): 490–94.
- [30]. Menga J. Systematic evaluation of the clinical nursing pathway with the grade approach applied to functional exercise in patients with hip replacements before and after surgery. 2016; 4(3): 185-93.

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