

Nurses' Performance regarding care of Preterm Neonates with Continuous Positive Airway Pressure

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Abstract

Background: Continuous positive airway pressure is a low-cost, effective way to improve the respiratory status of preterm and very low birth weight infants. **Aim:** This study aimed to assess nurses' performance regarding care of preterm neonates with continuous positive airway pressure. **Setting:** The study was carried out at Neonatal Intensive Care Units affiliated to both Suez Canal University Hospitals and Ismailia Medical Complex at Ismailia city. **Sample:** The subjects of this study were all nurses (convenient sample 73 nurse) who provide direct care at Neonatal Intensive Care Units at the previously mentioned settings. **Tools of data collection:** Three tools were used to collect the data; structured interview questionnaire, observational checklist and likert type rating scale. **Results:** The results of the study revealed that, more than half of the studied nurses had average knowledge about preterm neonates with continuous positive airway pressure. While the majority of them had incompetent level of practice and the majority of the studied nurses showed positive attitude. There was a statically significant relationship between total studied nurses' level of knowledge regarding care of preterm neonates with continuous positive airway pressure and their practice. **Conclusion:** The study concluded that, the studied nurse had an average level of knowledge, and incompetent practice regarding care of preterm neonates undergoing continuous positive airway pressure while the great majority of the studied nurses had a positive attitude towards continuous positive airway pressure. **Recommendation:** the study recommended that, training educational programs and workshops regarding care of preterm neonates with continuous positive airway pressure.

Keywords: Attitude – Continuous Positive Airway Pressure – Nurses – knowledge – Practices – preterm neonates.

1. Introduction

One of the cornerstones of neonatal-perinatal medicine achievements has been the evolution of newborn respiratory support, which has allowed infants who were previously thought to be unviable to survive.

There is a growing emphasis on developing strategies that not only save lives but also limit the impairment of the lungs and other organ systems (*Jain & Bancalari, 2019*).

Globally, 15 million pregnancies each year,

1 in 10, result in preterm birth (*Risnes et al., 2021*). Preterm delivery (PTD) is defined as delivery before 37 weeks completed gestation. It represents a major cause of neonatal morbidity and mortality in both developed and developing countries with European and North American figures ranges between 5–10% of all deliveries The majority of preterm birth is unfortunately located in Africa and Asia, where about 85% of all preterm births occur (31 % and 54%, respectively). The PTD in Egypt is estimated to be less than 10% in the general population (*Mohamed, Mesabah, Haroun, & Mousa, 2022*).

A live birth before the 37th week of pregnancy is considered a preterm birth. Prematurity can be defined by the baby's birth weight or gestational age. Preterm neonates are classified as either extremely preterm or preterm based on their birth age. In most neonatal intensive care units, a nasal cannula, continuous positive airway pressure (CPAP), and endotracheal intubation are used to supplement oxygen therapy (*Said et al., 2019*).

The World Health Organization has declared reduced newborn mortality a global priority. Every year, 2.5 million infants die in their first month of life (*Mapp & Gabel,*

2019).

One of the leading causes of infant mortality is respiratory disorders. CPAP therapy is thought to be the simplest and most cost-effective intervention for lowering the risk of death in newborns with RDS. As the use of CPAP decreased, the rate of mechanical ventilation decreased from 12.3 to 11.8 per 1000 births (*Irtanti & Soetadji, 2019*).

The World Health Organization strongly advises using CPAP to treat premature babies who have respiratory problems. CPAP is a non-invasive form of breathing support that requires less advanced technical expertise than mechanical ventilation, which involves the insertion of an endotracheal tube and thus requires more advanced technical expertise (*Kinshella et al., 2020*).

Continuous positive airway pressure is frequently regarded as the "missing link" between supplemental oxygen and mechanical ventilation. Gregory et al. defined CPAP in 1971, and it was used to support respiration in infants with RDS (*Tiryaki & Cinar, 2016*). CPAP is a type of non-invasive breathing support that does not require a high level of technical knowledge. Furthermore, because they are easier to maintain and repair, simple CPAP systems, such as bubble CPAP, have

recently been developed (*Dewez & van den Broek, 2017*).

Premature infants need complex and specialized treatment and care for survival and prevention of CPAP complications. Whose management of premature infants requires high levels of knowledge and skills by professional caregivers. Nurses have a key role in assessing, monitoring, supporting, providing education and identifying the needs of premature neonates undergoing CPAP due to constant contact with the neonate and family. To improve the quality of care, the implementation of the nursing process as a professional method is recommended, which includes five steps of assessment, diagnosis, planning, implementation and evaluation (*Taghinejad, Nikfarid, Monfared, Hoseini, & Habibi, 2021*).

Significance of the Study:

Continuous Positive Airway Pressure is an important therapy for neonates with respiratory problems. Now it becomes a standard of care for all preterm neonates with respiratory distress and new evidence help increasing the work of CPAP. As stated by *Thukral et al. (2016)* that, CPAP provides the continuous pressure in a spontaneously breathing neonate and increases the functional

residual capacity of the lung resulting in better gas exchange for preterm neonates. Also, it has been shown to reduce the risk of mortality by 40% and the need for surfactant and mechanical ventilation by about 50%. So, it has become the standard of care in managing sick preterm neonates with respiratory distress.

The aim of the study:

This study aimed to assess nurses' performance regarding care of preterm neonates with continuous positive airway pressure.

Objectives of the study:

- Assess nurses' knowledge regarding care of preterm neonates with continuous positive airway pressure.
- Assess nurses' practices regarding care of preterm neonates with continuous positive airway pressure.
- Assess nurses' attitude regarding care of preterm neonates with continuous positive airway pressure.
- Identify the relationship between nurses' knowledge, practices and their attitude regarding care of preterm neonates with continuous positive airway pressure.

Research question:

What is the nurses' knowledge regarding care

of preterm neonates with continuous positive airway pressure?

What is the nurses' practices regarding care of preterm neonates with continuous positive airway pressure?

What is the nurses' attitude regarding care of preterm neonates with continuous positive airway pressure?

What is the relationship between nurses' knowledge, practices and their attitude regarding care of preterm neonates with continuous positive airway pressure?

2. Subject and Methods

Study design:

A descriptive correlational research design was utilized to assess nurses' performance regarding care of preterm neonates with continuous positive airway pressure.

Study setting:

The study was carried out at Neonatal Intensive Care Units (NICUs) affiliated to both Suez Canal University Hospitals and Ismailia Medical Complex.

Study subjects:

The study comprised convenient sample of all nurses who provide direct care at NICUs at the previously mentioned setting (73 nurses) regardless of their age, gender, qualification and years of experience. 9

nurses who included in the pilot study were excluded later from the study sample in addition to 8 nurses didn't comprise to the study sample due to the effects of COVID-19, so the final study sample was 73 nurses.

Tools of data collection:

Tool (1): A structured Interviewing Questionnaire Sheet (Al Sharkawi et al. (2019)) the questionnaire comprised two parts as the following:

Part 1: It included personal characteristics of nurses such as age, gender, academic qualifications, years of experience, and attendance at training courses related to nursing care provided to preterm neonates on Continuous positive airway pressure.

Part 2: Nurses' knowledge of nursing care for preterm neonates receiving CPAP, which included:

a) Knowledge about preterm neonates such as; definition, causes and complications.

b) Knowledge about mechanical ventilation such as; definition, indications, types and indications of each type.

c) Knowledge about continuous positive airway pressure such as; definition, indications, contra indications, cases, types,

and complications.

e) Knowledge about nursing care provided to preterm neonates with CPAP such as; suctioning, oxygen administration, blood gases techniques, gavage feeding of preterm neonate and skin care.

Scoring system:

There were 41 questions in total to assess nurses' knowledge. In terms of knowledge scores, the correct answer was given (1), the incorrect answer and I don't know was given (0). The total number of knowledge scores was 41, and the scores were added up and converted to a percent score (100%). poor knowledge (if nurses' total score of knowledge percent <60% , average knowledge (if nurses' total score of knowledge percent 60% <85%), or good knowledge (if nurses' total score of knowledge percent $\geq 85\%$).

Tool (2): Checklists for Observation:

adapted from Bowden and Greenberg (2016) It was used to evaluate nurses' practises during the care of preterm neonates with continuous positive airway pressure, which included (collection of blood gases samples "venous and arterial blood sampling," use of pulse oximetry, oxygen therapy administration, gavage feeding, nasal/oral

suction, and nursing care for neonates with continuous positive airway pressure).

Scoring system:

The nurses' practice was classified as; not done have score (0), incorrectly done have score (1) and correctly done have score (2).

- According to the nurses' actual practice, their level of performance will be categorized as the following:

- Incompetent (< 85).
- Competent (≥ 85).

Tool (3): Likert Type Rating Scale: was designed by the researcher in the light of relevant literature and studies and used to assess pediatric critical nurses' attitude regarding continuous positive airway pressure. The scale comprised of 10 statements that reflect nurses' attitudes.

Scoring system:

Scores of 1 and 0 were respectively given to the responses of agree and disagree. The total score of the scale was 30 grades, the attitude was considered to be positive if the score was more than 18 grades ($\geq 60\%$), while it was considered to be negative if the score was less than 18 grades (<60%).

Tool validity and reliability:

The tools were evaluated for its content validity, comprehensiveness and applicability by a jury consisting of five experts in Pediatric Nursing and Pediatrics who revised the tools, and modifications were done according to their opinion. Tool reliability was assessed by the researcher for testing the internal consistency of the instrument by measuring the related Cronbach's alpha and its value was (.704).

Field work:

The researcher explained the study's purpose to each nurse. The actual fieldwork took place between the beginning of March 2021 and the end of July 2021. The researcher was available four days a week (Saturday, Sunday, Monday, and Tuesday) by rotation from 9.00 AM to 2.00 PM in the previously mentioned setting.

During the interview, the researcher introduced herself to the nurses and gave them a brief overview of the study and its expected outcomes. In order to collect the necessary data, a structured interviewing questionnaire and likert type rating scale were distributed, and each nurse was individually interviewed for 20-30 minutes depending on the physical and mental readiness of the studied nurses and the mitigating

circumstances in each study setting, with the researcher available for more clarification whenever needed.

The researcher checked the observational checklist while observing nurses' care of preterm neonates with continuous positive airway pressure. During the shift, each skill was observed once.

Pilot study:

A pilot study was conducted over a period of one month, from the beginning of March, 2021 up to the beginning of April, 2021 on 10% (9 nurses) of the total sample (81) to evaluate the research plan, clarity, applicability of the study tool and to estimate the time needed to fulfill these tools. The pilot study was excluded from study sample. The necessary modification were done as suggested by the jury. Then the final form of questionnaire was used for data gathering.

Ethical considerations:

The Research Ethics Committee at the Faculty of Nursing Suez Canal (committee no. 94/11.2020 at 30-11-2020) approved the study proposal. The directors of the Suez Canal University Hospitals and the Ismailia Medical Complex gave their official approval. Prior to participation in the study, the studied nurses gave their verbal consent after a brief

explanation of the study's purpose and expected outcomes. Furthermore, each nurse was aware of the significance of her participation and was aware that she had the right to withdraw from the study at any time. Assuring the confidentiality and anonymity of the information collected. The study's design did not endanger the subjects in any way.

Data analysis:

The collected data were organized, revised, stored, tabulated and analyzed. Statistical analysis was done by computer using Statistical Package of Social Science (SPSS) program version 20.

The following statistical techniques were used:

- Percentage (percentage is calculating by taking the frequency in the category divided by the total number of participants and multiplying by 100%)
- Chi-square (X²) for categorical data (used to compare observed results with expected results).
- Independent t test (compares the means of two groups to determine if there is a statistically significant difference between the means of two variables).
- Proportion probability of error (P- value).

3. Results

Table (1): Reveals that 45.2% of the studied nurses aged between 25 to less than 30 years and 71.3% of them had diplom of Technical Nursing Institute. It is showed that 38.4% of the studied nurses had years of experience ranged between 5 to less than 10 year. Almost 63% of the studied nurses didn't attend training courses about continuous positive airway pressure.

Table (3): shows that, the highest percentage of the studied nurses (90.3%) had positive attitude regarding CPAP.

Table (4): shows that, there was statistically significant relationship between the studied nurses' age, years of experience and their total knowledge.

Table (5): illustrates that there was no statistically significant relationship between the studied nurses' age, gender, marital status, education, experience and total practices.

Table (6): illustrates that, there were no statistically significant relationship between the studied nurses' age, gender, marital status, education, experience and total attitude.

Table (7): indicates that, there was statically significant relationship between the studied

nurses' total level of knowledge and total level of practices regarding care of preterm neonates with CPAP with p value < 0.05 .

Figure (1): clarifies that 82.2% of the studied nurses had good knowledge regarding prematurity While 17.8% of them had an average level of knowledge.

Figure (2): clarifies that 60 % of the studied nurses had an average level of knowledge regarding mechanical ventilation. While, 33% of them had good level of knowledge about mechanical ventilation.

Figure (3): reveals that 50.7% of the studied nurses had an average level of knowledge regarding continuous positive airway pressure knowledge.

Figure (4): reveals that 57.5% of the studied nurses had an average level of knowledge regarding care of preterm neonates with continuous positive airway pressure. While 35.6% had good level of knowledge.

Figure (5): shows that 97.3% of the studied nurses had incompetent level of practices regarding care of preterm neonates with continuous positive airway pressure.

4. Discussion

Continuous Positive Airway Pressure

(CPAP) is a well-known method of respiratory support in premature infants. CPAP technology advancements and a better understanding of various respiratory diseases improve the survival of extremely preterm neonates on CPAP. (*Safaa, 2019*). Therefore, the present study was conducted to assess nurses' performance regarding care of preterm neonates with continuous positive airway pressure.

In terms of the sociodemographic characteristics of the nurses studied, the current study discovered that less than half of the nurses' ages ranged from 25 to less than 30 years. This finding is consistent with *Aziz and Abdul-Hamza, (2017)* in a study entitled "Assessment of nurses' knowledge toward The Continuous Positive Airway Pressure (CPAP) Machine in Neonatal Intensive Care Unit at Al-Diwanyia City Hospitals" who revealed that half of the nurses are between the ages of 25 and 29. While this disagrees with *Thabet et al. (2021)* in a study entitled "Influence of Training Program Implementation on Nurses' Performance Regarding Neonates Invasive Mechanical Ventilation" who reported that less than half of the nurses were between the ages of 20 and 30.

In assessing nurses' attitudes towards

CPAP, the findings of this study revealed that the majority of the nurses studied had a positive attitude. This result was consistent with the findings of the study conducted by **Irtanti and Soetadji, (2019)** who reported that the nurses studied had a favourable attitude towards continuous positive airway pressure. One possible interpretation of this result is that nurses are enthusiastic about maintaining and practising clinical procedures effectively, but this point of view is not supported in actual practice this point of view is supported by **Soliman et al. (2019)** who stated that the studied nurses had incompetent practise despite having a positive attitude towards peripheral intravenous.

The study of the relationship between nurses' knowledge and sociodemographic characteristics. The study's findings revealed a statistically significant relationship between the total knowledge of the nurses studied and their age and years of experience. This result agreed with **Elsobkey and Amer, (2018)** who found a statistically significant relationship between the total knowledge of the nurses studied and their age and years of experience. This result could be attributed to the fact that total knowledge increases with increasing age, education level, and years of experience. While this disagreed with **Aziz and Abdul-**

Hamza, (2017) who conducted a study titled "Assessment of nurses' knowledge toward The Continuous Positive Airway Pressure (CPAP) Machine in Neonatal Intensive Care Unit at Al-Diwanyia City Hospitals" reported that, there was no statistical significant relationship between nurses' age and their knowledge concerning CPAP machineat.

The current study found no statistically significant relationship between the gender of the nurses studied and their overall level of knowledge. This agree with **Aziz and Abdul-Hamza, (2017)** who stated that there is no statistically significant relationship between nurses' gender and CPAP machine knowledge.

The study found no statistically significant relationship between the studied nurses' age, education, experience, and total level of practice this disagrees with **Al Sharkawi et al. (2019)** who revealed that, There was a highly statistically significant difference between the total practise score of the nurses studied and their age, academic qualifications, and years of experience prior to programme implementation. The study found no statistically significant differences between the studied nurses' age, education, experience, and attitude. this agreed with **Irtanti and Soetadji, (2019)** who reported

that, Age, education, and experience had no effect on CPAP usage behaviour in neonates in the NICU.

The study discovered a statistically significant relationship between the total level of knowledge and total level of practise of the nurses studied. This agreed with *Al Sharkawi et al. (2019)* who stated that, There were highly statistically significant differences with a positive correlation between the total knowledge and performance score of the nurses studied regarding care provided to preterm neonates on CPAP.

In terms of nurses' knowledge of preterm neonates, the current study found that the majority of the nurses studied had correct knowledge this agrees with *Mohammed and Alsawaf, (2016)* in a study entitled "Assessment of Nursing staff's Knowledge and Practice regarding Care of Premature Babies in Mosul Teaching Hospitals" showed that, the nurses have adequate knowledge about care of premature neonates. While this disagrees with *Fadlamola and Mohammed, (2020)* in a study entitled "Nurse's Knowledge and Practice on the Care of Preterm Infants at Khartoum State Hospitals" reported that, nurses had poor knowledge regarding care

of a premature neonates. This can be explained by the fact that nurses working in NICUs gain more knowledge and experience while working because the NICU has a high rate of preterm neonates.

In terms of nurses' mechanical ventilation knowledge, the current study found that nearly two-thirds of the nurses studied had an average level of knowledge. This findings are supported by *Jain and Bancalari, (2019)* in a study entitled "New developments in respiratory support for preterm infants" revealed that nurses' increased knowledge has resulted in significant progress in the respiratory support of these infants. While this disagrees with *Thabet et al. (2021)* in a study entitled "Influence of Training Program Implementation on Nurses' Performance Regarding Neonates Invasive Mechanical Ventilation" revealed that one-third of the nurses studied had an average level of knowledge, while less than half had a good level of knowledge.

In terms of total nurses' CPAP knowledge, the study's findings revealed that half of the nurses studied had an average level of CPAP knowledge. this result disagrees with *Irtanti and Soetadji, (2019)* in a study entitled "Knowledge the Use of Continuous Positive

Airway Pressure (CPAP) In Neonates" revealed that approximately three-quarters of the nurses studied had a high level of knowledge about CPAP.

One possible explanation for the nurses' average level of knowledge about mechanical ventilation and CPAP is that the majority of the nurses studied had a diploma from a technical institute of nursing and had not attended training courses on caring for preterm neonates with CPAP.

In terms of nurses' overall knowledge of nursing care for preterm neonates using CPAP, this study found that more than half of them had good knowledge this finding disagrees with *Safaa, (2019)* who discovered that roughly half of the nurses studied had average knowledge of CPAP care for preterm neonates. This could be due to the presence of doctors who are more knowledgeable and provide adequate practical knowledge regarding the care of preterm neonates on CPAP.

Concerning nurses' total level of knowledge regarding care of preterm neonates with CPAP. The present study revealed that, more than half of the studied nurses had average knowledge. These results in accordance with *Al Sharkawi et al.*

(2019) who stated that, half of the studied nurses had average knowledge. Also in the same line this finding agreed with *Dake, (2020)* in a study entitled "Effectiveness of training module regarding care of neonate on bubble CPAP on knowledge and practices of nurses working in Neonatal Intensive Care Unit in selected hospitals of city" who stated that three-quarters of the nurses studied had average knowledge and one-third had good knowledge. While this disagrees with *Irtanti and Soetadji, (2019)* Respondents had good knowledge, according to those who discovered it. These findings may be attributed to a lack of ongoing education and preparation for work or training in the care of this group of neonates. In addition, the studied nurses' motivation to update their knowledge was lacking.

Concerning nurses' overall level of knowledge regarding CPAP care for preterm neonates. The current study found that more than half of the nurses studied had average knowledge. These results in accordance with *Al Sharkawi et al. (2019)* who stated that, half of the studied nurses had average knowledge. Also in the same line this finding agreed with *Dake, (2020)* in a study entitled "Effectiveness of training module

regarding care of neonate on bubble CPAP on knowledge and practices of nurses working in Neonatal Intensive Care Unit in selected hospitals of city" who indicated that, three quarter of the studied nurses had average knowledge and one third of them had good knowledge. While this disagrees with *Irtanti and Soetadji, (2019)* Respondents had good knowledge, according to those who discovered it. These findings may be attributed to a lack of ongoing education and preparation for work or training in the care of this group of neonates. In addition, the studied nurses' motivation to update their knowledge was lacking.

The current study found that the majority of the nurses studied had incompetent levels of practise when it came to caring for preterm neonates with continuous positive airway pressure ventilation this agreed with *Elsobkey and Amer, (2018)* who indicated that, the majority (87.5%) of the studied nurses had incompetent practice. This disagreed with *Dake, (2020)* who stated that approximately half of the nurses studied had average practises and less than half had good practises regarding neonate CPAP care.

Possible explanations for these findings include a knowledge-practice gap and a

lack of integration of theoretical knowledge and practise. Also, a lack of facilities or tools in NICUS affects the level of practise of the nurses studied, as there was a lack of facilities, tools, and nursing staff as one nurse cared for three cases at the same time.

5. Conclusion:

Based on the findings of this study, it is possible to conclude that the nurses studied had an average level of knowledge regarding the care of preterm neonates receiving continuous positive airway pressure. While their care of preterm neonates receiving continuous positive airway pressure was incompetent. The vast majority of the nurses polled were supportive of continuous positive airway pressure.

6. Recommendations:

- Nursing staff working in NICUs should be provided with training educational programmes and workshops regarding the care of preterm neonates undergoing continuous positive airway pressure in order to improve the quality and safety of neonatal care by having nurses acquire sufficient knowledge.

- Providing booklets, pamphlets, and boosters to NICUs to assist nurses in expanding their knowledge of the CPAP machine.

Table (1): Percentage distribution of the studied nurses' according to their demographic characteristics (n=73).

Items	No.	%
Age (in Years)		
<20	3	4.1
20:<25	28	38.4
25:<30	33	45.2
≥30	9	12.3
Years of experiences		
<1 year	3	4.1
1<5 years	24	32.9
5<10 years	28	38.4
≥ 10 years	18	24.7
Training Courses		
NO	46	63
YES	27	37

Table (2): Percentage distribution of studied nurses according to their attitude regarding care of preterm neonates with CPAP (n=73)

Items	Agree		Indifferent		Disagree	
	No	%	No	%	No	%
Do you think: CPAP is the most effective method to use for preterm neonates with respiratory problems.	61	83.6	5	6.8	7	9.5
CPAP has an effective role in respiratory rate and improving blood gases for preterm neonates.	54	74.0	9	12.3	10	13.7
CPAP reduce the need for mechanical ventilation	69	94.5	2	2.75	2	2.75
CPAP is safe and cost effective	72	98.6	0	0	1	1.4
CPAP is easy to use and apply to preterm neonates.	69	94.5	2	2.75	2	2.75
CPAP is associated with complication less than mechanical ventilation.	73	100	0	0	0	0
CPAP is associated with high rate of nasal injury.	65	89.0	3	4.1	5	6.9
The appropriate size of the nasal cannula for the neonate with CPAP contributes to the successful operation of CPAP.	69	94.5	2	2.75	2	2.75
CPAP is affected by the preterm neonate's position.	54	74.0	9	12.3	10	13.7
CPAP needs close observation before and after weaning.	73	100	0	0	0	0

Table (3): Percentage distribution of studied nurses according to their attitude regarding care of preterm neonates with CPAP (n=73)

Attitude	No	%
Positive (> 60%)	66	90.3
Negative (< 60%)	7	9.7

Table (4): Relationship between the studied nurses' total knowledge regarding care of preterm neonates with CPAP and their sociodemographic characteristics (n=73)

Total nurses' knowledge regarding care of preterm neonates with Continuous Positive Airway Pressure		
Nurses' characteristics	test	P value
Age (in years)	7.56	<.001*
Gender	.253	.841
Marital status	160	.874
Level of education	.487	.616
Years of experience	7.52	<.001*

Table (5): Relationship between the studied nurses' total practices regarding care of preterm neonates with CPAP and their sociodemographic characteristics (n=73)

Total nurses' practices regarding care of preterm neonates with Continuous Positive Airway Pressure		
Nurses' characteristics	test	P value
Age (in years)	.476	.70
Gender	.331	.742
Marital status	040	.968
Level of education	.142	.868
Years of experience	.442	.724

Table (6): Relationship between the studied nurses' attitude regarding care of preterm neonates with CPAP and their sociodemographic characteristics (n=73)

Total nurses' attitude regarding care of preterm neonates with Continuous Positive Airway Pressure		
Nurses' characteristics	test	P value
Age (in years)	1.67	.181
Gender	.270	.788
Marital status	1.43	.161
Level of education	.443	.644
Years of experience	1.62	.191

Table (7): Relationship between total studied nurses' level of knowledge and total level of practices regarding care of preterm neonates with CPAP (n=73)

Items	Level of practice				X ²	p-value
	Competent (n=2)		Incompetent (n=71)			
	N	%	N	%		
Knowledge Levels						
Poor	1	20	4	80	6.89	.032*
Average	0	0	42	100		
Good	1	3.8	25	96.2		

Figure (1): Percentage distribution of the studied nurses according to their level of knowledge about premature neonates



Figure (2): Percentage distribution of the studied nurses according to their level of knowledge about mechanical ventilation

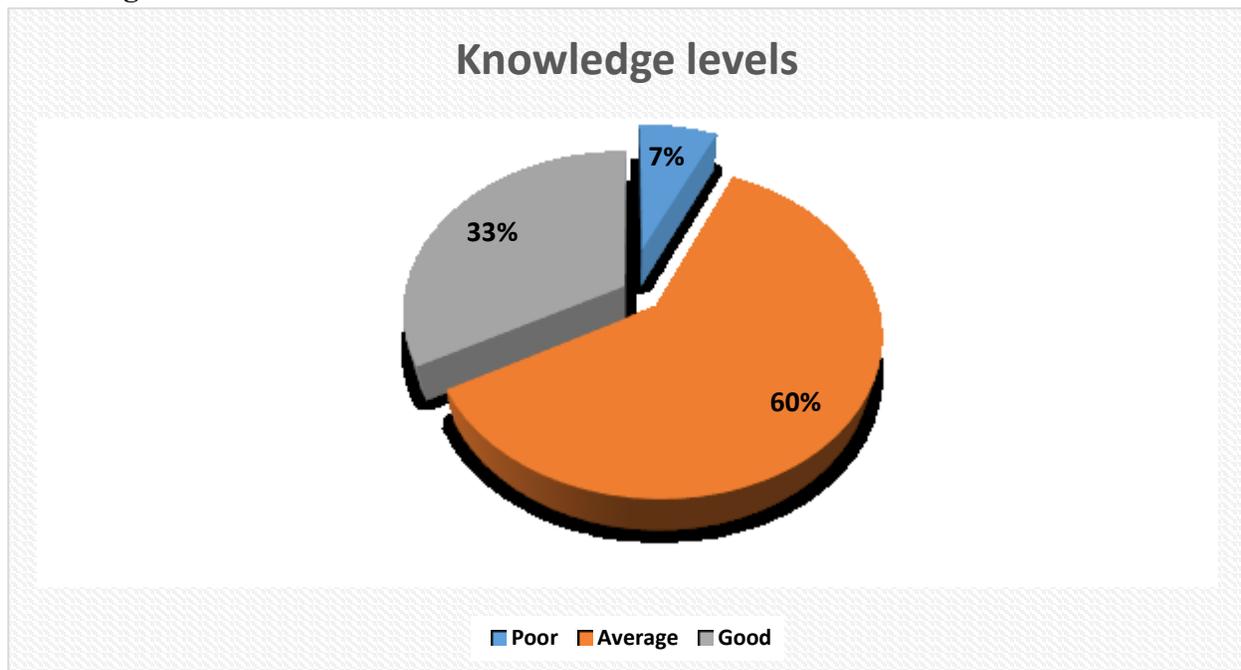


Figure (3): Percentage distribution of the studied nurses according to their level of knowledge about continuous positive airway pressure

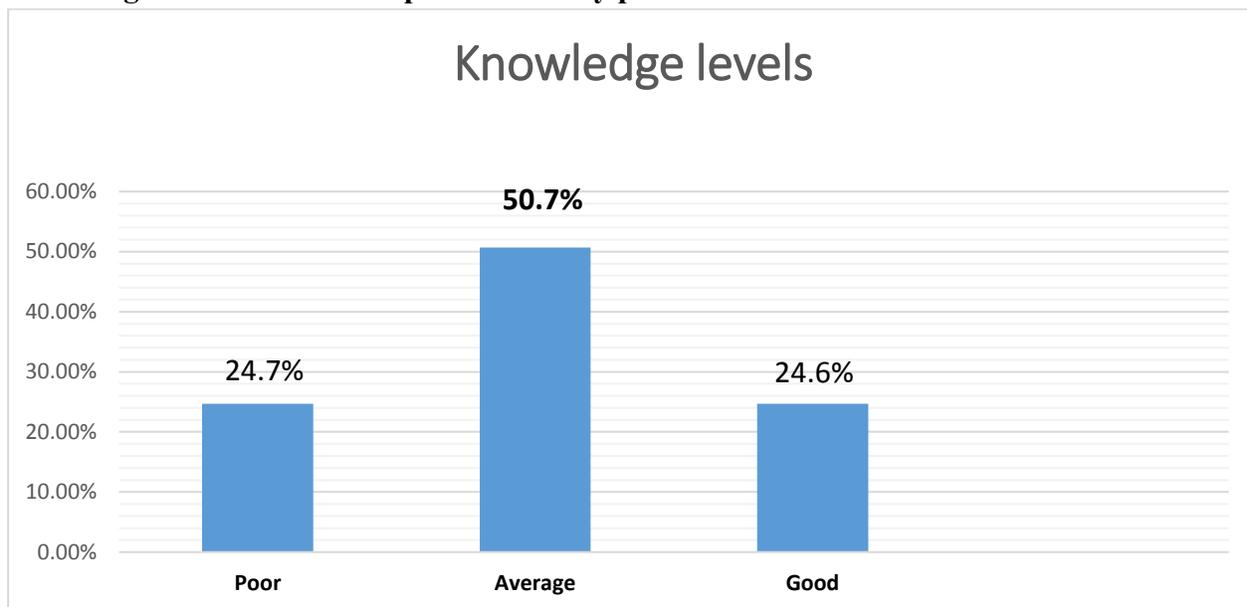


Figure (4): Percentage distribution of the studied nurses according to their level of knowledge about nursing care of preterm neonates with CPAP

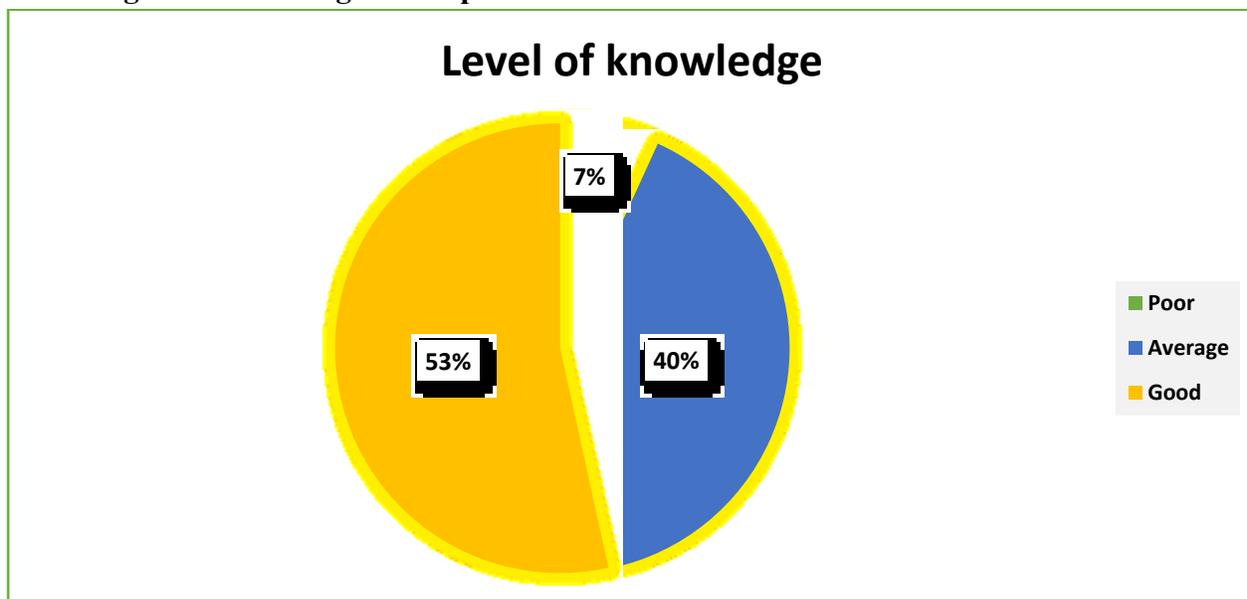


Figure (5): Percentage distribution of the studied nurses according to their total level of knowledge about care of preterm neonates with CPAP

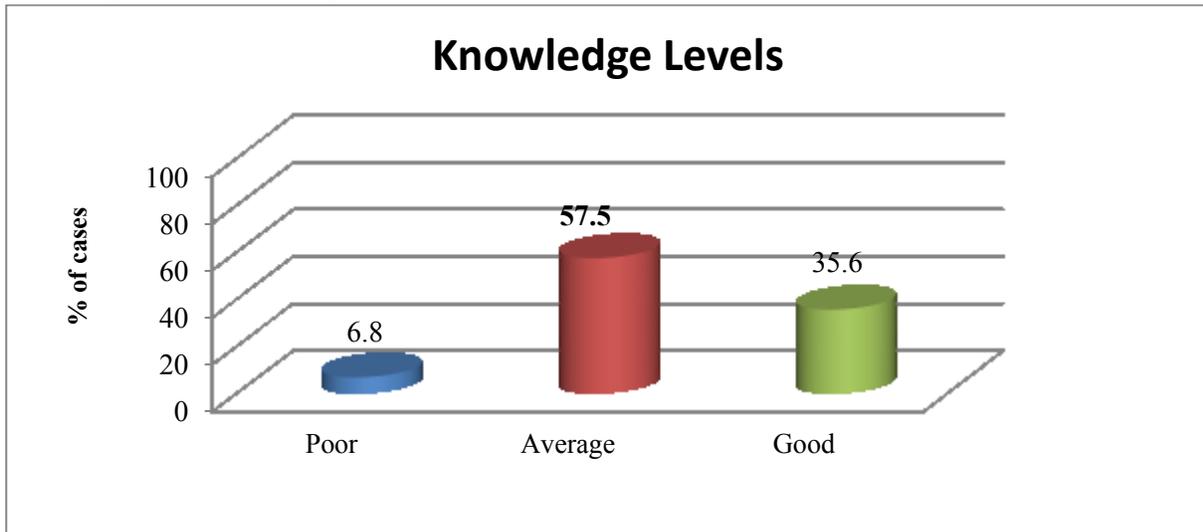


Figure (6): Distribution of nurses' level of practices regarding care of preterm neonates with continuous positive airway pressure



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