



Assessment of Nurses' Performance Regarding Non-Pharmacological Pain Management of Neonates in Intensive Care Unit

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Abstract

Background: Pain is a major source of neonatal distress. Non-pharmacological pain management refers to use of drug-free methods to relieve pain. That is effective, low risks to neonates and low operating cost. **Aim:** To assess nurses' performance regarding non-pharmacological pain management of neonates in intensive care unit. **Design:** A descriptive design was used to utilized this study. **Setting:** This study carried out at Neonatal Intensive Care Units at Fayoum General Hospital affiliated to Ministry of health and Fayoum Health Assurance Hospital affiliated to Health Assurance Organization. **Sample:** A purposive sample consisted of 100 nurses who working in the previous mentioned settings. **Tools:** Two tools used for data collection, **Tool (1):** A structured interview questionnaire consisted of two parts: Part (1): Characteristics of studied nurses. Part (2): To assess knowledge of studied nurses regarding neonatal pain and non-pharmacological management. **Tool (2):** Observational checklist to assess practices of studied nurses regarding non-pharmacological pain management. **Results:** the mean age of studied nurses was 33.3 ± 3.9 years and 52% of studied nurses had poor level of knowledge. And, 82% of them had incompetent practices regarding non-pharmacological management methods. **Conclusion:** more than half had poor level of knowledge and majority had incompetent practice regarding neonatal pain and non-pharmacological pain management methods. Furthermore, there was highly significant between nurses' age, experience years, qualifications and their total knowledge and practice regarding neonatal pain and non-pharmacological management methods. **Recommendations:** Continuous training program for neonatal nurses about non-pharmacological pain management.

Keywords: Nurses performance, Neonates, Pain, Non-pharmacological, Intensive Care Unit.

Introduction:

Pain is an unpleasant physical and emotional experience associated with actual or potential tissue damage. However, this concept cannot be applied literally to neonates due to lack of their ability to verbalize and the absence of previous painful experiences (Raja et al., 2020). Pain is a major source of neonatal distress and is a common frequent symptom of a possible disease process, it is considered as a foremost distress influencing all aspects of life. Neonates require attentive care considering their high morbidity and mortality rates (Amponsah et al., 2020).

The healthy and sick neonates often undergo various painful medical procedures during their first year of life, this procedures commonly performed can classified from mild to severe painful procedures causing ranges of minor and temporary discomfort especially those who hospitalized. These procedures include; intramuscular injection, subcutaneous injection, venous or arterial puncture, heel lance, nasogastric tube insertion, removal of adhesive tab, venous cannulation and central line insertion (Mcnair, 2020).

The neonatal nervous system is very plastic because it is immature and undergoing major developmental changes; therefore, neonates may be vulnerable to neurodevelopmental changes from painful stimuli, increasing the risk of neurodevelopmental impairments, including short and long term physical and psychological disability. Adverse effect



of pain including changes in brain development, processing, and alterations in somatosensory function that lead to pain, this damage may have long-term effects that persist into childhood and even adulthood (Williams & Lascelles, 2020).

The neonatal pain is recognized and should be examined and determined by physiological and behavioral indicators; physiological indicators include heart rate variability, respiratory rate, breathing pattern, blood pressure, oxygen saturation, intracranial pressure and skin color. Behavioral indicators include crying patterns, facial expressions, sleep patterns, body movement, muscle tone, and censurability. In neonates, specific facial features such as eye squeeze, brow bulge and open-squared mouth are associated with acute pain (Gupta et al., 2021).

Untreated pain has immediate and long-lasting harmful consequences to the nervous system development and inhibits the neonate's ability to fight infections. Painful experiences may cause structural and physiological changes within the nervous system, decreased pain thresholds and hypersensitivity to pain. Serious complications of untreated pain such as sleep disturbance, feeding problems, maternal-infant interactions may persist long after the noxious stimuli has ended, demonstrating recall of pain and somatic complications (Morris et al., 2022).

Pain management in the neonatal period should base on accurately identifying the presence of pain as the first step for its optimal management. The main goal of pain management in the neonate is the use of interventions to minimize its intensity and duration. Thus, helping neonates to reorganize recover from this stressful experience. Pain treatment should occupy a prominent place within the activities in the neonatal intensive care unit. Consequently, prevention and control of pain should be a priority throughout the neonates' hospital stay (Nascimento & Teixeira, 2018).

Non-pharmacological pain management refers to the use of drug-free methods to relieve mild and moderate pain as well as, improve wellbeing in the neonates. The non-pharmacological measures include: breastfeeding or expressed breast milk (EBM), oral sweet as sucrose, glucose, non-nutritive sucking, skin to skin contact (SSC) or kangaroo care (KC), swaddling/ facilitated tucking and music. Non-pharmacological methods have proven the efficiency and low risks to neonates, as well as low operating cost concerning intensive care. There is great evidence support its analgesic effects to prevent adverse effects of procedural pain in neonates. (Koukou et al., 2022).

Neonatal nurses are the main health care providers who provide care for neonates and their most important responsibility is implement a strong evidence-based measurement tool to reflect accurate pain assessment and responsible to find an effective pain management method. Neonatal nurses play an important role in neonatal pain management by anticipate problems and systematically evaluate the management especially pain. Nurses act as a nurturer to premature and full-term neonate in Neonatal Intensive Care Units (NICUs). Nurses are the main link between neonates and parents, health education and training should be provided to neonate's mothers to improve their neonate's health status (Mahmoud et al., 2022).

2- Significance of the study:

In Egypt more than half (52.9%) of the Late preterm neonates were admitted to (NICU) (Algameel et al., 2020). While over 3.6 million live births in the United States (US) in 2020, and although pinpointing the number of neonatal intensive care unit (NICU) admissions is a challenge, it has been estimated that 9–13% of infants require neonatal intensive care for complex medical needs (Pineda et al., 2023). Neonates exposed to 26 painful procedures per day during hospitalization; as heel lancing. Untreated pain during the neonatal period may lead to higher heart rates and lower oxygen saturation. The serious complications for untreated pain can be apnea, intracranial hemorrhage (Shen et al., 2021). Non-Pharmacological methods are economical, tolerated well by neonates, easily assimilated and implemented by the nurses, low or no risk of complication. Non-pharmacological methods have proven to be effective whether used alone or combined with pharmacological methods (El Awady & Gharib, 2021).

So that, from the research point of view it is important to assess nurses' knowledge and practices regarding to neonatal pain and non-pharmacological pain management to improve the quality of care and reduce further complication of untreated pain.

3- Aim of the Study:

This study aimed to assess nurses' knowledge and practices regarding non-pharmacological pain management of neonates in intensive care unit.



4- Research Questions:

- 1- What are nurses' knowledge and practices regarding neonatal pain and non-pharmacological pain management?
- 2- Is there a relationship between nurses' knowledge, practices and their characteristics?

5- Subjects and Methods:

Study design:

A descriptive research design was utilized to achieve the aim of the study and answer the research questions.

Study settings:

This study was conducted at NICU in both Fayoum General Hospital and Fayoum Health Assurance Hospital. The Neonatal Intensive Care Unit in Fayoum General Hospital affiliated to Ministry of Health was located on second floor in hospital. This unit divided into 8 rooms, each room contains 5 incubators. While the NICU in Fayoum Health Assurance Hospital affiliated to Health Assurance Organization was located on second floor in hospital. This unit divided into two rooms, each room contains 8 incubators.

Study sampling:

A Purposive sample consisted of 100 neonatal nurses who provide care for neonates at the previously mentioned setting regardless their age, gender, educational level and nurses less than one year of experience will excluded.

Tools of data collection: Two tools used in this study:

Tool (I): Structure Interviewing Questionnaire:

It was designed by the researcher in simple Arabic language, after reviewing the related literature and references Mohamed et al, (2019) it consists of two parts.

Part (1): Characteristics of the study sample which include:

a- Characteristics of studied nurses: include age, gender, level of education, years of experience, residence, attendance of educational courses about neonatal pain and non-pharmacological management and participation in pain assessment and management of neonatal pain.

b- Characteristics of neonates: include Age, gender, gestational age and diagnosis.

Part (2): Studied Nurses' knowledge regarding neonatal pain and non-pharmacological pain management; it was consisted of 40 questions divided into Nurses knowledge regarding pain concepts (6 items), painful nursing procedures for neonates (6 items), neonatal pain assessment (6 items), and different non-pharmacological pain management methods for neonates (5 items), how to use non-pharmacological methods for neonates: oral sweet solution (5 items), non-nutritive sucking (4 items), kangaroo care (4 items), and environment stimuli (4 items) all of these questions divided into (29) closed questions and (11) open questions.

Scoring system:

Knowledge obtained from the studied nurses was checked with model key answer, the open questions scored as the following: correct answer was scored "two", while the incomplete correct answer was scored "one" and incorrect answer was scored "zero". While closed questions a score "one" was given for every correct answer and score "zero" was given for every incorrect and don't know answer. Finally, 51 score for 40 questions. The total scores of knowledge were summed and converted into a percentage score and categorized as:

- Good knowledge if total score $75\% \leq 100\%$ equal 38.5 to 51 score
- Average knowledge if total score $50\% < 75\%$ equal 26 < 38.5 score
- Poor knowledge if total score $> 50\%$ equal less than 26 score.

**Tool (II): Observation Checklists:**

This tool adapted from Abd El-Aziz, (2019) to assess nurses' practices regarding non-pharmacological neonatal pain management methods. It consisted of 20 statements as oral-sweet solution (4 statements), nonnutritive sucking (3 statements), Skin- to- Skin contact (5 statements), modification of environmental stimuli (4 statements) and daily care of neonate (4 statements).

Scoring system:

The total score of studied nurses' practices ranged from 0-20 score each item was evaluated as "done" was scored "one" score and "not done" was scored "zero". These scores were summed and converted into a percentage scores:

- Competent practices $\geq 85\%$ equal $17 \leq 20$ score.
- Incompetent practices $< 85\%$ equal less than 17 score.

Operational Design:

The operational design included preparatory phase, content validity, pilot study and fieldwork.

1. The Preparatory Phase

It included reviewing of related literature using textbooks, journals, scientific periodicals and web-sites was conducted to develop the study tools and to get acquainted with the various aspects of the research problem.

2. Pilot Study:

A Pilot study involved ten nurses (10% of the total sample size) to test feasibility and applicability of the tools and to assess the time required to fulfill the tools. The result of the data obtained from the pilot study helped in modification of the study tools, where some items were corrected as necessary. Subjects included in the pilot study were excluded later from the study sample.

3. Content Validity:

The tools were revised by a jury of 3 experts of pediatric nursing from Faculty of Nursing- Helwan University and Fayoum University. The jury reviewed the tools for its validity, comprehensiveness, accuracy, clarity and relevance.

4. Content reliability:

The internal consistency of the developed tools was tested for their reliability using Cranach's alpha coefficient test by a statistician to assess reliability of the tools; the tools were reliable at tool one: $r=0.753$ and tool two was reliable at $r=0.877$.

5. Field work:

Once permission was granted to proceed with the study, the researcher visited the study setting; the actual field work was carried out for data collection over three months started from January, 2023 to the end of March, 2023. The researcher was available two days/week by the rotation in the previously mentioned setting during the morning shifts from 9 am to 12 pm, the purpose of the study was explained by the researcher to each nurse providing care for neonates in NICU before data collection in addition to clear and brief idea about aim of the study and its expectation. The average time needed for completion of each questionnaire sheet by nurses was approximately 20-30 minutes; the researcher observed the actual practice of every nurse by observational checklist and filled by the researcher in 20-30 minute.

Administrative Design:

An official letter requesting permission to conduct the study was submitted from the Dean of Faculty of Nursing- Helwan University to the director of previously mentioned study setting to collect the necessary data for the current study. The letter included the aim of the study in order to get permission and help for collection of data. The necessary approval was obtained from the units' directors.

Ethical considerations:

An official permission to conduct the proposed study was obtained from The Scientific Research Ethical Committee, Faculty of Nursing, Helwan University. Participation in the study was voluntary and subjects were given complete full information about the study and their role before oral consent and that they had the right to refuse to participate. The ethical considerations included explaining the purpose and nature of the study, stating the possibility to withdraw at any time, confidentiality of the information where it was not accessed by any other party without taking permission of the participants. Ethics, values, culture and beliefs was respected.

Statistical Design:

Upon completion of data collection, data was organized, categorized, tabulated, entered and analyzed using Statistical Package for the Social Science (SPSS), IBM SPSS Statistics for Windows, and Version 24. Armonk, NY: IBM Corp. Statistical presentation and analysis of the present study was conducted, using the mean, standard deviation (SD), chi-square test (X^2) was used to compare between groups in qualitative and linear correlation coefficient was used for detection of correlation between two quantitative variables in one group. Statistical significance was considered at (P-value <0.05), P value >0.05 mean Non significant, while P value <0.001 mean High significant.

6- Result:

Table (1): Distribution of the studied nurses according to their characteristics (n =100).

Item	No	%
Age/years		
20: < 25	23	23
25: < 30	42	42
30: < 35	15	15
35: < 40	12	12
40: ≤ 45	8	8
Mean ±SD= 33.3 ±3.9		
Residence		
Urban	71	71
Rural	29	29
Previous attendance of training courses about neonatal pain		
Yes	15	15
No	85	85
Participate in pain assessment and management		
Yes	15	15
No	85	85

Table (1) shows that, less than a half (42%) of the studied nurses age was ranged from 25 to less than 30 years with mean ± SD of age 33.3 ± 3.9 years. As well, less than three quarters (71%) of the studied nurses were from urban areas. The majority (85%) of nurses didn't attend any previous training programs regarding neonatal pain and didn't participate in neonatal pain assessment and management.

Table (2) Distribution of the studied nurses' total knowledge about neonatal pain and non-pharmacological management (n =100).

Neonatal pain and Non-pharmacological pain management Knowledge Items	Good		Average		Poor	
	No	%	No	%	No	%
Concepts of pain	20	20	27	27	53	53
Neonatal pain assessment	12	12	31	31	57	57
Physiological, behavioral and vocal pain indicators	19	19	26	26	55	55
Different pain management strategies in NICU	18	18	26	26	56	56
Using of non-pharmacological methods for pain management	14	14	37	37	49	49

Table (2) shows that, more than half (55% & 56%) of the studied nurses have poor knowledge regarding physiological, behavioral and vocal changes and different pain management strategies in NICU respectively. While only 20% have good knowledge regarding concepts of pain.

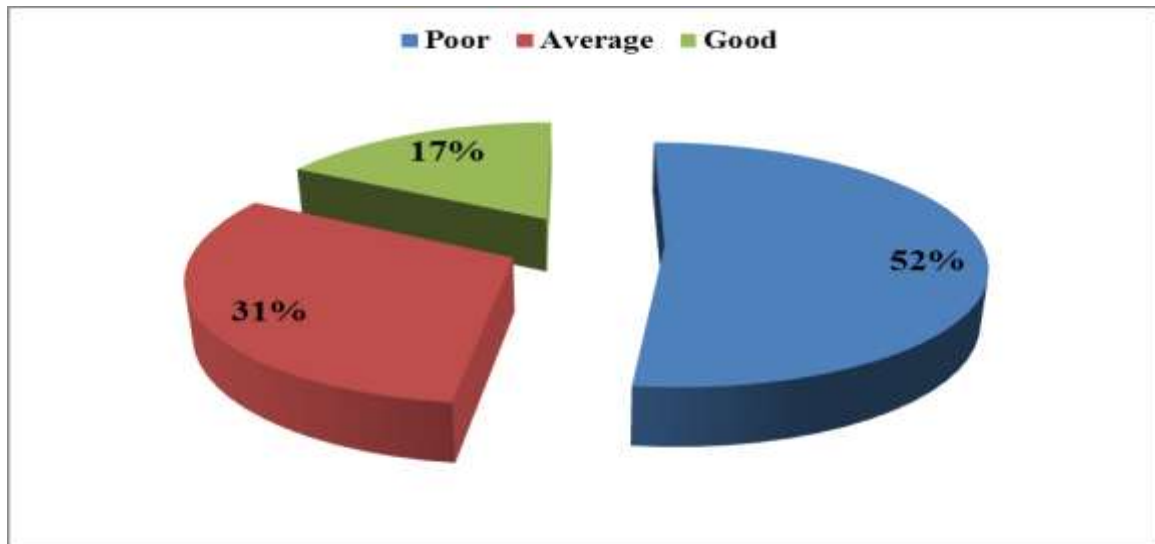


Figure (1) Percentage distribution of the studied nurses' according to their total knowledge about neonatal pain and non-pharmacological management methods (n=100).

Figure (1) shows that, more than half (52%) of the studied nurses had poor level of knowledge, while 31% of them had average level and only 17% of them had good level of total knowledge regarding neonatal pain and non-pharmacological management methods.

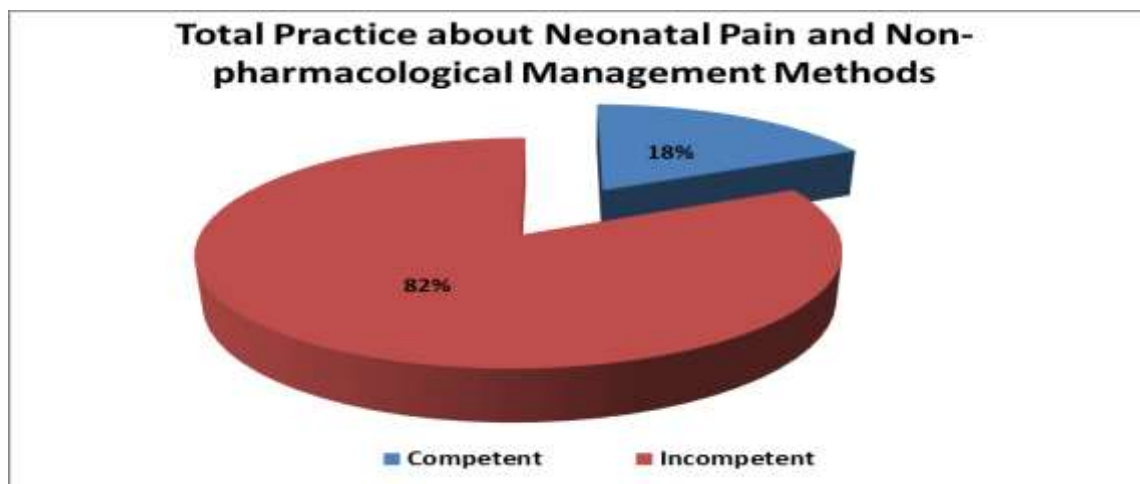


Figure (2): Percentage distribution of studied nurses' according to their total practices about neonatal pain and non-pharmacological management methods (n=100)

Figure (2) reveals that, the majority (82%) of the studied nurses had incompetent practices, while, 18% of them had competent practices regarding neonatal pain and non-pharmacological management methods.

Table (4): Relation between nurses' characteristics and their total knowledge about neonatal pain and non-pharmacological pain management methods (n=100).

Characteristics	Total knowledge						Total	X ²	P
	Good		Average		Poor				
	No	%	No	%	No	%			
Age									
20 < 25	2	2	7	7	14	14	100	81.120	0.009**
25 < 30	8	8	11	11	23	23			
30 < 35	4	4	7	7	5	5			
35 < 40	2	2	3	3	6	6			
40 ≤ 45	1	1	3	3	4	4			
Gender									
Male	3	3	6	6	10	10	100	41.683	0.034
Female	14	14	25	25	42	42			
Qualifications									
Diploma	3	3	5	5	25	25	100	48.321	0.001**
Nursing institute	6	6	10	10	25	25			
Bachelor	8	8	16	16	2	2			
Residence									
Urban	10	10	19	19	42	42	100	63.521	0.000**
Rural	7	7	12	12	10	10			
Years of Experience									
< 5 years	1	1	6	6	26	26	100	52.021	0.000**
5 < 10 years	5	5	12	12	23	23			

10 < 15 years	9	9	11	11	2	2			
15 years ≤ 20	2	2	2	2	1	1			
Previous attendance of training courses about neonatal pain									
Yes	9	9	4	4	2	2	100	11.462	0.143
No	8	8	27	27	50	50			
Participate in pain assessment and management									
Yes	12	12	21	21	1	1	100	51.213	0.184
No	5	5	10	10	51	51			

X²=chi-square test. No significant at p > 0.05. *Significant at p < 0.05. ** Highly significant at p < 0.01

Table (4) shows that, there was a highly statistically significant relation between nurses' age, years of experience, residence, qualifications and their total knowledge about neonatal pain and non-pharmacological pain management methods at P-value <0.001**

Table (5) Relation between nurses' characteristics and their total practices about neonatal pain and non-pharmacological pain management methods (n=100)

Characteristics	Total practice				Total	X ²	P
	Competent		Incompetent				
	No	%	No	%			
Age							
20 < 25	3	3	20	20	100	43.685	0.008**
25 < 30	6	6	36	36			
30 < 45	3	3	13	13			
35 < 40	4	4	7	7			
40 ≤ 45	2	2	6	6			
Gender							
Male	5	5	13	13	100	11.021	0.527
Female	13	13	69	69			
Qualifications							
Diploma	4	4	29	29	100	48.133	0.002**
Nursing institute	4	4	37	37			
Bachelor	10	10	16	16			
Residence							
Urban	9	9	62	62	100	11.810	0.461
Rural	9	9	20	20			
Years of Experience							
< 5 years	2	2	31	31	100	89.230	0.00**
5 < 10 years	5	5	35	35			
10 < 15 years	7	7	15	15			
15 years ≤ 20	4	4	1	1			
Previous attendance of training courses about neonatal pain							
Yes	13	13	2	2	100	12.322	0.621
No	5	5	80	80			

Participate in pain assessment and management							
Yes	16	16	18	18	100	11.523	0.427
No	2	2	64	64			

**Highly significant $p < 0.001$, χ^2 chi square

Table (5) shows that, there was a highly statistically significant relation between nurses' years of experience, qualifications, age and their total practices of studied nurses about neonatal pain and non-pharmacological pain management methods at P -value < 0.001 **

Table (6): Correlation between total knowledge of studied nurses and their total practice about neonatal pain and non-pharmacological methods (n=100).

Item	Total knowledge	
	R	P-value
Total practice	0.796**	0.000**

r= correlation coefficient test. P= p-value ** Highly significant at $p < 0.01$.

Table (6): indicate that, there is a strong positive correlation between total knowledge of the studied nurses and their total practices regarding the neonatal pain and non-pharmacological management methods at P - value < 0.001 **.

7- Discussion

Pain management among neonates presents a challenge to the clinical practice. Although neonates are able to process nociceptive stimuli, painful procedures are commonly performed in neonatal intensive care units without adequate treatment. Repeated and untreated pain experiences during the hospitalization at such early stages of life might lead to neurodevelopmental and behavioral damage, with detrimental consequences over both the short and long term (**Gomes et al., 2020**). Therefore, neonatal intensive care units must adopt effective pain assessment tools that consider multiple factors (gestational age and physiological and behavioral responses to pain). Thus, health care professionals, especially nurses face the dilemma of balancing the need for proper monitoring, testing, and treatment with the need to minimize neonatal pain (**Blomqvist et al., 2020**).

Regarding to age of the studied nurses, the current study finding showed that, less than a half of the studied nurses their age was 25 to 30 years with mean \pm SD of age 33.3 ± 3.9 years. This finding in the same line with **Al-Maaitah et al., (2023)** in a study entitled "Nurses' Improved Provision of Infants' Procedural Pain Assessment and Management with Non-pharmacological Interventions Following a Training Program in Jordan" who reported that, the ages of the studied nurses ranged from 24 to 35 years. While contrasted with **Wari et al., (2021)** who applied study entitled "Knowledge and Practice of Nurses and Associated Factors in Managing Neonatal Pain at Selected Public Hospitals in Addis Ababa, Ethiopia" who reported that, most of the studied nurses were aged between 24–28 years with a mean age of 26.7 ± 2.907 years. The researcher believed that, this age is appropriate to provide good care for neonates actively and energetically, and at the same time, with appropriate experience.

Concerning to gender of the studied nurses, the present study finding revealed that, the majority of them were females. This finding was in accordance with **Bonato et al., (2024)** in a study about "Perceptions of the Neonatal Intensive Care Unit Team and the Nursery about Newborn Pain" who reported that, all of the studied nurses were females. Also this finding was supported with **Saleh, (2023)** who applied study entitled "Nurses' Assessment and Management Practices of Pain among Intensive Care Patients in King Khalid Hospital, Kharj, and Riyadh" who showed that, the majority of the studied nurses were females. The researcher believed that, this finding may be because a more significant fraction of the nurses' task force in Egypt was females.

Regarding to educational qualification, the present study finding reported that, less than half of the studied nurses were technical nursing institute. This finding was supported with **Mohamed et al., (2021)** in a study entitled "Effect of an Educational Program through a Lecture versus Multimedia Methods on Pediatric Nurses' Knowledge and Attitude regarding Acute Pain Management" who reported that, A highly percentage of the studied nurses had technical nursing



institute. While this result contradicted with **Taplak, (2023)** who conducted study entitled "Pediatric Nurses' Knowledge and Practices Related Pain Management in Children" who stated that, less than two thirds of the studied nurses had a bachelor's degree. The researcher believed that, the fact that technical nursing institutes provided the community with large number of graduates than other agencies such as faculties of nursing.

The current study finding showed that, more than half of the studied nurses had poor knowledge in physiological, behavioral and vocal changes and different pain management strategies in NICU respectively. But, one fifth of them had good knowledge in pain concepts. This finding was supported with **Abbass, and Obaid,(2022)** in a study entitled "Effectiveness of Educational Program on Nurses' Knowledge Regarding Neonatal Pain Management" and found that the studied nurses had poor knowledge pre educational program regarding pain can't affect newborn's limb movements, and pain can affect newborn's facial expressions. The researcher believed that, this finding may be due to non-pharmacological pain management new trend not applied in hospital.

Regarding to total knowledge of the studied nurses about neonatal pain and non-pharmacological management methods, the current study finding showed that, more than half of the studied nurses had poor level of knowledge, while less than one third of them had average level and less than one fifth of them had good level of total knowledge about neonatal pain and non-pharmacological management methods. This finding was in the same line with **Elsayed et al., (2023)** in a study entitled "Upgrading Nurses' Knowledge, Attitude and Self-Efficacy toward Pharmacological and Non-Pharmacological Pain Management" who reported that, the majority of the studied nurses had low level of knowledge Toward Pharmacological and Non-Pharmacological Pain Management. And this finding was supported with **Dielle, (2023)** in a study entitled "The Knowledge, Practices and Attitude of Nurses towards Pain Management of Neonates in the Western Cape" who reported that, the studied nurses had feeble knowledge towards neonatal pain management. While disagreed with **Popowicz et al., (2021)** in a study entitled "Knowledge and Practices in Neonatal Pain Management of Nurses Employed in Hospitals with Different Levels of Referral—Multicenter Study" who showed that, the majority of respondents had a sufficient level of knowledge of pain. The majority of the nurses in previous studies believed that neonates are less sensitive to pain than adults because they have a less functional and immature nervous system. Moreover, they believed that neonates need fewer analgesics because their pain diminishes more quickly than adults. The researcher believed that, this indicates the need for education regarding the presence of neonate pain, its consequences, and appropriate interventions.

According to total practice about neonatal pain and non-pharmacological management methods, the present study finding revealed that, the majority of studied nurses had incompetent practice, while, less than one fifth of them had competent practice about neonatal pain and non-pharmacological management methods. This finding was supported with **Qasim, et al., (2021)** in a study entitled "Nurses' knowledge and practice in assessment and management of neonatal pain at Governmental Hospitals in Gaza Strip" who revealed that, highly percentage of the studied nurses had very low of practice level with mean percentages. As well, in accordance with **Abd El-Aziz et al., (2019)** who study "Improving Nurses' Performance towards Non- Pharmacological Pain Management among Neonates in Neonatal Intensive Care Unit" and noted that, the studied nurses had poor nurses' knowledge and practice regarding neonatal pain assessment and management in NICU. While disagreed with **Muteteli et al., (2019)** in a study entitled "Neonatal Pain Management among Nurses and Midwives at two Kigali Hospitals" who found that, the majority of nurses practice better on neonatal pain management. Also **Wuni, et al., (2020)** in a descriptive cross-sectional study entitled "Evaluating Knowledge, Practices, and Barriers of Pediatric Pain Management among Nurses in a Tertiary Health Facility in the Northern Region of Ghana" who reported that. more than half of the studied nurses had good pain management practices. The researcher believed that, this finding may be due to absence of pain management protocol and lack of some knowledge that reflects on level of practice among studied nurses.

The present study finding showed that, there was a highly statistically significant association between nurses' age, years of experience, residence, qualifications and their total knowledge about neonatal pain and non-pharmacological pain management methods. These findings supported with **Mohamed, et al., (2019)** in a study entitled "Effect of Educational Program on Pediatric Nurses' Knowledge and Practice Regarding Selected Non-pharmacological Techniques to relieve Pain in Neonates" who reported that, there was a statistically significant relation between pediatric nurses' knowledge and their personal characteristics and their attendance in training programs. The researcher believed that, the nurses' years of experience and their qualifications increase level of nurses' knowledge.



The present study finding revealed that, there was a highly statistically significant association between nurses' years of experience, qualifications, age and their total practice of studied nurses about neonatal pain and non-pharmacological pain management methods. This finding was supported with **Tsegaye, et al.,(2023)** in a study entitled "Non-Pharmacological Pain Management Practice and Associated Factors Among Nurses Working at Comprehensive Specialized Hospitals" and found that there was statistically significant association between non-pharmacological pain management practice of nurses and their personal characteristics. The researcher believed that, the nurses' age and years of experiences increase level of nurses' practice.

The current study finding indicated that, there is a highly significant positive correlation between total knowledge of studied nurses and their total practice about the neonatal pain and non-pharmacological management methods. This finding was contrasted with **Selvi, et al., (2022)** in a study about "Assessment of Knowledge, Attitude and Practice towards Neonatal Pain Management among Nursing in New Delhi" and reported that there positive weak correlation between knowledge and practice among the studied nurses. The researcher believed that, this finding may be due to the nurses had years of experience working in neonatal intensive care units and increase level of nurses knowledge enhances level of practice.

8-Conclusion:-

Based on the results it can be concluded that, more than half of studied nurses had poor level of knowledge regarding neonatal pain and non-pharmacological management methods. As well, the majority of studied nurses had incompetent practices regarding non-pharmacological pain management. Furthermore, there was a highly statistically significant between nurses' age, years of experience, qualifications and their total knowledge and total practice regarding neonatal pain and non-pharmacological pain management methods. In addition to, there was a highly significant positive correlation between total knowledge of the studied nurses and their total practice regarding the neonatal pain and non-pharmacological management methods.

9-Recommendation: -

In the light of the study findings, the following recommendations are suggested:

- ⇒ Continuous training programs for neonatal nurses in NICU regarding pain assessment scale used and non-pharmacological pain management methods.
- ⇒ Provision the guidelines booklet to newly nursing staff caring for neonates during any to provide them by needed information of the neonatal pain and non-pharmacological pain management methods and how use it.
- ⇒ Simple illustrated booklets, posters and guidelines for neonatal nurses regarding neonatal pain and its non-pharmacological management.

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