Nurses' Performance towards Non-Pharmacological Pain Management Techniques among Neonates

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Abstract

Background: One of the main causes of newborn distress is chronic pain. Non-pharmacological pain management is the practice of managing pain without the use of drugs. That works well and poses little risk to newborns. **Aim:** To assess nurses' performance towards non-pharmacological pain management techniques among neonates. **Design:** A descriptive research approach was applied to perform this study. **Setting:** This study was conducted at the Neonatal Intensive Care Unit (NICU) in Sohag General Hospital (SGH). **Sampling:** A convenient sample of all available nurses were included in data collection at Neonatal Intensive Care Unit in Sohag General Hospital. **Tools:** Two tools used for data collection, **Tool (1):** A questionnaire consisted of two parts: **Part (1):** Includes personal characteristic of nurses. **Part II**: Nurses' knowledge regarding non-Pharmacological pain management techniques among neonates questionnaire. **Tool II:** An observational checklist to assess practices of studied nurses . **Results:** 62.2% of nurses demonstrated unsatisfactory knowledge while 37.8% showed satisfactory knowledge. Additionally, 69% exhibited inadequate practices, whereas 31% practiced competently. A statistically significant positive correlation was found between the nurses' overall knowledge and their practice scores concerning non-pharmacological pain management techniques for neonates at (p-value < 0.001). **Conclusion:** More than three fifth of the studied nurses had unsatisfactory level of total knowledge regarding non-pharmacological pain management techniques among neonates, Also, less than three quarter of the studied nurses had incompetent level of total practice regarding non-pharmacological pain management techniques among neonates. **Recommendations:** Continuous training programs for neonatal nurses in NICU**.**

Keywords: Nurses' Performance, Neonates, Non-pharmacological, Pain management

Introduction

A neonate is a baby in the first 28 days of life. In the 1st two weeks of life, newborns admitted to a Neonatal Intensive Care Unit (NICU) typically endure 134 unpleasant operations, such as endotracheal suctioning or heel pricks for blood collection, which are frequently required to provide the finest care. Numerous times, the same newborn undergoes some of these procedures, which have been linked to negative physiological outcomes like bradycardia and hypoxemia **(El Awady and Gharib, 2021).**

Any individual can endure pain. Pain is described by the International Association for the Study of Pain as a distressing sensory and emotional experience that is either linked to actual or potential tissue damage, or closely resembles such damage. One symptom that harms people and presents difficulties for medical professionals is pain (**International Association for the Study of Pain, 2020).**

Untreated pain has instantaneous and long-lasting negative consequences on the development of the neurological system and weakens the newborn's defenses against infections. Anatomical and physiological changes in the nervous system, enhanced sensitivity to pain, and decreased pain thresholds can all be consequences of painful experiences. If left untreated, pain can have long-lasting negative repercussions, including sleep disturbance, feeding problems, mother-newborn interactions, pain memory, and somatic disorders **(Morris et al., 2022).**

Both pharmaceutical and non-pharmacological methods of managing pain are crucial components of newborn care. Chemical or pharmacological therapies can have adverse side effects in some people, and in others, they can cause allergies. Handling infant pain without the use of drugs is known as non-pharmacological pain treatment. No matter how bad the stressor is, it tries to lessen newborns' stress by using therapies that mimic attachment ideas, like being close to the caregiver and enhancing feelings of safety and security. Nurses are able to treat pain without the use of medications other than opioids (**Guo et al., 2020**).

Non-pharmacological approaches are a supplement to pharmaceutical treatments, not a replacement for them. These techniques are beneficial, particularly when it comes to treating mild to moderate pain. They are applied independently for managing mild pain and are combined with pharmacological treatments to control moderate to severe pain levels. Nurses can use a variety of non-pharmacological pain management (NPPM) techniques when providing nursing care. These non-pharmacological techniques can be applied both before and after any painful procedure. These interventions encompass the use of sweet-tasting oral solutions, non-nutritive sucking, breastfeeding, skin-to-skin contact (Kangaroo Care), swaddling, therapeutic touch or massage, music therapy, supported tucking positions, rocking or cuddling, multisensory engagement, and modification of environmental factors. Physical and behavioral results from the evaluation of such care demonstrated that newborns experienced less pain during nursing or medical treatments (**Mohamed et al., 2021)**.

Nurses in Neonatal Intensive Care Units (NICUs) need to recognize the significance of evaluating, re-evaluating, and effectively managing pain due to the frequently reported high incidence of painful interventions (**Al-Maaitah et al., 2022).** By anticipating issues and methodically assessing management, particularly pain, neonatal nurses play a crucial role in neonatal pain management. In neonatal intensive care units, nurses care for both premature and full-term newborns. Since nurses serve as the primary liaison between newborns and their parents, it is important to give mothers health information and training in order to promote the health of their children (**Mahmoud et al., 2022).**

Significance of the study

Providing pain relief for newborns in neonatal intensive care units is ethically essential and inherently warranted. They are particularly susceptible to the negative effects of pain and stress at a young age, in addition to being completely reliant on others to manage their suffering. Over the past 25 years, NICU neonates' immediate and long-term negative effects from early life trauma and stress have drawn a lot of attention (**Ilhan et al., 2021).**

In NICUs, the assessment and reassessment of infant pain are inadequate, applied inconsistently, and have little international documentation. According to the research, healthcare providers only use pharmaceutical or non-pharmacological pain management techniques for a small percentage of uncomfortable operations **(Al-Maaitah et al., 2023).**

One of the basic duties of nurses in the NICU is to assess and treat pain. Newborns are often more vulnerable to the adverse effects of drugs since many of their systems are still developing. Non-pharmacological methods are less costly, have little to no chance of problems, are simple for nurses to understand and use, and are well-tolerated by newborns. Non-pharmacological approaches have been demonstrated to be successful when used either alone or in conjunction with pharmaceutical treatments **(El Awady & Gharib, 2021).** So it is important to conduct this study which aimed to assess the nurses performance towards non pharmacological pain management techniques among neonates

Aim of the study

To assess nurses' pperformance towards non-ppharmacological pain mmanagement techniques among neonates

Research Questions

1) What is the level of nurses' knowledge regarding non-ppharmacological pain mmanagement techniques among neonates?
2) What is the level of nurses' practices regarding non-pharmacological pain management techniques among neonates?
3) Is there a relation between nurses' knowledge and practices regarding non-pharmacological pain management techniques among neonates?

Subjects and Method

The study was done under four main designs as follows:

1-Technical design
2- Operational design.
3- Administrative design.
4- Statistical design.

Technical design

Research design

A descriptive research design was utilized to conduct this study**.**

Setting

This study was carried out at the Neonatal Intensive Care Unit in Sohag General Hospital, located in Sohag City.

Sampling

A convenient sample of all available nurses (45 nurses) were included and data collection was done at the Neonatal Intensive Care Unit in Sohag General Hospital.

Tools for data collection

Tools were used to collect necessary data:

Tool I: A questionnaire sheet designed by (Nwaneri et al., 2018), itincludes the following two parts to collect the required data from nurses.

Part I: **Include personal characteristics of nurses,** such as (age, gender, educational qualification, years of experience, attendance of previous educational sessions related to neonatal pain etc.,).

Part II: **Nurses' knowledge regarding non-pharmacological pain management techniques among Neonates questionnaire**: This tool was adopted from **Mwanza et al., (2019**) It consists of 25 questions related to nures's knowledge about non-pharmacological pain management techniques among neonates.

Scoring System: as complete (2), incomplete (1) and don`t know (0). These scores were converted into a percent score was classified as the following

- Unsatisfactory level of knowledge (< 75%).
- Satisfactory level of knowledge (≥ 75%).

Tool II: An observational checklist was developed by **Bassam & Sabaq, (2021).** It comprises 11 items designed to evaluate pediatric nurses' observed practices regarding the use of non-pharmacological methods for relieving pain in neonates during various painful procedures, which include observed practices about non-nutritive sucking, physical methods (touching – positioning - facilitated tucking), skin to skin contact, holding and rocking, swaddling, and music and modifying environmental stimuli.

Scoring system: Responses were recorded as either 'done' or 'not done,' assigning one point for each completed action and zero for those not performed. Each nurse's total score was then calculated and expressed as a percentage by dividing the obtained score by the highest possible score.

- Competent level of practice Score (≥ 75 %).
- Incompetent level of practice Score (> 75 %).

Operational design

Preparatory phase

The researcher reviewed both current and international literature—including books, journals, periodicals, magazines, and online sources—to gain deeper insight into the topic and to support the development of the study tool.

Pilot study

A pilot study involving 10% of the sample (5 nurses) was conducted to assess the practicality, clarity, and time efficiency of the data collection tools. They were included in the study.

Fieldwork

- The researcher was available in the study settings 2 days per week from 9 a.m. to 12 p.m. by scheduled rotation. Data was collected from nurses who accepted to be included in the study after explaining the aim of the study.
- Nurses was asked to fulfill the questionnaire sheet. As regards their knowledge, it demands the suitable time throughout their work. Also the researcher was observed the nurses practice using observational checklist.
- Questionnaire sheet took about half hour to fill all items of the sheet.

Validity

The content validity of the tools was tested its comprehensiveness, appropriateness, clarity and relevance, it were reviewed by five experts in pediatric nursing field, modifications were made according to the expert's judgment.

Reliability

The internal consistency of the study tools was evaluated using Cronbach's Alpha, yielding a reliability coefficient of 0.912 for the knowledge section and 0.853 for the practices section.

Ethical considerations

Formal approval to carry out the proposed study was granted by the Scientific Research Ethics Committee (Approval No. 197) at the Faculty of Nursing, Sohag University and written permission obtained from Director of Governmental Hospital of Sohag General Hospital. Participation in the study was entirely voluntary, and all participants were thoroughly informed about the study's objectives and their involvement prior to providing written consent. Ethical considerations included a clear explanation of the study's purpose and procedures, the assurance that participants could withdraw at any point without needing to provide a reason, and a guarantee of confidentiality, with access to information restricted unless permission was granted. Additionally, the study upheld respect for participants' ethics, values, cultural backgrounds, and personal beliefs.

Administrative design

Authorization to conduct the study was secured from both the Dean of the Faculty of Nursing at Sohag University and the Director of Sohag General Hospital.

Statistical design

After completing data collection, the data were organized, tabulated, and statistically analyzed using IBM's Statistical Package for the Social Sciences (SPSS), version 22. Descriptive statistics—containing frequencies, percentages, means, and standard deviations—were used to present the data. Comparisons of qualitative variables were conducted using the Chi-square test. Correlation between the study variable were tested by using Pearson correlation. Also, data presented in form bar chart and pie chart. A p-value of ≤ 0.05 was regarded as statistically significant, while a p-value of ≤ 0.001 indicated a highly statistically significant difference

Results

Table (1): Clarified that 44.4% of the study nurses' age ranged between 26- 30 years with Mean± Standard deviation (27.8 ± 9.05), and all (100%) of them were female. Also, 77.8% of the studied nurse were married and 46.7% of them had 1-5 years of experiences.

Figure (1): Illustrated that 91.1% of the studied nurses of the studied nurses didn't attend previous training courses about non pharmacological pain managements, while only 9% of them were attending.

Figure (2): Illustrated that most (91.1%) of the studied nurses had technical institute regard their educational level.

Table (2): Revealed that, 84.4%, 86.7%, and 77.8%, of the nurses had incomplete correct knowledge about "signs of neonatal pain", "nonnutritive sucking" and "physical methods of non-pharmacological treatments for pain management in neonates", respectively. while 100%, 93.3%, 100% and 95.65% of the studied nurses had complete correct knowledge regarding "there were methods of non-pharmacological pain management therapies", "oral sweet solution", "pain assessment tools include" and "components of pain assessment" respectively.

Table (3): Showed that, most (95.6%, 97.8%) of the nurses had correct knowledge about "Pain management was not as essential to the care of neonates because they didn't remember painful experiences" and "Physiologic stress associated with pain can be more dangerous than the side effects of analgesia" respectively. And all of them had correct knowledge about "In relation to body weight neonates require less analgesia than adults" and "the pain was a result of medical and nursing procedures", While 42.2% and 55.6% of the studied nurses had incorrect knowledge regarding "Analgesia was too dangerous to use in neonates" and "Pain diminishes quicker in newborns than in adults" respectively.

Table (4): Clarified that the mean ± S.D were 73.51±4.475 regarding total knowledge scores indicating overall unsatisfactory knowledge level among the studied nurses.

Figure (3): Shows that more than three fifth (62.2%) of the studied nurses had unsatisfactory level of total knowledge regarding Non-Pharmacological Pain Management Techniques among Neonates, while only more than one third (37.8%%) of them had satisfactory level of total knowledge.

Table (5): Illustrated that, regarding **physiological parameters of pain assessment** most (91.1%, 91.1% and 86.7%) of the studied nurses assess "heart rate", "breathing and oxygen saturation" respectively. Also, most of them assess all **behavior changes** across "Crying/moaning" (95.6%), "State of arousal/alertness" (91.1%), "Arm movements" (91.1%) and "Leg movements" (91.1%). As regard to **facial expressions in general**, 91.1% and 95.6% assess "frown" and "grimace" respectively, while 68.9% and 91.1% of them not done "normal/relaxed" and "Taut tongue" respectively. According to **posture/tone**, 86.7% of the studied nurses assess "flexed step", while 60% of them not assess "normal/relaxed step".

Table (6): Indicated that, all of the studied nurses perform "hand hygiene", "touching and positioning". also, most of them do "facilitated tucking" (91.1%), "encourage mother to continue breastfeeding" (91.1%) and "guide parents to use kangaroo care" (82.2%). While 82.2% and 84.4% of the studied nurses didn't "give sucrose per oral and not apply "recorded music or live music" respectively. Furthermore, 68.9% of them didn't "lay out the blanket on a flat surface", "fold down the top corner of the blanket" or "pull the wrap around the baby's body to the right side".

Table (7): Showed that all of the nurses in the study (100%) reported holding the infant's thighs while supporting the abdomen and hips during diaper changes. Additionally, 91.1% indicated that they positioned a pillow or roll under the baby's shoulders—not the head—when the infant was in a supine position. In contrast, 64.4% of the nurses did not hold the baby prior to performing procedures that might cause stress or pain to help provide a sense of comfort and security.

Table (8): Clarified that the mean ± S.D were 66.67±9.48 regarding total practice scores indicating overall incompetent practice level among the studied nurses.

Figure (4): Showed that less than three quarter (69%) of the studied nurses had incompetent level of

total practice regarding non-pharmacological pain management techniques among neonates, while only less than one third (31%) of them has competent level of total practice.

Table (9): Showed that there was a statistically significant relation between nurses' total knowledge level and their age, level of education and years of experiences.

Table (10): Indicated a statistically significant association between the nurses' overall practice levels and both their age and years of professional experience.

Table (11): Showed that there was a statistically significant positive correlation between the studied nurses' total knowledge and total practice scores regarding non-pharmacological pain management techniques among Neonates at (p-value < 0.001)

Results

Table (1): Percentage distribution of the studied nurses according to their characteristics (N=45).

Item	No	%
Age (years)		
20-25 years	17	37.8
26-30 years	20	**44.4**
31-40 years	4	8.9
>40 years	4	8.9
Mean± S.D 27.8 ± 9.05		
Gender:		
Male	0	0
Female	45	**100**
Marital status		
Single	10	22.2
Married	35	**77.8**
Divorced	0	0
Widow	0	0
Years of experience:		
1-5 years	21	**46.7**
6- 10 years	14	31.1
> 10 years	10	22.2

Figure (1) Percentage distribution of the studied nurses regarding attendance of training courses about non-pharmacological techniques

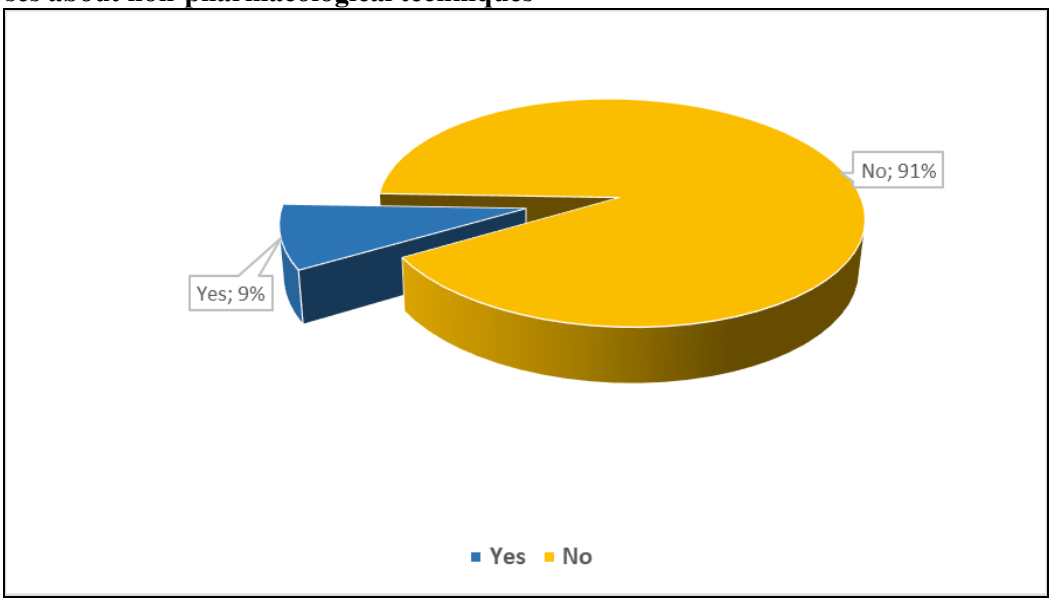

Figure (2) Percentage distribution of the studied nurses regarding their educational level (n=45).

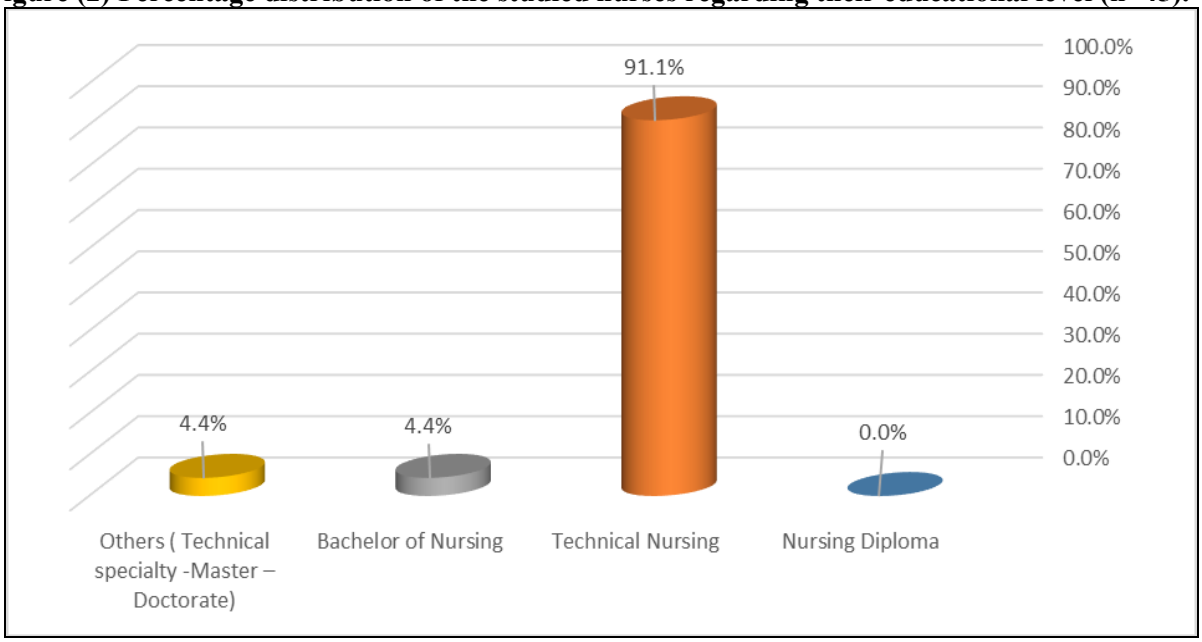

Table (2): Percentage distribution of the studied nurses according to their knowledge regarding non-pharmacological pain management techniques among neonates (N=45).

Items	Complete correct		Incomplete correct		Incorrect/ Don't know	
	No	%	No	%	No	%
Nurses' information about neonatal pain						
The concept of neonatal pain	1	2.2	28	62.2	16	35.6
Signs of neonatal pain	2	4.4	38	**84.4**	5	11.1
Nurses' information about non-pharmacological pain management techniques in neonates						
Definition of non-pharmacological management	2	4.4	30	66.7	13	28.9
Benefits of non- pharmacological management	30	66.7	14	31.1	1	2.2
Barriers that prevent the provision of optimal non pharmacological pain management for neonates by nurses	12	26.7	33	73.3	0	0
Nurses' information about non-pharmacological treatments for pain management in neonates						
Are there methods of non-pharmacological pain management therapies?	45	**100**	0	0	0	0
If yes, what are the different methods of non-pharmacological pain management therapies	14	31.1	21	46.7	10	22.2
What is oral sweet solution	42	**93.3**	0	0	3	6.7
What is nonnutritive sucking	6	13.3	39	**86.7**	0	0
What are Physical methods	3	6.7	35	**77.8**	7	15.6
Nurses' information on pain assessment in neonates						
Pain assessment tools include	45	**100**	0	0	0	0
Components of pain assessment	43	**95.6**	2	4.4	0	0
The pain Assessment flow sheet must be completed every	5	11.1	18	40.0	22	48.9

Table (3): Percentage distribution of the studied nurses according to their knowledge regarding non-pharmacological pain management techniques among neonates (N=45). (Conti.)

Items	Correct		Incorrect/ Don't know	
	No	%	No	%
Neonates, particularly those born preterm have no pain.	32	71.1	13	28.9
Pain responses are innate and not acquired through learning.	42	93.3	3	6.7
Neonates perceive pain differently and generally to a lesser extent compared to adults.	39	86.7	6	13.3
Pain management in neonates is sometimes underestimated due to the belief that they do not retain memories of painful events.	43	**95.6**	2	4.4
The physiological stress caused by pain may pose greater risks than the potential side effects of pain-relieving medications.	44	**97.8**	1	2.2
Analgesics in neonates may carry significant risks.	26	57.8	19	**42.2**
Pain diminishes quicker in newborns than in adults.	20	44.4	25	**55.6**
In relation to body weight neonates require less analgesia than adults.	45	**100**	0	0
Is the pain a result of medical and nursing procedures?	45	**100**	0	0
Are you able to identify the source of pain in newborn infants?	42	93.3	3	6.7
Pain is considered the 5th vital sign.	35	77.8	10	22.2
You must complete a pain assessment chart each time you administer pain medication.	35	77.8	10	22.2

Table (4): Mean score of the studied nurses according to their knowledge regarding non-pharmacological pain management techniques among neonates (N=45).

Total knowledge score	Minimum	Maximum	Mean ± Standard deviation	Interpretation
	68	84	**73.51±4.475**	**Unsatisfactory**

Figure (3): Percentage distribution of the studied nurses according to their level of total knowledge regarding non-pharmacological pain management techniques among neonates (N=45).

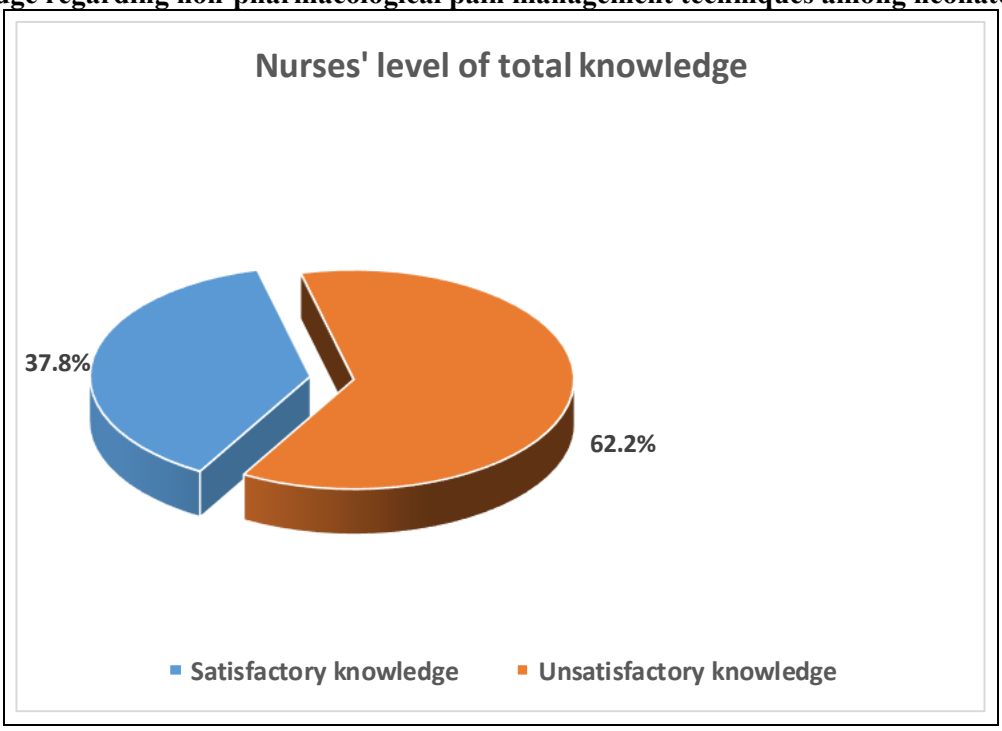

Table (5): Number and percentage distribution of nurses regarding pain assessment in neonates (N=45):

Pain assessment in neonates	Done		Not done	
	No	%	No	%
Physiological parameters:				
Heart rate	41	**91.1**	4	8.9
Breathing	41	**91.1**	4	8.9
Blood pressure	33	73.3	12	26.7
Oxygen saturation	39	**86.7**	6	13.3
Behavioral changes:				
Crying/moaning	43	**95.6**	2	4.4
State of arousal/alertness	41	**91.1**	4	8.9
Arm movements	41	**91.1**	4	8.9
Leg movements	41	**91.1**	4	8.9
Facial expressions in general				
Normal/ Relaxed	14	31.1	31	**68.9**
Frown	41	**91.1**	4	8.9
Grimace	43	**95.6**	2	4.4
Lip pursing	35	77.8	10	22.2
Taut tongue	4	8.9	41	**91.1**
Chin quiver	18	40.0	27	60.0
Posture / Tone				
Normal / Relaxed	18	40.0	27	**60.0**
Extended	36	80.0	9	20.0
Flexed	39	**86.7**	6	13.3
Tense	36	80.0	9	20.0

Table (6): Number and percentage distribution of nurses regarding use of non-pharmacological pain management techniques among neonates (N=45)

Items assessing nurses' application of non-pharmacological techniques for pain relief in neonates	Done		Not done	
	No	%	No	%
• Hand washing	45	**100**	0	0
***Physical methods**:*				
• Touching	45	**100**	0	0
• Positioning	45	**100**	0	0
• Facilitated tucking	41	**91.1**	4	8.9
Parental counseling:				
• Encourage mother to continue breastfeeding	41	**91.1**	4	8.9
• Guide parents to use kangaroo care	37	**82.2**	8	17.8
Sucrose/non-nutritive sucking:				
• Giving sucrose per oral	8	17.8	37	**82.2**
• Non-nutritive sucking together with sucrose per oral	18	40.0	27	60.0
***Music**:*				
• Recorded music	7	15.6	38	**84.4**
• Live music (singing or humming)	7	15.6	38	**84.4**
Swaddling				
Spread the blanket flat on a surface.	14	31.1	31	**68.9**
Fold down the upper corner of the blanket.	14	31.1	31	**68.9**
Lay the baby on their back in the center of the blanket.	18	40.0	27	60.0
Position the baby's left arm alongside their body.	16	35.6	29	64.4
Wrap the blanket around the baby's body toward the right side.	14	31.1	31	**68.9**
Gently place the baby's right arm in the correct position.	12	26.7	33	73.3
Tuck the opposite side of the blanket under the baby's left side.	16	35.6	29	64.4
Secure the bottom edge of the swaddle.	20	44.4	25	55.6

Table (7): percentage distribution of nurses regarding use of non-pharmacological pain management techniques among neonates (N=45)

Neonatal supportive position items	Done		Not done	
	No	%	No	%
1. Support the baby's thighs as well as the abdomen and hips during diaper changes.	45	**100**	0	0
2. Position a pillow beneath the shoulders, avoiding placing it under the head.	41	**91.1**	4	8.9
3. Hold the baby before performing any procedure that might cause stress or pain to help provide comfort and security.	16	35.6	29	**64.4**
4. Use the palm of your hand to maintain direct contact when holding the baby.	41	**91.1**	4	8.9
5. Hold the baby for at least 30 seconds or until they appear calm and stable.	39	86.7	6	13.3
7. When the baby is lying on their back (supine), keep the head aligned along the body's midline.	24	53.3	21	46.7
8. Place a pillow or rolled support under the baby's shoulders when in the supine position.	41	**91.1**	4	8.9
9-When turning the baby onto their side (lateral position), roll and pull gently like a log to minimize overstimulation.	23	51.1	22	48.9
10-Ensure the baby's nose, neck, sternum, and tailbone remain aligned in a straight line while in the lateral position.	43	95.6	2	4.4
11-When placing the baby prone (on their stomach), roll them like a log without lifting the body.	27	60.0	18	40.0
12-Keep your hands near the baby's face and mouth area during handling.	39	86.7	6	13.3
13-After repositioning, hold the baby for a sufficient time before gently releasing your hands.	39	86.7	6	13.3

Table (8): Mean score of the studied nurses according to their practices regarding non-pharmacological pain management techniques among neonates (N=45).

Total practice score	Minimum	Maximum	Mean ± Standard deviation	Interpretation
	50	83	**66.67±9.48**	**Incompetent**

Figure (4): Percentage distribution of the studied Nurses according their level of total practices regarding non-pharmacological pain management techniques among neonates (N=45)

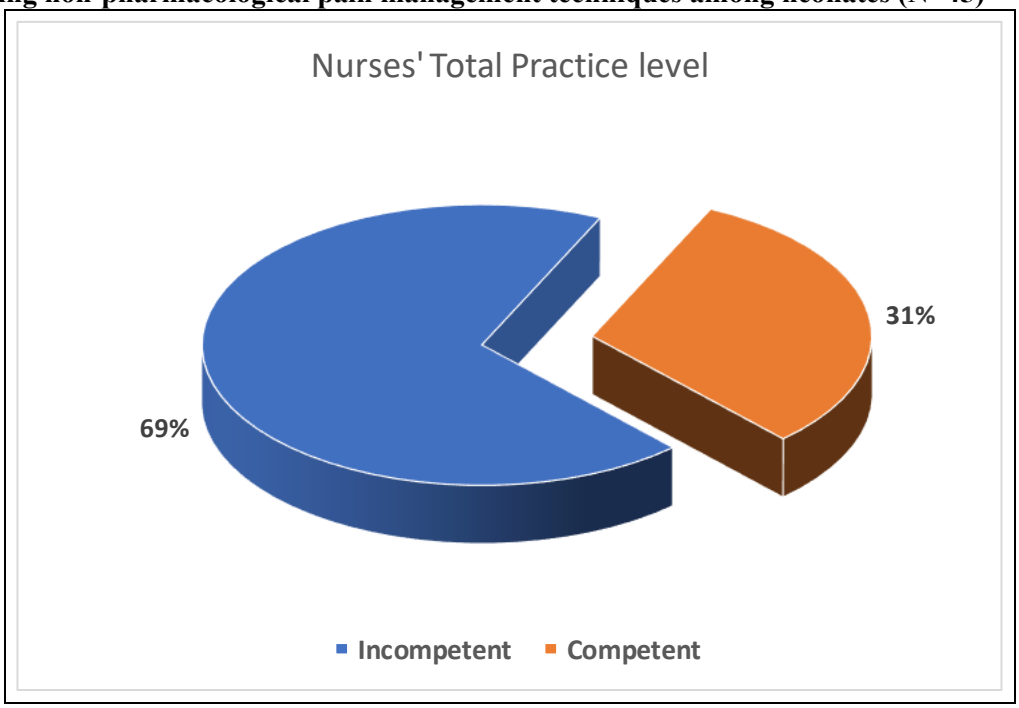

Table (9) The relationship between nurses' characteristics and their total knowledge level (n=45)

Items	Total No	Total knowledge level		X^2	P-Value
		Unsatisfactory	Satisfactory		
Age (years)					
20-25 years	17	12	5	9.286	**.041***
26-30 years	20	14	6		
31-40 years	4	1	3		
>40 years	4	1	3		
Sex					
Male	0	0	0	--	--
Female	45	28	17		
Residence:					
Rural	32	20	12	.120	.652
Urban	13	8	5		
Marital status					
Single	10	6	4	.027	.869
Married	35	22	13		
Level of Education					
Nursing Diploma	0	0	0	8.667	**.038***
Technical Nursing	41	28	13		
Bachelor of Nursing	2	0	2		
others (Technical specialty – Master –Doctorate	2	0	2		
Years of experience:					
1-5 years	21	12	9	5.036	**.045***
6- 10 years	14	8	6		
> 10 years	10	8	2		
Training Courses About Non-Pharmacological Techniques:					
Yes	4	2	2	.279	.597
No	41	26	15		

Table (10): The relationship between nurses' characteristics and their total practice level (n=45)

Items	Total No.	Total practice level		X^2	P-Value
		Incompetent	Competent		
Age (years)					
20-25 years	17	16	1	4.286	**.033***
26-30 years	20	14	6		
31-40 years	4	1	3		
>40 years	4	0	4		
Sex					
Male	0	0	0	--	--
Female	45	31	14		
Residence:					
Rural	32	20	12	2.11	.146
Urban	13	11	2		
Marital status					
Single	10	4	6	3.424	.064
Married	35	27	8		
Level of Education					
Nursing Diploma	0	0	0	3.09	.085
Technical Nursing	41	31	10		
Bachelor of Nursing	2	0	2		
others (Technical specialty – Master –Doctorate	2	0	2		
Years of experience:					
1-5 years	21	19	2	8.036	**.045***
6- 10 years	14	10	4		
> 10 years	10	2	8		
Training Courses About Non-Pharmacological Techniques:					
Yes	4	1	3	4.45	0.051
No	41	30	11		

Table (11): Correlation between total knowledge and total practice among the studied nurses.

	Total knowledge	
Total Practice	**R**	**0.544**
	p-value	**0.000***

Discussion

With a mean± standard deviation of 27.8 ± 9.05, the current study made it clear that less than half of the nurses under examination were between the ages of 26 and 30 based on the characteristics of the nurses under investigation. This conclusion may be the consequence of the NICU being a highly dynamic environment that demands faster and more efficient work from young nurses. This result aligns with the findings of **Al-Maaitah et al. (2023).** Conversely, **Wari et al. (2021)** reported that most nurses in their study were aged between 24 and 28 years, with an average age of 26.7 ± 2.907 years. Additionally, a study conducted in Jordan indicated that participating nurses ranged in age from 24 to 35 years.

Furthermore, the recent study found that fewer than half of the nurses were between one and five years experienced. Furthermore, less than 10% of the nurses in the study had previously taken any training courses on non-pharmacological pain management, and most of those who had only taken one session. One possible explanation for this result is that a sizable percentage of the nursing students were young (26–30 years old). This result was supported by **Sayed, (2024)** who noted that the majority of the nurses in their study had not completed a course on treating neonatal pain without the use of pharmaceuticals. The research was entitled "Assessment of Nurses' Performance Regarding Non-Pharmacological Pain Management of Neonates in Intensive Care Unit."

Furthermore, the current study revealed that more than two-thirds of the nurses under investigation lived in rural areas and that the majority of them held degrees from technical institutes. This may be the case because, compared to other organizations, such as nursing faculties, technical nursing schools generated

a greater number of graduates for the community. This finding was supported by **Mohamed et al. (2021)** in their study, which reported that a large number of nurses had graduated from technical nursing institutes. However, the results from **Taplak's (2023)** studydiffered, revealing that fewer than two-thirds of the nurses held a bachelor's degree.

The current study found that most nurses had incomplete knowledge about "signs of neonatal pain," "nonnutritive sucking," and "physical methods of nonpharmacological treatments for pain management in neonates." In contrast, the majority of nurses had complete knowledge about "oral sweet solution" and "components of pain assessment." This outcome can be the result of hospitals not implementing new non-pharmacological pain care trends. This result was attached according to **Sayed (2024)**, insufficient knowledge of "nonnutritive sucking" and "signs of neonatal pain" was seen among most nurses. The study "Effectiveness of Educational Program on Nurses' Knowledge Regarding Neonatal Pain Management" by **Abbass and Obaid (**2022**)** found that nurses in the study were well-versed in "components of pain assessment" prior to an educational program. This finding was controversial, but it was in line with that study. This finding concurs with **El Awady and Gharib's (2021)** study, "Enhancing Pediatric Nurses' Performance Regarding Selected Non-Pharmacological Techniques to Alleviate Pain in Neonates," where most nurses accurately recognized that neonates need less analgesia compared to adults when considering their body weight.

According to the current study, only over one-third of nurses had satisfactory overall knowledge of non-pharmacological pain management approaches for newborns, whereas over three-fifths of nurses had unsatisfactory overall knowledge. The researcher speculates that this result may be due to the fact that a sizable percentage of the nurses in the study had degrees from technical institutes and had not attended any non-pharmacological pain treatment training programs.

In a study titled "Upgrading Nurses' Knowledge, Attitude and Self-Efficacy toward Pharmacological and Non-Pharmacological Pain Management," **Elsayed et al. (2023)** found that most nurses in the study had little to no knowledge of pharmacological and non-pharmacological pain management. And this finding was supported with **Dielle, (2023)** who found that nurses had inadequate knowledge of neonatal pain treatment. Although they disagreed with **Popowicz et al. (2021)**, the study demonstrated that most respondents knew enough about pain.

The current study demonstrated that, with respect to physiological indicators of pain evaluation in neonates, the majority of nurses who were surveyed evaluated "heart rate," "breathing," and "oxygen saturation." Additionally, the majority of them evaluate all behavioral changes in the areas of "crying/moaning," "state of arousal/alertness," "arm movements," and "leg movements." Regarding facial emotions in general, the majority of nurses evaluate "grimace" and "frown," but they do not evaluate "Taut tongue." The majority of the nurses in the study evaluate "flexed step" based on posture and tone, whereas three-fifths do not evaluate "normal/relaxed step." This outcome can derive from the fact that assessing pain in newborns is a straightforward and repeatable process. This finding was in the same line with **Abd El-Aziz, (2018)** who carried out a research project which showed that most of the examined nurses assessed the neonate's breathing, oxygen saturation, heart rate, crying or groaning, and flexed step of posture to gauge pain. Furthermore, **Wari et al. (2021)** supported this conclusion by noting that whereas most responders always utilize crying to gauge baby distress, more than half of nurses use vital signs.

The current study found that all of the nurses who were analyzed engaged in "hand hygiene" and "touching and positioning" in connection with the application of non-pharmacological pain management methods for newborns. Most of them also "encourage mother to continue breastfeeding," "guide parents to use kangaroo care," and "facilitated tucking." However, neither "live music" nor "recorded music," nor oral administration of sucrose, are used by the majority of the nurses in the study. Furthermore, nearly two-thirds of them do not "fold down the top corner of the blanket," "pull the wrap around the baby's body to the right side," or "lay out the blanket on a flat surface." This result was in agreement with **Ismail & Ali, (2025)** who revealed that nurses most frequently used breastfeeding and tucking as non-pharmacological pain management techniques, while oral sucrose and music were less frequently used. However, this finding contradicted that of Costa et al. (2017), who carried out a study titled "Freitas Nurses' knowledge and practices regarding pain management in newborns" and discovered that the majority of the nurses in the study used oral sucrose as a non-pharmacological pain reliever for neonates.

The study revealed that every nurse involved placed a pillow beneath the baby's shoulders—not the head—when in the supine position, and supported the baby's thighs, abdomen, and hips during diaper changes. However, fewer than two-thirds of the nurses reported holding the baby prior to performing any procedure that might cause stress or pain to offer a sense of security. This finding was consistent with a study by **Abass & Obaid (2022)** titled "Effectiveness of educational program on nurses' knowledge regarding neonatal pain management," which revealed that over

25% of the nurses in the study don't hold the baby before performing any stressful or painful tasks.

The current study demonstrated that fewer than three quarters of the nurses under investigation had incompetent total practices, and less than one third had competent total practices, with respect to the overall practices of nurses with relation to non-pharmacological pain management strategies for neonates. This finding, according to the researcher, could be the consequence of the absence of a pain management protocol and data indicating the level of practice among the nurses in the study. This finding was confirmed by **Sayed (2024)**, who found that while less than one-fifth of the nurses in the study had competent practice regarding neonatal pain and non-pharmacological management techniques, the rest of them had incompetent practice. A study titled "Nurses' knowledge and practice in assessment and management of neonatal pain at Governmental Hospitals in Gaza Strip" by **Qasim et al. (2021)** also supported the findings, revealing that a significant portion of the nurses in the study had very low practice levels with mean percentages. Contrary to **Wuni et al. (2020)**, who found that over half of the nurses in their study had effective pain management techniques, the descriptive cross-sectional study raised some concerns.

Regarding the association between nurses' attributes and their overall level of knowledge, the current study demonstrated a statistically significant relationship between nurses' total level of knowledge and their years of experience, age, and educational attainment. According to the study, this outcome might be because highly qualified staff nurses with years of experience are more knowledgeable. These results were in agreement with **Mohamed et al. (2019),** whose study identified a statistically significant relationship between pediatric nurses' years of experience and their qualifications. In contrast, **El Awady and Gharib (2021)** reported no statistically significant differences in nurses' knowledge levels based on their characteristics throughout different phases of the program ($p > 0.05$).

The study found a statistically significant positive correlation between the total knowledge and total practice scores of the nurses involved and their knowledge of non-pharmacological pain management techniques for neonates (p-value < 0.001). According to the study, nurses who possess a suitable level of knowledge are more likely to perform competently, and their level of knowledge also improves their level of practice. This result was supported by **Mohamed et al., (2019)** who found that the preprogram phase of the study showed a very positive correlation between the nurses' total knowledge and practice. However, **Selvi et al.'s (2022)** study in New Delhi found no relationship between the nurses' knowledge and practice, which contradicted this finding

Conclusion

Based on the results The study was concluded that 62.2% of the nurses demonstrated an unsatisfactory overall knowledge level about non-pharmacological pain management techniques in neonates, whereas just over one-third showed a satisfactory level. Additionally, 69% of the nurses were found to have incompetent overall practice skills in applying these pain management techniques, with fewer than one-third exhibiting competency. Moreover, a statistically significant positive correlation was observed between the nurses' total knowledge and their practice scores

Recommendation

Based on the findings of this study, the following recommendations were suggested: -

1. Implement ongoing training programs for neonatal nurses in NICUs focusing on pain assessment scales and non-pharmacological pain management techniques.
2. Provide newly hired nursing staff caring for neonates with a guideline booklet containing essential information on neonatal pain and the use of non-pharmacological pain relief methods.
3. Apply continuous on-the-job training related to neonatal pain management for all NICU nurses.
4. Encourage hospital administrators to motivate and support nurses in applying non-pharmacological pain relief techniques within NICUs.
5. Conduct further research to evaluate ICU nurses' knowledge and practices before and after educational interventions on non-pharmacological pain management for neonates.
6. Undertake additional studies using larger, probability-based samples to allow for broader generalization of findings

References

1. **Abass, F., & Obaid, B. (2022):** Effectiveness of educational program on nurses knowledge regarding neonatal pain management. *International journal of health sciences, 6(S1), 10399-10407.*
2. **Abd El-Aziz, E., Abd El Aziz, A., Adly, R., & El Sallab, S. (2018):** Improving nurses' performance towards non-pharmacological pain management among neonates in neonatal intensive care unit. *IOSR Journal of Nursing and Health Science, 7(4), 83-97.*
3. **Al-Maaitah, E., Razeq, N., & Obeidat, H. (2023):** Nurses' improved provision of infants' procedural pain assessment and management with non-pharmacological interventions following a

training program in Jordan. *Journal of Neonatal Nursing, 29(2), 356-360.*

4. **Blomqvist, Y., Gradin, M. & Olsson, E. (2020):** Pain Assessment and Management in Swedish Neonatal Intensive Care Units. Pain Management Nursing, 21(4), 354-359.
5. **Bonato, L., Dezordi, C. & Rebelato, C. (2024):** Perceptions of the Neonatal Intensive Care Unit Team and the Nursery about Newborn Pain. BrJP, 7, e20240001.
6. **Bssam,S., and Sabaq, G. (2021).** Enhancing Pediatric Nurses' Performance Regarding Selected Non-Pharmacological Techniques to Alleviate Pain in Neonates: An Educational Program. *Egyptian Journal of Health Care, 12(2), 1411-1429.*
7. **Costa, T., Rossato, L., Bueno, M., Secco, I., Sposito, N., Harrison, D., Freitas. (2017):** Nurses' knowledge and practices regarding pain management in newborns Rev. Esc. Enferm. USP S, Pp. 51, 10.1590/S1980-220X2016034403210.
8. **Dielle, R. (2023):** The knowledge, Practices and Attitude of Nurses towards Pain Management of Neonates in the Library of Western Cape. A descriptive study. Available at: http://hdl.handle.net/11394/10547.
9. **El Awady Bassam, S., & Gharib Sabaq, A. (2021).** Enhancing Pediatric Nurses' Performance Regarding Selected Non-Pharmacological Techniques to Alleviate Pain in Neonates: An Educational Program. *Egyptian Journal of Health Care, 12(2), 1411-1429.*
10. **Elsayed, Z., Elhalafawy, S. & Elsharkawy, M. (2023):** Upgrading Nurses' Knowledge, Attitude and Self-Efficacy toward Pharmacological and Non-Pharmacological Pain Management in Children. *Tanta Scientific Nursing Journal, 30(3), 63-76.*
11. **Gomes Neto, M., da Silva Lopes, I., Araujo, A., Oliveira, L. & Saquetto, M. (2020):** The Effect of Facilitated Tucking Position during Painful Procedure in Pain Management of Preterm Infants in Neonatal Intensive Care Unit'. a systematic review and meta-analysis. *European journal of pediatrics, 179, 699-709.*
12. **Guo, W., Liu, X., Zhou, X., Wu, T., & Sun, J. (2020).** Efficacy and safety of combined nonpharmacological interventions for repeated procedural pain in preterm neonates: A systematic review of randomized controlled trials. *International Journal of Nursing Studies, 102, 103471.*
13. **Ilhan, E., Pacey, V., Brown, L., Spence, K., Gray, K., Rowland, ,.J E.,... & Hush, ,.J M. (2021).** Neonates as intrinsically worthy recipients of pain management in neonatal intensive care. Medicine, Health Care and Philosophy, 24, 65-72.
14. **International Association for the Study of Pain (IASP). (2020).** IASP announces revised definition of pain. International Association for the Study of Pain [On-line].Available at : https://www.iasp-pain.org/PublicationsNews/NewsDetail. On Saterday,25 February 2023 at 3:00 pm
15. **Ismail, A., & Ali, A. (2025):** Neonatal nurses' knowledge and use of non-pharmacological pain management interventions in Saudi Arabia. *Journal of Neonatal Nursing, 31(1), 210-215.*
16. **Mahmoud Farrag, J., Mohamed Ahmed, S., Abdallah Mohammed, H. & Mohamed Ahmed Ayed, M. (2022)** 'Non-pharmacological Strategies to Mitigate Pain and Anxiety among Children on Dialysis'. *Egyptian Journal of Health Care, 13(1), 1609-1625.*
17. **Mohamed Bayoumi, M., Khonji, L., & Gabr, W. (2021).** Are nurses utilizing the non-pharmacological pain management techniques in surgical wards?. Plos one, 16(10), e0258668.
18. **Mohamed, A., Bahig, D., Ahmed, Z., & Mohamed, M. (2021):** Effect of an Educational Program through a Lecture versus Multimedia Methods on PediatricNurses' Knowledge and Attitude regardingAcutePain Manageme. *Egyptian Journal of Health Care, 12(3), 86-101.*
19. **Mohamed, A., El-Bana, M., Mohamed, E., & Abolwafa, F. (2019):** Effect of educational program on pediatric nurses' knowledge and practice regarding selected nonpharmacological techniques to relive pain in neonates. *Journal of Neonatal Nursing, 25(6), 285-292*.
20. **Morris, E., Howell, M., Pickup, E., Iber, C., & Wang, S. (2022).** Pediatric sleep and pain: etiologies, consequences, and clinical considerations. Journal of Clinical Sleep Medicine, 18(9), 2281-2289.
21. **Nwaneri A, Ndubuisi .I, Anarodo .A, Okoronkwo .I, Offor E. (2018)**. Nurses' Knowledge and Level of Utilization of Non-Pharmacological Pain Control for Orthopaedic. *International Journal of Nursing Science; 8(4): 61-66.*
22. **Popowicz, H., Mędrzycka-Dąbrowska, W., Kwiecień-Jaguś, K. & Kamedulska, A. (2021):** Knowledge and Practices in Neonatal Pain Management of Nurses Employed in Hospitals with Different Levels of Referral—Multicenter Study'. In Healthcare Vol. 9, No. 1, p. 48. MDPI.
23. **Qasim, Y., Abdeljawad, H. & Abusafia, A. (2021):** Nurses' Knowledge and Practice in Assessment and Management of Neonatal Pain at Governmental Hospitals in Gaza Strip': A Cross Sectional Study. Clinical Journal of Nursing Care and Practice, 5(1), 038-42.

24. **Saleh, A. (2023):** Nurses' Assessment and Management Practices of Pain among Intensive Care Patients in King Khalid Hospital, Kharj,Riyadh. Heliyon, 9(9), e19986.
25. **Sayed, A. (2024):** Assessment of Nurses' Performance Regarding Non-Pharmacological Pain Management of Neonates in Intensive Care Unit. Helwan International Journal for Nursing Research and Practice, 3(7), 409-423.
26. **Selvi, A., Gauba, A., Joshi, P. & Pandey, C. (2022):** Assessment of Knowledge, Attitude and Practice towards ―Neonatal Pain Management among Nursing in New Delhi. A Web Based Online KAP–Questionnaire–Based Cross-Sectional Study. *International Journal Of Special Education*, 37(3), 15679-15690.
27. **Taplak, A. (2023):** Pediatric Nurses' Knowledge and Practices Related Pain Management in Children'. Gümüşhane Üniversitesi Sağlık Bilimleri Dergisi, 12(4), 1807-1816.
28. **Tsegaye, D., Yazew, A., Gedfew, M., Yilak, G. & Yalew, Z. (2023):** Non-Pharmacological Pain Management Practice and Associated Factors among Nurses Working at Comprehensive Specialized Hospitals'. SAGE Open Nursing, 9, 23779608231158979.
29. **Wari, G., Wordofa, B., Alemu, W., & Habte, T. (2021):** Knowledge and practice of nurses and associated factors in managing neonatal pain at selected public hospitals in Addis Ababa, Ethiopia,. *Journal of multidisciplinary healthcare,* 14(2021), 2275-2286.
30. **Wuni, A., Salia, S., Mohammed Ibrahim, M., Iddriss, I., Abena Nyarko, B., Nabila Seini, S. & Mohammed, J. (2020):** Evaluating Knowledge, Practices, and Barriers of Pediatric Pain Management among Nurses in a Tertiary Health Facility in the Northern Region of Ghana': A Descriptive Cross-Sectional Study, Pain Research and Management, Volume 2020(1), Article ID 8846599, 11 pages..