

Knowledge, Perception, and Attitudes of Nursing Staff about Assessment and Management of Neonatal Pain

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ABSTRACT

Background: Pain assessment is a crucial aspect of neonatal care in the neonatal unit. It involves observing specific physiological and behavioral changes by nursing staff to ameliorate pain and discomfort in neonates.

Objectives: To assess the knowledge, perceptions, and attitudes of the nursing staff of neonatal care units about the assessment and management of neonatal pain.

Materials and methods: A descriptive cross-sectional study was executed on all nurses working in neonatal care units at four pediatric teaching hospitals in Baghdad/Rusafa from the 1st of January to the 31st of December 2022. A total sample of 121 nurses was recruited from these hospitals. Demographic criteria of the nursing staff were collected, including age, sex, years of experience in neonatal care, and whether they had received previous neonatal care training. Nurses' knowledge and attitude toward neonatal pain were assessed using a two-point Likert scale, with ten agree and ten disagree questions. Scores were then categorized into two grades based on the median cut-off point: Scores between 5 and 10 were graded as acceptable, while scores below 5 were categorized as poor.

Results: The mean age of the recruited participants was 32.6 ± 9 years. The study revealed that 86 nurses (71.1%) had an acceptable score regarding their knowledge of neonatal pain perception, while 81 nurses (69.4%) had an acceptable score regarding their practices in neonatal pain management. Characteristics such as age, gender, having children, previous neonatal training, and working in neonatal care units for two years or more were significantly related to nurses' knowledge and practices in neonatal pain perception and management (P -value < 0.05).

Conclusion: Most nursing staff demonstrate a satisfactory score regarding their knowledge and attitudes about neonatal pain. Variables such as age, gender, having children, previous neonatal training courses, and working in neonatal care units for two years or more impacted the nurses' scores.

Keywords: Assessment; Iraq; Neonatal pain; Nurses.

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INTRODUCTION

Pain can be defined as an unpleasant sensory and emotional experience associated with real or potential tissue damage [1]. It is a subjective symptom related to previous experience with injuries, a state that might not occur in neonates. Therefore, a more

useful new definition proposes that pain perception is an inherent quality of life that appears early in development, serving as a vital signaling system for potential tissue damage [2]. Untreated and chronic pain, especially in neonates, can result in various short-term complications, such as delayed wound healing, delayed recovery, impaired mobility, and sleep disturbances. However, over the long term, it can contribute to behavioral and cognitive abnormalities and developmental regression, altering the nervous system's development and maturation regarding pain perception [1].

Controversies about fetal and, in turn, neonatal pain are

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rather complicated. Before the 1980s, it was widely believed that neonates do not feel pain because of insufficient myelination in the brain and the lack of memory for pain due to the immaturity of the central nervous system (CNS) [3]. However, current neuroscientific evidence indicates the possibility of fetal pain perception during the first trimester (less than 14 weeks gestation) [4].

Acute pain is a highly complex, dynamic, and subjective experience useful for growing children, warning them of danger and limiting exposure to additional injuries. However, lifelong significant physiological and psychological sequences may follow untreated acute, recurrent, or chronic painful experiences related to diseases or medical care [5].

The neonatal period is the most vulnerable period of life, with a high rate of morbidity and mortality [6, 7]. Neonates may be subjected to many painful experiences as early as the first day of life. These painful experiences include diagnostic and therapeutic procedures in addition to disease processes. The need for a method to assess neonatal pain is essential since neonates are unable to self-report. Pain is a subjective symptom that an individual should report. As a result, the healthcare provider must anticipate and use accepted and effective methods and scoring systems to assess pain in neonates.

To alleviate neonatal pain, the nursing team must act promptly using pharmacological and non-pharmacological measures. Pharmacological measures include the use of medications ranging from local and topical anesthesia to opioids. Non-pharmacological measures include a reduction in light level, noise reduction, swaddling, kangaroo care, facilitated tucking, non-nutritive sucking, massage, sucrose, and other sweeteners. The severity of pain and the underlying problem determines the choice between pharmacological and non-pharmacological measures [8, 9].

Repetitive painful experiences in preterm neonates may link to many behavioral disorders in childhood, such as attention deficit disorders, learning disorders, and behavioral problems [10, 11]. This may be related to the CNS's structural and physiological changes in response to untreated pain. Stress hormones produced as a response to untreated pain have been linked, in the short term, to increased morbidity and mortality and, in the long term, with impaired pain perception, chronic pain syndromes, and somatic complaints such as sleep disturbances, feeding problems, and an inability to self-regulate in response to internal and external stressors.

Neonatal nursing staff's ability to assess and manage neonatal pain is affected by many factors, including a shortage of nursing staff with resulting work overload, a lack of knowledge and perceptions about neonatal pain, personal professionalism and experiences, and personal experience with pain and hospitalization. Furthermore, neonatal characteristics such as maturity, general well-being, sleep-wake cycle, and parent education may also impact the nursing ability to assess and manage neonatal pain [1]. To mitigate the impact of these factors, a scale for objective neonatal pain assessment is necessary for early anticipation and management of neonatal pain.

It is crucial to note that using a multidimensional scale for assessing pain in neonates, which assesses behavioral and physiological responses to pain, is the most comprehensive approach available [12]. A systematic review from Italy concluded that no universally accepted gold standard scales for neonatal pain assessment exist [13]. However, the most popular and studied multidimensional pain scales for children and

infants include the Neonatal Facial Coding System (NFCS), the Neonatal Infant Pain Scale (NIPS), and the Premature Infant Pain Profile (PIPP) [14]. Unfortunately, using such a scale is still not adopted as a part of routine neonatal care, highlighting a significant gap in our current practices. Furthermore, more comprehensive assessment tools and additional provider education are required to increase the clinical utility of pain scales, addressing different aspects of neonatal pain [15]. A recent study implies that video-based evaluation is feasible for assessing neonatal pain in a clinical context. Additionally, real-time remote evaluation of the degree of neonatal pain allows for improved diagnosis and treatment of the illness [16].

The role of nurses in neonatal care units is vital in anticipating and managing pain in sick neonates. They are the first healthcare providers to receive neonates upon admission. Additionally, the most painful procedures in neonatal care units are routinely performed by nursing staff. Therefore, training programs about neonatal pain are essential to improving the ability of nurses to diagnose and treat neonatal pain. Such training programs in developed countries have improved nurses' responses to pain. On the contrary, limited data from developing countries shows that nurses lack pain management training for various reasons [17].

A recent systematic review study shows that in the clinical setting, using a pain assessment tool that is appropriate and validated for the specific type of pain and infant group is imperative. Research must produce dependable outcomes to deliver the finest evidence-based healthcare strategies. The inappropriate use of pain scales in studies raises serious questions about the ethical conduct of research and resource utilization [18].

The present study aimed to assess the knowledge, perceptions, and attitudes of nursing staff in neonatal care units in four teaching hospitals in Baghdad regarding neonatal pain assessment and management.

MATERIALS AND METHODS

A descriptive cross-sectional study was carried out on all nurses working in neonatal care units of four pediatric teaching hospitals in Baghdad/Rusafa from January 1st to December 31st, 2022. One hundred twenty-one nurses were recruited from the four hospitals (AL-Elwiya, AL-Zahra'a, Ibn AL-Baladi, and Children's Well-Fare Teaching Hospitals). Socio-demographic characteristics of the nurses are studied, including age, gender, educational level, having children, having previous training in neonatal care, and job duration.

The knowledge and practices regarding neonatal pain perception among recruited nurses were assessed using a questionnaire based on previous studies [17, 19-21]. This questionnaire consisted of two parts. The first part includes questions to evaluate nurses' knowledge and perception of neonatal pain. These questions address whether neonates, including premature ones, perceive pain and if they experience more pain than older children and adults. Additional questions include: Are vital signs always reliable indicators of the intensity of neonates' pain? Do premature neonates perceive pain, and do they experience less pain than term neonates? Can neonates sleep despite severe pain? Is a pain scale always needed for routine use? Do neonates forget pain more slowly than adults? Can the same stimuli of the same intensity cause pain of different intensities? Is continuous assessment essential for effective pain relief?

The second part evaluated their attitude towards neonatal

pain management. It includes questions such as: Can breastfeeding be an effective analgesic? Is paracetamol useful for relieving pain in neonates? Is combining analgesics with different mechanisms of action better? Can opioids, such as morphine and pethidine, be used for relieving neonatal pain? Is the recommended route of opioid administration for relieving acute pain intravenously? Can respiratory depression complicate opioid use, such as morphine and pethidine? Should analgesics for postoperative pain initially be given around the clock on a fixed schedule? Furthermore, nurses were also asked about the role of non-nutritive sucking and swaddling in managing neonatal pain.

Each part contained ten agree-and-disagree questions rated on a two-point Likert scale. Questions answered correctly received a score of one, and those with incorrect answers received a zero. Scores were categorized into two grades based on the median cut-off point. Scores between 5 and 10 were deemed acceptable, while scores below five were considered poor [21, 22].

Ethical approval was gained from the Ethical Approval Committee of the AL-Kindy College of Medicine, University of Baghdad, Baghdad, Iraq. Informed consent was obtained from the participants' nurses after a brief discussion and explanation of the study's purpose and benefits. Additionally, they were assured that their data would remain confidential and that their answers would not be used to evaluate their job performance.

The data were then analyzed using a statistical package for the social sciences (SPSS) version 24 software. Data analysis included percentages of total scores, mean and standard deviation calculations for age and job duration, and Chi-square tests for other variables and their potential relationships. The results were presented using tables, and a P-value < 0.05 was used to determine statistical significance.

RESULTS

The mean age of the enrolled participants was 32.6 ± 9 years. Their socio-demographic characteristics revealed that 73.6% of the nurses were female, 71.9% were married, and 62.8 had children. Only 45.5% graduated from a nursing institute, while 43.8% graduated from secondary school (Table 1).

The study found that 53 nurses (43.8%) had over ten years of experience in the neonatal care unit, and 68 nurses (56.2%) had previously completed a neonatal care training course. The mean duration of their work in neonatal wards was 6.48 years, SD 5.698 (Table 2).

The assessment of participants' knowledge regarding their perception of neonatal pain showed that 86 nurses (71.1%) achieved an acceptable score, while 35 (28.9%) scored poorly. The mean score out of 10 was 6.47 ± 1.955 . A significant association was found between a nurse's perception of neonatal pain and several factors, including an older age group, female gender, having children, prolonged experience in neonatal care, and previous neonatal training courses (Table 3).

Regarding the assessment of nurses' practices in neonatal pain management, the study found that 81 nurses (69.4%) had an acceptable score, while 40 nurses (33.1%) had a poor score. The mean score out of 10 was $6.2, \pm 2.105$. We observed significant associations between nurses' practices in neonatal pain management and their age, educational state, years of experience, and previous neonatal training courses. Table 4 details the absence of significant associations with other variables.

Table 1. The sociodemographic characteristics of the 121 nurses.

Variable	Frequency	Percent
Age group		
20–29 years	31	25.6
30–39 years	32	26.4
40–49 years	37	30.6
> 50 years	21	17.4
Sex		
Male	32	26.4
Female	89	73.6
Educational status		
Secondary school	53	43.8
Nursing institute	55	45.5
Nursing College	13	10.7
Having children		
Yes	76	62.8
No	45	37.2
Total	121	100

Table 2. The duration of working in neonatal wards and previous neonatal training courses of the 121 nurses.

Variable	Number	Percent
Duration of working (years)		
Less than 5	22	18.2
6–10	46	38
More than 10	53	43.8
Total	121	100
Previous training		
Yes	68	56.2
No	53	43.8
Total	121	100

DISCUSSION

The study reveals that most enrolled nurses demonstrated an acceptable score in their perception (71%) and practices (66.9%) toward neonatal pain. In comparison, an Indian study reported a mean total score of 8.7 out of 17 among their participants. This variance could be attributed to differences in the characteristics of nursing staff working in neonatal wards, including their experience, skills, education, and training in neonatal pain management [23]. A study conducted in Saudi Arabia found that 63% of participant nurses had an average neonatal score for pain assessment, whereas another study in Egypt indicated that most participating nurses exhibited a high level of knowledge regarding neonatal pain assessment and management [24, 25]. These differences may be linked to variations in nurses' years of experience and their participation in workshops or training about neonatal pain perception assessment and practices.

The nurses' age in this study ranged from 20 to 53 years. Notably, this age group constitutes the most common group of workers in government jobs in Iraq. The mean age of nurses was 32.6 ± 9 years, which is relatively similar to findings from another study conducted in Baghdad in 2015, showing a mean age of 36 years [26]. There is a strong association between the age of nurses, their scores regarding knowledge about neona-

Table 3. The association between Nurse's knowledge about neonatal perceptions of pain and their variables.

Variables	Characteristics	Knowledge about Neonatal perception of pain		Total Number.(%)	Chi-square	P-value
		Poor score No.(%)	Acceptable score No.(%)			
Age (years)	< 20–29	14 (11.6)	17 (14)	31 (25.6)	10.21	0.017
	30–39	12 (9.9)	20 (16.5)	32 (26.4)		
	40–49	6 (4.9)	31 (25.6)	37 (30.5)		
	> 50	3 (2.5)	18 (14.9)	21 (17.4)		
	Total	35 (29)	86 (71)	121 (100)		
Sex	Male	4 (3.3)	28 (23.1)	32 (26.4)	5.7	0.017
	Female	31 (25.6)	58 (70.2)	89 (73.6)		
	Total	35 (29)	86 (71)	121 (100)		
Educational status	Secondary school	13 (10.7)	40 (33.1)	53 (43.8)	15.07	0.55
	Nursery institute	17 (14)	38 (31.4)	55 (45.5)		
	Nursing College	5 (4.1)	8 (6.6)	13 (10.7)		
	Total	35 (29)	86 (71)	121 (100)		
Having children	Yes	14 (11.6)	62 (51.2)	76 (62.8)	10.96	0.001
	No	21(17.4)	24 (19.8)	45 (37.2)		
	Total	35 (29)	86 (71)	121 (100)		
Having previous neonatal training	Yes	12 (9.9)	56 (46.3)	68 (56.2)	9.6	0.002
	No	23 (19)	30 (24.8)	53 (43.8)		
	Total	35 (29)	86 (71)	121 (100)		
Experience period	< 5 years	12 (9.9)	10 (8.3)	22 (18.2)	9.64	0.008
	6–10 years	13 (10.7)	33 (27.3)	46 (38)		
	> 10 years	10 (8.3)	43 (35.5)	53 (43.8)		
	Total	35 (29)	86 (71)	121 (100)		

tal pain perception, and their practices regarding neonatal pain management. Nurses aged 30 and above appear to have higher scores. This finding is consistent with an Egyptian study that showed a strong association between nurses' age and their perceptions and practices towards neonatal pain [25]. As nurses age, they accumulate more experience and likely undergo additional training courses, leading to an improvement in their attitude and decision-making regarding management. Additionally, health authorities in Iraq often select nursing staff working in neonatal care units according to their skills, which might increase with age.

About two-thirds of the nursing staff studied were female. A similar Brazilian study found that 98% of the sample were female nurses [27]. However, a study from Mosul City showed that more than 80 nursing staff in the neonatal care unit were male [28, 29]. The gender of the nursing staff in this study also appeared to have a significant positive association with knowledge scores but no association with practices towards neonatal pain. In Iraq, most female nurses choose to work in gynecological and pediatric wards for social and religious reasons.

Most of the participants in this study either graduated from a secondary school or a health institute. The knowledge and attitude of nurses towards neonatal pain were not affected by their graduation, which could be due to a defect in health institutes' syllabus regarding neonatal pain. This finding goes with the results of other Iraqi studies [22, 29, 30]. However, another study from Egypt showed a significant association between a nurse's educational level and their perception and practices toward neonatal pain [25]. Differences in the sample size, socioeconomic standards, and graduation level could

explain this difference.

About two-thirds of the participant nurses had children, which was significantly positively correlated with their knowledge scores regarding newborn pain. However, it was not significantly associated with their attitudes toward neonatal pain management. This is properly explained by the fact that, as nurses had children, they had increased empathy and understanding of neonatal needs and familiarity with various neonatal problems, so that they would have more experience caring for neonates. Studies from India and Egypt obtained a similar finding [31, 32].

The present study showed that more than half of the participating nursing staff had previous training courses in neonatal care. This training appeared to have a significant positive association with nurses' knowledge and attitude scores toward neonatal pain. Training programs equipped nurses with skills and experience in assessing and managing neonatal pain. Studies from Iran, Egypt, and Ethiopia obtained a similar finding [16, 25, 33].

Regarding working in neonatal wards, most participating nurses worked for more than two years in such wards, and the mean duration was 6.4 ± 5.6 years. The duration of working in neonatal wards was found to have a significant association with scores of knowledges and attitudes among the nursing staff. As much as the nurses get years of experience, they get more confident in themselves, and cumulative knowledge and skills will be gained over these years. This finding agrees with the results of two other studies that showed the same association [25, 34] but in contrast with the findings of an Indian study that failed to demonstrate such an association [31].

Table 4. The association between Nurses' practice regarding neonatal pain management and their variables.

Variables	Characteristics	Nurses' practices toward neonatal pain management		Total Number.(%)	Chi-square	P-value
		Poor score No.(%)	Acceptable score No.(%)			
Age (years)	< 20–29	18 (14.9)	13 (10.7)	31 (25.6)	11.78	0.008
	30–39	8 (6.6)	24 (19.8)	32 (26.4)		
	40–49	9 (7.4)	28 (23.1)	37 (30.6)		
	More than 50	5 (4.1)	16 (13.2)	21 (17.14)		
	Total	40 (33.1)	81(66.9)	121 (100)		
Sex	Male	14 (11.6)	18 (14.9)	32 (26.4)	2.24	0.13
	Female	26 (21.5)	63 (52)	89 (73.6)		
	Total	40 (33.1)	81 (66.9)	121 (100)		
Educational status	Secondary school	16 (13.2)	37 (30.6)	53 (43.8)	1.20	0.54
	Nursery institute	18 (14.9)	37 (30.6)	55 (45.5)		
	University	6 (5)	7 (5.9)	13 (10.7)		
	Total	40 (33.1)	81(66.9)	121 (100)		
Having children	Yes	23 (19)	53 (43.8)	76 (62.8)	0.72	0.39
	No	17 (14)	28 (23.1)	45 (37.2)		
	Total	40 (33.1)	81 (66.9)	121 (100)		
Having previous neonatal training	Yes	16 (13.2)	52 (43)	68 (56.2)	6.36	0.01
	No	24 (19.8)	29 (24)	53 (43.8)		
	Total	40 (33.1)	81 (66.9)	121 (100)		
Experience period	< 5 years	14 (11.6)	8 (6.6)	22 (18.2)	11.36	0.003
	6–10 years	12 (9.9)	34 (28.1)	46 (38)		
	> 10 years	14 (11.6)	39 (32.2)	53 (43.8)		
	Total	40(33.1)	81(66.9)	121 (100)		

Unfortunately, because the study was cross-sectional, it was not possible to determine the temporal relationship of the variable. Furthermore, small sample size and information bias, or response bias were other two limitations to the study.

CONCLUSION

This study concluded that most nursing staff had an acceptable score regarding their knowledge and attitudes about neonatal pain. The variables significantly associated with the nurse's score include age, gender, having children, previous neonatal training, and working in neonatal care units for two years or more. On the other hand, the educational status of the nursing staff was found to have no association with their knowledge and attitude about neonatal pain. Additionally, special groups of nursing staff, namely those who are less than 30 years old and male nurses, show poor scores in their knowledge and attitudes about neonatal pain. We recommend good and ongoing training courses and programs for all nurses working in the neonatal wards or units to assess and improve their knowledge and attitudes towards neonatal pain. Additional training courses are recommended for male nurses and those aged less than 30 years. Moreover, we recommend that the Iraqi Ministry of Health adopt special standard protocols or guidelines about neonatal pain and apply them in all neonatal care units.

ETHICAL DECLARATIONS

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Ethics Approval and Consent to Participate

The AL-Kindy College of Medicine, University of Baghdad, Baghdad, Iraq, granted ethical approval. We obtained informed consent from all nurses who participated in the current study.

Consent for Publication

Not applicable (no individual personal data included).

Availability of Data and Material

Data generated during this study are available from the corresponding author upon reasonable request.

Competing Interests

The authors declare that there is no conflict of interest.

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Authors' Contributions

All of the listed authors significantly, directly, and intellectually contributed to the work and consented to its publication.

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