Nurses' Knowledge about Physiological and Behavioral Pain Indicators of Newborn in Port-Said

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Abstract

Background: Newborns treated in a neonatal intensive care unit (NICU) are exposure to a variety of painful procedures. Unrelieved pain in newborns may lead to potential long term physiological and behavioral consequences. Nurses in NICU have a professional and ethical accountability to have knowledge about assessment and treatment of pain in newborns.

The Aim of this Study: Was to investigate nurses' knowledge about physiological and behavioral pain indicators of newborn. The present study was a descriptive study. The study included all nurses working in the intensive care units for newborns in Port Said Hospitals (N=70). The data were collected using a Nurses' Pain Knowledge Structured Questionnaire Sheet. The results of this study indicated that; the majority of the nurses had lack of knowledge about physiological and behavioral indicators of pain in newborn. Moreover; no statistical significant differences were found between nurses' knowledge scores about pain in newborns and their age, their level of education or their experience in neonatal intensive units. It is recommended that nurses who cares for newborns should be familiar with and trained to assess pain of newborn through in service-training programs and nurses must be encourage to attend national, international conferences and workshops about pain assessment and management of newborns.

Key Words: Newborn – Pain indicators.

Introduction

PAIN is defined as “An unpleasant sensory and emotional experience associated with actual or potential tissue damage” [1]. Although the newborns’ nervous system is still under developing, they are fully capable of transmitting, perceiving, responding to, and probably remembering noxious stimuli [2]. The nerves of the newborns respond more readily to noxious stimuli, with a lower threshold to stimulation, than those of adults. The neural pathways that descend from the brain to the spinal cord are not well developed in the newborns, resulting in limiting the ability of their central nervous system to inhibit nociception than the adults [3].

Newborns admitted to NICU are often exposed to pain from variety of sources, caused by diagnostic procedures such as arterial/venous puncture, heel stick, lumbar puncture, and retinopathy of prematurity (ROP) examination and bone marrow aspiration [4]. Therapeutic procedures also cause pain in newborns include nasogastric tube placement, tracheal intubation and extubation, tracheal suctioning, chest tube insertion, mechanical ventilation, suprapubic aspiration, dressing changes, suture removal, and removal of adhesive tape [4]. Frequency of invasive procedures is inversely related to gestational age and severity of illness. Therefore, the smaller and sicker newborns are exposed to the greater numbers of most painful procedures [5].

Pain in newborns cause physiological and behavioral responses. There are several parameters that used to assess physiological responses to pain. These parameters include increase sympathetic stimulation; heart rate, blood pressure, respiratory rate, changes in the level of oxygen and carbon dioxide in blood and palm sweating. Vagal tone which is manifested by pallor or flushing diaphoresis, dilated pupil and increase intracranial pressure are among the manifestation of pain [6].

Behavioral changes in newborns who have pain includes vocalizations; crying in higher-pitch,
tense, and harsh, whimpering, moaning. Moreover there are facial expressions in response to pain in newborns which includes; grimacing, furrowing or bulging of the brow, quivering chin, eye squeeze, nasal flaring, curling/curving of the tongue and facial twitching [7]. Body movements in newborns when feel pain consist of general diffuse body activity as flexing/extending extremities; extending legs; fingers play, hand on face, limb withdrawal, swiping and thrashing. The newborns have changes in tone, hypertonicity, rigidity, fist clenching then hypotonicity and flaccidity in response to painful stimuli [8].

Assessment and management of neonatal pain are an ethical duty for health care professionals and primarily focus of nursing care [9]. The assessment of pain is an essential role for the pediatric nurse and this should form a part of the routine assessment procedure for newborn assigned to the nurse [10]. Nurses, especially the pediatric nurses, should know the various neonatal pain assessment instruments, use them effectively and ensuring appropriate interventions [11].

Multidisciplinary approaches for management of pain in newborns are required in neonatal intensive care unit. Pain can be managed either pharmacologically or non-pharmacologically. The non-pharmacological strategies include; non-nutritive sucking, swaddling, oral sucrose solution, skin to skin contact and breastfeeding. Pharmacological agents are required in invasive procedures and post-operative period include; opioid, morphine, fentanyl, topical anesthetic cream [12]. It is important for nurses who care for newborns to prevent or eliminate pain as much as possible to promote positive neuro-developmental outcomes during infancy and also in later childhood and adulthood [10].

Aim of the study:
Investigate nurses' knowledge about physiological and behavioral pain indicators of newborns.

Subjects and Methods
A descriptive study design was used, carried out at the Neonatal Intensive Care Units (NICU) of the Governmental and Health Insurance Hospitals in Port Said City. Which include 4 Hospitals.

Sample:
A sample of convenience was used in this study. Consisted of all nurses working in Neonatal Intensive Care Units, regardless of their years of experience or qualifications, comprised the study subjects with total number 70 nurses. Data collection took a period of 4 months from January to April 2012.

Tool of the study:
Nurses' pain knowledge structured questionnaire sheet:
It was developed by the researcher guided by Jones' pain tool [13] to identify nurses’ knowledge about physiological and behavioral pain indicators of newborn. It consisted of three parts:
Part (I):
Socio-demographic data such as; nurses' age, level of education, years of experience care for neonates, training programs attended about neonatal care especially during pain.
Part (II):
Nurses' knowledge about pain as; definition, causes, factors affecting pain, pain assessment and management of newborn.
Part (III):
Physiological and behavioral pain indicators. It included:
A- Physiological signs as, increase heart rate, blood pressure, respiratory rate, pallor, sweating.
B- Behavioral signs as, crying, grimace, general diffuse in body activity, sleep-wake cycle change, irritability, lethargy.

Scoring system:
Scores were used to evaluate nurses’ knowledge where each true answer of knowledge was given one mark and zero mark if not known.

Total knowledge score about newborns’ pain were 93 marks distributed as follows:
A- Nurses’ knowledge about pain in newborns (61 marks) were distributed as follows:
• Definition of pain (2 marks).
• Causes of pain in newborns (10 marks).
• Factors affecting pain sensation in newborns (4 marks).
• Types of medical and nursing interventions causing pain (12 marks).
• Nursing management of pain in newborns (11 marks).
• Non-pharmacological management to relieve pain in newborns (7 marks).
• Types of medications used to relieve pain in newborns (4 marks).
• Signs of pain in newborns (11 marks).

**B- Nurses’ Knowledge about Physiological and Behavioral Pain Indicators in Newborns (32 marks)** were distributed as the follows:
• Vocal indicators of pain in newborns (2 marks).
• Facial indicators of pain in newborns (7 marks).
• Body movement indicators of pain in newborns (6 marks).
• Physiological indicators (11 marks).
• Behavioral indicators (6 marks).

**Total score of knowledge was classified as follows:**
• Good 65% or more.
• Fair 50% to less than 65%.
• Poor less than 50%.

**Results**

Table (1) illustrates the socio-demographic characteristics of the studied nurses. It is clear from the table that 45.7% of the nurses’ aged between 20 to less than 25 years with a mean age 26.0±4.9 and 54.3% of the nurses graduated from Secondary Nursing School.

Table (2) demonstrate occupational characteristics of the studied nurse. It is revealed from the table that 67.1% of the studied nurses had experience from 1 to less than 6 years’ about newborns. Only 8.6% of the nurses attended training courses about neonatal pain, all of them attended course about the effect of pain on newborns.

Table (3) represents nurses’ assessment of pain in newborns. It is shown from the table that 58.6% of the studied nurses assessed pain in newborns. 57.1% of the studied nurses had obstacles when assess pain in newborns related to lack of time (40.5%).

Figures (1,2) illustrate knowledge of nurses about physiological indicators of pain in newborns. 98.6% of nurses knew that heart and respiratory rates would increase when newborns exposure to pain and 78.6% of the studied nurses knew that suckling reflex decreased when the newborn had pain while 62.9 of the studied nurses knew that the face of newborn become pallor when exposure to pain. Only 25.7% of the studied nurses knew that the blood glucose level would increase during pain.

Figure (3) demonstrates nurses’ knowledge about behavioral indicators of pain in newborn. 88.6 of nurses had knowledge about facial indicators of pain in newborns. 87.1 % of the nurses had knowledge about both vocal and body movement indicators of pain in newborns.

Figure (4) represents nurses’ knowledge about facial indicators of pain in newborns. The most facial signs known by the studied nurses were facial redness or pallor (62.9%) and grimace of the face (32.9%). While, only 8.6 % of the nurses knew that the newborn close eye firmly during pain.

Figure (5) represents nurses’ knowledge about vocal indicators of pain in newborns. It is clear from the figure that the most vocal signs known by the studied nurses were vigorous crying (81.4%) followed by groaning (21.4%).

Figure (6) revealed body movement’s indicators of pain in newborns. Body movement indicators of pain in newborn stated by one third of the studied nurses were kicking with legs (34.3%) while less than one quarter of them mentions flex legs to abdomen (22.9%), increased random movement (22.9%). Only 15.7% of the nurses knew that pain in newborns could be accompanied with convulsions.

Figure (7) describe scores of nurses’ total knowledge about pain in newborns. It revealed from the figure that 95.7% of the nurses had “poor” levels of total knowledge scores.

Figure (8) indicates that 90.9% of the nurses who are less than 25 years had “poor” total knowledge score about pain in newborns and 100% of nurses who are 25 years and more had “poor” total knowledge score about pain in newborns.

Figure (9) demonstrates from the figure that all of the studied nurses who graduated from technical institute and secondary nursing schools had “poor” total knowledge scores about pain indicators of newborns. While 85% of the nurses who have baccalaureate nursing degree had “poor” total knowledge scores.

Figure (10) revealed that 94.7% of the nurses who have experience less than 6 years had “poor” knowledge score and 100% of the nurses with experience of 6 years or more regarding pain of newborns.
Nurses’ Knowledge about Physiological & Behavioral Pain

Fig. (1): Nurses’ knowledge about physiological indicators of pain in newborns.

Fig. (2): Nurses’ knowledge about physiological indicators of pain in newborns.

Fig. (3): Nurses’ knowledge about behavioral indicators of pain in newborn.

Fig. (4): Nurses’ knowledge about facial indicators of pain in newborns.

Fig. (5): Nurses’ knowledge about vocal indicators of pain in newborns.

Fig. (6): Body movement’s indicators of pain in newborns.
Fig. (7): Scores of nurses’ total knowledge about pain in newborns.

Fig. (8): Total scores of nurses’ knowledge about pain in newborns according to their age.

Fig. (9): Total scores of nurses’ knowledge about pain of newborns according to their educational level.

Fig. (10): Total scores of nurses’ knowledge about pain of newborns according to their duration of experience for care of neonates.

Table (1): Socio-demographic characteristics of the studied nurses.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>No. n=70</th>
<th>%</th>
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<tbody>
<tr>
<td>Age/years:</td>
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<td></td>
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<tr>
<td>&gt;20</td>
<td>1</td>
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</tr>
<tr>
<td>20-</td>
<td>32</td>
<td>45.7</td>
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<tr>
<td>25-</td>
<td>21</td>
<td>30.0</td>
</tr>
<tr>
<td>30-</td>
<td>13</td>
<td>18.6</td>
</tr>
<tr>
<td>35 or more</td>
<td>3</td>
<td>4.3</td>
</tr>
<tr>
<td>Min-Max/years</td>
<td>18-39</td>
<td></td>
</tr>
<tr>
<td>Mean±SD</td>
<td>26.0±4.9</td>
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<tbody>
<tr>
<td>Baccalaureate nursing degree</td>
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<td>28.6</td>
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<tr>
<td>Technical nursing institute</td>
<td>12</td>
<td>17.1</td>
</tr>
<tr>
<td>Secondary nursing school</td>
<td>38</td>
<td>54.3</td>
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Table (2): Occupational characteristics of the studied nurses.

<table>
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<th>Duration of experience about newborns/years:</th>
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<td>14.3</td>
</tr>
<tr>
<td>1-</td>
<td>47</td>
<td>67.1</td>
</tr>
<tr>
<td>6-</td>
<td>6</td>
<td>8.6</td>
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<tr>
<td>12 and more</td>
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<th>No. n=70</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>6</td>
<td>8.6</td>
</tr>
<tr>
<td>No</td>
<td>64</td>
<td>91.4</td>
</tr>
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<table>
<thead>
<tr>
<th>Type of training courses about pain in newborns*:</th>
<th>n=6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment of pain in newborns</td>
<td>5</td>
</tr>
<tr>
<td>Care of newborns in pain</td>
<td>5</td>
</tr>
<tr>
<td>Effect of pain on newborns</td>
<td>6</td>
</tr>
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</table>

*More than one answer.
Assessment of pain in newborns:

Pain is a dynamic experience, and nurses have the responsibility for understanding that effective pain control is important [14]. It is great importance to assess the neonatal pain indicators knowledge among nurses to improve nurse’s understanding about the concept and mechanisms of pain in order to plan effective nursing intervention in clinical practice. Management of pain should be a priority for all pediatric health care providers [15].

Newborns are undergoing many painful procedures daily, which may have long-term negative effects. Painful procedures are a risk for brain damage through an increase in arterial and intracranial pressure, and oxygen desaturation [16]. Neonatal pain treatment is still far from being satisfactory [5]. Several reasons may explain why neonatal pain is underestimated; it may be due to a cultural lack of empathy with newborn and a resistance to the consideration of newborns as “real” patients.

McCaffery M. et al. [17] illustrated that, the in-service education is important and is considered as a cornerstone of total quality management, moreover, the continuous improvement is impossible without it. The finding of the present study showed that the minority of the nurses attended training courses related to pain and its management (Table 2). This result may be due to insufficient time of nurses in NICU to attend educational programs or that the authority individuals of NICU department do not provide training for nurses about pain of the newborn. This result goes in line with [18] who emphasized the value of advanced educational preparation and continuing education sessions for nurses. Also, [19] carried a research about pain management in newborn and stated that few nurses reported that they received training on neonatal pain.

The results of the present study revealed that more than half of the studied nurses reported that they had obstacles hinder their role in assessment of pain (Table 3). The finding of the current study may be due to the fact that nurses who care for neonates do not have a sufficient time for assessing pain. This finding was in line with [20] who stated that nurses identified a number of barriers that concerning the organizational aspects, such as, workload, legal or institutional constraints and also analgesic prescription was sometimes inadequate or that doctors were unavailable to review medication. In this respect [21], added that perceived barrier to provide adequate pain management include lack of knowledge about pain assessment and management among nurses and physicians, lack of standardized approach to treat pain, fear of addiction and overdose.

Regarding the nurses’ knowledge about physiological indicators of neonatal pain in the present study, it was noticed that the majority of nurses mentioned that the most indicators of pain in neonates were increase in the heart and respiratory rates, decrease Pa O₂ and increase sweating (Fig. 1). These results may be due to the fact that the nurses take vital signs for newborns and notice these changes after painful procedures. The findings of the present study are supported by [22] who stated that painful procedures in newborn stimulate sympathetic nervous system and results in tachycardia, peripheral vasoconstriction, diaphoresis, respiratory rate alterations and oxygen desaturation. Glucose is essential for normal metabolism in the neonate, particularly for cerebral and cardiac metabolism [23] stated that newborns subjected to a variety of noxious stimuli have immediate hormonal responses, such as, decreased secretion of insulin. The result of the present study indicated that only a small number of nurses mentioned that increase blood glucose level is a physiological indicator of pain in newborn (Fig. 2). This may be due to the infrequent use of this method by nurses for newborns who have pain in NICU.

Behavioral indicators are important markers of pain in newborns. Three categories of pain behaviors, facial expression, vocalizations, and motor activity [24]. The highest percentage of nurses in the present study had fair knowledge regarding behavioral signs of pain in newborns includes facial, vocal and body movements indicators (Figs. 3-6). The rationale for such finding may be due to the fact that behavioral signs of pain are easily observed and easily assessed by nurses. This finding was supported by [25] who stated that behavioral responses associated with pain in newborns were
vocalization of sounds, changes in facial expression which included brows lowered and drawn together, eyes tightly closed, mouth opened and squarish and unexpected or unusual body movements. Understanding these behavioral pain indicators make pain assessment in newborns a little easier. In another study [26], added that these behavioral indicators may not be present in some newborns who are neurologically impaired or pharmacologically paralyzed.

The results of the present study revealed that the majority of the studies nurses were able to determine the vocal indicators of pain in newborns where a large percentage of the sample agreed that continuous vigorous crying is the most common pain indicator (Fig. 5). This result may be explained in the light of the fact that cry is easily observed and the nurses consider the newborns cry because they are in pain or hungry. This finding is congruent with [25] who show that crying is association with acute pain in neonates and it is more intense and sustained when in pain. This result was supported by [27] who also found that crying help in discriminating between the different degrees of pain and if pain intensity is low, crying features are quite different than if pain intensity is high.

The current study results regarding nurses’ knowledge related to newborns’ pain are alarming. The majority of nurses had “poor” knowledge scores regarding newborns’ pain (Fig. 7). In this regard [28], who assessed knowledge and practices of nurses about pediatric pain, found that nurses have lack of knowledge about pain in children. The poor knowledge score findings in the present study may be attributed to the fact that nurses do not emphasize for updating their knowledge regarding pain in newborns. These results may be attributed to the facts that nurses in NICU may have a false perception about pain in newborns and that newborns do not feel pain and do not need treatment. The finding of the current study illustrated by [29] where they found that nurses lacked knowledge about pain. In this respect [30] indicated that nurses had misconceptions and inadequate knowledge regarding pain.

In studying the relationship between nurses’ knowledge scores and their level of education, it was found that nurses who have high level of education had “good” score level of knowledge (Fig. 9). This result may be attributed to their curriculum which might include pain and pain assessment. This finding is supported by [31]; who found that there was a positive correlation between the education level of the nurses and their knowledge regarding pain.

It is revealed from the findings of the present study that nurses who have of experience less than 6 years had “Good” knowledge score compared to nurses with experience of 6 years or more (Fig. 10). This finding may be attributed to the fact that the young nurses may still remember the knowledge they had at school. This finding was not supported by [25] who studied the pain management practices in children after surgery and mentioned that nurses who have lack of experience, have lack in their knowledge. In this respect [12] illustrated that there was no relationship between increased clinical experiences and overall pain scores of knowledge and practice.

Conclusion:

Based on the findings of the current study, it is concluded that, the majority of the studied nurses who are working in the Neonatal Intensive Care Units (NICU) in Port Said lack of knowledge regarding physiological and behavioral indicators of pain in newborns. In addition, there is no relation between nurses’ knowledge about newborns’ pain and their age, level of education or years of experience in caring for newborns.

Recommendations:

- Nurses, especially those caring for newborns, should be familiar with and trained to use pain assessment tool for newborns’ through in-service training programs.

- Hospital policy should include the application of pain assessment in NICU.

- Adequate pain assessment facilities should be available to encourage nurse to assess pain in newborns.

- Simple Arabic handout about newborns’ pain indicators, causes, methods of assessments and non-pharmacological pain management should be available in all NICU.

- Encourage nurses to attend national and international conferences, and workshops about pain assessment and management for newborns.

References


3- HOWARD R., CARTER B., CURRY J., MORTON N., RIVETT K. and WILLIAMS: Good practice in postoper-


