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Nurses' Knowledge and Practice in Assessment and Management of Neonatal Pain at Governmental Hospitals in Gaza Strip

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Dedication

I dedicate this project to God Almighty my creator, my strong pillar, my source of inspiration, wisdom, knowledge and understanding.

To my amazing mother and father whom without, I would not be the person that I am today. Thank you for being amazing role models, for always encouraging my dreams, and for all of the sacrifices you made in order for me to live the life I have.

To My beautiful Aunt Taghreed.

To my beloved wife Israa. I appreciate the sacrifices you have made in helping me realize my dream.

To my son Khaled and my beautiful daughters Sara and Malak who are the joy of my life for their patience and support.

To my brothers and sisters Faraj, Israa, Mahmoud, Ahmed, Amal, Said, Mohamed, Heba and Saja, thank you for being my cheerleaders and for showing patience and tolerance with my busy schedule.

To my homeland Palestine

To the Holy Land of Jerusalem

To whom born too soon, you inspire me every day to advocate for those who cannot advocate for themselves.

To. All of them I dedicate this work.

Signed: Yuonis K. S. Qasem

Date:

Declaration

I certify that this thesis submitted for the degree of Master is the result of my own research, except where otherwise acknowledged, and that this thesis (or any of its parts) has not been submitted for higher degree to any other university or institution.

Signed: ……

Yuonis K. S. Qasem

Date: / /

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Abstract

Pain among neonates whom admitted to neonatal intensive care units (NICUs) is a common phenomenon as they exposed to a variety of painful procedures that may result in physiological and behavioral alterations, as well as changes in the development of the nervous system and long-term harm. The pain is considered the fifth vital sign, the nurses have an important role in assessing and managing pain by using multi non-pharmacological and pharmacological methods and involvement of physicians and family in pain assessment and management. The study aimed to investigate neonatal nurses' knowledge and practices related to pain assessment and management that may contribute to improve the quality of pain management by nurses at NICUs of governmental hospitals in Gaza Strip. The study design was quantitative, descriptive cross sectional, conducted at the NICUs affiliated to the governmental hospitals " Al Shifa Hospital - Al Nasser Pediatric Hospital - European Gaza Hospital ". The sample consisted of all nurses working in NICUs. The total number of nurses was 102. The data were collected from study participants by using a self-administered questionnaire. The response rate was 100%. The data collected were analyzed by using descriptive and inferential statistical tests with level of statistical significance at $p<0.5$. The level of Knowledge and Practice were categorized into five groups "very low< 60%, low 60% - 69.99%, moderate 70% - 79.99%, high 80% - 89.99%, very high 90% - 100%". The results showed that nurses had low total knowledge level with mean percentages (67.07%) and low total practice level with mean percentages (61.04%). There was significant weak correlation between nurse's knowledge and practices r = (0.343). There were significant differences in the nurses' knowledge and practices between their different gender, in favor to male nurses. There were significant differences in the nurses' knowledge between their different educational qualification, in favor to nurses who have master. There were significant differences in the participants' practice between who received course or educational program related to assessment and management on neonatal pain at NICU and who didn't receive ($P<0.05$). This study revealed that the nurses had high level of knowledge (81.33%) and low level of practices (68.2%) towards involving physicians in assessment and management of neonatal pain. And show that the nurses had moderate level of knowledge (70.66%) and very low level of practices (58.6%) towards involving families in assessment & management of the pain of their neonates. Therefore, the study recommended to developing course or educational program related to assessment and management of neonatal pain to promote their integrated pain management care for neonates.

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List of Abbreviations

CRIES	Cry, Required Oxygen, Increased vital signs, Expression, Sleeplessness
DAN	Douleur Aigue Nouveau-ne (Neonatal Acute Pain Registration System)
EGH	European Gaza hospital
EMLA	Eutectic Mixture of Local Anesthetics
FTP	facilitated tucking by parents
G.S	Gaza Strip
GNN	Gaza Neonatal Network
MBPS	Modified Behavioral Pain Scale
MoH	Ministry of Health
MPAT	Modified Pain Assessment Tool Scale
MSN	Master of Nursing Sciences
NANN	National Association of Neonatal Nurses
NFCS	Neonatal facial coding system
NICU	Neonatal Intensive Care Unit
NIPS	Neonatal infant pain scale
NNS	Non-Nutritive Sucking
N-PASS	Neonatal pain, agitation, and sedation scale
OCHA	United Nation Office for the Coordination of Humanitarian Affairs
PCBS	Palestinian Central Bureau of Statistics
PIPP	Premature infant pain profile
RCT	Randomized Control Trial

SMD	overall Standardized mean differences
SSC	Skin-to-skin care
UNRWA	United Nation Relief and Work Agency for Palestinian Refugees in the Near East
WB	West Bank
WHO	World Health Organization

Chapter One
Introduction

1.1 Background

Pain is “an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage. Pain of any origin comprises an individual’s life. The prevention and management of pain is an important aspect of health care worker (Kumar & Elavarasi, 2016). There are four main vital signs routinely monitored by medical professionals and health care providers include body temperature, pulse rate, respiration rate and blood pressure, International guidelines for pain management in the Neonatal Intensive Care Unit (NICU) suggest that pain is the fifth vital sign, and it should be assessed. Nurses’ neonatal pain assessment and management have improved over the years (Gradin & Eriksson, 2011).

Historically, and in all settings, pain has been unrecognized and under treated in neonates , the most frequently cited reason was the belief that neonate have blunted or absent ability to feel pain; it was suggested that newborns have immature nervous systems and do not remember painful experience, moreover, it was argued that administering medicines with every procedure would increase the likelihood of drug accumulation and resultant adverse effects, However, combining pharmacological and comfort measures reduces this risk, consequently, exaggerated concerns for the safety of analgesics in neonates militated against their use (Akuma & Jordan, 2011).

Painful experiences in the neonatal period may result in physiological and behavioral alterations, as well as changes in the development of the nervous system, which can provoke considerable damage in the future. However, several studies indicate that hospitalization in (NICU) includes a high number of painful procedures, most of them necessary for diagnosis and treatment (Sposito et al., 2017).

Pain exposure in NICU is considered a major source of distress for neonates and their families (Cignacco et al., 2009). An infant requiring neonatal intensive care may be exposed to as many as 12 to16 invasive, painful procedures each day. Pain in the neonatal intensive care unit can be categorized as acute procedural pain, acute prolonged pain, or chronic pain (Lake, 2013).

Infants treated in NICU are exposed to a variety of painful procedures and to environmental stress, repeated and prolonged pain exposure in preterm infants during a vulnerable time for brain development may have adverse consequences. If pain is not assessed well, it cannot be managed well, nurses cannot recognize that an infant is suffering, they are unable to do anything about it (Pölkki et al., 2010). Repeated exposure of neonates to stressful events, such as painful procedures, adversely affects their physiologic and neurologic status and results in long term harm, including changes to brain microstructure and function, neurodevelopment, stress systems, and stress sensitive behaviors (Grunau, 2013).

Nurses play a vital role in the management of pain of their patients and the role is even bigger in the underdeveloped premature neonatal population. Infants cannot voice what they need to be said therefore the nurse must prove to be the advocate and voice of the client. The nurses' goal of pain management in neonates is to minimize the experience of pain and maximize the neonate's capacity to cope with and recover from the many painful procedures in the NICU. The nurse must maintain a balance between pain relief and adverse effects of analgesics. This requires that the nurse have knowledge and feel comfortable providing pharmacologic interventions as well as non-pharmacologic interventions (Nicolet et al.,2010).

1.2 Problem statement

Uncontrolled pain remains serious health problem, nurses' knowledge and practice about pain in neonatal period still misunderstood such neonate and premature unable to feel pain due to their immature nervous systems, inadequate nursing pain assessment and management to neonatal patient contribute in increase serious problem due to neonate more sensitive to nociceptive stimuli than the elder. Research studies that examined the nursing knowledge of pain assessment and management in neonatal intensive care unit are limited in Palestine especially in Gaza. More research is needed to assess if neonatal nurses have adequate knowledge and practice about optimal pain assessment and management for neonates while exposed to painful stimuli. More information is needed to explain nursing knowledge about pain assessment and management in NICU to bridge the gap between the recommended best practice and the reported nurses' knowledge of assessment and management of pain among neonates in order to improve care for neonate experiencing pain.

1.3 Justification

The researcher noticed the problem from clinical experience and review of related literature, the most recent studies indicate that nurses demonstrate less knowledge about pain assessment and management than their international counterparts. There are concerns that pain is often unrecognized and under-treated in neonates. Thus, a study on knowledge and practice of pain assessment and management in NICU will help identify knowledge and practice of nurses and show the cooperation between nurses and physicians in working as team to have more accurately pain assessment and best pain management. As well as show the family involvement in pain assessment and management that will help the nurses to perform non pharmacological pain relief interventions.

Up to the researcher's knowledge about this topic the researcher found that the problem of neonatal pain assessment and management has limited research evidence that assess nurses' knowledge and practice regarding neonatal pain including involving physicians and family in the process, so this study comes to assess the readiness of nurses through their knowledge and practice to deal with neonatal pain and to provide the evidence about their competence to assess and relief neonatal pain in NICUs in governmental hospitals of Gaza Strip.

The result of this study may add value to the nursing profession. In practice, the result may help in improving the nurses' pain assessment and management provided to neonate, so the decision makers can apply programs to enhance optimal nursing pain assessment and management provided to neonate. As well as adopt policies to improve its quality.

1.4 The overall aim

The purpose of this study is to investigate neonatal nurses' knowledge and practices related to pain assessment and management that may be improve the quality of pain management by nurses at NICUs of governmental hospitals in Gaza Strip.

1.5 Objectives

1. To identify level of knowledge regarding neonatal pain assessment and management among neonatal nurses.
2. To determine the reported level of practice by neonatal nurses for pain assessment and management of neonates at NICUs.
3. To assess the level of involving physicians by nurses in assessing and management of neonatal pain at NICUs.
4. To assess the level of involving families for the assessment and management of the pain of their neonates.
5. To investigate the relationship between nurses' sex, age, educational level, years of experience, and level of knowledge and practice about pain assessment and management at NICU in GS.
6. To suggest recommendations to improve knowledge and practice among nurses regarding pain assessment and management in NICU in GS.

1.6 Research Questions

1. What is the level of nursing knowledge about neonatal pain assessment and management in NICUs of the governmental hospital at G.S?
2. What is the of level of nurses' practice for pain assessment and management among neonates at NICUs of the governmental hospital at G.S?
3. What is the level of involving physicians by nurses in assessing and management of neonatal pain at NICUs of the governmental hospital at G.S?
4. What is level of involving families for the assessment and management of the pain of their neonates in NICUs of the governmental hospital at G.S?
5. Is there relationship between nurses' sex, age, educational level, years of experience and level of their knowledge and practice about pain assessment and management in NICUs of the governmental hospital at G.S?
6. What are the recommendations that could be provided to improve knowledge and practice among nurses regarding neonatal pain assessment and management in NICUs of the governmental hospital at GS?

1.7 Operational definitions

1.7.1 Knowledge:

The level of scores that obtained by the neonatal nurses through answering correct responses of the knowledge domain about neonatal pain assessment and management in the self-administered questionnaire.

1.7.2 Practice:

The reported level of performance by neonatal nurses about their assessment and management of neonatal pain at the NICU that will be measured using the self-administered questionnaire.

1.7.3 Physician's involvement:

The level of reported neonatal nurses' responses about the integration of physicians in pain assessment and management of newborns at NICUs that will be measured through the self-administered questionnaire.

1.7.4 Family's involvement

The reported neonatal nurses' responses about the integration of families in assessing and providing care and comfort for the pain of their neonates in the NICU that will be measured through the self-administered questionnaire.

1.8 Context of the study

1.8.1 Demographic Context

Palestine is an Arabic Country, relatively small one, the total surface area of the historical Palestine is about 27.000 Km^2, Palestine has been occupied in1948 by Israel and divided into three parts are separated geographically; the West Bank (WB) 5.655 Km2, Gaza Strip (GS) 365 Km2 and East Jerusalem. Palestine is surrounded by Lebanon, Syria, Jordon, Egypt, and Mediterranean Sea. GS is small area of land bounded on the south by Egypt, on the west by Mediterranean Sea and on the east and north by the occupied territories in 1948 (Palestinian Central Bureau of Statistics-PCBS, 2017). (Annex1).

1.8.2 Population:

The total area of the GS and WB is about 6,020 Sq. Km with total population living in is about 4,952 million individuals (3,008 WB and 1,943 in GS). The total population density (capita/Km2) is consider very high 778 in Palestine (506 in WB and 4,986 in GS). The Total fertility rate is 4.1 births, in WB 3.7 and 4.5 in the GS (PCBS, 2017). Because isolation, restriction and closure of single passengers crossing (Rafah) on GS there is significant increase in poverty rates which reached up 53% by the end of 2017 (United Nation Office for the Coordination of Humanitarian Affairs – OCHA, 2018). GS is divided into five governorates: Gaza Governorate, North Governorate, Mid-zone Governorate, Khan-Younis Governorate, and Rafah Governorate (MOH, 2017).

1.8.3 The Palestinian health care system:

Health care system in Palestine is complex mix of different sectors. Health service delivery in Palestine is divided into five major health care providers are the Ministry of Health (MoH), the nongovernmental organization, the United Nation Relief and Work Agency for Palestinian Refugees in the Near East (UNRWA), the Palestinian Military health services and the private sector. MoH bears the heaviest burden, as it has the responsibility, the main roles and responsibilities of the MOH according to the Palestinian Public Health Law is: providing, regulating and supervising the provision of health care in Palestine. Also, MOH is responsible about planning the health care services in coordination with different stakeholders, enhancing health promotion to improve the health status, developing human resources in health sector, managing and disseminating health information, and others.

UNRWA provides primary care services, only for refugee and purchase secondary care services for the hardship cases. Non-governmental organization provide primary, secondary and some tertiary services. Private for- profit sector provide three level of care through variety of specialized hospitals investigation centers (MoH, 2017).

Years of low socioeconomic status, conflict and repeated attack of Israeli siege left the health sector across the GS lacking adequate physical infrastructure, supplies and training opportunities. Health facilities are overstretched, and service is frequently interrupted by power crisis. These challenges further threaten the health of population (WHO, 2016).

There is also a chronic shortage of essential lifesaving drugs and medical disposables in Gaza's hospitals, where care for newborn babies, particularly those cared in intensive care.

Medical supplies were in very short supply and health facilities were often not able to treat the sick during the crisis. The overall bad economic status of the Palestinians in GS increases the load on the governmental hospitals to provide secondary care especially in case of emergency. This also increases the need for efficient healthcare provision and effective clinical supervisory system to effectively managing the services (WHO, 2017).

1.8.4 Neonatal Intensive Care Unit in Gaza Governmental hospitals:

According to the last update of Gaza Neonatal Network (GNN) in 2013, there is eight hospitals have intensive care units in GS. Three of these hospitals (Al Shifa hospital – Al Nasser Pediatric Hospital – The European Gaza hospital (EGH)) have the third level of NICUs. The total number of nurses is about 101 nurses, Al Nasser Pediatric Hospital (44) - Al Shifa hospital (40) - EGH (17) with different academic levels (diploma, baccalaureate, and master) In addition the total number of incubators 111, only 38 of this is intensive neonatal incubators and 25 are high dependency cots. The total number of admissions to NICUs per year is (1500 Al Naser, 528 EGH, 2400 Al-Shifa) (GNN, 2013).

Chapter Two

Literature Review

2.1 Conceptual Framework

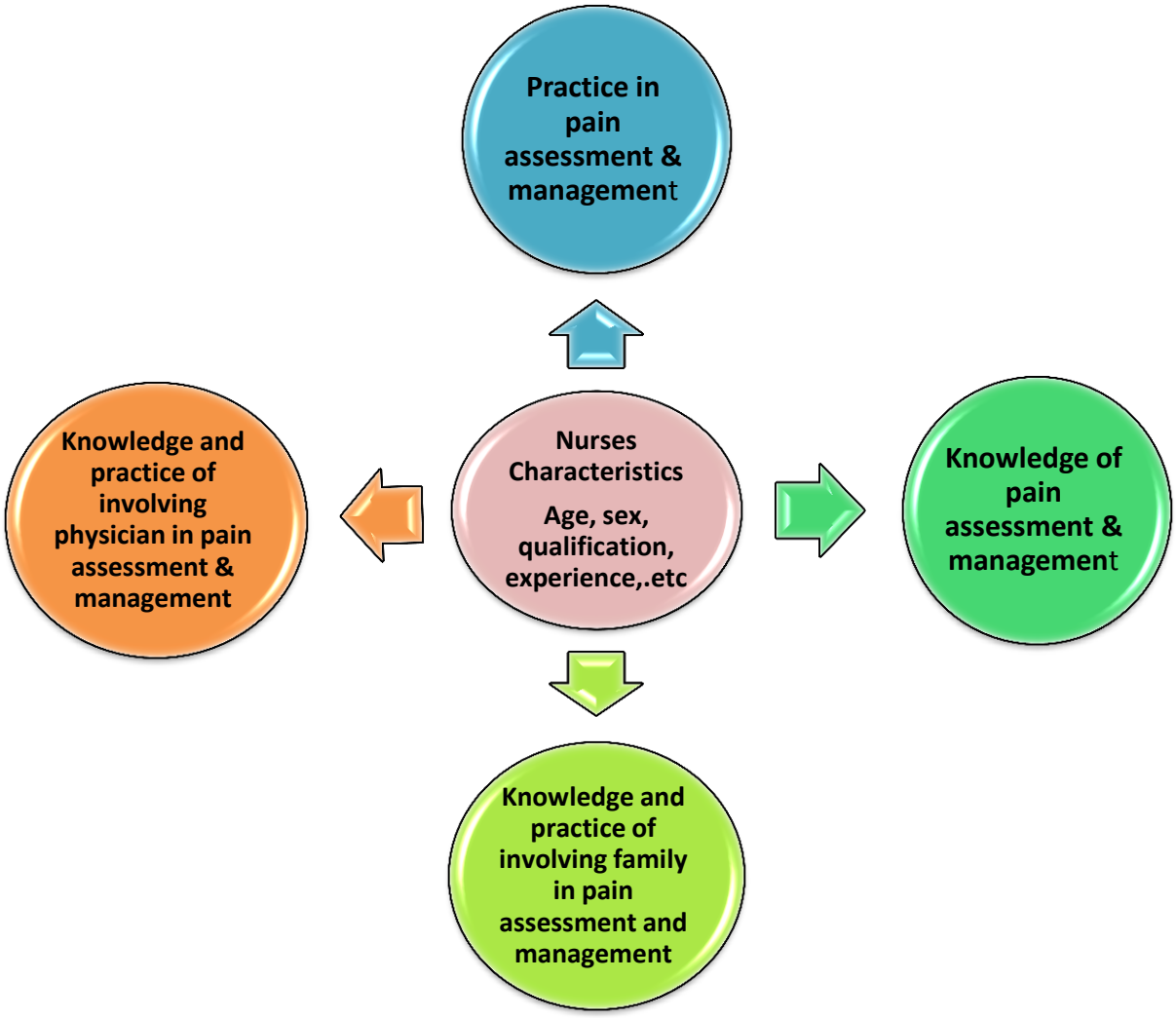

Figure (2.1): Conceptual Framework

The self-developed conceptual framework shows the relations between the nurses' characteristics as independent variables and the other dependent variables (knowledge of pain assessment & management, practice of pain assessment & management, knowledge and practice of involving physician in pain assessment & management, and knowledge and practice of involving family in pain assessment & management).

2.2 Background

Pain is an unpleasant experience felt by neonates in all health care settings. A successful pain management plan includes an accurate and timely assessment of the neonates, an appropriate intervention to decrease the pain, an evaluation of the intervention to determine its effectiveness, re-intervention if necessary, and accurate documentation of every step of the plan (Martinez, 2014).

2.3 Pain Assessment

Pain assessment in the non-verbal neonate can be a very challenging task in an already subjective process. The American Academy of Pediatrics and the Canadian Pediatric Society published a policy stating that each healthcare facility should establish a neonatal pain control program aimed at routine assessment of pain, reduction in the number of painful procedures, and also reduction and prevention of acute pain from invasive procedures. There are pain scales used to assess pain; however, there are variations in the methods and scales used, and there is no universal method to assess pain in this population. Objective measurements including heart rate, blood pressure, and salivary cortisol" tests can help to determine if there is a problem with injury and stress (emotional or physical)" can be used, but most care providers usually rely on grimace, crying, and overall demeanor (Witt et al., 2016).

2.4 Pain assessment scales

To assessing pain by physiologic parameters in the neonatal population, there are multiple validated pain scales utilized by NICUs to assess pain. the neonatal infant pain scale (NIPS); neonatal facial coding system (NFCS); neonatal pain, agitation, and sedation scale(N-PASS); cry, required oxygen, increased vital signs, expression, sleeplessness scale (CRIES); COMFORT Scale; and Douleur Aigue Nouveau-ne (DAN) scoring system. These scales have been developed proven valid and reliable for newborn population (Witt et al., 2016).

1- Neonatal Infant Pain Scale (NIPS)

Facial expression, crying, breathing, patterns, arm and leg movements, arousal are observed. This scale designed to measure procedural pain in preterm and full-term

newborns up to 6 weeks after birth. This scale has high rate of reliability and validity (Hockenberry & Wilson, 2015).

2- Premature infant pain profile (PIPP)

Heart rate, oxygen saturation, facial actions are observed. This scale designed to measure procedural and postoperative pain in premature (gestational age less than 37 weeks). This tool is reliable and valid (Hockenberry & Wilson, 2015).

3- Neonatal Facial Coding System (NFCS)

Observation to facial actions. designed to measure procedural pain in neonate, this tool has high rate to reliability, validity, clinical utility is well established and high degree of sensitivity to analgesia (Witt et al., 2016).

4- Neonatal Pain, Agitation, and Sedation Scale (N-PASS)

Crying, irritability, facial expression, extremity tone and vital signs are observed. designed to measure procedural, postoperative, mechanically ventilated patients. Includes sedation end of scale, does not distinguish pain from agitation, its reliable and valid (Hockenberry & Wilson, 2015).

5- Cry, Required Oxygen, Increased Vital Signs, Expression, Sleeplessness Scale (CRIES)

Crying, facial expression, sleeplessness, requires oxygen to stay at 95 % saturation, increased vital signs are observed. designed to measure postoperative pain. This tool is reliable and valid (Hockenberry & Wilson, 2015).

6- COMFORT Scale

Movement, calmness, facial tension, alertness, respiration rate, muscle tone, heart rate, and blood pressure are observed. designed to measure postoperative pain and critical care. This tool is reliable and valid and clinical utility well established (Witt et al., 2016).

7- Douleur Aigue Nouveau-ne (DAN) scoring system

Facial expression, limb movements and vocal expression are observed. Designed to measure procedural pain. This tool is reliable and valid (Witt et al., 2016).

8- Modified Behavioral Pain Scale (MBPS).

Designed to assess procedural pain in infants and is considered valid for assessing immunization pain, The child is evaluated prior to the procedure to give a baseline for comparison during and after the procedure. Parameters: (1) facial expression (2) cry (3) movements (Crellin et al., 2018)

9- Modified Pain Assessment Tool Scale (MPAT)

The MPAT is an observational scale designed to assess neonatal pain. It is a multidimensional pain assessment tool that was specifically designed for neonates undergoing surgical intervention. The MPAT has been validated for surgical and non-surgical neonates, from 24 weeks gestation to full term, up to 6 months old. The MPAT scale focuses on the following behavioral and physiological responses to painful stimuli, and includes a nurse's perception indicator "behavioral signs of pain: posture/tone, sleep pattern, facial expression, color and cry and physiological signs of pain: respirations, heart rate, saturations and blood pressure" (Elessi et al., 2019).

2.5 Pain management

Neonatal pain is best managed using a multi-directional approach which can be conceptualized in a tiered manner and includes non-pharmacologic and pharmacologic modalities. The foundational basis for optimizing pain management in the neonatal population is aimed at reducing the total number of painful events. This has been well established as a fundamental intervention employed in the NICU, where painful procedures are performed regularly (Witt et al., 2016).

During painful procedures in NICU various pharmacological and non-pharmacological measures are used for pain management in neonates. The various non-pharmacological measures for pain relief in neonates include Kangaroo skin care, tactile soothing and oral dextrose solution in different strength. The pharmacological measures include paracetamol and opioids boluses or infusions. The use of muscle relaxant and sedative may mask babies' response to painful stimuli and does not provide pain relief (Mahmud et al., 2017)

2.6 Non-pharmacological forms of pain management

There are a multitude of different non-pharmacological forms of pain management available for the health care providers to utilize in order to most effectively manage the pain of the newborn infants. Some of the most commonly used forms of non-pharmacological pain management tools are pacifiers, non-nutritive sucking (NNS), non-nutritive sucking with the use of a sucrose solution, swaddling, containment, breastfeeding, and skin-to-skin contact. Each of these tools has proven useful in different situations and for different painful procedures. Success in pain management is often achieved when the use of pharmacological pain management and non-pharmacological methods are paired and used in synchrony (Hagy 2015). Non-pharmacological pain intervention is a prophylactic and complementary approach to alleviate pain. A number of non-pharmacological therapies have shown to be effective in the management of mild to moderate pain in neonates (Noghabi et al., 2014). The choice of appropriate non-pharmacological approaches will depend on the neonate's condition, ability to suck, maternal/parental presence and availability of other pain relief methods.

2.6.1 Breastfeeding

Whenever possible, breastfeeding medically stable newborns during heel lancing, intra muscular injections or venipuncture, effectively reduces pain(Cignacco et al., 2007). However, simply feeding the newborn small volumes of breast milk is ineffective. For breastfeeding to be effective as a pain management strategy, the infant must achieve an effective latch, with sustained sucking and swallowing for at least 5 minutes prior to the procedure (Shah 2012). Supporting mothers to breastfeed during painful procedures involves scheduling of non-urgent procedures in partnership with mothers (Harrison et al., 2015).

2.6.2 Skin-to-skin care /Kangaroo care

In preterm infants; The kangaroo care is efficacious in reducing pain reactivity and improving pain related regulation for preterm infants. The kangaroo care is recommend as an intervention for reducing pain reactivity and improving regulation of pain-related distress in preterm infants. (Cong et al., 2009). In neonates, the kangaroo care is not efficacious as an intervention for pain reactivity nor pain related regulation. However,

based on an examination of the methodologies in the studies and the significant treatment effect for preterms, future research should explore whether using a longer exposure time in kangaroo care prior to the painful procedure (i.e. 10 minutes or longer for neonates), could lead to a significant treatment effect. (Pillai et al., 2011). Similarly to breastfeeding, facilitating Skin-to-skin care (SSC) when feasible during non-urgent procedures involves scheduling of non-urgent procedures in partnership with parents and ensuring the clinicians performing the procedures are comfortable and ergonomically seated at the infant's level (Harrison et al., 2015).

2.6.3 Non-nutritive sucking (NNS)

NNS supports regulation of preterm and newborn infants and reduces acute procedural pain compared to no treatment. NNS in combination with sucrose is more efficacious for reducing procedural pain than when used in isolation (Stevens et al., 2013).

2.6.4 Oral sucrose

Glucose (and its alternative forms, such as sucrose) causes endogenous opioid release, through an unknown mechanism. Oral sucrose has been shown in large numbers of trials to effectively decrease procedural pain in neonates, sucrose is safe and effective for reducing procedural pain from single events. An optimal dose could not be identified due to inconsistency in effective sucrose dosage among studies. use of sucrose in combination with other non-pharmacological and pharmacological interventions is needed. Sucrose use in extremely preterm, unstable, ventilated (or a combination of these) neonates needs to be addressed (Stevens et al., 2013). The effect of oral sucrose is potentiated by simultaneously allowing the infant to suck. Generally, small volume doses are required. To ensure sustained effect, sucrose may be given in small aliquots over the duration of the procedure (Avelar et al., 2015).

2.6.5 Swaddling/Facilitated tucking

Evidence supports the use of swaddling/facilitated tucking in preterm infants as a strategy to reduce procedural pain although there is limited evidence of its effectiveness in term newborn infants (Pillai et al., 2011).

2.6.6 Multisensory stimulation

It consists of making eye contact with the infant, massaging the face and back, speaking to the infant gently but firmly, giving oral sucrose, and letting the infant smell the parental natural scent. The idea is to distract the infant from the pain, causing competition between painful and non-painful stimuli. Care must be taken not to over stimulate the infant (Bellieni et al., 2002).

2.6.7 Interventions which may reduce the effects of pain/stress.

Cluster nursing care and interventions where appropriate and limit handling of the infant to allow undisturbed rest as close incubator doors gently, adjust alarms to an appropriate level, appropriate voice levels at the bedside, avoid placing telephones/radios/pages close to incubators and use incubator covers or drapes to decrease light levels as appropriate for each baby (Raeside, & Reilly 2019).

2.7 Pharmacologic management

This means that to give analgesics as ordered by physician. The tradition World Health Organization (WHO) stepladder has been replaced with a two-step approach for use with children. This two-step strategy consists of a choice of category of analgesic medications according to the child's level of pain severity.

For neonate with mild pain, the first step is to administer a non-opioid; acetaminophen are the medicines of choice, in neonates from 0 to 29 days acetaminophen 5–10 mg/kg every 6–8 hrs. The second step for children with moderate or severe pain is to administer a strong opioid. Morphine is the medicine of choice for the second step and fentanyl are used, although other opioids may be considered (WHO, 2012).

2.7.1 Topical or local anesthetics

Local anesthetics may be applied to the skin before clinical procedures. The cream should be applied to no more than three areas at the same time (WHO, 2012).

- **Lidocaine**

Lidocaine may be administered subcutaneously for procedures such as chest drain insertion. Given at least one to two minutes before the procedure(Hall, 2013).

2.7.2 Oral analgesics

1. Oral paracetamol

May be used for management of pain in particular post-operative pain relief. Also may be used following vaccinations (Raeside, & Reilly 2019).

2. Oral opiates

Oral morphine may be given for procedural pain. Also may be used as a weaning programmer when extended use of IV morphine has been necessary (Raeside, & Reilly 2019).

2.7.3 Opioids

Opioids provide both sedation and analgesia, have a wide therapeutic window, and decrease hemodynamic and metabolic stress responses, but they do not provide amnesia. Benzodiazepines are a better choice when amnesia is required. Morphine and fentanyl are the most commonly used opioids in the NICU population (Hall, 2013).

2.7.4 Intravenous pharmacological interventions:

1. Morphine

Morphine is the most commonly used opiate used for analgesia, it's appropriate in neonates without hypotension, but wide variability occurs in dosing and clinical usage, Clinical experience suggests that a ceiling effect may be reached by using doses up to 0.5mg/kg. Morphine has a slow onset of analgesia owing to lower lipid solubility, especially in premature infants. Its mean onset of action is 5 min and the peak effect is at 15 min. Complications include respiratory depression, hypotension, bladder distention/urinary retention, feeding intolerance, Caution should be exercised in neonates <26 weeks gestational age or those with pre-existing hypotension (Walter-Nicolet et al., 2010).

2. Fentanyl

Another commonly used opioid, fentanyl has a rapid onset of action (2 to 3 min), short duration of action (60 min with bolus doses) and minimal hemodynamic effects**,** the potency ratio of fentanyl compared to morphine is different in adults (80 to 100 times) as compared to infants (13 to 20 times)**,** tolerance develops rapidly, especially with infusions compared to boluses. In addition, the risk of dependence and withdrawal is greater as compared to morphine**,** intravenous infusion is considered the safest way to administer fentanyl (Anand, 2007).

3. Beyond opioids: ketamine and midazolam

In addition to the usual opioids, other options should be evaluated. Consideration should also be given to short-term infusions of ketamine or midazolam, recognizing that midazolam is a sedative amnesic agent, and not an analgesic (Raeside, & Reilly 2019).

A. Ketamine

Ketamine is commonly used for procedural pain. It produces a dissociative state resulting in sedation, analgesia and amnesia. It is the only drug that causes all three effects. It has been shown to be safe and effective for sedation in pediatric critical care procedures, It increases muscle tone and blood pressure, thus maintaining hemodynamic stability (Green et al., 2001). Ketamine does not cause respiratory depression and maintains respiratory drive. With regard to opioid tolerance and withdrawal, methadone and ketamine work in a similar way. May be used in younger neonates and those with hypotension. The complications include respiratory depression, chest wall rigidity (especially if given too quickly), mild hypotension used only in babies who are ventilated due to risk of chest wall rigidity (Hall, 2013).

B. Midazolam

Midazolam is a benzodiazepine drug that produces anxiolysis, sedation, amnesia, and muscle relaxation but no analgesia. It is often used before induction of anesthesia and for conscious sedation before diagnostic procedures. Midazolam is frequently used for infants <32 weeks during mechanical ventilation, with initial doses of 0.03 mg/kg/h (0.05 mcg/kg/min). Onset of action ranges from 2 to 6 min, lasting 1 hour after a single IV

dose. Although the combination of opioids with midazolam is common practice in many NICUs, extreme caution is suggested because of the many serious adverse events. Midazolam may cause respiratory depression, hypotension, and bradycardia (van Alfen-van der Velden et al., 2006).

4. Paracetamol

May be considered for post-operative patients who are nil by mouth and may be used in combination with opiates. Caution in hepatic impairment or neonates with unconjugated hyperbilirubinaemia (Hall, 2013).

Randomized and quasi-randomized controlled trials of paracetamol for the prevention/treatment of pain in neonates (≤28 days of age) to determine the efficacy and safety of paracetamol for the prevention or treatment of procedural/postoperative pain or pain associated with clinical conditions in neonates. To review the effects of various doses and routes of administration (enteral, intravenous or rectal) of paracetamol for the prevention or treatment of pain in neonates. The result of study was the paucity and low quality of existing data do not provide sufficient evidence to establish the role of paracetamol in reducing the effects of painful procedures in neonates. Paracetamol given after assisted vaginal birth may increase the response to later painful exposures. Paracetamol may reduce the total need for morphine following major surgery, and for this aspect of paracetamol use (Ohlsson& Shah, 2017).

2.8 Suggested management approaches for painful procedures commonly performed in the NICU :

2.8.1 Heel lance

Consider use of venipuncture instead of heel lance in full-term neonates and more mature preterm neonates (because it is less painful, more efficient and requires less resampling). This approach may not apply to the care of extremely preterm infants. Use a pacifier with sucrose (concentration 12%- 24%) given 2 minutes before the procedure. Use swaddling, containment, or facilitated tucking. Consider skin-to-skin contact with the mother. EMLA (a eutectic mixture of local anesthetics: lidocaine and prilocaine hydrochloride in an emulsion base), acetaminophen, and warming the heel are ineffective for heel lancing; squeezing for blood collection is the most painful part of the procedure (Carbajal et al., 2010).

2.8.2 Percutaneous venous catheter insertion

Use a pacifier with sucrose. Use swaddling, containment, or facilitated tucking. Apply EMLA to the proposed site (when non-urgent). Consider opioid dose, if intravenous access is available. Consider a similar approach for venipuncture (Walter-Nicolet et al., 2010).

2.8.3 Percutaneous arterial catheter insertion

Use a pacifier with sucrose. Use swaddling, containment, or facilitated tucking. Apply EMLA to the proposed site. Consider subcutaneous infiltration of lidocaine. (Walter-Nicolet et al., 2010).

2.8.4 Central venous line placement

Use a pacifier with sucrose. Use swaddling, containment, or facilitated tucking. Apply EMLA to the proposed site, if non-urgent. Consider subcutaneous infiltration of lidocaine. Consider slow intravenous opioid infusion (morphine sulfate or fentanyl citrate). Consider using general anesthesia for the procedure (Walter-Nicolet et al., 2010).

2.8.5 Umbilical catheter insertion (umbilical arterial/umbilical venous

Consider the use of a pacifier with sucrose. Use swaddling, containment, or facilitated tucking. Avoid the placement of sutures or hemostat clamps on the skin around the umbilicus (Hall, 2013).

2.8.6 Peripherally inserted (central catheter placement)

Use a pacifier with sucrose. Use swaddling, containment, or facilitated tucking. Apply EMLA to the proposed site (when non- urgent). Consider opioid dose, if intravenous access is available (Hall, 2013).

2.8.7 Lumbar puncture

Use a pacifier with sucrose. Apply EMLA to the proposed site. Consider subcutaneous infiltration of lidocaine. Because containment is not possible, careful physical handling is advised (Avelar et al., 2015).

2.8.8 Subcutaneous or intramuscular injection

Avoid subcutaneous and intramuscular injections; give drugs intravenously whenever possible. If necessary: Use a pacifier with sucrose. Use swaddling, containment, or facilitated tucking. Apply EMLA to the proposed site (Avelar et al., 2015).

2.8.9 Endotracheal intubation

Many variations in clinical approach have been noted; the superior efficacy of any one technique is not supported by current evidence, Use combination of atropine sulfate and ketamine hydrochloride. Use combination of atropine, thiopental sodium, and succinylcholine chloride. Use combination of atropine, morphine, or fentanyl, and non-depolarizing muscle relaxant (pancuronium, vercuronium, rorcuronium). Consider using a topical lidocaine spray, if available. Tracheal intubation without the use of analgesia or sedation should be performed only for resuscitation in the delivery room or for other life-threatening situations associated with the unavailability of intravenous access (Carbajal et all., 2010).

2.8.10 Endotracheal suction

This is considered a stressful procedure and may be associated with the same physiological responses that accompany other painful procedures. Use a pacifier; may consider giving sucrose. Use swaddling, containment, or facilitated tucking. Consider continuous intravenous infusion of opioids (morphine) or slow injection of intermittent opioid doses (fentanyl, meperidine) (Hall, 2013).

2.8.11 Nasogastric or Oro-gastric tube insertion

Use a pacifier with sucrose. Use swaddling, containment, or facilitated tucking. Use a gentle technique and appropriate lubrication (Walter-Nicolet et al., 2010)

2.8.12 Chest tube insertion

Anticipate the need for intubation and ventilation in neonates breathing spontaneously. Use a pacifier with sucrose. Consider subcutaneous infiltration of lidocaine. Consider slow intravenous opioid infusion (morphine or fentanyl). The use of intravenous midazolam is not recommended (Avelar et al., 2015).

2.9 Nurses' knowledge and practice in assessment and management of neonatal pain

A quantitative cross-sectional study in Jordan to assess nurses' knowledge of neonatal pain and describe current pain management practice among neonatal nurses working in hospitals in Jordan. In all, 240 registered nurses were employed across the 18 NICUs all nurses employed in NICUs work full time across both day and night shifts. The study signified that nurses had knowledge deficit about neonatal pain, which may lead to pain in neonates being underappreciated and overlooked. Nurses reported that pain from almost all painful procedures is never or only rarely treated in neonates (Abdel Razeq et al., 2016).

Clinically representative rather than a randomized controlled sample in five NICUs in Gaza Strip and 8 NICUs in West Bank in Palestine. The study involved 850 patients admitted to NICUs during the period from August 15th to November 8th 2018 to compare two commonly cited neonatal pain assessment tools, (N-PASS) and (mPAT), with regard to their psychometric qualities, to explore intuitive clinicians' ratings by relating them to the tools' items and to ensure that neonates receive adequate pain control. Results were both assessment tools performed equally well regarding physiologic parameters. N-PASS makes it possible to assess pain during sedation the reliability and validity were high for both assessment tools. N-PASS tool discriminated between painful and stressful situations better than mPAT. There is most not all, health professionals lack the enough knowledge about mPAT score intervention, On the other hand, it was obvious that clinicians were informative regarding the use of analgesia and dose tittering to fit the neonate (Elessi et al., 2019).

A descriptive cross-sectional study was conducted on 120 neonatal nurses working in the Neonatal Intensive Care Units (NICUs) and neonatal units in Ardebil, Iran were selected using the census sampling technique to investigate neonatal nurses' perceptions of knowledge and practice in pain assessment and management in NICU. The study indicated, the nurses had adequate level of knowledge about the neonatal pain and majority of the nurses in the study reported that they did not use assessment tools regularly. the nurses in study aware of the pharmacologic treatments and felt confident in using them. Regarding the non-pharmacologic interventions, the majority of the nurses acknowledged their superiority over pain medications (Mehrnoush, et al., 2016).

In a descriptive, cross-sectional survey, 76 neonatal units from 52 cities in Poland took part, 355 participants from level III NICU, 204 from level II NICU and 58 respondents from level I NICU by developed questionnaire sent to randomly selected hospitals throughout Poland to describe nurses' and midwives' basic knowledge about pain and practice regarding procedural pain assessment and management in Polish neonatal care units. The result was deficiency in the knowledge and practice of neonatal pain management. There is a need for the education of health professionals on neonatal pain management, The failure in the treatment and assessment of pain in neonates is more widespread than suspected. Polish neonatal units need national guidelines for pain management as well as the curriculum for nurses and midwives should put more emphasis on the evaluation and treatment of pain in newborns (Panek & Kwinta, 2018).

A descriptive cross-section study including questionnaire was conducting in neonatal units in Bandar Abbas University Hospitals, Iran, to determine nurses' knowledge, attitude, and performance pain management in neonates. A total of 50 nurses and nurses' assistants working in neonatal units participated in study. Results showed that the nurses had poor performance regarding the assessment, measurement, and relief of pain. However, they showed positive attitudes towards pain control in neonates (Noghabi et al., 2014).

A cross-sectional descriptive study includes convenience sample consisted of 237 neonatal nurses with a membership in National Association of Neonatal Nurses (NANN) and neonatal nurses in Connecticut who were not NANN members in Palo Alto, California to investigate neonatal nurses' perceptions of knowledge and practice in pain assessment and management. Results showed that the nurses were knowledgeable, and about 50% felt that they received adequate training and continuing education on pain. Participants reported the use of pain assessment tools (81%) and felt confident in uses of pharmacologic (83%) and non-pharmacologic interventions (79%).

Nurses' perceptions of well-managed pain were significantly correlated with training, use of appropriate and accurate pain tools, and clear and research-based protocols (Cong & Vazquez, 2013).

A descriptive and cross-sectional study carried out in Curitiba, Brazil, data were collected from 51 nurses from six public hospitals having NICUs. The sample consisted of 52 nurses, 50 (98%) were female and only one (2%) was male working in NICUs based on an

adapted questionnaire in the period of data collection between December, 2014, and July, 2015 aimed to evaluating knowledge and practices regarding the management of neonatal pain. Results showed that the most nurses have knowledge about the importance of using and systematizing scales for assessing neonatal pain, but did not always use them.

They are aware of the drugs available for treating neonatal pain, however they are unaware of their actions. A large number of professionals also pointed out that decisions about pain management conduct must be made by the multi- professional team. Regarding practices used for pain control, nurses do not perform all the non-pharmacological interventions pointed out by themselves as important, finally; nurses considered neonatal pain a real event; however, they do not perform pain assessment or treatment of newborns in a systematized way. It is necessary to implement knowledge translation strategies in order to improve pain management in newborns (Costa et al., 2017).

Quasi-experimental design, convenience sample of 51 neonatal nurses working in NICUs affiliated to Mansoura University Children's Hospital. Data were collected by using predesigned questionnaire sheet to assess nurses' knowledge about neonatal procedural pain and its non-pharmacological management and the observation sheet to assess nurses' application of non-pharmacological pain management methods in the neonatal intensive care unit. The result shows that all of the nurses had poor knowledge and practice regarding oral sweet solution, nonnutritive sucking, positioning, skin to skin contact and both light and noise as the basics regarding modification of environmental stimuli as non-pharmacological methods for neonatal procedural pain preprogram. statistically significant difference regarding nurses' knowledge and practices about neonatal pain and its non-pharmacological management methods pre, immediately post and at follow up of the program implementation. There was a significant positive effect of the educational program in improving nurses' performance towards non-pharmacological pain management in NICUs (Abd El- Aziz, et al., 2018).

Descriptive study was conducted using an electronic, voluntary and anonymous survey, convenience sample of nurses working in a NICU setting was invited to participate in the survey. Result was current pain management protocols/guidelines need to be reviewed often to ensure these protocols are clear, comprehensive and based on current research. All nurses should be thoroughly educated in the current protocols of the unit to manage newborn pain in order to increase adherence to such protocols. Working closely with the

health care team to manage pain should be emphasized and expected. Education on the negative long-term neurological effects that newborns can experience due to repetitive unrelieved pain experiences should be part of the student nurses' education for pre-licensure students, or continuing education for those already in practice.

Nurses should continue to be educated and trained in the recognition/assessment of pain in newborn patients. Education and further training should include the correct utilization of pain assessment tools, current protocols/guidelines to address pain, and the re-assessment of pain once there has been an intervention to relieve pain. Education should also focus on the use of pharmacologic as well as non-pharmacological interventions to relieve pain and the management of possible side effects (Martinez, 2014).

Cross-sectional, descriptive and correlational survey design using a questionnaire of 362 finnish nurses, including Registered Nurses (RN) and Children's Nurses or Practical Nurses (PN). They were recruited from all of the country's five university hospitals (Helsinki, Kuopio, Oulu, Tampere, Turku) that are located in different geographical areas of Finland, the participants were working in the NICU to describe the nurses' attitudes towards and perceptions of pain assessment in neonatal intensive care and the demographic factors related to these attitudes and perceptions of pain. Result was study indicated that the nurses' attitudes on average were positive towards the pain assessment of premature infants. The respondents agreed that it is important to use pain scales and that systematic documentation is a prerequisite for a high pain management. However, there were some gaps in the knowledge concerning the respondents' perceptions of the items, which is a challenge to nursing and nursing education (Pölkki et al., 2010).

Randomized control trial in NICU of military hospital, Rawalpindi, Pakistan from Jan to Dec 2013 of 252 babies out of these 139 (55%) were males and the rest 113 (45%) were females were enrolled in the study to assess neonatal pain by using Modified Behavioral Pain Scale (MBPS). Babies were given 10% dextrose and sterile water two minutes before a painful procedure and pain assessment was done after the procedure. The different painful procedures included, heel prick, nasogastric (NG) tube insertion, cannulation, catheterization and venipuncture for blood sampling, results showed that role of oral glucose in neonatal pain relief during painful procedures as compared to placebo, significant pain reduction was observed during venipuncture and heel lancing with oral glucose solution, neonatal pain should be given due consideration and to prevent any

acute and chronic consequences of neonatal pain, it should be managed promptly. 10% dextrose is easily available and a cheap solution and it can be used for pain management in NICU during different painful procedures (Mahmud et al., 2017)

2.10 Discrepancy between physicians and nurses

When the physicians and nurse practitioners evaluated the infants' pain, the infants' likelihood of receiving analgesia post-operation was four times that of when the nurse completed the pain assessment. Analgesia seems to only be utilized by the nurses to relieve pain during the more invasive procedures, such as intubation or chest drain insertion, and nurses have shown to use analgesia less often than doctors (Anand, 2007).

An anonymous questionnaire was sent to general perinatal maternal and child medical centers that had level 3 units across Japan**,** total of 61 of 89 head nurses and 54 of 89 head neonatologists replied to describe current neonatal pain management and individual and organizational factors that can improve neonatal pain practice from the viewpoints of both head nurses and head neonatologists in Japan. The result was more than 60% of units (head nurses, 65%; head neonatologists, 61%) did not use pain scales, and about 63% units (both head nurses and head neonatologists) had no rules for health care professionals on the best methods for implementing pain relief for painful diagnostic and therapeutic procedures. Only 17% of head nurses and 24% of head neonatologists considered that nurses and physicians in their units collaborated in pain management, and <20% of units (both head nurses and head neonatologists) had written guidelines for their unit on neonatal pain management. Japanese neonatal intensive care units need national guidelines for pain management, and these might improve collaboration between nurses and physicians in minimizing neonatal pain (Ozawa & Yokoo 2013).

The cross-sectional study was performed in census method in the NICUs of educational hospitals with participation of 157 staff in Iran to determine the nurses and physicians' viewpoints about assessment, intervention, and evaluation of pain in the infants in the NICUs. Data collection tool was a questioner that was designed to assess the four components of pain management namely assessment, pharmacological intervention, non-pharmacological intervention, and evaluation.

The result findings of study indicated the total average scores of pain management from nurses and physicians' viewpoint 66.7 and 65.5, respectively that were at the moderate level. The average score of non-pharmacological interventions from nurses' viewpoint (69.4) was meaningfully higher than that of the physicians'.

A significant relationship was noticed between the respondents' viewpoint on the non-pharmacological interventions. A meaningful relation was found between participation in continuing education and scores of pain management, The effect of work experience and continuing education on pain management is proved in the study. Researchers suggest that both experienced staff employment and education continuation must be incorporated in pain management in NICUs (Mohamadamini et al., 2017).

A descriptive cross-section study including questionnaire was distributed by lead clinicians to all doctors and nurses in all seven NICUs in one area of the United Kingdom (UK) to describe nurses' and doctors' knowledge and reported practice regarding procedural pain assessment and management in NICUs. The result was the doctors do not seem to consistently employ comfort measures for any procedure, while nurses normally utilized some type of comfort measure in each of the procedures, except a heel prick, even if that comfort measure is only the use of a pacifier. Additionally, it is interesting to note, ("clinicians agreed that both medicines and comfort measures should be used more frequently than they currently are"). While the most cited reason for not administering analgesia was performing the procedure in an emergency situation, a small minority group in the study (20%) felt there was no reason to not use analgesia in a procedure or situation in which analgesia would be used in an adult (Akuma & Jordan, 2011).

Qualitative content analysis study was carried out. The participants were the nurses and physicians working in the NICU of Alavi medical training center in Ardabil, Iran, to explore factors influencing neonatal pain management from the perspectives of nurses and physicians in NICU. Twenty-five nurses took part in focus group discussions and five physicians attended private interviews. Four focus group discussions and five interviews were carried out until data saturation was ensured. Result was that lack of educational courses, absence of an infant pain management policy, and management issues were the main obstacles in the way of implementation of infant pain management by nurses and physicians at the NICU. Therefore, strategies are required to reduce or remove these barriers NICUs (Mehrnoush et al., 2018).

Multicenter observational study to ten participating NICUs collected data for the 72 hours after a surgical operation on 25 consecutive neonates (N = 250), including demographics, principal diagnoses, operative procedure, other painful procedures, pain assessments, interventions (pharmacologic and non-pharmacologic), and adverse events in neonates who underwent minor and major surgery was conducted to evaluate the practices of postoperative pain assessment and management in neonates to identify specific targets for improvement in clinical practice. The result was the documentation of postoperative pain assessment and management in neonates was extremely variable among the participating hospitals. If the pain was assessed by clinicians with prescriptive authority, such as physicians or nurse practitioners, neonates had a fourfold increase in the odds ratio for post-operative analgesia, as opposed to pain assessment by nurses, pain assessment by physicians must be emphasized, in addition to developing evidence-based guidelines for postoperative care and educating professional staff to improve postoperative pain control in neonates (Taylor et al., 2006).

2.11 Role of family in neonatal pain assessment and management

The role of the family in neonatal pain management is central and integral to supporting the identification of pain in the neonate, implementation interventions, and promoting the best neurological outcomes of the neonate. The environment of a neonatal critical care unit, which is full of monitors, wires, tubing, beeps, clicks, alarms, interventions, and foreign terminology, is, by itself, more stress than a family anticipates experiencing when discovering a new life is on its way.

Recognizing this loss of control, the stress, and the maternal need to protect, the clinicians should engage the family soon after the admission on how to identify signs of pain, how to deliver non-pharmacological interventions to alleviate or mitigate pain, while working to promote a strong family unit and a satisfactory experience in an otherwise unpleasant situation (Heidari et al., 2013).

Most parents will experience feelings of guilt and helplessness when their newborn must undergo so many painful procedures in the NICU. Non-pharmacologic interventions have a secondary benefit to pain management; these interventions provide an opportunity for the family to be involved in the pain management of the child. The family can be taught the techniques in order to properly provide gentle human touch, facilitated tucking, and kangaroo care and therefore a bonding experience can be facilitated through simple pain management strategies (Martinez, 2016).

Infant-directed singing is a medium for parents and infants to communicate in a mutual relationship. Parental infant directed singing is a multisensory, biopsychosocial communication that applies to ill and vulnerable hospitalized infants. The primary musical features of infant-directed singing are ideal for emotional coordination and sharing between parent and infant without the risk of over-stimulation. The parental infant-directed singing is regarded as a non-pharmacological emotion regulation intervention, which may modify the painful experience for both the infant and the parent before, during and after painful procedures in the neonatal intensive care context. A music therapist specialized in neonatal music therapy methods can mentor parents in how to use entrained and attuned live lullaby singing in connection to painful procedures. Pain and the vast amount of painful procedures early in infancy, combined with early parent–infant separation and lack of parental participation in the care of the infant during neonatal intensive care, place arduous strain on the new family's attachment process and on the infant's and parents' mental health, both from a short and long-term perspective. Therefore, the argue with bio psychosocial rationales, that live parental infant-directed singing should be promoted in neonatal pain care worldwide. Consequently, parents should be welcomed round the clock and invited as prescribed pain management for their infant (Ullsten et al., 2018).

Four London regional referral NICUs participated in a randomized controlled trial (RCT), ranging in size from 31 to 44 beds. The study was approved by an authorized committee of the United Kingdom to describe perceptions and feelings of parents who participated in a randomized controlled trial of an intervention to increase parent knowledge and involvement in infant pain management and to further refine the conceptual representation of the parental experience of involvement in infant pain management (or lack thereof) and the influencing factors. The results showed that parents expressed strong preferences for more information about all aspects of infant pain care, improved timing of information giving, and involvement opportunities. They further desired increased sensitivity and consistency in infant care giving and increased use of specific pain-relieving interventions by NICU staff. Contextual factors such as parents' emotional state and the communication and support from NICU staff influenced parents' ability to achieve their desired level of involvement (Franck et al., 2011).

Two randomized controlled crossover trials, the effectiveness of facilitated tucking by parents (FTP) was compared to a non-pharmacological evidence-based practice (oral glucose), a pharmacological method (intravenous oxycodone) and a placebo (oral water) or control care in the context of heel lance and endotracheal or pharyngeal suctioning to develop a new pain management method called (FTP) to alleviate procedural pain in preterm infants in the (NICU). The result of FTP was positively perceived by all participating parents, Overall, the mothers did not express any negative issues about FTP. The FTP was preferable to oral glucose and intravenous oxycodone when efficacy, safety and family issues were considered in treating short-term procedural pain in preterm infants. In conclusion, FTP as a safe and effective pain management method can be recommended for use in the pain care of preterm infants in clinical practice (Axelin, 2010)

2.12 Summary of studies

Pain is "an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage. In the past the pain has been unrecognized and under treated in neonates, the most frequently cited reason was the belief that neonate have blunted or absent ability to feel pain; it was suggested that newborns have immature nervous systems and do not remember painful experience. Several studies indicate that hospitalization in (NICU) includes a high number of painful procedures which may lead to physiological and behavioral alterations, as well as changes in the development of the nervous system. The most of studies suggest the pain is the fifth vital sign, and it should be assessed. The pain should be managed by using multi methods as non-pharmacological and pharmacological methods. Many studies shows if the nurses assess pain according pain assessment scale they lead to good intervention to manage pain. The nursing knowledge about neonatal pain assessment and management consider very important to do good practice to relief pain as evidence-based guidelines. The cooperation between nurses and physicians in pain assessment and management have more accurately pain assessment and best pain management and the family involvement in pain assessment and management that will help the nurses to perform non pharmacological pain relief interventions.

Thus study will show the level of nurses knowledge and practice of pain assessment and management in NICU and the level nurses knowledge and practice in physician's involvement and family involvement by nurses in pain assessment and management and show demographic variables that may be influence on level of nurses knowledge and practices.

Chapter Three

Methodology

This chapter presents the method of the study to answer the research questions. In this chapter different items were explained: study design, place of the study, study population, sample size, sampling process, period of the study, inclusion and exclusion criteria, ethical and administrative consideration, study tools, reliability, validity, pilot study, data collection, data management of the study.

3.1 Study design

This is a quantitative analytic cross-sectional study conducted to investigate neonatal nurses' knowledge and practices related to pain assessment and management in the governmental hospital at G.S. The data collected via self-administered questionnaire for nurses in neonatal departments.

3.2 Study population

The population of this study consists of all nurses working in third level in NICUs of the three governmental hospitals (Al Shifa' Hospital- Al Nasser Pediatric Hospital- European Gaza hospital) at G.S. The total number of nurses working in these departments are 102 nurses " Al Nasser Pediatric Hospital (43) - Al Shifa' Hospital (40) - European Gaza hospital (19) "with different academic level (Diploma, Baccalaureus and Master).

3.3 Study setting

The setting of the study is in third level in NICUs of the governmental hospital (Al Shifa' Hospital - Al Nasser Pediatric Hospital - European Gaza hospital) at G.S; these three hospitals have third level of NICUs.

3.4 Study period

The study was conducted in the period between Jan. 2019 to Nove. 2019. Data collection have two weeks to complete in Octo. 2019. Data analysis and discussion were finished at Nov 2019. The study took approximately 11 month in total from its beginning.

3.5 Sample size and sampling

All nurses working in NICUs of the governmental hospital (Al Shifa - Al Naser - European Gaza hospital) at G.S, about 102 nurses were included in the study "census sample"

3.6 Eligibility criteria

3.6.1 Inclusion criteria

All nurses working in NICUs of the targeted governmental hospitals at G.S during the period of the study and who are willing to participate in the study.

3.6.2 Exclusion criteria

Other nurses in the hospital who work in the NICUs as nurse students and volunteers**.**

3.7 Study instruments and tools

A self-administered questionnaire constructed by the researcher himself based on the review of the literature and past experiences to assess the knowledge and practice of the nurses regarding to pain assessment and management. (Annex 2). The questionnaire validated by disseminating this questionnaire to a panel of experts.

The first part of the questionnaire covered the respondents' demographic information which includes age, sex, level of education, Current position, workplace, average monthly income, work experience, in-service course or educational program.

The second part of the questionnaire developed by the researchers to measure knowledge of the participants towards pain assessment and management in NICUs. It was composed of 14-item True-False questions, each item in the knowledge section of the questionnaire had 2 possible responses, either true or false. One mark will be awarded for every correct response, zero otherwise. The total score ranged from 0-14 and it was then converted into percentage. The higher scores indicated the higher level of knowledge.

The third part of the questionnaire developed by the researcher to measure practice of the participants towards pain assessment and management in NICUs. Each item in the practice section of the questionnaire had three possible responses, namely No Never = zero, Sometimes = one, and Yes, Always = two. The possible scores ranged from 0-24. These scores were then converted into a percentage. The higher scores indicated the higher level of practice.

The fourth part of the questionnaire developed by the researchers to measure two parts; A-knowledge related to physician's involvement by nurses in pain assessment and management in NICUs. It was composed of 6-item True-False questions, each item in the knowledge section of the questionnaire had 2 possible responses, either true or false. One mark will be awarded for every correct response, zero otherwise. The total score ranged from 0-6 and it was then converted into percentage. The higher scores indicated the higher level of knowledge. B- practice related to physician's involvement by nurses in pain assessment and management in NICUs**.** Each item in the practice section of the questionnaire had three possible responses, namely No Never = zero, Sometimes = one, and Yes, Always = two. The possible scores ranged from 0-10. These scores were then converted into a percentage. The higher scores indicated the higher level of practice.

The fifth part of the questionnaire developed by the researchers to measure two parts; A-nurses knowledge related to family's participation in providing care and comfort during painful procedures and management of pain in NICU. It was composed of 6-item True-False questions, each item in the knowledge section of the questionnaire had 2 possible responses, either true or false. One mark will be awarded for every correct response, zero otherwise. The total score ranged from 0-6 and it was then converted into percentage. The higher scores indicated the higher level of knowledge. B- nurses practice related to family's participation in providing care and comfort during painful procedures and management of pain in NICU**.** Each item in the practice section of the questionnaire had three possible responses, namely No Never = zero, Sometimes = one, and Yes, Always = two. The possible scores ranged from 0-10. These scores were then converted into a percentage. The higher scores indicated the higher level of practice.

3.8 Scoring of the questionnaire

The scores for knowledge and practice of participants were categorized in accord with McDonald‘s (2002) learning outcomes. This McDonald categorized the learning outcomes of multiple choice examinations into five grades (A, B C, D, and F) or five levels (very high, high, moderate, low, and very low) as follows:

A	Very low	< 60%
B	Low	60% - 69.99%
C	Moderate	70% - 79.99%
D	High	80% - 89.99%
F	Very high	90% - 100%

3.9 Validity of the instrument

The constructed questionnaires were sent to eight experts (Annex 3) to validate the questions and its relation to the domains that reflect the study. Comments of the experts were considered and modification was performed accordingly.

3.10 Reliability

The reliability of instrument was demonstrated by a Cronbach’s Alpha, it was 0.734. The table (3. 1) shows the reliability estimated of the derived factors for the questionnaire.

Table 3.1 Reliability statistics

Cronbach's Alpha	N of Items
0.734	48

3.11 Pilot study

The researcher performed a pilot study in Al Nasser Pediatric Hospital, Al Shifa' Hospital and European Gaza hospital after receiving the approval to perform it from the hospitals general directorate. A pilot study of 30 nurses to ensure reliability of instrument, some minor change and modification were performed without any effect on the main domains were included.

3.12 Data collection

Data were collected by using self-administered questionnaires; to investigate neonatal nurses' knowledge and practices related to pain assessment and management that may be to improve the quality of pain management by nurses at NICUs of governmental hospitals in Gaza Strip.

The researcher distributed the questionnaires to the participants at the working time in the all shifts and receiving them after completion of the questionnaires on designated time. Researcher chick that all questionnaire returned and complete.

3.13 Response rate

The total number of target population was 102 subjects. 102 of them positively responded with response rate of 100%.

3.14 Data entry and analysis

The collected data entered into the computer software Statistical Package for Social Science (SPSS) Program, the stages of data analysis included coding the questionnaire, data entry, data cleaning, constructing frequency table for all the study variables. The statistical tests used for analysis of data is descriptive statistics as frequencies, range, percentage, mathematical mean and standard deviation and inferential statistical tests as, T-test, and one-way ANOVA. and Pearson correlation were used. All analysis and observed differences will be considered statistically significant at the level of P-value equals to or less than 0.05.

3.15 Administrative and ethical considerations

The researcher maintained all ethical considerations in this study; approval from the Faculty of health professions at Al-Quds University (Annex 4), official letter of approval to conduct the study from Helsinki committee (Annex 5), administrative approval from MOH for data collection process (Annex 6) and all nurses participant were asked to sign consent forms after reading an information sheet.

3.16 Limitation of the study

The selection of third level NICUs only altered the larger sample size.

Chapter Four:
Results and Discussion

This chapter illustrates the results of statistical analysis of the data from 102 nurses', including descriptive analysis that presents the socio-demographic characteristics of the study sample and answers to the study questions. In this chapter, the results of this study are presented under the following headings:

1. Characteristics of the study participants.
2. Levels of nurses' knowledge and practice regarding neonatal pain assessment and management among neonatal nurses.
3. level of nurses' knowledge and practice related to physicians involving in assessment and management of neonatal pain at NICUs.
4. levels of nurses' knowledge and practice related to families involving in assessment and management of the pain of their neonates.
5. Total levels of knowledge and practice regarding neonatal pain assessment and management among neonatal nurses.
6. The relationship between socio-demographic variables and nurses' knowledge and practices towards pain assessment and management of neonates at NICUs.

4.1 Characteristics of the study participants

This section presents description of study sample socio-demographic characteristics including age of subjects, gender, education level, job position, as well as, variables about workplace, monthly income, year of work in NICU, course or educational program related to assessment and management on neonatal pain at NICU.

Table (4.1): Characteristics of the study participants (n=102)

Variables	categories	Frequency	Percent
Age	**<30**	50	49.0
	30-40	46	45.1
	>40	6	5.9
Gender	**Male**	63	61.8
	Female	39	38.2
Education level	**Diploma**	17	16.7
	BSN	80	78.4
	MSN	5	4.9
Current position	**Nurse**	82	80.4
	Senior staff nurse	17	16.7
	Head nurse	3	2.9

Table (4.1) shows that nearly half (49 %) of study participants' ages were at age group (<30). There is newly employment of nurses since several years and the big numbers of employees retired in the last years could explain this result, these results matched with the study result conducted by Lake (2013) who found that (52%) of the nurses were at age group (<30). In addition, this table shows that (61.8%) of the study participants were male, compared to (38.2%) were female. This result considered against the historical background of female dominant in nursing profession (Christensen, 2017). This result inconsistent with study conduct by Costa et al., (2017) who found (98%) were female and only (2%) was male. Also, these results show that most of the study participants (78.4%) had bachelor degree which consider positive point to provide appropriate pain management to neonates, on the other hand there is Diploma (16.7) and only (4.7%) of the study participant had MSN degree but not related to pediatric field. These results similar to result of study conduct by Martinez (2014) who found that (59 %) of nurses carried bachelor degree, and (8 %) of sample were MSN level and (33%) were diploma level. There is current position were as: nurse (80.4%), senior staff nurse (16.7%) and head nurse (2.9 %).

4.1.1 Workplace

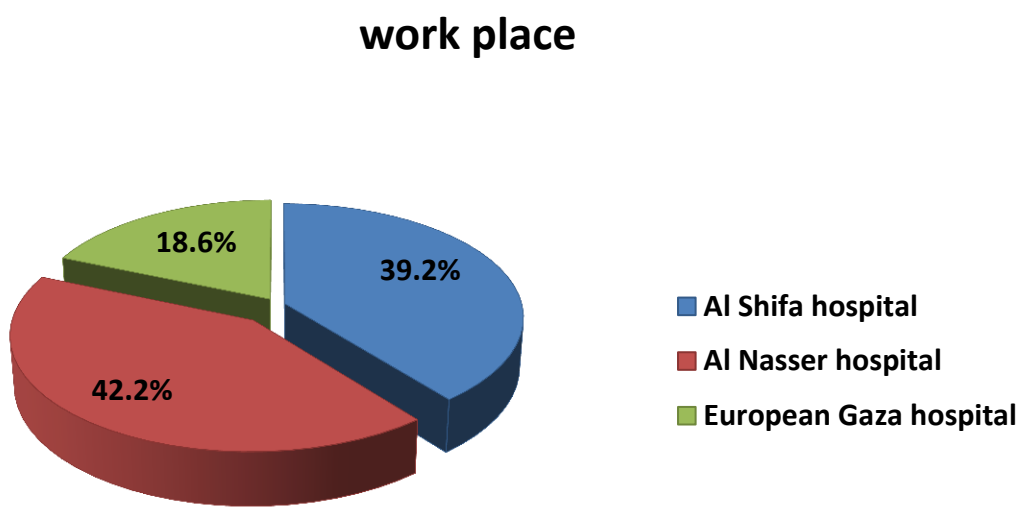

Figure (4.1): Distribution of the study participants according to workplace (n=102)

In terms of work place Figure (4.1) shows that (42.2%) of study participants were working in Al Nasser Pediatric Hospital, and (39.2%) of study participants were working in Al Shifa Hospital, and lastly (18.6%) were working in European Gaza Hospital.

In addition, these percentages of the study participants reflect only the employed nurses. Although Al- Shifa Hospital has a larger number of incubators, the number of nurses relatively small due to the researcher exclude volunteers and students from sample.

4.1.2 Monthly income

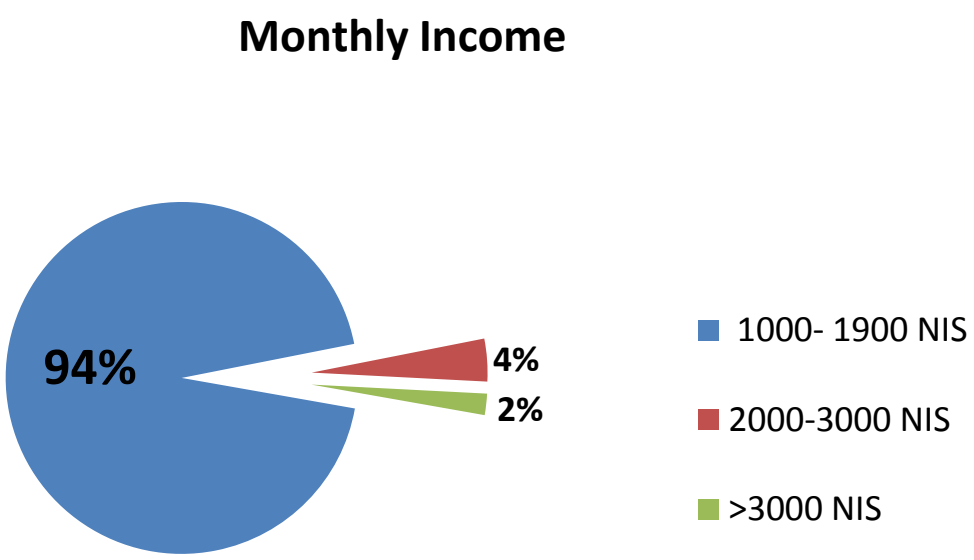

Figure (4.2): Distribution of the study participants according to monthly income (n=102)

In terms of monthly income Figure (4.1) shows that (94%) of study participants receive a salary 1000_1900 NIS monthly, and (4%) of study participants receive a salary 2000_3000 NIS monthly, and lastly (2%) were receive a salary >3000 NIS monthly.

4.1.3 Years of work in NICU

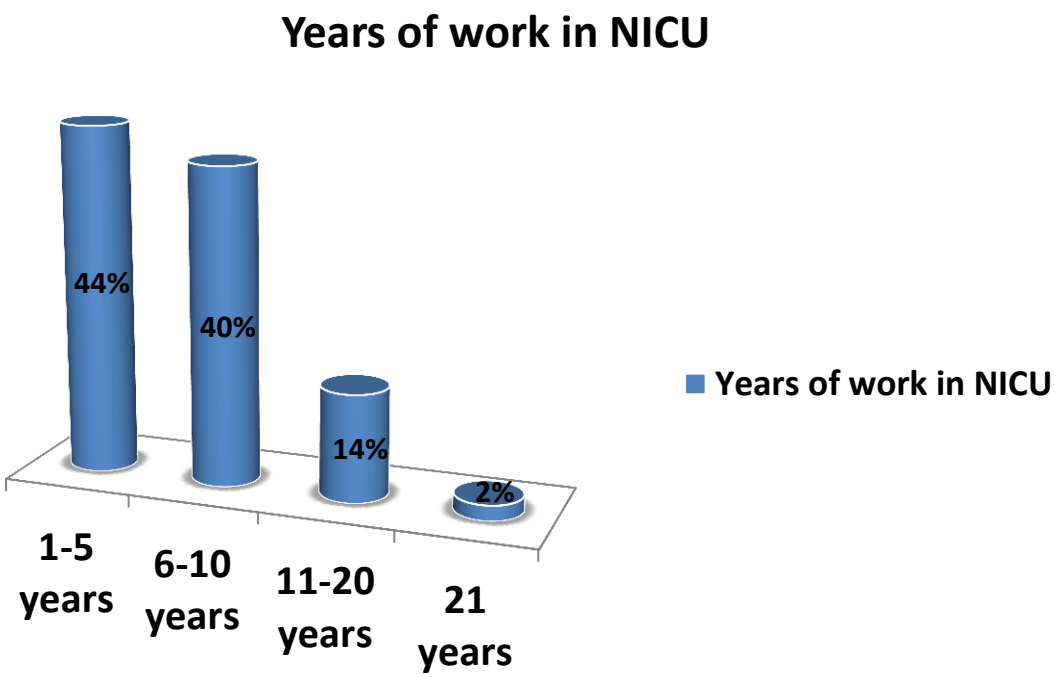

Figure (4.3): Distribution of the study participants according to work experience in NICU (n=102)

Figure (4.3) shows that (44%) have experience in NICU (1- 5) years and (40%) have experience (6-10). This result matched the result of a study conducted by Mehrnoush (2016) who found that (50 %) had years of experience in NICU between one to five years. This result inconsistent with study conducted by Abd El- Aziz, et al., (2018), who found that (26%) had years of experience in NICU between one to five years.

The big numbers of employees retired in the last years could explain the few years of unit experience. In addition, the (44%) of study participants had years of experience in NICU less than five years may be resulted from rotating nurses through units (NICU, SCBU and Baby Friendly) within the hospital or to another departments in hospital. This (1-5) years considered few years of study participants' experiences that may be considered an important chance to increase nursing practices depends on evidence-based practices rather than traditional department experiences.

4.1.4 Study participants according to participation in course or educational program related to assessment and management on neonatal pain at NICU

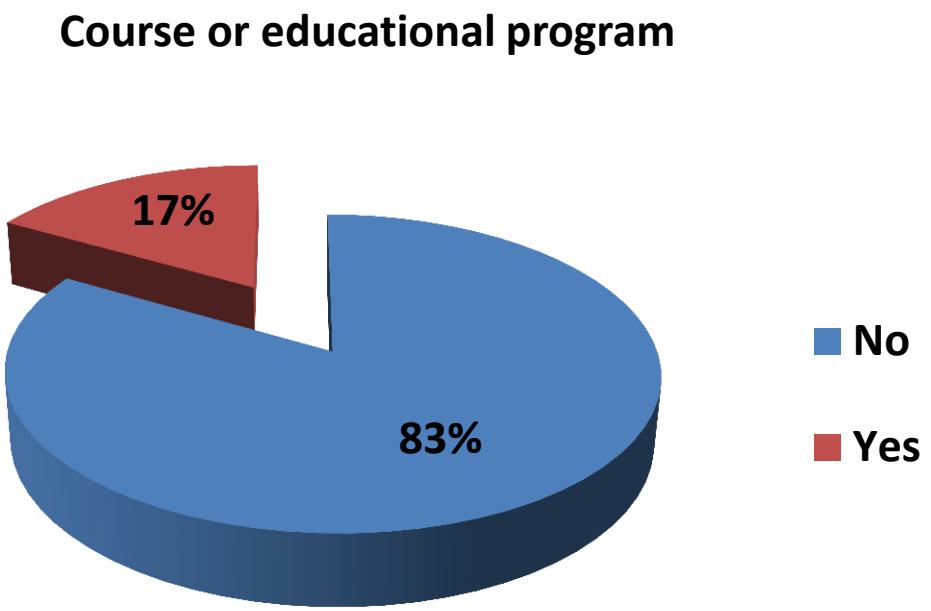

Figure (4.4): Distribution of study participants according to participation in course or educational program related to assessment and management on neonatal pain at NICU

Figure (4.4) shows that the majority (83%) of study participants didn't receive any course or educational program related to assessment and management on neonatal pain at NICU, while only (17%) of nurses received it. This result match to result of study conduct by Abd El- Aziz, et al., (2018) who found that (70.6 %) didn't receive training courses about neonatal pain and (29.4) received training courses about neonatal pain. This result inconsistent with study conducted by Martinez (2014), who found that (62%) of study participants have received educational program related to assessment and management on neonatal pain and (20%) didn't receive any educational program.

4.2 Knowledge and practice regarding neonatal pain assessment and management among neonatal nurses

To determine level of knowledge and practice pain assessment and management among nursing who working in NICU in governmental hospitals in Gaza strip, descriptive statistic include measure of mean, SD and percentage.

Table (4.2): levels of knowledge and practice regarding neonatal pain assessment and management among neonatal nurses

Study domains	Max score	Mean score (SD)	Mean percentage	Level category
knowledge	14	8.32 (2.15)	59.42	Very low
Practice	24	14.08 (3.70)	58.33	Very low

Table (4.2) shows that the knowledge and practices mean scores of study participants were (8.32) and (14.08) respectively. The mean percentages were (59.42%) for knowledge and (58.33%) for practice which were categorized as very low level depend on McDonald's standard. These results approximately matched with the study conducted by Abdel Razeq et al., (2016) who found knowledge and practice deficit about neonatal pain. Also, the result of this study congruent with Abd El- Aziz et al., (2018) who found poor nurses' knowledge and practice regarding neonatal pain assessment and management in NICU. While the results of this study inconsistent with the study conducted by Maghami, et al. (2016) who showed there was moderate to high nurses' knowledge (71.71 %) and practice (68.2%).

Based on researcher’s point of view, when comparing finding from this study with previously published studies conclude there is significant problem of poor knowledge and practice held by nurses caring for neonates experiencing pain.

Table (4.3): Mean score of participants' responses to knowledge and practice items regarding assessment & management of pain among neonates

Rank	Study domains	Mean (SD)	Mean %
	knowledge		
1	Pain is unpleasant sensory and emotional experience associated with actual or potential tissue damage	0.95(.217)	95
2	Pain should be assessed before and after administrating pain drugs.	0.90(.299)	90
3	Pain assessment of neonates leads to more effective pain management	0.8(.391)	81
4	The response to pain among neonates is completely natural	0.78(.413)	78
5	Neonates do not experience pain	0.68(.466)	69
6	Physiologic stress associated with pain among neonates can be more dangerous than the side effects of analgesia.	0.66(.474)	67
7	Analgesia is not critical to the care of neonates because they do not remember painful experiences.	0.64(.480)	65
8	Term and preterm newborns respond to pain in the same way.	0.60(491)	61
9	Prematures cannot feel pain before full term.	0.56(.498)	57
10	Neonates experience a lesser degree of pain than child and adult	0.51(.502)	52
11	Analgesia is too dangerous to use in neonates.	0.40(.493)	40
12	Morphine is not used for neonate pain relief due to the risk of respiratory depression	0.33(.474)	33
13	Pain diminishes quicker in newborns than in adults.	0.24(.432)	25
14	In relation to body weight, neonates require less analgesia than adults do.	0.19(.399)	20
	Practice		
1	You administer pain medication as order by a doctor around the clock.	1.43(.653)	71.57
2	You use pharmacologic interventions through many invasive procedures such as Endotracheal tube insertion, Umbilical line insertions, Lumbar punctures	1.40(.649)	70.10
3	You evaluate and measure the neonatal pain as one of the vital signs when examining the neonate	1.27(.720)	63.73
4	You observe the following side effect such as respiratory distress, nausea, vomiting, if a neonate receives opioids drugs	1.27(.692)	63.73
5	You use positioning as non-pharmacological measures to reduce pain	1.22(.639)	60.78
6	You use modifying environmental stimuli as non-pharmacological measures to reduce pain	1.20(.581)	59.80
7	You use massage & touching as non-pharmacological measures to reduce pain	1.15(.620)	57.35
8	You evaluate and measure the neonatal pain as one of the vital signs when examining the neonate	1.14(.630)	56.86
9	You administer paracetamol because it's the most commonly analgesic used in neonates	1.09(.631)	54.41
10	You assess neonatal pain at least once a shift	1.08(.699)	53.92
11	You use oral sucrose & pacifiers as non-pharmacological measures to reduce pain	.95(.680)	47.55
12	You use non-pharmacologic interventions through many invasive procedures	.88(.664)	44.12

As show in table (4.3), according this results the highest statement in knowledge regarding pain assessment and management among neonatal nurses was pain is unpleasant sensory and emotional experience associated with actual or potential tissue damage with weighted mean 95%, followed by statement, Pain should be assessed before and after administrating pain drugs with weighted mean 90%. While the lowest statement was; In relation to body weight, neonates require less analgesia than adults do with weighted mean 20%. followed by statement, Pain diminishes quicker in newborns than in adults with weighted mean 25%.

And show the results to the highest statement in practice regarding pain assessment and management among neonatal nurses was admonition to pain medication as order by a doctor around the clock with weighted mean 71.57%, followed by statement, using of pharmacologic interventions through many invasive procedures such as Endotracheal tube insertion, Umbilical line insertions, Lumbar punctures) with weighted mean 70%. While the lowest statement was; using of non-pharmacologic interventions through many invasive procedures with weighted mean 44%. followed by statement, using of oral sucrose & pacifiers as non-pharmacological measures to reduce pain with weighted mean 47%.

These results approximately matched with the study conducted by Noghabi et al. (2014) who found the nurses had poor nurses performance regarding pain assessment, measurement, and relief of pain. While the results of this study inconsistent with the study conducted by Maghami, et al. (2016) who found that nurses have high knowledge and practice regarding neonatal pain assessment and management.

Based on researcher's point of view, there is high correct response to pain definition question and assessment of pain should be before and after administrating pain drugs and the nurse give pain medication as doctor order and when there is needed to painful procedure. Also there is weakness in respond to correct answer in neonates require less analgesia than adults do and in application of non-pharmacologic methods during invasive procedure as oral sucrose & pacifiers.

4.3 Knowledge and practice related to physicians involving in assessment and management of neonatal pain at NICUs.

Table (4.4): levels of nurses' knowledge and practice related to physicians involving in assessment and management of neonatal pain at NICUs.

Study domains	Max score	Mean score (SD)	Mean percentage	Level category
knowledge	6	4.88 (1.22)	81.33	High
practice	10	6.82 (2.12)	68.2	Low

Table (4.4) shows that the knowledge mean scores of study participants were (4.88). The mean percentages were (81.33%) for knowledge which were categorized as high level depend on McDonald's standard. The practice mean scores of study participants were (6.82). The mean percentages were (68.2%) for practice which were categorized as low level depend on McDonald's standard.

These results approximately matched with the study conducted by Akuma & Jordan, (2011) who found the mean score of knowledge (82%) and practice were low and when asked to rank the procedures most commonly performed in the NICU in order of their levels of pain, nurses consistently ranked every procedure higher on the pain intensity scale than doctors.

The result of this study congruent with Martinez (2014) who found the total nurses' have high knowledge regarding physicians involving in assessment and management of neonatal pain and show indicate pain was more likely to be addressed when nurses collaborated closely with the attending physician. Also, the result of this study congruent with Taylor et al., (2006) who showed there was lack nursing practice in physicians' involvement in pain assessment and management and there's lack of communication between bedside nurses and physicians, or inconsistent use of numeric pain ratings to inform practice.

While the results of this study inconsistent with Hagy (2015) The incongruity lies in their knowledge of when to intervene with these mediations. And inconsistent with Mohamadamini et al., (2017) who showed there was moderate nursing knowledge and practice in physicians' involvement in pain assessment and management.

Based on researcher's point of view, the nurses in study have high knowledge in involving physician in pain assessment and management and know that the cooperate with physician leading to more accurate pain assessment and more effective pain management but the practice were low level may be due to the pain assessment and management become routinely from nurses responsibility.

Table (4.5): Mean score of participants' responses to knowledge and practice items regarding physicians involving in assessment and management of neonatal pain at NICUs.

Rank	Study domains	Mean (SD)	Mean %
	knowledge		
1	Pain management should be a multidisciplinary effort and the responsibility of nurses and physician	.91(.285)	**91**
2	The physician should be involved in pain management through documentation or verbal communication	.84(.365)	**84**
3	The pain should be assessed and managed regularly by both physician and nurse	.79(.406)	**79**
4	Working closely with the attending physician to accurately manage pain encourages me to provide high level care	.79(.406)	**79**
5	When the physicians and nurse working together to assess the neonatal pain, the neonate likelihood of receiving more effective pain management is increased	.77(.420)	**77**
6	The treatment of pain is an important priority for the physician if involved by nurse when doing any painful procedure	.76(.426)	**76**
	Practice		
1	You tell physician if the neonate has continued to pain and non-pharmacological pain management are failed	1.46(.608)	**73.04**
2	You alert the physician to the pain management if the physician is going to do a painful procedure	1.38(.614)	**69.12**
3	When doing any painful procedure, you are preparing analgesia according to the physician's orders	1.38(.646)	**69.12**
4	You work with a physician's together as team work to assess and manage the pain	1.30(.594)	**65.20**
5	You have a shared decision with the physician to delay the invasive procedure after giving the analgesia to the neonate	1.29(.590)	**64.71**

As show in table (4.5), according this results the highest statement in knowledge regarding physicians involving in assessment and management of neonatal pain at NICUs was pain management should be a multidisciplinary effort and the responsibility of nurses and physician with weighted mean 91%. While the lowest statement was; the treatment of pain is an important priority for the physician if involved by nurse when doing any painful procedure with weighted mean 76%.

In addition, show the results the highest statement in practice regarding physicians involving in assessment and management of neonatal pain at NICUs was the nurse tell physician if the neonate has continued to pain and non-pharmacological pain management are failed with weighted mean 73%. While the lowest statement was; the nurse shared decision with the physician to delay the invasive procedure after giving the analgesia to the neonate with weighted mean 64.7%.

The result of this study congruent with Ozawa & Yokoo (2013) pain management multidisciplinary effort and the responsibility of nurses and physician. And congruent with Martinez, (2014) working closely with the attending physician was encouraging towards high level of care (evidence based) and the majority of participants agreed to be more prone to provide high level of care when they worked closely with the physician on pain management. Also, this result inconsistent with Mohamadamini et al., (2017) the nurse has moderate level of knowledge and practice and nurse share in decision making with physicians in pain management.

Based on researcher's point of view, the nursing knowing well the involving physician in neonatal pain assessment and management has important role in accurate and effective pain management but may be internal disputes between nursing and doctors and lack of communication between members of the same team .

4.4 Knowledge and practice related to involving families in assessment and management of the pain of their neonates

Table (4.6): levels of Nurses' knowledge and practice related to involving families in assessment & management of the pain of their neonates

Study domains	Max score	Mean score (SD)	Mean percentage	Level category
knowledge	6	4.24 (1.37)	70.66	Moderate
practice	10	5.86 (1.93)	58.6	Very Low

Table (4.6) shows that the knowledge mean scores of study participants were (4.24). The mean percentages were (70.66%) for knowledge which were categorized as Moderate level depend on McDonald's standard. The practice mean scores of study participants were (5.86). The mean percentages were (58.6%) for practice which were categorized as very low level depend on McDonald's standard. These results approximately matched with the study conducted by Elessi, (2019) who found health care provider have knowledge about family involvement and have lack practices regarding non-pharmacological approach and family involvement in assessment and management of the pain of their neonates, Nevertheless, gaps still exist between knowledge and attitude regarding the assessment and management of neonatal pain.

The result of this study congruent with Mehrnoush (2016) who found the mean score of knowledge (71.6%) of the nurses that parents should be involved in providing care and comfort during painful procedures. While the results of this study inconsistent with the study conducted by Franck et al. (2011) who found the total nurses' have high knowledge and practice regarding parents' preferences and involvement in relation to their role in providing comfort to their infants in the NICU setting.

Based on researcher's point of view, in this study the nurse have high level of knowledge about family involvement in pain assessment and management that will helping their neonate in relief pain by using non pharmacological methods during any painful procedure, in practice the nurse were very low level about family involvement in pain assessment and management may be due to hospital policy and may be due work overload.

Table (4.7): Mean score of participants' responses to knowledge and practice items regarding involving families in assessment and management of the pain of their neonates

Rank	Study domains	Mean (SD)	Mean %
	knowledge		
1	The participant of parents in non-pharmacological pain management with nurses contribute in more effectively pain management	.79(.406)	**79**
2	Communicating with and educating neonate's parents play an effective role in relieving pain	.74(.443)	**74**
3	Parents should be involved with the care and comfort of their neonate during painful procedures	.72(.453)	**72**
4	Touch and talk intervention by mother effective to relive pain	.71(.458)	**71**
5	When performing a painful procedure, breast feeding will relieve pain in neonates	.71(.458)	**71**
6	The prevention of pain in neonates is an expectation of parents	.58(.496)	**58**
	Practice		
1	You provide parents with more information about Neonate's pain and pain management	1.36(.541)	**68.14**
2	You instruct the family about the ways by which parents can contribute in the non-pharmacologic pain management of their neonates	1.24(.583)	**61.76**
3	You Share the parents about the signs of pain among neonates	1.16(.593)	**57.84**
4	You keep parents informed about the pain assessment scales of neonatal pain	1.09(.676)	**54.41**
5	You give one of the parents the option to attend when doing pain management.	1.02(.526)	**50.98**

As show in table (4.7), according to this results, the highest statement in knowledge regarding involving families in assessment and management of the pain of their neonates was the participant of parents in non-pharmacological pain management with nurses contribute in more effectively pain management with weighted mean 79%. While the lowest statement was; The prevention of pain in neonates is an expectation of parents with weighted mean 58%.

In addition, show the results of the highest statement in practice regarding involving families in assessment and management of the pain of their neonates You provide parents with more information about Neonate's pain and pain management with weighted mean 68%. While the lowest statement was; the nurse gives one of the parents the option to attend when doing pain management with weighted mean 51%.

These results approximately matched with the study conducted by Mehrnoush (2016) that show high correct of the nurses that the participant of parents in non-pharmacological pain management contribute in more effectively pain management . While the results of this study inconsistent with the study conducted by Heidari et al., (2013) the nurse engage the family soon after the admission on how to identify signs of pain, how to deliver non-pharmacological interventions.

4.5 Total levels of knowledge and practice regarding neonatal pain assessment and management among neonatal nurses

In this section the researcher explained the total of nurses knowledge and practice in pain assessment and management, physicians involvement and family involvement in pain assessment and management in NICU by nurses.

Table (4.8): Total levels of knowledge and practice regarding neonatal pain assessment and management among neonatal nurses

Study domains	Max score	Mean score (SD)	Mean percentage	Level category
knowledge	26	17.44 (3.47)	67.07	Low
practice	44	26.86 (6.34)	61.04	Low

Table (4.8) shows that the total the knowledge and practices mean scores of study participants were (17.44) and (26.86) respectively.

The mean percentages were (67.07%) for knowledge and (61.04%) for practice which were categorized as low level depend on McDonald's standard. These results approximately matched with the study conducted by Noghabi et al. (2014) showed there was poor nurses' knowledge (48.2%) and practice (42.2%). Also, the result of this study congruent with Dames et al. (2016) who found the nurses lack knowledge and practice of the clinical management of neonatal pain, which is not a part of the daily neonatal care routine. While the results of this study inconsistent with the study conducted by Hagy (2015) pain management in the NICU has revealed that health care providers are not deficient in their knowledge of assessment or their knowledge of appropriate intervention.

This low level of total nurses' knowledge regarding neonatal pain assessment and management, which considered not enough to provide nursing care toward neonate who complain pain in NICU, and reflect the need for enhancing nurses' knowledge regarding neonatal pain assessment and management, physician and family involvement in pain assessment and management. This result may be related to the lack of regular education courses and evidences supported by research, inadequate of continuous clinical supervision and evaluation. In addition, it may be due to unclear of hospital policy or standard guidelines to pain assessment scales and pain management protocols in NICU. Other reasons may be related to work overload, lack of nurses‟ motivation to improve their knowledge and lack of the desire to update knowledge. In addition, this result may due to an absence incorporation pain assessment and management in neonates of course in a nursing curriculum the taught nursing program in colleges.

Regarding low level of nurses' practice, this low practice level may be related to low level of nurses' knowledge. In addition, this result could be explained by the number of nurses small relative to the number of patients. Also, low level of practices reflects the status of training offered to nurses working in NICUs, lack nurses training of pain management such as pharmacological and non-pharmacological pain management, physician and family involvement by nurses in pain management, lack of clinical expertise.

4.6 Relationship between nurses' knowledge and practices towards pain assessment and management of neonates at NICUs

Table (4.9): Relationship between Nurses' Knowledge and Practices towards pain assessment and management of neonates at NICUs

Variable	**Nurses' knowledge**	
Nurses' practices	**Pearson Correlation**	**P-value**
	0.381	0.000

The table shows that there is a significant weak correlation between nurses' knowledge and their practices toward pain assessment and management of neonates at NICUs ($p<0.001$). This result congruent with a study conducted by Zubaidah & Naviati (2018) they found there was positive correlation between nurses' knowledge and practices ($r = 0.715$; p value = 0,000). The results of the current study related to this relationship; this is not consistent with the results of Cong & Vazquez (2013) which revealed that the present study showed that there is no statistically significant difference between nurses' knowledge and their practice, gaps exist in knowledge, and practice in neonatal pain assessment and management. Moreover, the result of this study inconsistent with Martinez (2014) showed that there is no statistically significant difference between nurses' knowledge and their practice, who found a gap between knowledge/skill and implementation of strategies to manage pain.

This result of current study demonstrates that there is no gap between nurses' knowledge and their practices, with an increase in the level of nurses'' knowledge toward pain assessment and management of neonates at NICUs, the level of their practices is increased.

4.7 The relationship between socio-demographic variables and nurses' knowledge and practices towards pain assessment and management of neonates at NICUs.

There are many factors influence on nurses' knowledge and practices. In this study the researcher examined relation between socio-demographic variables and nurses knowledge and practices towards pain assessment and management of neonates at NICUs including age, gender, education level, job position, as well as, variables about workplace, monthly income and year of experience in NICU, course or educational program related to assessment and management on neonatal pain at NICU.

4.7.1 Age and nurses' knowledge and practices relationship

Table (4.10): Relationship between age and nurses' knowledge and practices

Variable	N	Mean (SD)	df	F*	P value
Nurses' Knowledge					
<30 years	50	17.50 (3.67)	2, 99	.069	.933
30 – 40 years	46	17.33 (3.43)			
>40 years	6	17.83 (2.229)			
Nurses' Practice					
<30 years	50	26.78 (6.33)	2, 99	.731	.484
30 – 40 years	46	26.37 (6.48)			
>40 years	6	29.67 (3.07)			

*One-way ANOVA

Table (4.10) shows that there were no statistically significant differences in the level of nurses' knowledge and practices between their different age groups (P>0.05). These results are similar to study conduct by Abd El- Aziz, et al., (2018) who found that there was no association between nurses' knowledge and practices with their ages. In addition, these result congruent with the study conduct by Lake (2013) who found that there were no statistically significant differences in the nurses' knowledge between their different age groups.

Based on researcher’s point of view, NICU closed area, which allow to older existing staff to exchange knowledge and practices with new employed nurses which lead to nurses’ knowledge and practice not affected by age differences.

4.7.2 Gender and nurses' knowledge and practices relationship

Table (4.11): Relationship between gender and nurses' knowledge and practices

Variable	Max score	Mean (SD)		t statistics (df)	p value *
		Male	Female		
Nurses' Knowledge	**26**	**18.16 (3.16)**	**16.28 (3.67)**	**2.63 (71.5)**	**.010**
Nurses practices	**44**	**27.98 (6.25)**	**24.79(5.84)**	**2.60 (84.8)**	**.011**

*Independent sample t test

Table (4.11) shows that there were statistically significant differences in the nurses between male and female (P<0.05). Independent sample t test was conducted to know the differences between male and female, the test shows that the male nurse have significantly higher mean level of knowledge than female nurses regarding neonatal pain assessment and management among neonate. On other hand this table show there were statistically significant differences in the nurses' practice between male and female nurse (P<0.05). The test show that the male nurses have significantly higher mean level of practice than female nurses regarding neonatal pain assessment and management. This result is inconsistent with the study conduct by Germossa (2018), who found that there were statistically significant differences between nurses that the female nurses have significantly higher mean level of practice than male nurses regarding neonatal pain assessment and management among neonate.

Based on researcher’s point of view, the finding of this study inconsistent with previous studies the number female nurses are small this may from causes for these differences.

4.7.3 Educational qualification and nurses' knowledge and practices relationship

Table (4.12): Relationship between educational qualification and nurses' knowledge and practices

Variable	N	Mean (SD)	df	F	P value*
Nurses' Knowledge					
Diploma	17	15.29 (2.97)	**2, 99**	**6.73**	**.002**
Bachelor	80	17.68 (3.39)			
MSN	5	21 (2.34)			
Nurses' Practice					
Diploma	17	26.47 (4.97)	**2, 99**	**0.283**	**0.754**
Bachelor	80	26.70 (6.63)			
MSN	5	28.80 (4.20)			

*One-way ANOVA

Table (4.12) shows that there were statistically significant differences in the study participants' knowledge between their different educational qualifications (P<0.05). Tukey Post hoc was conducted to know the differences between which groups, the test shows that the difference is between the nurses' who have diploma degree and bachelor degree in favor to those who are have bachelor degree. In addition, the test shows that the difference is between the nurses' have Bachelor degree and nurses have MSN degree in favor to those who have MSN degree.

On other hand this table show that there were no statistically significant differences in the participants' practices between their different educational qualifications (P>0.05).

These results are similar to study conduct by Lake (2013) who found that there was statistically significant main effect for education on knowledge (P<0.05) who found the Bachelor degree have significant higher knowledge from diploma degree. This result is inconsistent with the study conduct by Abdel Razeq et al., (2016), who found that no statistically significant differences between nurses' educational qualification and nurses' knowledge. Also, this result is inconsistent with the study conduct by Germossa (2018), who found there was no statistically significant difference observed between nurses' educational level and nurses' knowledge.

Based on researchers' point of view, nurses with higher levels of nursing education have high knowledge in neonatal pain assessment and management than nurses who have lower levels of nursing education. The nurses with high level of educational qualification exposed to more theoretical knowledge rather than practice issues, which may bring the professionals closer to the correct answers of knowledge.

4.7.4 Job position and nurses' knowledge and practices relationship

Table (4.13): Relationship between current position and nurses' knowledge and practices

Variable	N	Mean (SD)	df	F	P value*
Nurses' Knowledge					
Nurse	82	17.26 (3.57)	**2, 99**	**1.26**	**.287**
Senior staff nurse	17	17.82 (3.06)			
Head nurse	3	20.33 (1.52)			
Nurses' Practice					
Nurse	82	26.62 (6.31)	**2, 99**	**0.419**	**0.659**
Senior staff nurse	17	26.88 (6.48)			
Head nurse	3	30.00 (3.60)			

*One-way ANOVA

Table (4.13) shows that there was no significant difference in the level of nurses' knowledge and practices towards pain assessment and management of neonates at NICUs with the current position ($p>0.05$). Also, there is no significant difference in the level of nurses' practices with the current position ($p>0.05$). This means that the different in nursing position do not affected on knowledge and practices towards pain assessment and management of neonates. This result due to no variation between sample population.

These results congruent with the study conduct by Amaral et al., (2013) who found that there were no statistically significant differences in the nurses' knowledge and practice between their different Job position, that show all team believes in the ability of infants to feel pain and links physiological indicators to behavioral ones.

4.7.5 Place of work and nurses' knowledge and practices relationship

Table (4.14): Relationship between place of work and nurses' knowledge and practices

Variable	N	Mean (SD)	df	F	P value*
Nurses' Knowledge					
Al Shifa hospital	40	17.80 (3.64)	**2, 99**	**1.76**	**.176**
Al Nasser hospital	43	16.72 (2.88)			
European Gaza hospital	19	18.32 (4.13)			
Nurses' Practice					
Al Shifa hospital	40	25.88 (6.54)	**2, 99**	**0.835**	**0.437**
Al Nasser hospital	43	27.65 (4.91)			
European Gaza hospital	19	26.63 (8.21)			

*One-way ANOVA

Table (4.14) shows that there were no statistically significant differences in the study participants' knowledge and practices between their different place of work (P>0.05).

Studies related to the association with place of work are lacking within previous studies

Based on researchers' point of view, the workload, occupancy ratio within different NICUs, daily work pressure may lead to decrease quality of care provided by nurses toward neonate who complain pain. In addition, these circumstances may lead to decrease nurses' ability to acquire newly knowledge and update their practices. European Gaza Hospital had the lowest occupancy ratio and workload, which may lead to positive effect on their levels of knowledge and increase opportunity of staff to participate in training courses.

4.7.6 Monthly income and nurses' knowledge and practices relationship

Table (4.15): Relationship between monthly income and nurses' knowledge and practices

Variable	N	Mean (SD)	df	F	P value*
Nurses' Knowledge					
1000-1900	96	17.29 (3.44)	**2, 99**	**2.142**	**.123**
2000-3000	4	18.75 (2.87)			
>3000	2	22.00 (4.24)			
Nurses' Practice					
1000-1900	96	26.58 (6.35)	**2, 99**	**.732**	**.484**
2000-3000	4	28.50 (4.57)			
>3000	2	30.25 (3.53)			

*One-way ANOVA

Table (4.15) shows that there were no statistically significant differences in the study participants' knowledge and practices between their different monthly income (P>0.05).

Based on researchers' point of view, increased monthly income is one of the incentives that encourage nurses to provide high-level practice and enable them to receive continuous training courses to the treatment of pain for neonate, which increases knowledge without wasting time in the search for another job to increase the monthly income.

Studies related to the association with monthly income are lacking within previous studies

4.7.7 Work experience in NICU and nurses' knowledge and practices relationship

Table (4.16): Relationship between work experience and nurses' knowledge and practices

Variable	N	Mean (SD)	df	F	P value*
Nurses' Knowledge					
1-5 years	45	17.53 (3.51)	**3, 98**	**.946**	**.422**
6-10 years	41	16.93 (3.63)			
11-20 years	14	18.71 (2.84)			
21 years	2	17.00 (2.82)			
Nurses' Practice					
1-5 years	45	26.96(5.60)	**3, 98**	**1.455**	**.232**
6-10 years	41	25.59(6.68)			
11-20 years	14	29.57(6.89)			
21 years	2	27.00 (2.82)			

*One-way ANOVA

Table (4.16) shows that there was no significant difference in the study participants knowledge between their different work experiences ($p>0.05$). Also, there is no significant in the participants' practices between their different work experience ($p>0.05$). These results are similar to study conduct by Abdel Razeq et l., (2016) who found that there no significant difference in the level of nurses' knowledge and practices towards pain assessment and management of neonates with the work experience. This is not consistent with the results of Lake. (2013) who found that the nurses with more total years of nursing experience ($M = 8.58$, $p = .04$) have better knowledge and practice about pain in neonates. Moreover, the result of this study inconsistent with Cong (2013) showed that there is increase in amount of years worked, the neonatal nurse builds confidence and is more apt to recognize and intervene in various neonatal cues to painful situations.

These results could be explained by the larger part of the study participants had less than 5 years' work experience in NICU. The longer a nurse works in the NICU have more opportunity there may be to increase knowledge through both experience and education. In addition, NICU considered a closed area, which may lead to share knowledge and practices between the overall nurses work within the department.

4.7.8 Participation in course or educational program related to assessment and management on neonatal pain at NICU and nurses' knowledge and practices relationship

Table (4.17): Relationship between participation in course or educational program related to assessment and management on neonatal pain at NICU and nurses' knowledge and practices

Variable	Mean (SD)		t statistics (df)	p value *
	Yes	No		
Nurses' Knowledge	18.59(2.62)	17.21(3.58)	-1.845(29.43)	.75
Nurses practices	30.12 (5.58)	26.03 (6.16)	-2.565(23.658)	.017

*Independent sample t test

Table (4.17) shows that there were no statistically significant differences in the study participants' knowledge between nurses who received course or educational program related to assessment and management on neonatal pain at NICU and who didn‟t receive (P>0.05). These results is not consistent with the results of Mehrnoush et al. (2016) who found that there was a statistically significant relationship between education and pain, lack of knowledge and training program regarding pain management followed by not knowledge about using pain assessment tools and pain management guide line.

Also this is not consistent with the results of Germossa et al. (2018) who found the educational program improved nurses' scores for pain management knowledge and attitudes. This may lead to more effective pain management by nurses.

In addition, this table shows that there were statistically significant differences in the participant practices between who received course or educational program related to assessment and management on neonatal pain at NICU and who didn’t receive (P<0.05) in favor to nurse who receive course or educational program. These results congruent with

study conducted by Panek & Kwinta. (2018) they found there was statistically significant relationship between nurses who received education course and pain treatment according to the guidelines. Also this study congruent with Maghami, et al. (2016) how show the nursing who have training courses or educational courses about neonatal pain management able to applying the results of these studies in educational references, not only it is possible to improve the ability of nurses to the assessment and control of pain neonate, but also be a great help in relieving pain and suffering.

Chapter Five

Conclusion and recommendations

In this chapter, the main finding of study reviewed and answer to research questions will be given and provide recommendations for the decision makers to improve nurses' knowledge and practices in assessment and management of neonatal pain.

5.1 Conclusion

The hospitalized in NICU are exposed to a variety of painful procedures and to environmental stress may result in physiological and behavioral alterations, as well as changes in the development of the nervous system and long-term harm. The nurse has an important role in assessing and management of neonatal pain.

The study finding showed that nurses had very low level of knowledge and practices toward neonatal pain assessment and management, the mean percentage were (59.42%) for knowledge and (58.33%) for practices. And show that the nurses had high level of knowledge (81.33%) and low level of practices (68.2%) towered physicians involving in assessment and management of neonatal pain. And show that the nurses had moderate level of knowledge (70.66%) and very low level of practices (58.6%) towered involving families in assessment & management of the pain of their neonates.

The study showed that nurses had low level of knowledge and practices in total levels of nurses' knowledge and practice regarding neonatal pain assessment and management, the mean percentage were (67.07%) for knowledge and (61.04%) for practices.

In addition, when comparing the socio-demographic variables and total nurses' knowledge and practices towards neonatal pain assessment and management the results showed that there were no significant relationships between most of them except in the relationship between gender and nurses' knowledge and practices, the male nurses have higher level of knowledge and practice than female nurses. Regarding the study participants' educational qualification, the result showed that the difference in knowledge is between the nurses' who MSN degree, diploma degree and bachelor degree in favor to those who are have MSN degree. Also, shows that there were statistically significant differences in the participant practices between who received course or educational program and who didn't receive, in favor to nurse who receive course or educational program.

5.2 Recommendations

1. There is a need to design course or educational program related to assessment and management of neonatal pain to update and enhance the knowledge and practice of neonatal nurses.
2. Health care providers should address the use of non-pharmacological and pharmacological pain management among neonates at NICUs.
3. MoH should formulate protocol to guide pain management in NICU and guide to improve involving family in assessment and management of the pain of their neonates.
4. Policies should address the integrative approach of pain management among neonates at NICUs
5. Further research study may be needed after implementing educational program for nurses on integrative approach for assessment and management of neonatal pains at NICUs.

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Annexes

Annex (1) Palestine map

Annex (2) Self-administered questionnaire

Consent Form

Questionnaire (English version)

Dear participant:

You are being asked to participate in a research study titled: **Nurses' Knowledge and Practice in Assessment and Management of Neonatal Pain at Governmental Hospitals in Gaza Strip.** You have the right to know what you will be asked to do so that you can decide whether or not to be in the study. Your participation is voluntary. If you do not want to continue to be in the study, you may stop at any time without penalty or loss of benefits to which you are otherwise entitled. This research as a key prerequisite of the requirements for a master's degree from faculty of graduate studies-Pediatric Nursing program-Al-Quds University. Researcher himself funds this research. Therefore, I hope you to answer all questions because your opinion represents a great importance for this study. This questionnaire will take 15 min approximately. This research will only be used for scientific research purposes. Information produced by this study will be stored in the investigator's file and identified by a code number only. For questions about the study or a research-related injury, contact the researcher on Mobile No. 0567186600.

Researcher: Younis Khaled Qassem Signature

yuness553@gmail.com …….

1. Socio Demographic Data

1. Age (years)……
2. Gender:◊ Male ◊ Female
3. Educational qualification:

   ◊ Diploma ◊ BSN ◊ MSN ◊ Other specify……

4. Current position:

   ◊Nurse ◊ Senior staff nurse ◊ Head nurse

5. Hospital :

   ◊ Al Shifa hospital ◊ Al Nasser hospital ◊ European Gaza hospital

6. Average monthly income in NIS : ……..
7. Years of experience in NICU department: ……..
8. Have you had any course or educational program related to assessment and management on neonatal pain at NICU? Yes……..

   No…….

2. Knowledge towards pain assessment and management

Direction: please put (√) in the column you chosen.

	Parameter	Response	
		Yes	No
1.	Pain is unpleasant sensory and emotional experience associated with actual or potential tissue damage		
2.	Pain should be assessed before and after administrating pain drugs.		
3.	Neonates do not experience pain		
4	The response to pain among neonates is completely natural		
5.	Neonates experience a lesser degree of pain than child and adult		
6.	Pain assessment of neonates leads to more effective pain management		
7.	Analgesia is not critical to the care of neonates because they do not remember painful experiences.		
8.	Physiologic stress associated with pain among neonates can be more dangerous than the side effects of analgesia.		
9.	Analgesia is too dangerous to use in neonates.		
10.	Morphine is not used for neonate pain relief due to the risk of respiratory depression		
11.	Pain diminishes quicker in newborns than in adults.		
12.	In relation to body weight, neonates require less analgesia than adults do.		
13.	Prematures cannot feel pain before full term.		
14.	Term and preterm newborns respond to pain in the same way.		

1. Pain assessment and management practices

Direction: please consider the following behavior as they relate to your practice. You should consider your reaction to each behavior and put (√) in the column you chosen**.**

NO	Parameter	Response		
		No. Never	**Some times**	**Yes. Always**
1.	You assess neonatal pain at least once a shift			
2.	You evaluate and measure the neonatal pain as one of the vital signs when examining the neonate			
3.	You observe physiological change in neonatal period (such as BP, respiratory rate, heart rate, temperature, or O2 saturation) in order to assess their pain.			
4.	You observe the following side effect such as respiratory distress, nausea, vomiting, if a neonate receives opioids drugs			
5.	You administer pain medication as order by a doctor around the clock.			
6.	You use pharmacologic interventions through many invasive procedures such as Endotracheal tube insertion, Umbilical line insertions, Lumbar punctures			
7.	You administer paracetamol because it's the most commonly analgesic used in neonates			
8.	You use non-pharmacologic interventions through many invasive procedures			
9.	You use oral sucrose & pacifiers as non-pharmacological measures to reduce pain			
10.	You use positioning as non-pharmacological measures to reduce pain			
11.	You use massage & touching as non-pharmacological measures to reduce pain			
12.	You use modifying environmental stimuli as non-pharmacological measures to reduce pain			

2. Knowledge and practices related to physician's involvement

a. Knowledge towards physician's involvement in pain assessment and management

Direction: please put (√) in the column you chosen

NO	**Parameter**	**Response**	
		Yes	**No**
1.	Pain management should be a multidisciplinary effort and the responsibility of nurses and physician		
2.	The physician should be involved in pain management through documentation or verbal communication		
3.	The treatment of pain is an important priority for the physician if involved by nurse when doing any painful procedure		
4	The pain should be assessed and managed regularly by both physician and nurse		
5.	When the physicians and nurse working together to assess the neonatal pain, the neonate likelihood of receiving more effective pain management is increased		
6.	Working closely with the attending physician to accurately manage pain encourages me to provide high level care		

b. **Practice towards physician's involvement in pain assessment and management**

Direction: please consider the following behavior as they relate to your practice. You should consider your reaction to each behavior and put (√) in the column you chosen

NO	**Parameter**	**Response**		
		No. Never	**Some times**	**Yes. Always**
1.	You work with a physician's together as team work to assess and manage the pain			
2.	You tell physician if the neonate has continued to pain and non-pharmacological pain management are failed			
3.	When doing any painful procedure, you are preparing analgesia according to the physician’s orders			
4	You alert the physician to the pain management if the physician is going to do a painful procedure			
5.	You have a shared decision with the physician to delay the invasive procedure after giving the analgesia to the neonate			

3. Knowledge and practice related to Family's involvement

a. Knowledge towards Family's involvement in pain assessment and management

Direction: please put (√) in the column you chosen

NO	Parameter	Response	
		Yes	**No**
1.	Parents should be involved with the care and comfort of their neonate during painful procedures		
2.	Touch and talk intervention by mother effective to relive pain		
3.	When performing a painful procedure, breast feeding will relieve pain in neonates		
4.	Communicating with and educating neonate's parents play an effective role in relieving pain		
5.	The participant of parents in non-pharmacological pain management with nurses contribute in more effectively pain management		
6.	The prevention of pain in neonates is an expectation of parents		

b. practice towards Family's involvement in pain assessment and management

Direction: please consider the following behavior as they relate to your practice. You should consider your reaction to each behavior and put (√) in the column you chosen

NO	Parameter	Response		
		No. Never	**Some times**	**Yes. Always**
1.	You provide parents with more information about Neonate's pain and pain management			
2.	You give one of the parents the option to attend when doing pain management.			
3.	You Share the parents about the signs of pain among neonates			
4	You keep parents informed about the pain assessment scales of neonatal pain			
5.	You instruct the family aboutthe ways by which parents can contribute in the non-pharmacologic pain management of their neonates			

Annex (3) Name of panels of expert

1. Dr. Ahmad Nijim (Al Azhar University – Gaza)
2. Dr. Arifa Al bahry (Islamic University of Gaza)
3. Dr. Hamza Abdeljawad (Al Quds University – Gaza)
4. Dr. Hatem Al Dabaka (University College of Ability Development)
5. Dr. Majed Awadallah (Al Nassr Pediatric Hospital)
6. Dr. Mohamed Aljerjawy (Palestine College of Nursing)
7. Dr. Osama Elian (Palestine College of Nursing)
8. Dr. Sherine Abed (Al Nassr Pediatric Hospital)

Annex (4) Al-Quds University approval Latter

Al Quds University
Faculty of Health Professions
Nursing Dept. –Gaza

جامعة القدس
كلية المهن الصحية
دائرة التمريض– غزة

التاريخ:2019/9/14

حضرة الأخ/ د. رامي العبادلة حفظه الله
مدير عام الادارة العامة لتنمية القوى البشرية
السلام عليكم ورحمة الله وبركاته

الموضوع: تسهيل مهمة الطالب يونس خالد قاسم

تهديكم كلية المهن الصحية بجامعة القدس أطيب التحيات، ونرجو من حضرتكم مساعدة الطالب المذكور بخصوص جمع معلومات خاصة بموضوع:

Nurses' Knowledge and Practice in Assessment and Management of Neonatal Pain at Governmental Hospitals in Gaza Strip

وذلك من ممرضي وممرضات أقسام الحضانة في مستشفيات وزارة الصحة (الشفاء + النصر + الأوروبي) وذلك ضمن رسالة الماجستير الخاصة به لبرنامج تمريض الأطفال.

وتفضلوا بقبول وافر الاحترام والتقدير

د. حمزة محمد عبد الجواد
أستاذ مساعد في علوم التمريض
منسق برامج ماجستير التمريض بغزة
كلية المهن الصحية - جامعة القدس
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دائرة التمريض
Nursing Department

Tel: 08 2644210+08 2644220
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Annex (5) Helsinki committee for ethical approval

المجلس الفلسطيني للبحث الصحي
Palestinian Health Research Council

تعزيز النظام الصحي الفلسطيني من خلال مأسسة استخدام المعلومات البحثية في صنع القرار
Developing the Palestinian health system through institutionalizing the use of information in decision making

Helsinki Committee
For Ethical Approval

Date: 2019/10/7 **Number:** PHRC/HC/616/19

Name: Younis Khaled Qassem الاسم:

We would like to inform you that the committee had discussed the proposal of your study about: نفيدكم علماً بأن اللجنة قد ناقشت مقترح دراستكم حول:

Nurses' Knowledge and Practice in Assessment and Management of Neonatal Pain at Governmental Hospitals in Gaza Strip

The committee has decided to approve the above mentioned research. Approval number PHRC/HC/616/19 in its meeting on 2019/10/7 و قد قررت الموافقة على البحث المذكور عاليه بالرقم والتاريخ المذكوران عاليه

Signature

Member Member

Chairman

Genral Conditions:-
1. Valid for 2 years from the date of approval.
2. It is necessary to notify the committee of any change in the approved study protocol.
3. The committee appreciates receiving a copy of your final research when completed

Specific Conditions:-

E-Mail:pal.phrc@gmail.com

Gaza - Palestine غزة - فلسطين
شارع النصر - مفترق العيون

Annex (6) Permission to collection data from MoH

State of Palestine
Ministry of health

دولة فلسطين
وزارة الصحة

التاريخ:13/10/2019
رقم المراسلة 378554

السيد : رامي عيد سليمان العبادله المحترم

مدير عام بالوزارة /الإدارة العامة لتنمية القوى البشرية - /وزارة الصحة

السلام عليكم ,,,

الموضوع/ تسهيل مهمة الباحث// يونس قاسم

التفاصيل //
بخصوص الموضوع أعلاه، يرجي تسهيل مهمة الباحث/ يونس خالد قاسم
الملتحق ببرنامج ماجستير التمريض – تخصص إدارة التمريض – جامعة القدس أبوديس في إجراء بحث بعنوان:-
"Nurses' Knowledge and Practice in Assessment and Management of Neonatal Pain at Governmental Hospitals in Gaza Strip"
حيث الباحث بحاجة لتعبئة استبانة من عدد من الممرضين والممرضات العاملين في اقسام الحضانة في مستشفيات قطاع غزة (مجمع الشفاء الطبي – مستشفى النصر للأطفال – مستشفى غزه الأوربي)، بما لا يتعارض مع مصلحة العمل وضمن أخلاقيات البحث العلمي، ودون تحمل الوزارة أي أعباء أو مسئولية.
وتفضلوا بقبول التحية والتقدير،،،
ملاحظة /
1. تسهيل المهمة الخاص بالدراسة أعلاه صالح لمدة 6 شهر من تاريخه.
2. البحث المذكور حصل على موافقة لجنه اخلاقيات البحث الصحي (لجنة هلسنكي)

محمد ابراهيم محمد السرساوي
مدير دائرة/الإدارة العامة لتنمية القوى البشرية -

التحويلات

■ محمد ابراهيم محمد السرساوي(مدير دائرة)	← رامي عيد سليمان العبادله(مدير عام بالوزارة)	للإفادة(13/10/2019)
■ رامي عيد سليمان العبادله(مدير عام بالوزارة)	← مدحت عباس خضر حسن(مدير عام بالوزارة)	إجراءاتكم بالخصوص(13/10/2019)
■ رامي عيد سليمان العبادله(مدير عام بالوزارة)	← عبد السلام محمد عبد صباح(مدير عام بالوزارة)	إجراءاتكم بالخصوص(13/10/2019)
■ عبد السلام محمد عبد صباح(مدير عام بالوزارة)	← مصطفى سليم عبد الكحلوت(مدير مستشفى)	إجراءاتكم بالخصوص(14/10/2019)
■ عبد السلام محمد عبد صباح(مدير عام بالوزارة)	← محمد محمد عبد الحليم ابوسلمية(مدير مستشفى)	إجراءاتكم بالخصوص(14/10/2019)
■ عبد السلام محمد عبد صباح(مدير عام بالوزارة)	← يوسف فوزي اسماعيل العقاد(مدير مستشفى)	إجراءاتكم بالخصوص(14/10/2019)
■ يوسف فوزي اسماعيل العقاد(مدير مستشفى)	← اشرف خليل محمد ابو الروس(مدير اداري)	لعمل اللازم(14/10/2019)
■ يوسف فوزي اسماعيل العقاد(مدير مستشفى)	← عطا اسماعيل خليل الجعبري(مدير دائرة التمريض)	لعمل اللازم(14/10/2019)

Gaza Tel. (+970) 8-2846949 Fax. (+970) 8-2826295
غزة تلفون. (+970) 8-2846949 فاكس. (+970) 8-2826295

العنوان: معرفة وممارسة الممرضين في تقييم ومعالجة آلام حديثي الولادة في المستشفيات الحكومية في قطاع غزة.

إعداد: يونس خالد قاسم

إشراف: د. حمزة عبد الجواد

ملخص الدراسة

يعتبر الألم ظاهرة شائعة بين المواليد في داخل قسم العناية المركزة لحديثي الولادة، حيث يتعرضون لمجموعة متنوعة من الإجراءات العلاجية المؤلمة، التي قد تؤدي إلى حدوث تغيرات فسيولوجية وسلوكية، وكذلك تغيرات في تطور الجهاز العصبي وتُحدِث ضرراً على المدى البعيد. وهنالك دوراً هاماً للممرضين والممرضات في تقييم وعلاج الألم باستخدام عدة طرق غير دوائية ودوائية وكذلك من خلال إشراك الأطباء وعائلات الأطفال حديثي الولادة في تقييم وعلاج الألم. إن الهدف الرئيسي لهذه الدراسة هو تقييم الجانب المعرفي والممارسات لتقييم وعلاج الألم المقدمة لحديثي الولادة من وجهة نظر الممرضين والممرضات العاملين داخل أقسام العناية المركزة لحديثي الولادة من المستوى الثالث في مستشفيات قطاع غزة الحكومية.

وكانت هذه الدراسة وصفية مقطعية، وقد أجريت هذه الدراسة في وحدات العناية المكثفة للمواليد التابعة للمستشفيات الحكومية "مستشفى الشفاء–مستشفى النصر للأطفال–مستشفى غزة الأوروبي" وكان العدد الإجمالي للعينة 102 ممرض وممرضة. وتم جمع البيانات من المشاركين في الدراسة باستخدام استبياناً ذاتياً. وكان معدل استجابة المشاركين في الدراسة (100%).

وأظهرت نتائج هذه الدراسة بأن لدي الممرضين مستوي منخفض من المعرفة والممارسة فيما يتعلق بتقييم وعلاج الألم عند المواليد يصل إلى (67.07%) للمعرفة و (61.04%) للممارسة التمريضية، وأظهرت النتائج ارتباطاً ضعيفاً بين المعرفة والممارسات التمريضية.

وكما أظهرت النتائج وجود اختلافات في المعرفة والممارسات التمريضية على أساس اختلاف الجنس، لصالح الممرضين الذكور. وأظهرت النتائج وجود اختلافات في المعرفة التمريضية وفقاً لدرجاتهم العلمية وكانت الأفضلية لمن لديهم شهادات ماجستير. وبينت نتائج هذه الدراسة وجود علاقة ذات دلالة إحصائية بين المعرفة والممارسات التمريضية وتلقيهم لدورات في تقييم وعلاج الألم عند المواليد.

كشفت هذه الدراسة أن التمريض لديه مستوى عالي من المعرفة بنسبة (81.33 ٪) ولديهم مستوى منخفض من الممارسة بنسبة (68.2 ٪) فيما يتعلق بإشراك الطبيب في تقييم وعلاج الألم. أيضاً أظهرت الدراسة أن التمريض لديه مستوى متوسط من المعرفة بنسبة (70.66 ٪) ولديهم مستوى منخفض جداً من الممارسة بنسبة (58.6 ٪) فيما يتعلق بمشاركة الأُسرة في تقييم وعلاج الألم لأبنائهم المواليد.

أوصت الدراسة بتطوير دورة أو برنامج تعليمي يتعلق بتقييم وعلاج آلام المواليد لتحديث المعرفة والممارسة لدى الممرضين والممرضات بشكل شمولي.