Deanship of Graduate Studies

Al-Quds University

Evaluation of Nurses' Knowledge and Practices regarding Preterm Neonatal Care across Hospitals in the South & Middle of the West Bank, Palestine.

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M.Sc Thesis

Jerusalem – Palestine

2025/1447

Evaluation of Nurses' Knowledge and Practices regarding Preterm Neonatal Care across Hospitals in the South & Middle of the West Bank, Palestine.

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A Thesis Submitted in Partial Fulfillment of Requirement For the Degree of Master of Pediatric Nursing / Faculty of Health Professions/ Al-Quds University

2025/1447

Al-Quds University
Deanship of Graduate Studies
Pediatric Nursing Program/ Nursing Department

Thesis Approval

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Jerusalem – Palestine

2025/1447

Dedication:

With endless mercy His, guidance, and strength, all of this had been possible. Throughout

First and foremost, I dedicate this work to God Almighty. every challenge, He has been my source of hope, patience, and perseverance. I am deeply grateful for His blessings and for granting me the ability to complete this journey.

Special appreciation is extended to Professor Abdallah Al-Wawi, whose support, insightful guidance, and continuous encouragement significantly contributed to the development and completion of this research.

To my dear family, dad, mom, my sisters Noor and Nicole, your love, prayers, and constant encouragement have carried me through the most difficult moments. Thank you for believing in me even when I doubted myself. Your sacrifices, support, and faith in my dreams have been the foundation of everything I've accomplished.

Finally, this thesis is dedicated to all nurses devoted to the care of preterm neonates. Their compassion, dedication, and resilience represent the core of neonatal care. It is hoped that this study will offer a meaningful contribution to their essential work and to the advancement of neonatal health.

Sign: Nadine G. Y. Freij.

Declaration:

I hereby declare that this thesis is my original work and has been completed in partial fulfillment of the requirements for the degree. All sources of information and data used in this study have been duly acknowledged. This work has not been submitted to any other institution or university for the award of any degree or diploma. I also affirm that any assistance received during the course of this research has been properly acknowledged in the appropriate sections.

Sign:

Nadine G. Y. Freij.

Date: 21 / 12 /2025

Acknowledgement:

First and foremost, I am deeply grateful to God for the blessings, love, and support that have carried me throughout this journey. I am especially thankful to my supervisor, Assistant Professor Dr. Abdallah Al-Wawi, for his patience, guidance, and valuable insights, without which this work would not have been possible.

I owe my deepest gratitude to my parents, whose dedication, motivation, and unwavering support have been my greatest inspiration since childhood.

Lastly, I warmly acknowledge the support of my sisters, whose understanding and encouragement have always uplifted me and kept me focused on my goals. My sincere thanks are also extended to all the nurses who participated in this study, as their cooperation and contributions were vital to the success of this research.

Abstract

Background: Preterm neonates are highly vulnerable and require specialized care in neonatal intensive care units (NICUs) to reduce morbidity and mortality. Nurses play a critical role in providing this care, and their knowledge and practices directly influence neonatal outcomes. This study aimed to assess the current levels of nurses' knowledge and practices regarding preterm neonatal care in NICUs in the West Bank. The research examined the knowledge and practices of nurses regarding the care of preterm neonates.

Methods: This study was conducted in neonatal intensive care units (NICUs) across seven governmental and private hospitals in the West Bank, including Al-Ahli Hospital, the Palestinian Medical Complex, H-Clinic Hospital, Holy Family Hospital, Saint Joseph Hospital, Alia Hospital, and Beit Jala Hospital. The participants included all nurses working in these NICUs, with a total of 152 respondents. A quantitative descriptive cross-sectional design was used. Data were collected in June – July 2025 through a self-administered questionnaire and analyzed statistically to measure knowledge and practice across domains such as thermoregulation and phototherapy. Relationships between demographic characteristics and outcomes were also assessed, forming the basis for recommendations to improve neonatal nursing care.

Results: The study showed that nurses demonstrated high levels of knowledge (mean = 93.1 ± 15.1) and practice (mean = 176.6 ± 8.7) in preterm neonatal care. Within the practice subdomains, thermoregulation scored the highest (M = 47.6 ± 1.2), while phototherapy scored the lowest (M = 40.8 ± 3.1). Female nurses had significantly higher knowledge scores than males ($p = 0.009$), though practice scores did not differ by gender ($p = 0.149$). Nurses in private hospitals scored higher in knowledge compared to those in governmental hospitals ($p = 0.021$), while practice levels were similar ($p = 0.178$).

Conclusion: The researcher recommended that nurses should be enrolled in specialized training before starting work in the NICU, emphasizing the importance of an orientation period. Additionally, ongoing continuing education programs should be implemented to update and enhance nurses' knowledge and practices.

Keywords: Preterm neonates, Neonatal intensive care unit (NICU), Nursing knowledge, Nursing Practices, Premature neonatal care.

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List of abbreviations

AAP	American Academy of Pediatrics.
ANOVA	One way Analysis of Variance.
CPAP	Continuous positive airway pressure.
G6PD	Glucose-6-phosphate dehydrogenase.
IMR	Infant Mortality Rate.
KMC	Kangaroo Mother Care.
MOH	Ministry of Health.
NG	Naso Gastric.
NICU	Neonatal Intensive Care Unit.
OG	Oro Gastric.
PCBS	Palestinian Central Bureau of Statistics.
RDS	Respiratory Distress Syndrome.
ROP	Retinopathy of Prematurity.
SPSS	Statistical Package of Social Science
WHO	World Health Organization.

Chapter One

Introduction

This chapter introduces the study and provides the foundation for evaluating nurses' knowledge and practices related to preterm neonatal care in neonatal intensive care units (NICUs). It outlines the problem of prematurity, the role of nurses in neonatal care, and the significance, aim, and objectives of the study. In addition, the chapter presents the research questions, hypotheses, and key definitions, thereby establishing a clear framework for the study and guiding the subsequent chapters.

1.1Background:

Neonatal intensive care units (NICUs) provide specialized and advanced care for preterm and critically ill neonates who require continuous monitoring and life-saving interventions. The quality of care delivered in these units largely depends on the expertise, knowledge, and clinical practices of nursing personnel. Each year, approximately 15 million neonates are born preterm worldwide, many of whom require admission to NICUs to manage complications associated with prematurity and to support their survival and development. Each year, approximately 15 million neonates are born preterm, many requiring intensive care to navigate their fragile start in life (Fund, 2021).

Globally, preterm birth remains a major public health concern, with approximately 15 million neonates born prematurely each year, many requiring specialized care in (NICUs) to survive and thrive (Salimah, 2020)

In West Bank, Palestine, the risks are particularly significant in areas with limited healthcare resources, making the expertise of nurses and other healthcare professionals in NICUs crucial for the survival and wellbeing of these vulnerable neonates. (WHO, 2023).

Due to the preterm neonates' immature physiological systems and instability, they are classified as a high-risk population that requires continuous intensive care to survive due to respiratory problems, temperature instabilities, feeding difficulties, jaundice and delayed brain development (Walani, 2020). Such significant health issues arise from the underdevelopment of

their body systems, and the extent of this immaturity is linked to their gestational age (Sarapat, 2017).

Nurses, as the primary caregivers in NICUs, play a crucial role in determining neonatal outcomes. Their knowledge and attitudes toward neonatal nursing practices directly influence critical outcomes such as survival rates, prevention of complications, infection control, and maintenance of thermal stability, effective respiratory support, nutritional adequacy, and neurodevelopmental progress. Variations in nurses' knowledge and clinical competence can therefore affect the quality and safety of care provided, ranging from routine monitoring of vital signs to the performance of complex and invasive procedures (HCN, 2024).

Moreover, NICU nurses play a significant part in assessing the risk factors in neonates, promoting their developmental growth process, providing family-centered care and encouraging parent attachment, all of which are linked to the quality of care. In other words, in order to achieve satisfactory outcomes of the neonatal patients including preterm ones, the availability of NICU's services and care givers must be competent (AAP, 2012).

Additionally, Neonatal nursing care necessitates nurses who are competent, skilled, vigilant and professional. Therefore, it is crucial to continuously update nursing knowledge and practices in order to ensure that the comprehensive care needs of preterm neonates in the NICU are adequately addressed (Han, 2023).

This research specifically investigated the level of knowledge and practices among nurses regarding neonatal nursing care in the area of the south and middle of the West Bank, Palestine. It aims to evaluate their understanding of best practices by uncovering the strengths and gaps in knowledge of neonatal nursing care at NICUs. Therefore, the findings were expected to inform potential training and educational initiatives to enhance neonatal nursing practices in the south and middle of the West Bank, Palestine.

1.2 Problem Statement:

Prematurity is a serious worldwide health issue, and its complications are thought to be the primary cause of child mortality under the age of 5 years (WHO, 2023). In low-income areas where there are lack of the primary care of preterm neonates such as warmth, breastfeeding support and infection control measures, 50% of the babies born at or below 32 weeks of gestation are at extreme risk for death (WHO, 2023). In other words, more than 90% of extremely preterm babies who are born before 28 weeks of gestation in low-income countries have high mortality within the neonatal period, yet in high-income countries, less than 10% of extremely preterm babies die within this period (WHO, 2023).

According to Palestinian Ministry of Health, 1,426 cases of neonate mortality have been reported in 2022 which is higher than the Infant Mortality Rate (IMR) in 2021; nevertheless, it still has lower rates than previous years. This improvement in IMR is related to the advanced

health services provided in Palestine such as increase awareness of pregnant women and health care practitioners (MoH, 2024).

According to the Palestinian Central Bureau of Statistics (PCBS), the data shows a decline in child and neonate mortality rates during the past ten years where the rate reached 15 deaths per 1000 live births. However, starting from 2015 until 2019, the neonate mortality rate has declined to 12 deaths per 1000 live births in the West Bank (PCBS, 2022).

Nurses play a pivotal role in improving outcomes for preterm neonates, as the quality of care provided in neonatal intensive care units largely depends on nurses’ knowledge, skills, and clinical practices. Evidence suggests that up to 70% of neonatal deaths could be prevented through simple, evidence-based interventions, such as effective thermoregulation such as promotion of breastfeeding, skin-to-skin contact, and infection control measures (WHO, 2023). However, despite the critical contribution of nurses to neonatal survival, limited research has evaluated nurses’ knowledge and practices related to preterm neonatal care in Palestine, particularly in the southern and central regions of the West Bank. Most available data focus on mortality statistics and healthcare service coverage, with insufficient attention to nurses’ preparedness and practical competence in NICU settings.

Therefore, this study aims to evaluate nurses’ knowledge and practices regarding preterm neonatal nursing care in the southern and central regions of the West Bank, Palestine, in order to identify gaps in practice and inform strategies to enhance the quality of neonatal care provided in clinical settings.

1.3 Justification / Significance of the Study:

This study is justified by its potential to significantly enhance the quality of neonatal care in area of the south and middle of the West Bank, Palestine. Neonatal health is a critical component of overall healthcare, particularly in areas facing challenges such as high neonate mortality rates. By assessing nurses' knowledge and practices, this research aims to identify and understand both strengths and weaknesses in current practices which can lead to better clinical neonatal outcomes, which is essential for reducing morbidity and mortality rates.

In addition, this study addresses existing knowledge gaps among nursing professionals regarding neonatal care. Literature suggests that there may be considerable variations in nurses' training and exposure to neonatal cases. The research provided policy makers and managers in the healthcare institutions with concrete data on existing gaps, enabling the development of targeted educational programs to enhance nurses’ practices and knowledge. This, in turn, contributed to the improvement of clinical practices and the promotion of better health outcomes for preterm neonates.

The cultural context of the south and middle of the West Bank is another important factor that this study had explored. Understanding local cultural, social, and economic effects on nursing practices is important for developing interventions that are not only effective but also culturally

relevant. This aspect of the research ensured that any recommendations made are tailored to the unique needs and beliefs of the community.

Moreover, the findings of this study can have significant implications for healthcare policy in the region. By providing evidence on the current state of neonatal nursing knowledge and practices, the study enabled policymakers to make more informed decisions concerning resource allocation, training programs, and quality improvement initiatives. This evidence-based approach can foster a more effective healthcare environment for both providers and patients.

Finally, this study served as a foundational piece for future research on neonatal care within Palestine and similar contexts. By generating a comprehensive understanding of the current landscape, it encourages further investigation into the factors that influence nursing practice and neonatal outcomes. In summary, this study is significant not only for enhancing the quality of neonatal care but also for informing policy decisions and contributing to the broader field of nursing research.

1.4 Aim of the Study

The aim of this study is to evaluate the knowledge and practices of nurses regarding preterm neonatal nursing care in the south and middle of the West Bank, Palestine.

1.5 Objectives of the Study:

- To assess the nurses' knowledge level regarding the nursing care provided for preterm neonates in the NICUs at the governmental and private hospitals in South & Middle of the West Bank, Palestine.
- To assess the nurses' practices level regarding the nursing care provided for preterm neonates in the NICUs at the governmental and private hospitals in South & Middle of the West Bank, Palestine.
- To examine the relationship between the nurses' socio-demographic characteristics (e.g., age, gender, education level, and years of experience, monthly income, job description, marital status, receiving prior training, neonatal care training) and their knowledge levels about the nursing care provided for preterm neonates in the NICUs.
- To examine the relationship between the nurses' socio-demographic characteristics (e.g., age, gender, education level, and years of experience, monthly income, job description, marital status, receiving prior training, neonatal care training) and their practices levels about the nursing care provided for preterm neonates in the NICUs.
- To identify the barriers faced by nurses in providing care to preterm neonates in NICUs in the southern and central regions of the West Bank, Palestine.

1.6 Research questions:

1. What is the level of nurses' knowledge regarding the nursing care provided for preterm neonates in the NICUs at governmental and private hospitals in the South and Middle of the West Bank, Palestine?

2. What is the level of nurses' practices regarding the nursing care provided for preterm neonates in the NICUs at governmental and private hospitals in the South and Middle of the West Bank, Palestine?
3. Is there a relationship between nurses' socio-demographic characteristics (e.g., age, gender, education level, and years of experience, monthly income, job description, marital status, receiving prior training, neonatal care training) and their knowledge level about nursing care provided for preterm neonates in the NICUs?
4. Is there a relationship between nurses' socio-demographic characteristics (e.g., age, gender, education level, and years of experience, monthly income, job description, marital status, receiving prior training, neonatal care training) and their practices level regarding nursing care provided for preterm neonates in the NICUs?
5. What are the barriers faced by nurses in providing care to preterm neonates in NICUs in the southern and central regions of the West Bank, Palestine?

1.7 Study Hypotheses:

Null Hypotheses (H_0):

H_{01}: The level of nurses' knowledge regarding nursing care for preterm neonates in the NICUs is within the same expected range, with no statistically significant variation between hospital types.

H_{02}: The level of nurses' practices regarding nursing care for preterm neonates in the NICUs is within the same expected range, with no statistically significant variation between hospital types.

H_{03}: There is no statistically significant relationship between nurses' socio-demographic characteristics and their knowledge level about nursing care for preterm neonates in NICUs.

H_{04}: There is no statistically significant relationship between nurses' socio-demographic characteristics and their practices level regarding nursing care for preterm neonates in NICUs.

1.8 Theoretical Definitions:

- **Knowledge:** refers to the understanding or awareness of a particular subject gained through learning or experience and it may be either broadly recognized or specifically possessed by an individual. (Cambridge, 2024a)
- **Practice:** Practice refers to the repeated performance of an activity with the aim of developing or improving skill. (Cambridge, 2024c)
- **Preterm neonate:** "neonates who were born before completing 37 weeks of gestation". (WHO, 2023)

- **Neonatal intensive care unit (NICU):** is a specialized unit in a hospital specifically designed to deliver medical care to critically ill neonates and very young newborns. (Cambridge, 2024b)
- **Preterm neonatal care:** Refers to the specialized medical, nutritional, and supportive care offered to infants born before 37 weeks of gestation. (Christman, 2025)

Chapter Two

Literature Review

This chapter reviews existing literature related to nurses' knowledge and practices in the care of preterm neonates in neonatal intensive care units (NICUs). The review focuses on key aspects of neonatal nursing care, including respiratory support, feeding practices, thermal regulation, and infection prevention. It also examines factors influencing nurses' performance, such as educational level, clinical experience, training opportunities, and healthcare context. Additionally, the chapter highlights gaps identified in previous studies and the implications of these gaps for neonatal outcomes, particularly in resource-limited settings. This review provides a foundation for the current study and supports the rationale for examining nurses' knowledge and practices in the West Bank, Palestine.

2.1 Introduction:

There are multiple previous studies that focus on preterm neonates receiving care in the NICU and highly relevant to the topic of evaluating nurses' knowledge and practices. These studies assess the level of nurses' knowledge, explore the effectiveness of current care practice and identify gaps that need improvement. For instance, several studies have highlighted the essential role of nurses during neonatal care provision in respiratory support, feeding practices and thermal regulation in order to achieve optimal outcomes for the preterm neonates.

2.2 Search strategy:

PubMed and Google Scholar were chosen as the primary databases for exploring preterm neonatal care, as they provide broad coverage of nursing and medical research. Key journals relevant to this topic include The Journal of Perinatology, The Journal of Neonatal Nursing, and Advances in Neonatal Care. Effective search terms included "preterm neonatal care," "NICU nursing practices," "premature neonatal care," and "neonatal intensive care interventions." Priority was given to studies published within the past 10 years that specifically addressed NICU settings and examined both clinical and supportive strategies for caring for preterm neonates. Articles were included if they discussed methods of providing care, barriers faced by nurses, or interventions implemented in the NICU. Exclusion criteria comprised opinion papers, studies lacking empirical evidence, and research focused on non-neonatal populations. This selection

process ensured that the reviewed literature closely reflected the challenges and current practices in preterm neonatal care within intensive care units.

2.3.1 Epidemiology of preterm:

Preterm birth is recognized worldwide as a leading contributor to neonatal mortality and morbidity, with long-term adverse effects on health (National Institutes of Health [NIH], 2016). The World Health Organization (Stark, 2023; WHO, 2023) emphasizes that monitoring preterm birth rates is essential for understanding the scope of the problem at global, regional, and national levels, as well as for tracking changes over time. These data are crucial for informing the development of health policies, guiding the allocation of healthcare resources, and evaluating the effectiveness of interventions aimed at improving neonatal outcomes (Vogel, 2018).

Each year, approximately 15 million babies are born prematurely, and the rate continues to rise globally. Prematurity is the leading cause of death among children under five, particularly in low-income countries where about 12% of births are preterm, compared to 9% in high-income nations. The majority of preterm births occur in Africa and South Asia. In the United States, around 10% of neonates were born preterm in 2016, with higher rates among African American women. Although rates declined between 2007 and 2014 due to fewer teen pregnancies, they rose again in 2016. In many developing countries, such as Sri Lanka, inadequate data systems hinder accurate reporting, and neonatal mortality remains high even among babies with average birth weights (Kannaujiya et al., 2022).

In Palestine, preterm birth and low birth weight were responsible for 24.6% of neonate deaths in the West Bank and 16.8% in the Gaza Strip (PCBS, 2022).

2.3.2 Risk factor of preterm:

The factors contributing to preterm birth are complex and not entirely understood, often involving a combination of influences related to the fetus, placenta, uterus, and maternal health. While many cases occur spontaneously without a clear cause, genetic factors may increase susceptibility. Preterm birth is strongly associated with low socioeconomic status, which can lead to maternal under nutrition, anemia, inadequate access to healthcare, substance abuse, and a history of reproductive complications such as miscarriages or stillbirths. Other risk factors include teenage pregnancy, short intervals between pregnancies, single parenthood, having more than four children, and maternal smoking. Fetal development can also be affected by maternal body size, social background, and genetic history. In developed nations, conditions such as anemia and hypertension in expectant mothers continue to significantly influence preterm birth rates. For instance, research conducted in Northern Australia identified teenage pregnancy, prior preterm delivery, insufficient prenatal care, pregnancy-related hypertension, and placental abnormalities as major contributors to preterm birth (Gardner, 2023).

2.3.3 Risk factor of preterm in Palestine:

A study conducted in Palestine explored various risk factors associated with preterm birth among Palestinian women, grouping them into social, medical, and psychological categories. Socially, residing in a nuclear family structure was identified as a contributing factor. Medically, increased risk was linked to a personal or family history of preterm birth, previous caesarean sections, multiple pregnancies, and congenital gynecological abnormalities involving the cervix, uterus, or placenta. Additional medical risk factors included maternal smoking, vaginal infections, premature rupture of membranes (PROM), bleeding during pregnancy, and complications such as hypertensive disorders, genitourinary infections, diabetes, and kidney disease. Psychological stress and mental health challenges during pregnancy were also found to significantly increase the likelihood of preterm delivery (Sarhan, 2015).

2.3.4 Characteristics of preterm neonates:

Nurses providing care for preterm neonates should be familiar with their typical physical characteristics and able to detect any deviations. Most preterm infants weigh less than 2.4 kg (5.5 pounds) and often have a thin appearance with a head that appears large in proportion to the chest. Their fontanels are wide and soft, sutures may overlap, and the skull bones tend to feel soft and spongy, particularly along suture lines. These infants generally exhibit poor muscle tone, reduced limb flexion, and minimal subcutaneous fat.

Other common features include underdeveloped ear pinnae with soft, pliable cartilage, and an abundance of lanugo, especially on the face and back. Scalp hair often has a fine, wool-like texture. The skin is typically thin and translucent, revealing underlying veins and covered with a thick layer of vernix caseosa. The soles of the feet and palms may have few or no creases, and eyelids may remain fused. Breast tissue and nipples are usually underdeveloped. In male preterm neonates, the testes may be undescended with scant scrotal rugae, whereas in female preterm neonates, the labia and clitoris tend to be more prominent (Machado, 2021).

2.3.5 Preterm common health problem and nursing care:

Complications associated with preterm birth are the primary cause of mortality in children under the age of five. The Centers for Disease Control and Prevention (CDC) reports that roughly 15 million infants are born prematurely each year, with rates rising globally. Preterm birth and low birth weight together account for approximately 17% of neonatal deaths worldwide (Zivaljevic, 2024).

1. **Respiratory Distress Syndrome (RDS):**

The respiratory system is among the last fetal systems to mature, placing preterm infants at high risk of respiratory distress syndrome (RDS). This serious condition, caused by immature lungs

and insufficient surfactant, is a leading cause of illness and death in neonates born before 34 weeks, affecting about 70% of those born prior to 33 weeks (Yadav, 2023).

A lack of surfactant in preterm neonates reduces lung compliance, often necessitating respiratory support such as oxygen therapy or mechanical ventilation, which can sometimes cause additional lung injury. The primary challenge in respiratory distress syndrome (RDS) is a mismatch between ventilation and blood flow, resulting in low oxygen levels and elevated carbon dioxide levels. Surfactant production generally begins between 26 and 34 weeks of gestation. Delaying preterm delivery provides more time for lung maturation, and administering corticosteroids to the mother can enhance surfactant production, thereby improving the newborn's lung function at birth (Yadav, 2023).

Symptoms of RDS appear immediately after birth, which includes:

- Rapid, shallow breathing
- Sharp pulling on the chest below the ribs with each breath taken in.
- Grunting sounds during exhalation
- Flaring of the nostrils during breathing.
- Neonates showing symptoms of respiratory distress syndrome (RDS) are usually admitted quickly to the neonatal intensive care unit (NICU) for specialized care provided by healthcare professionals experienced in premature infant management. Treatment approaches depend on the severity of the condition and may involve supplemental oxygen to relieve symptoms, continuous positive airway pressure (CPAP) to maintain open airways, mechanical ventilation, and surfactant replacement therapy, particularly in cases involving respiratory acidosis (Ekhaguere, 2022).

Nurses play a critical role in the care of preterm neonates with RDS. They are responsible for ensuring these neonates receive comprehensive supportive care, which includes gentle handling, maintaining a stable body temperature, and careful fluid management. Nurses must also conduct regular physical assessments to detect early signs of RDS, such as monitoring the respiratory rate and evaluating grunting to determine the condition's severity. Additionally, it is essential for nurses to ensure that emergency equipment is readily available and functional in case of sudden cardiac or respiratory arrest (Elbilgahy, 2025).

2. Apnea of prematurity:

Apnea of prematurity is considered a developmental condition commonly seen in preterm neonates, especially those born at very early gestational ages. The frequency and severity of apnea are inversely related to gestational age, with the most extreme cases occurring in the most premature neonates. This condition arises due to an immature respiratory control center in the

brain, particularly linked to poor myelination in the brainstem. Fortunately, as the neonate matures, especially with increased gestational age, the condition often improves spontaneously (Roberts, 2015).

According to the American Academy of Pediatrics, an apneic episode is typically defined as a pause in breathing lasting 20 seconds or more, or a shorter pause accompanied by symptoms such as bradycardia (heart rate below 100 bpm), cyanosis, or pallor. Apnea can be classified into three types: central (absence of respiratory effort), obstructive (blockage of airflow, often in the pharyngeal area), or mixed. Most episodes in preterm neonates are of the mixed type, where one type can lead to or occur alongside the other (Khetarpal., 2023).

Nursing care for neonates with apnea of prematurity focuses on close observation and continuous monitoring, as these neonates can experience sudden and rapid changes in condition. Nurses must carefully assess the neonate's response to respiratory therapy and aim to identify the cause of apnea to guide treatment. Management may involve tactile stimulation to prompt breathing; if ineffective, interventions such as suctioning, repositioning, or using a bag and mask may be required. Pharmacological treatment with methylxanthines, like caffeine or theophylline, is often used to stimulate the respiratory center by blocking adenosine receptors in the central nervous system. Additionally, treating any underlying issues such as correcting metabolic imbalances or maintaining body temperature is essential for effective apnea management (Khetarpal., 2023).

3. **Temperature control in preterm neonates:** Preterm neonates are especially vulnerable Preterm neonates are highly prone to hypothermia because their bodies lose heat more rapidly than they can generate it. This vulnerability arises from several physiological characteristics: their body surface area is large compared to weight, the skin is thin and permeable leading to greater heat and fluid loss, subcutaneous fat is limited, brown fat deposits are poorly developed, and glycogen reserves are limited. In addition, their caloric intake is often insufficient for both thermogenesis and growth, and respiratory difficulties can restrict the efficient use of oxygen needed for heat production (Dunne, 2024).

Early signs of hypothermia in preterm neonates include cold feet, which typically cool before other parts of the body, along with weak sucking reflexes, difficulty in feeding, reduced activity or lethargy, and a weak cry (Roychoudhury, 2017).

Preterm neonates lose body heat primarily through their skin and respiratory tract via four mechanisms: evaporation, conduction, radiation, and convection (Knobel, 2014).

Understanding these mechanisms is essential for preventing hypothermia and ensuring the thermal protection of preterm neonates.

Two standard thermal care guidelines to prevent heat loss in preterm neonates immediately after delivery include:

Standard thermal care guidelines to prevent heat loss in preterm neonates immediately after delivery:
Firstly, maintaining the delivery room temperature at about 25°C is important to provide a warm environment that promotes thermal stability and minimizes the risk of heat loss in newborns. Secondly, the baby should be dried promptly, particularly the head, and any wet towels or blankets removed. The infant can then be wrapped in pre-heated blankets, ensuring that all contact surfaces are warmed beforehand. Reducing drafts in the room further helps preserve body temperature. In addition, placing a woolen cap on the newborn's head is an effective measure to limit heat loss through the scalp, as wool has been found to be more efficient than other fabrics (Knobel, 2014).

4. **Hyperbilirubinemia in preterm:**

Hyperbilirubinemia is a common condition in neonates that often requires medical attention, affecting around 60% of full-term and 80% of preterm neonates within the first week of life (Ullah et al., 2016). In most cases, this jaundice is physiological and not related to any underlying disease. Neonatal jaundice is identified by the yellow discoloration of the skin and sclera, resulting from the buildup of bilirubin in the skin and mucous membranes, which reflects elevated bilirubin levels in the bloodstream (Aynalem, 2020).

Hyperbilirubinemia develops when there is a disruption in the processes of bilirubin production, conjugation, and clearance .Bilirubin, formed during the breakdown of red blood cells, initially exists in an unconjugated state. This form attaches to albumin for transport to the liver, where it undergoes conversion into conjugated bilirubin before being eliminated through the stool. If unconjugated bilirubin remains unbound, its lipid-soluble nature allows it to cross the blood brain barrier, which can become hazardous at high levels. Newborns are particularly susceptible because they have a higher red blood cell count with shorter lifespans, and their liver function for bilirubin metabolism and excretion is still immature. Consequently, mild jaundice is frequently observed in neonates and is generally regarded as a normal, self-limiting condition (QCG, 2025).

Physiological Jaundice: Physiological jaundice is the most common type of hyperbilirubinemia in newborns and typically has no serious consequences. It is mainly caused by the physiological immaturity of the liver and usually appears between 24 to 72 hours after birth, resolving on its own by 10 to 14 days of life. In this condition, unconjugated bilirubin is the dominant form, with serum levels generally remaining below 15 mg/dL (Hegazy, 2015).

Pathological Jaundice: Jaundice that appears within the first 24 hours of life, involves a rapid rise in serum bilirubin levels (more than 5 mg/dL per day), persists beyond two weeks, or includes elevated levels of conjugated bilirubin is classified as pathological jaundice. This form of jaundice differs from physiological jaundice and typically requires medical evaluation and intervention (Hegazy, 2015).

Breast Feeding and Breast Milk Jaundice: Breastfeeding-related jaundice can occur due to infrequent feeding, which leads to reduced bilirubin elimination and an exaggeration of normal physiological jaundice. Additionally, breast milk jaundice is a separate condition caused by certain substances in the mother's milk that interfere with bilirubin metabolism, leading to prolonged jaundice in otherwise healthy neonates (Hegazy, 2015).

Treatment of Jaundice:

Once the neonate's bilirubin level is determined, the healthcare team assesses whether treatment is necessary based on several factors, including the baby's age, weight, degree of prematurity, bilirubin concentration, and any underlying medical conditions. If the bilirubin level is considered high relative to the neonate's developmental status, treatment is initiated to prevent further elevation. This is crucial, as excessively high bilirubin levels can be harmful and may lead to brain or nervous system damage. Treatment options for neonatal jaundice include various forms of phototherapy (conventional or intensive), exchange transfusion, and pharmacological therapies such as phenobarbitone or intravenous immunoglobulin (Adnan, 2024).

Phototherapy:

Phototherapy is an effective and safe method for treating hyperbilirubinemia in neonates, with minimal adverse effects. Its effectiveness depends on the amount of the neonate's skin exposed to the light. Double phototherapy has been shown to be more effective than single phototherapy, as it increases the surface area exposed. For optimal results, phototherapy should be continuous rather than intermittent and should only be paused briefly during breastfeeding or diaper changes (Bhutani, 2024).

Exchange Transfusion:

Exchange transfusion is a procedure in which portions of a newborn's blood are gradually removed and replaced with donor blood. This process helps eliminate harmful substances such as abnormal blood components, toxins, antibodies, and excess bilirubin while maintaining stable blood volume. It is mainly used in cases of isoimmune disease to remove bilirubin and hemolytic antibodies. However, the need for exchange transfusion has declined due to better prenatal care, prevention strategies, and advancements in the treatment of neonatal hyperbilirubinemia (Bhutani, 2024).

Pharmacological Treatment:

Phenobarbitone enhances the processing of bilirubin by increasing hepatic uptake, conjugation, and excretion. Its effects typically become noticeable after 3 to 5 days of treatment at a dose of 5 mg/kg. Phenobarbitone has been found to be effective in preterm neonates without causing significant side effects (ULLAH, 2016).

Intravenous immunoglobulin (IVIG) has also been shown to reduce the need for exchange transfusions and phototherapy in newborns affected by Rh hemolytic disease (ULLAH, 2016).

5. **Gastrointestinal problems:**

The gastrointestinal system starts developing early during fetal life and continues maturing after birth, even beyond full term. Understanding this maturation process is especially important for preterm neonates, as it directly impacts their nutrient absorption and, consequently, their growth and neurodevelopment. Preterm infants are particularly at risk for gastrointestinal complications such as feeding intolerance and necrotizing enterocolitis (Montenegro, 2022).

6. Necrotizing Enterocolitis (NEC):

Necrotizing enterocolitis (NEC) is the most common and serious gastrointestinal disorder affecting preterm neonates. In NEC, the immature gastrointestinal system exhibits increased microbial reactivity, leading to inflammation, mucosal damage, reduced blood flow to the intestines (mesenteric hypoperfusion), and ultimately tissue necrosis. The risk and severity of NEC are inversely related to gestational age, meaning neonates born around 27 weeks are much more susceptible than those born closer to 37 weeks (Ginglen, 2023).

Three primary factors contribute to the development of NEC: prematurity, bacterial colonization, and feeding type, with mother's own milk providing a protective effect compared to formula feeding (Ginglen, 2023).

Diagnosis of NEC is supported by abnormal abdominal X-rays showing characteristic patterns such as bubbly gas within the intestinal walls (pneumatosis intestinalis), prominent liver veins, or free air in the abdominal cavity indicating intestinal perforation. Clinically, NEC presents suddenly with symptoms including feeding intolerance (defined by significant residual stomach volume), abdominal distension, and bloody stools. Early radiographs reveal intramural gas, while advanced NEC cases may show pneumoperitoneum, signaling perforation and severe disease progression (Ginglen, 2023).

7. **Feeding problems:**

The development of the suckling reflex depends on the maturation of specific structures and functions. In clinical practice, examining the oral area and assessing oral reflexes is essential before beginning oral feeding. However, research indicates that the mere presence of these reflexes does not always mean the neonate is ready to feed orally.

In preterm neonates, non-nutritive sucking, sucking without feeding, often elicited by placing a finger or pacifier in the mouth, is common and usually serves as a precursor to nutritive sucking. Nutritive sucking occurs during actual feeding when the neonate draws milk from the breast or bottle (Kamity, 2021).

The coordination of suck-swallow-breath is crucial because swallowing and breathing share the same anatomical pathway and proper coordination helps prevent aspiration. Preterm neonates often have immature suck-swallow-breath coordination, which may cause swallowing during different phases of respiration, increasing the risk of aspiration.

Research recommends that oral feeding be delayed until neonates reach at least 34 weeks gestational age. Consequently, most preterm neonates require some form of tube feeding until they are mature and stable enough to feed exclusively by mouth (Kamity, 2021).

2.3.6 Insertion of Oro gastric / Naso gastric tube:

For nasogastric (NG) tube insertion, the appropriate length is measured from the nose to the earlobe, then down to a point midway between the xiphoid process and the umbilicus (Boeykens, 2023). For orogastric (OG) tube insertion, measure from the lips to the earlobe, then down to the midpoint between the xiphoid process and the umbilicus (Boeykens, 2023).

The NG or OG tube should be inserted gently, following the natural curve of the anatomy by directing it down and back toward the posterior pharynx. Slight resistance may be felt when the tube reaches the posterior pharyngeal wall. If there are no contraindications, flex the neonate’s head slightly forward and encourage sucking on a soother or, if appropriate, have an older patient take small sips of water while gently advancing the tube to the premeasured depth (Boeykens, 2023).

Gastric Residuals (GRs):

Decisions on whether to discard or re-feed gastric residuals (GRs) often depend on the individual nurse’s judgment, beliefs, experiences, and unit protocols. Discarding GRs may result in the loss of important substances such as hydrochloric acid and pepsin, which play crucial roles in preventing intestinal bacterial overgrowth, reducing inflammation, and lowering the risk of late-onset sepsis and necrotizing enterocolitis (NEC) (Abiramalatha, 2023).

When it comes to re-feeding gastric residuals, there is no universal consensus. Definitions of what constitutes an abnormal GR volume vary widely, sometimes based on total GR volume or as a percentage of the previous feeding. Thresholds reported in the literature include 10% of daily feeding volume, over 30% of the prior feeding, and most commonly, GR volumes exceeding 50% of a single feeding (Abiramalatha, 2023).

Retinopathy of Prematurity: Retinopathy of prematurity (ROP) is a multifactorial retinal condition marked by abnormal growth of blood vessels, with its occurrence rising as gestational age decreases. Major risk factors include low gestational age, low birth weight, and extended oxygen exposure. Other contributing factors are fluctuations in oxygen levels, severity of neonatal illness, mechanical ventilation, systemic infections, blood transfusions, intraventricular hemorrhage, and inadequate postnatal weight gain. Since ROP does not present obvious early

symptoms, timely and regular retinal screenings are crucial. Its development depends on the maturity of the retinal vasculature and the neonate's postnatal age. Diagnosis is confirmed through indirect ophthalmoscopic examination, and follow-up schedules are determined by the severity and rate of disease progression (Kaur, 2025).

Management of Retinopathy of Prematurity: Current treatment for Retinopathy of Prematurity (ROP) focuses on managing the second, proliferative phase of the disease rather than preventing the initial phase, which leads to abnormal blood vessel growth. Initially, cryocoagulation of the avascular retina was the primary treatment during Phase II ROP. However, laser photocoagulation has now largely replaced cryotherapy as the standard approach in most countries (Kaur, 2025).

2.3.7 Sleep Position:

Sleep positioning for preterm neonates remains a debated topic among researchers. The prone (stomach) position has been shown to improve lung function by increasing lung volume and enhancing ventilation-perfusion matching, resulting in about a 1% increase in oxygenation or a 10–15% rise in functional residual capacity (FRC). This position is commonly used in neonatal intensive care units (NICUs) worldwide, particularly because Sudden Neonate Death Syndrome (SIDS) is not typically a concern during the early weeks of life in the NICU (Almomani, 2020).

2.3.8 Kangaroo care:

Preterm neonates often require prolonged care in the NICU and may remain isolated in incubators for extended periods until their condition stabilizes. This separation commonly leads to a lack of maternal contact for days or even weeks (Deng et al., 2018). Kangaroo care is a method used primarily for preterm neonates, involving skin-to-skin contact between the newborn and a caregiver, usually the mother. This technique helps restore the neonate's sense of closeness and bonding (Gad, 2024).

Ideally, kangaroo care should be maintained continuously for over 20 hours daily, known as continuous kangaroo care. If practiced for shorter periods, it is referred to as intermittent kangaroo care. Healthcare providers play a vital role in implementing kangaroo care by educating, guiding, and supporting parents while monitoring both mother and baby closely (Gad, 2024).

Kangaroo care offers several physiological benefits for preterm neonates, including improved temperature regulation, enhanced oxygen saturation even in intubated babies, improved breastfeeding outcomes, quieter sleep, and pain relief. Additionally, it contributes to a reduction in overall hospitalization time (Gad, 2024).

2.3.9 Developmental Care:

Developmentally supportive care involves various strategies designed to minimize both the physical and emotional stress experienced by neonates and their families in the NICU environment. This approach is based on an understanding of each neonate's neurological maturation, which enables tailored and supportive interventions. It highlights the importance of providing care that is developmentally appropriate, family-centered, responsive to the neonate's needs, evidence-driven, and delivered through a collaborative team approach (Faez 2022).

2.3.10 Teamwork in NICU: In the NICU, physicians and nurses hold primary responsibility for the health care of preterm neonates, with additional support from professionals such as respiratory therapists, nutritionists, and pharmacists. Nurses play a central role as frontline caregivers, executing care plans and ensuring continuous support for neonates. Their practice in the NICU involves three key elements: delivering nursing interventions, assisting in medical procedures, and collaborating with the broader healthcare team. These interconnected roles are all focused on enhancing and sustaining the health and well-being of both the neonate and their family (Bell, 2023).

2.3.11 Preparedness of nurses to work in neonatal intensive care unit:

According to the American Academy of Pediatrics (Stark, 2023) neonatal care is classified into three levels based on the complexity of care required:

- Level I (Well Newborn Nursery): This level provides minimal nursing support. Often, there may be no separate nursery, and neonates remain with their mothers. Nurses are primarily responsible for occasional assessments and maternal education.
- Level II (Special Care Nursery): This level cares for full-term and stable preterm neonates. With a typical nurse-to-patient ratio of 1:3, nurses provide most of the care, with parents participating occasionally. Treatments may include IV therapy, respiratory support, and medication administration.
- Level III (NICU): This is the highest level of care, offering intensive support for extremely preterm or critically ill full-term neonates. Nurse-to-patient ratios range from 1:1 to 1:3, depending on the neonate's condition. Level III units handle critical respiratory support, complex medication regimens, and surgical interventions.

The findings of the relevant studies underscore the gaps in knowledge and performance can directly impact neonatal survival and outcomes so the need for continuous education and training for the nurses working in NICUs would be a must. By reviewing these studies, it is obvious that nurses' knowledge and practices significantly influence the quality of care provision to preterm neonates, making this a crucial area of focus for my research.

According to the methodologies, there were multiple similarities and differences; some studies employed quantitative design to assess nurses' knowledge level, while others have used observational methods to evaluate the practices performed by the nurses. Also, some studies employed mixed methods design by combining both qualitative and quantitative to explore deeply into the practices and training program needs.

Regarding the geographic context, some of the studies conducted in low-resource settings while other studies were in developed countries, which can affect the outcomes due to differences in the training opportunities and healthcare infrastructure. Furthermore, the evidence underscoring gaps in nursing educational programs and how these gaps negatively impact the neonatal outcomes had influenced the structure of my data collection by addressing both knowledge gaps and practical challenges faced by the nurses in the West Bank.

2.4 Summary of the studies:

Knowledge and Practices related studies:

Neonatal sepsis remains a major cause of morbidity and mortality in NICUs, making nurses' knowledge and practices important for prevention and treatment. A descriptive study conducted in Mwas and Mallawy hospitals in Minia, Egypt, assessed the knowledge and practices of 50 NICU nurses regarding neonatal sepsis. The results indicated that all nurses had a satisfactory level of knowledge about environmental risk factors, and more than three-quarters had satisfactory knowledge of maternal risk factors (78.0%) and medical management (76.0%). However, most participants demonstrated unsatisfactory knowledge concerning specific neonatal risk factors and prevention methods (92.0% for both). In terms of practice, the majority of nurses achieved good scores in blood sample withdrawal (94%), wearing septic gloves (92%), and intravenous injection preparation (92%). High practice scores were also noted for preparing bottle feeding (88%), inserting IV cannulas (84%), caring for incubators (86%), and wearing gowns (78%). The study found a highly significant association between nurses' knowledge levels and their personal characteristics. While these findings provide useful insight into neonatal sepsis care in the studied hospitals, a larger sample and more in-depth analysis of factors influencing practice would strengthen the conclusions (Abolwafa, 2019).

Knowledge of essential newborn care practices among healthcare providers is critical for improving neonatal survival and outcomes. A cross-sectional study in maternal health hospitals of Wolaita Zone, Ethiopia, evaluated the knowledge levels of 218 nurses and midwives working with newborns. Most participants believed that newborns should be kept in skin-to-skin contact with the mother immediately after birth in order to prevent thermal dysregulation, yet 31.4% did not know the recommended timing for the first bath. Regarding airway clearance and neonatal resuscitation when a newborn was not crying, 70.8% reported that they would call for help and start resuscitation, 16.7% said they would wrap the baby and allow skin-to-skin contact, and

12.5% stated they would place the baby on the newborn table and attend to the mother. In terms of breastfeeding, the majority reported initiation should be done within the first hour after birth, and 79.6% reported the recommended duration of exclusive breastfeeding as the first six months, while 1.4% said less than six months and 19% said more than six months. The study highlighted factors such as educational level, profession type, availability of guidelines, and interest in working as associated with higher knowledge scores; however, it did not explore the underlying reasons for these associations, for example, why midwives demonstrated better knowledge than nurses (Arba, 2020).

Phototherapy is a widely used intervention for managing neonatal jaundice, and it requires nurses to possess thorough knowledge to provide safe and effective care. A descriptive cross-sectional study conducted in Mosul, Iraq, evaluated the knowledge of 62 neonatal nurses about phototherapy through a self-administered questionnaire that included demographic questions and a knowledge assessment section. Findings revealed that nurses' understanding of phototherapy varied from good to acceptable. They showed strong knowledge regarding newborn characteristics, moderate knowledge of neonatal jaundice and indications for phototherapy, but limited knowledge about nursing care during phototherapy. The study concluded that while nurses generally had moderate knowledge, their comprehension of follow-up care during phototherapy was insufficient. Although the questionnaire offered a detailed evaluation across multiple domains of phototherapy knowledge, the study's small, non-random sample restricts the applicability of the results (Bura'a, 2024).

Parenteral nutrition plays a vital role in neonatal intensive care, requiring nurses to possess both strong technical skills and sufficient knowledge. An exploratory descriptive study conducted in the NICU of Benha University Hospital, Cairo, examined the knowledge and practices of 56 nurses providing parenteral nutrition. The study revealed that 46.4% of nurses had average knowledge, 21.4% scored well, and 32.2% demonstrated poor knowledge. Practice evaluation, based on a structured checklist, showed that 58.9% of participants were rated as incompetent, while 41.1% were competent. The authors attributed these outcomes to challenges such as heavy workloads and the lack of orientation training prior to employment. However, the study did not fully investigate how broader contextual factors like the work environment and availability of resources may influence the delivery of parenteral nutrition (Abu Horira, 2021).

Infection prevention is a critical aspect of neonatal intensive care, as newborns are highly susceptible to hospital-acquired infections. A descriptive study conducted across five hospitals in Sangali, India, evaluated the knowledge and practices of 60 NICU nurses regarding infection control using structured questionnaires and checklists. The results indicated that 56.7% of nurses had good knowledge, 38.3% scored at an excellent level, and only 5% showed average understanding, with none performing poorly. Regarding hand hygiene, 51.7% achieved good scores, 45% had average performance, and just 3.3% scored in the excellent range. Although all nurses wore NICU slippers before entry, adherence to hand washing protocols was inconsistent: only 55% washed after entering, 30% before handling infants, 55% after contact, and 73.3%

before and after procedures. The study emphasized that infection control practices were suboptimal and recommended further training, though the limited sample size (n = 60) restricts generalizability (Johnson, 2021).

Hypothermia poses a significant risk for preterm neonates, making it essential for nurses to have adequate knowledge and skills to prevent and manage this condition. A descriptive study in the NICUs of Benha University Hospital and Benha Specialized Pediatric Hospital in Egypt examined the knowledge and practices of 150 nurses regarding hypothermia care for preterm infants. Using interviews and observational checklists, knowledge was scored as correct (1) or incorrect/don't know (0), and practice as done (1) or not done (0), with levels classified as poor (<60%), average (60–85%), and good (>85%). Results indicated that 56.6% of nurses had average knowledge, 32.7% had good knowledge, and 10.7% had poor knowledge. In contrast, the majority (69.3%) displayed poor practice, while 19.4% and 11.3% achieved average and good practice levels, respectively. The findings showed a significant link between knowledge and practice, though the study did not investigate factors such as resource availability, hospital policy, workload, or environmental support that might influence outcomes (El-sattar, 2023).

Transitioning preterm neonates to oral feeding is a complex process that requires both knowledge and skill from neonatal nurses. A descriptive cross-sectional study in Istanbul, Turkey, investigated the knowledge and practices of 275 NICU nurses across nine hospitals. Data were collected using a demographic questionnaire and a 40-item true/false assessment. Findings showed that nurses had strong knowledge regarding general feeding readiness, alternative feeding methods, breast milk storage, and providing rest during feeds, with correct responses ranging from 55.6% to 99.3%. However, knowledge was weakest in areas such as cue-based feeding, oral–motor interventions, non-nutritive sucking, and optimal positioning for oral feeding, with correct answers between 7.6% and 21.5%. The average knowledge score was 64.7/100. In practice, while 86.2% of nurses considered oral–motor reflexes and 69.1% followed physician guidance when starting oral feeding, only 20% implemented evidence-based interventions, mainly non-nutritive sucking. None adhered to standardized protocols, and just 2.9% used validated tools (such as LATCH) for assessing feeding readiness. The study highlighted notable deficiencies in standardized, evidence-based feeding practices, underlining the need for protocol development, nurse training, and the use of validated assessment tools to better align practice with knowledge (Girgin, 2020).

Skin care is a vital aspect of neonatal nursing, as premature infants are particularly prone to skin injuries and infections. A descriptive study conducted in the NICUs of El-Fayoum University Hospital and El-Fayoum Public Hospital in Egypt assessed nurses' knowledge and practices related to neonatal skin care. Eighty nurses participated, with knowledge evaluated through a predesigned questionnaire, risk assessed using the Braden Q Scale, and practice measured via observational checklists covering seven procedures, including routine skin care, pressure minimization, cord care, diaper care, bathing, adhesive care, and other related tasks. Knowledge was scored based on 14 items (correct = 1, incorrect = 0), and practice was similarly scored, with

≥90% considered competent. Results revealed that 43.7% of nurses possessed good knowledge, yet 62.5% demonstrated incompetent practice overall. A highly significant positive correlation was found between knowledge and practice ($p < 0.001$). The study concluded that although nurses generally had adequate knowledge of neonatal skin care, practical application was lacking. The combined use of questionnaires and checklists offered a thorough understanding of the knowledge–practice gap, but the small sample size limits the generalizability of the findings (Mosbeh, 2022).

Preventing and controlling nosocomial infections is a key responsibility of NICU nurses, as such infections can have serious consequences for neonatal health. A quantitative descriptive study conducted at Kamla Raja Hospital in India evaluated the infection prevention knowledge of 30 NICU nurses using a structured 53-item questionnaire. This tool addressed topics including neonatal characteristics and mortality, causes and transmission of nosocomial infections, universal precautions, hand hygiene, gloving, gowning, NICU waste disposal, sterilization, and the nurses' role in infection control. Overall, nurses achieved an average knowledge score of 60%, with domain-specific scores ranging from 53% to 65% — highest in neonatal characteristics and gloving/gowning/waste disposal (65%) and lowest in understanding causes of nosocomial infections (53%). The findings underscored the need for continuous education on infection prevention. However, the study's small sample size and reliance on convenience sampling limit the ability to generalize these results to broader nursing populations (Pathak, 2022).

Kangaroo Mother Care (KMC) is an evidence-based practice that improves outcomes for low-birth-weight and preterm infants, and requires nurses to possess both knowledge and practical skills to guide and support parents effectively. A cross-sectional study at Koja District Hospital in North Jakarta, Indonesia, examined the knowledge, attitudes, and practices of 65 nurses and midwives in perinatal, postnatal, and labor wards regarding KMC. Data were collected using a structured validated questionnaire, which included 24 knowledge items, 20 questions on perceived benefits, 12 attitude statements rated on a 5-point Likert scale, and six practice-related questions. The findings revealed that while most participants understood the benefits of KMC, misconceptions persisted—such as the suitability of KMC for low-birth-weight neonates in incubators (with incorrect responses ranging from 26.7% to 52.4% in labor and postnatal wards) and concerns about hygiene due to increased ward crowding (incorrect responses of 72.4%, 20%, and 23.8% in perinatal, labor, and postnatal wards, respectively). In terms of practice, 40% of labor ward nurses opposed applying KMC for neonates weighing between 1,000 and 1,800 g. All perinatal ward nurses reported educating and assisting parents with KMC, but only 9 of 36 nurses in the labor and postnatal wards did so. The study emphasized that adequate knowledge among nursing staff is essential for the effective promotion and implementation of KMC, although its small sample size and reliance on self-reported data limit the generalizability of the results (Adisasmita, 2021).

Socio-demographic data related studies:

Nursing work experience is a crucial component in delivering high-quality care to preterm neonates. A study conducted in four maternal and childhood facilities in Basra, Iraq, assessed nurses' knowledge regarding the management of preterm neonates in NICUs. Using a selected sampling design, the researchers interviewed 40 nurses. The findings indicated that nurses with more years of experience (50%) achieved higher scores in preterm neonatal care compared to those with fewer years of experience. The study highlighted the importance of assigning more experienced nurses to ensure better care for preterm infants, as a significant relationship was identified between knowledge levels and years of experience. Nevertheless, the limited number of participants and the focus on one geographic area restrict the broader applicability of the results, indicating the need for future studies with larger, more diverse samples to enhance generalizability (Essa, 2018).

Enhancing nurses' competence in neonatal care is essential for improving the quality and safety of NICU services. A quasi-experimental study conducted in Egypt examined the impact of a professional development program on nurses' performance using questionnaires and observational checklists. The study involved 103 nurses from three hospitals in Mansoura. Results showed that before the program, all participants had poor knowledge of neonatal care standards. This improved significantly, with 83.5% achieving good knowledge immediately after and 52.4% retaining this level at follow-up. Practical skills also improved: bathing care rose from 71% good performance before training to 100% both post-intervention and at follow-up, intravenous therapy competency increased from 19.4% to 47.6% immediately after (though declining slightly to 39.8%), and oxygen therapy performance advanced from 39.8% to 100% immediately after and 91.3% at follow-up. Since the follow-up period was not specified, a longer evaluation would be valuable to assess lasting effects (Galil, 2019).

Feeding preterm infants requires advanced nursing competencies to ensure safe and effective care. An interventional study conducted in the NICUs of Al Thora Public Hospital and Al Slkhana Hospital for Maternal and Childhood in Yemen assessed the impact of an educational program on nurses' knowledge and practice in this area. Fifty nurses participated, with data collected through questionnaires, observation checklists, and a two-year follow-up. Prior to the intervention, 74% of nurses showed weak practical performance, this decreased dramatically to 6% after training. While more experienced nurses performed better at baseline, this difference disappeared following the program. Overall, mean practice scores improved from 42% to 97%, and knowledge scores rose from 53% to 95%, with poor knowledge dropping from 50% to 8%. The findings revealed a strong association between years of experience, knowledge, and practice, though most participants had less than five years of experience and still benefited greatly from the intervention (Abduh, 2020).

Effective care for neonates with respiratory distress syndrome (RDS) depends on both strong theoretical understanding and practical ability. A descriptive correlational study conducted in

three hospitals in Egypt examined the relationship between NICU nurses' knowledge and their actual performance in RDS care. Sixty nurses participated, with data gathered through structured questionnaires and observational checklists. The results revealed significant gaps between knowledge and practice in areas such as oxygen therapy delivery via nasal cannula or mask, CPAP care—including suctioning, respiratory rate monitoring, and chest observation—and capillary blood gas sampling ($P < 0.0001$). While 96.7% of nurses had poor knowledge scores on RDS care, half demonstrated good practical performance, and 30% achieved satisfactory levels. The study underscored a mismatch between theoretical knowledge and clinical practice, highlighting the need for targeted training programs to bridge this gap (Hegazy, 2015).

Several recent studies have highlighted the effectt of socio-demographic characteristics on nurses' knowledge and clinical practices in neonatal care settings. For example, a cross-sectional study among NICU nurses found that higher educational level and greater years of experience were significantly associated with increased knowledge and better practice levels, indicating that age, education, and experience play important roles in shaping nurses' competence in specialized neonatal care tasks.

In other settings, studies on developmental care practices have reported that demographic and work-related variable including marital status and length of NICU experience were associated with nurses' attitudes and reported practices, suggesting that personal background and professional tenure may influence how developmental care approaches are understood and

2.5 Summary:

The literature review demonstrates that nurses' knowledge and practices are essential for the effective care of preterm neonates in NICUs, with numerous studies showing that deficiencies in knowledge can negatively influence neonatal outcomes. A common theme across these studies is the value of continuous education and training for NICU nurses, particularly in areas such as respiratory support, feeding, and thermal regulation for preterm infants. These findings support the rationale for this research, reinforcing the need to assess the knowledge and practices of nurses in NICU settings, especially within the West Bank context. Additionally, the literature underscores the challenges nurses face, including limited resources and insufficient training opportunities, which significantly affect the quality of care for preterm neonates. These conclusions align closely with the aim and objectives of my study, which seeks to evaluate both the theoretical knowledge and practical performance of nurses in providing preterm neonatal care in the South and Middle regions of the West Bank. This alignment confirms that this study addresses an important gap in understanding neonatal care in Palestinian hospitals and provides a foundation for improving care quality and educational programs in NICUs.

2.6 *Conceptual Framework:*

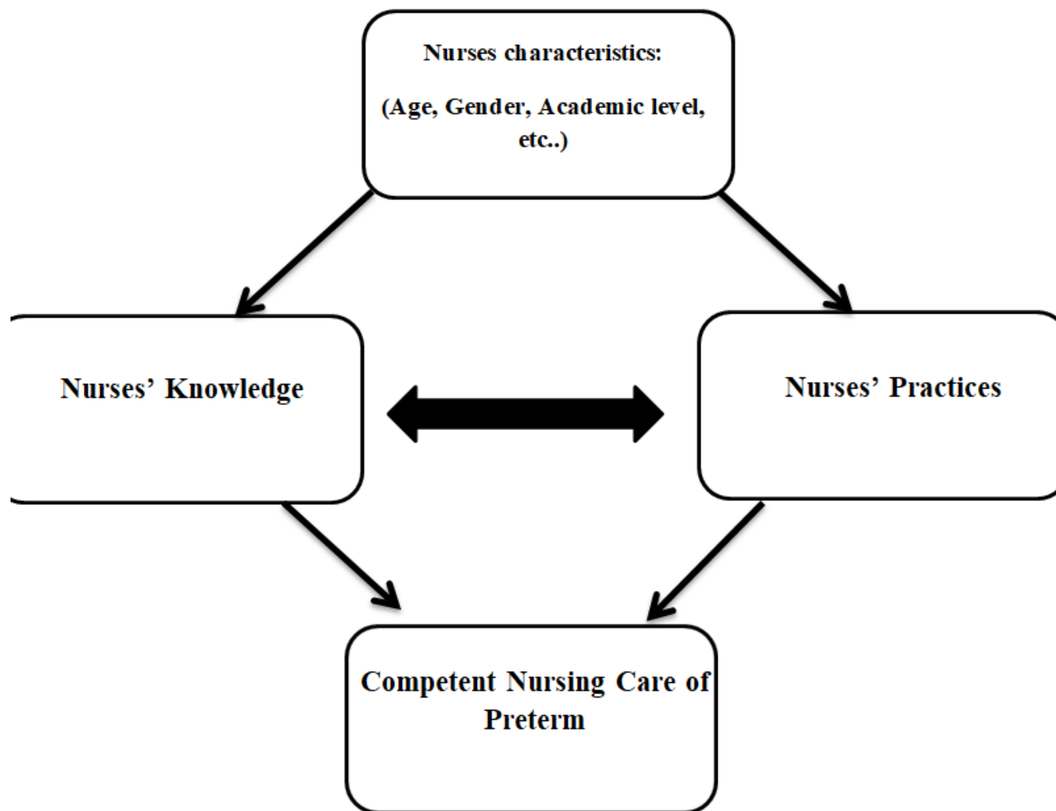

Figure 2.1: Conceptual framework of the study.

The researcher developed the above conceptual framework to illustrate the influence of the three dimensions; nurses' characteristics, nurses' knowledge and nurses' practices, on providing competent neonatal care. As shown in the diagram, there are three main elements lead to competent care among preterm neonates; the first element is the nurses' characteristics, each of these characteristics affect the nurses' knowledge and practices in care provision for preterm neonates. The second element is the nurses' knowledge which includes educational level, academic qualification and special nursing courses before and during working in the NICU. The third element is the nurses' practices. The researcher assumes that the competent nursing care provision for preterm neonates is established by interaction between these three elements.

2.7 Independent variables:

The demographic variables of the nurses:

Demographic variables included:

- Age.
- Marital status.
- Job description.

- Type of Hospital.
- Hospital Name.
- Level of Nursing Degree.
- Years of Total Work Experience.
- Years of Work in the NICU.

2.8 Dependent variables:

The Knowledge of the nurses towards preterm neonatal care, extent of nurses' practices of optimal preterm neonatal care and factors that affect the nurses' neonatal care provision.

2.9 Operational definition:

2.9.1 Nurses' Knowledge: Measured through a self-administered questionnaire, included 20 questions that assess the knowledge of the nurses regarding neonatal care at NICU especially for preterm neonates. This domain was measured by True and False questions (Al habbash, 2018).

2.9.2 Nurses' Practices: Measured through five-point Likert scale (Always, Often, Sometimes, Rarely, Never); where always got 5 degrees and never got 1 degree. This domain included 45 questions that assess the nurses' practices (Al habbash, 2018).

2.10 Conceptual definitions:

2.10.1 Nursing Knowledge: Nursing knowledge refers to the essential foundation that guides the process of patient care, shaping both decisions and actions in clinical practice. (Hall, 2021)

2.10.2 Nursing Practice: Nursing practice encompasses the responsibilities, functions, and roles acquired through education, enabling registered nurses to provide safe and effective care (Cambridge, 2024c).

2.10.3 Neonatal intensive care unit: is a specialized care environment composed of interconnected subsystems designed to protect and treat vulnerable neonates (URMC, 2024).

2.10.4 Definition of preterm: According to the World Health Organization (2017), a preterm infant is one born before 37 completed weeks of gestation (less than 259 days). Preterm births are categorized as extremely preterm (<28 weeks), very preterm (28–32 weeks), and moderate to late preterm (32–37 weeks) (WHO, 2023).

Chapter Three

Methodology

This chapter describes the research design, study setting, population, sampling methods, data collection tools, and analysis procedures used to investigate nurses' knowledge, practices, and barriers in providing care to preterm neonates in NICUs in the southern and central regions of the West Bank, Palestine. It also outlines ethical considerations and measures taken to ensure the reliability, validity, and rigor of the study, providing a clear framework for understanding how the research was conducted and how the findings were obtained.

3.1 Introduction:

A research process includes five phases which are the conceptual phase, the design and planning phase, the empirical phase, and the dissemination phase. This chapter discusses the design and planning phases which include research design and research site, population and sampling, research instruments, research validity and reliability. It also discussed the data collection process and the data analysis for this research.

3.2 Research Design:

This is quantitative descriptive cross-sectional study conducted to evaluate nurses' knowledge and practices in caring for preterm neonates in the NICUs of both governmental and private hospitals in the south and middle regions of the West Bank, Palestine. This design was deemed appropriate for the study's objectives, as it offers an effective approach that is both time- and cost-efficient.

3.3 Study population:

The targeted population were nurses working in the NICU at the private and governmental hospitals of the area of the South and Middle of the West Bank, Palestine.

3.4 Study setting:

The research was conducted in seven private and governmental hospitals located in the southern and middle regions of the West Bank, Palestine. These included Beit Jala Governmental Hospital

and Holy Family Hospital in the Bethlehem area; Al-Ahli Hospital and Hebron Governmental Hospital in Hebron; Saint Joseph Hospital in Jerusalem; as well as H-Clinic Specialty Hospital and the Palestine Medical Complex in Ramallah. These hospitals were purposefully selected due to the presence of (NICUs) equipped to provide specialized care for preterm neonates.

3.5 Selection Method and Sample Size:

This study was conducted in the (NICUs) of seven hospitals located in the southern and middle areas of the West Bank, Palestine. These hospitals were selected using purposive sampling based on the on the presence of NICUs within their facilities. The selected facilities included Saint Joseph Hospital, H-Clinic Specialty Hospital, and Palestine Medical Complex from the central region, as well as Beit Jala Governmental Hospital, Holy Family Hospital, Al-Ahli Hospital, and Hebron Governmental Hospital from the southern region.

The study population consisted of nurses working in the neonatal intensive care units of the selected governmental and private hospitals. A total of 152 nurses who met the inclusion criteria and were available during the data collection period participated in the study. Therefore, a convenience sampling method was used, and the sample represented all accessible and eligible NICU nurses at the time of data collection. The response rate was 100%.

Table (3.1): Distribution of study participants according to hospital:

Hospital name	N	%
Beit-Jala Governmental Hospital	9	5.92%
Holy Family Hospital	22	14.47%
Palestine Medical Complex	20	13.16%
Al-Ahli Hospital	40	26.32%
Hebron Governmental Hospital	20	13.16%
Saint Joseph Hospital	21	13.82%
Hclinic Speciality Hospital	20	13.16%
Total	**152**	**100%**

3.6 Eligibility Criteria:

3.6.1 Inclusion criteria:

- Registered nurses had been working in either private or governmental hospitals in the middle and South of the West Bank.
- Nurses holding a Diploma, Bachelor’s degree, or postgraduate qualification.
- Nurses with a minimum one year of working experience at NICUs; to ensure that the nurses included in the study had sufficient exposure to preterm neonatal care.

3.6.2 Exclusion criteria:

- Nurses who have been working in other departments in the selected hospitals.
- Nursing students.
- Volunteer nursing staff.

3.7 Study Instrument:

A self-administered questionnaire was developed by the researcher based on a review of the literature and past experiences to assess the knowledge and extent of practice of nurses regarding preterm neonatal care in governmental and private hospitals in the south and middle of the West Bank, Palestine. The questionnaire included three parts besides the cover page. It was developed primarily in English and subsequently translated into Arabic by the researcher to ensure clarity and comprehension among participants. To establish content validity, the questionnaire was reviewed by a panel of experts (Annex 6), and based on their feedback; several modifications were incorporated to enhance clarity, relevance, and appropriateness of the items.

The first part covered the socio-demographic data which include the age, type of hospital, hospital name, level of nursing degree, years of total work experience and years of work in the NICU. In addition orientation period before start work in NICU, long of orientation period, general courses through working in NICU, place of general course were received and period of general courses. As well as special training for preterm care, place of the special training for preterm care were received, period of special training for preterm care. Finally participation in continues education.

The second part of the questionnaire included questions about the knowledge of the nurses about preterm neonatal care provision in the NICU, composed of 20 items of multiple choice questions, each item had three possible responses (correct answer, incorrect answer and Don't know). One mark was be added to the correct answer and zero otherwise. Higher scores indicated a higher level of practice, and the interpretation of scores was guided by McDonald's (2002) framework for learning outcomes

The third part of the questionnaire was developed by the researcher to assess practices of the nurses towards preterm neonatal care, composed of 45 items that were organized into the following subdomains: Thermal Care, Respiratory Care, Feeding and Nutritional Care, Phototherapy Care, Infection Control care and Parents' Teaching. Answers were on a form of five-point likert scale (always- often -sometimes- rarely -never). Where "always" got 5 degrees and "never" got 1 degree. Higher scores indicated a higher level of practice, and the interpretation of scores was guided by McDonald's (2002) framework for learning outcomes.

3.8 Scoring of the questionnaire:

- The categorization of nurses' knowledge and practice levels regarding preterm neonatal care was based on McDonald's (2002) standard learning outcome measurement criteria. Composite scores were converted into percentages and interpreted using predefined cut-off points as follows:
- **Very Low:** less than 60%
- **Low:** 60% to 69.99%
- **Moderate:** 70% to 79.99%
- **High:** 80% to 89.99%
- **Very High:** 90% to 100%

3.9 Study validity & reliability:

3.9.1 Content validity:

The constructed questionnaire was submitted to a panel of six experts in Nursing (Annex 6) for validation of the items and their relevance to the study domains. Also, the developed questionnaire was presented to a statistician for further recommendations. The experts' feedback was carefully considered, and modifications were made accordingly.

3.9.2 Reliability:

A pilot study with 10 nurses was conducted to assess the reliability and validity of the study instruments and the internal consistency measure was computed by Cronbach's alpha to measure the reliability of both the scales (the knowledge and the practices). The value of Cronbach's alpha for all the knowledge items was 0.83, and for practices was 0.82. The values of Cronbach's alpha are higher than the lowest acceptable cut-point which is 0.70, and these levels of the reliability measurements confirming the existence of a high degree of reliability and internal consistency for the study scales. Table (3.2) presents the reliability estimates for the questionnaire's derived factors.

Table (3.2) Reliability Statistics:

Variable	Cronbach's Alpha	Number of items
Knowledge	.83	20
Practices	0.82	45

3.10 Pilot Study:

The researcher conducted a pilot study at Rafidia Hospital after obtaining approval from the hospital's general directorate. The purpose of the pilot study was to refine the methodology for the larger research by employing the same participants, settings, and data collection and analysis procedures intended for the main study, as recommended by (In, 2017). Ten questionnaires were distributed to nurses working in the NICU and subsequently collected. Participants were asked to identify any unclear or ambiguous terms or sentences to ensure clarity in the main study. Minor adjustments were made, which did not alter the core domains of the questionnaire. To prevent bias in the final results, the ten nurses involved in the pilot study were excluded from participating in the main study.

3.11 Data collection:

The data was collected from June to July, 2025 by using a developed questionnaire distributed among participants in the chosen hospitals. The researcher distributed the questionnaires to participants during their working hours in both day and evening shifts and collected them upon completion. On average, participants required approximately 20 minutes to complete the questionnaire. A covering letter accompanied each questionnaire, outlining the study title, purpose, and the identity of the researcher.

3.12 Data Analysis:

Data were analyzed using the Statistical Package for Social Sciences (SPSS) Version 23. Descriptive statistics, including frequencies, percentages, means, standard deviations, and percentage means, were computed to summarize the demographic and personal characteristics of the participants, as well as to describe the levels of the study variables, namely nurses' knowledge and practices regarding preterm neonatal care. The reliability and internal consistency of each scale were assessed using Cronbach's alpha coefficients. Inferential statistical analyses were conducted to test the study hypotheses, with significance determined at a $p\text{-value} \leq 0.05$. Specifically, the Pearson correlation coefficient was used to examine the relationship between nurses' knowledge and practices. One-way analysis of variance (ANOVA) was employed to evaluate differences in knowledge and practice scores across various socio-demographic groups. Additionally, the Tukey post hoc pairwise comparison test was applied following ANOVA to identify specific group differences in mean scores of knowledge and practices.

3.13 Ethical consideration:

Ethical approval was obtained from the Institutional Review Board of the Faculty of Health Professions and Ethical Approval from the Research Ethics Committee at Al-Quds University. In addition, official permission was obtained from the Ministry of Health to conduct the study in governmental hospitals, and formal approval was obtained from the administration of each

participating private hospital. In addition, a cover letter as a consent form was attached with the questionnaire, which asks the participants to kindly participate in the study. Moreover, anonymity of participants was maintained, and the participants were able to withdraw at any time. The information and the results of the study were used for research purposes only and confidentiality was maintained. Participants were told that their participation was voluntary. The nature of the study was fully described to the participants by the researcher.

Chapter four

Results

This chapter presents the findings of the study regarding nurses' knowledge, practices, and the barriers they face in providing care to preterm neonates in NICUs in the southern and central regions of the West Bank, Palestine. The results are organized according to the study objectives and research questions, using descriptive and inferential statistics to summarize the data and highlight significant patterns and relationships.

4.1 Introduction

This chapter presents the findings of the study, which aimed to assess the knowledge and practices of nurses regarding preterm neonatal nursing care in the south and middle of the West Bank, Palestine. By identifying gaps in knowledge and understanding how cultural and contextual factors influence nursing practices, the study seeks to provide insights that can inform educational interventions, improve neonatal care quality, and ultimately enhance health outcomes for newborns in the region.

The analysis presents a comprehensive summary of the participants' demographic profiles, along with descriptive statistics for the main study variables. It also includes inferential analyses that examine relationships and predictors related to clinical decision-making. The findings are structured to directly respond to the research questions, serving as a basis for interpretation in the following discussion chapter. Data are displayed in tables and accompanied by explanatory narratives to enhance clarity and understanding.

a. Participants' Characteristics

Table (4.1) presents the socio-demographic and professional characteristics of the study participants (n = 152). Regarding age, 42.8% (n = 65) of participants were younger than 30 years, while the largest proportion was aged 30 to under 40 years (50.7%, n = 77). Participants aged 40 years and above represented the smallest group (6.6%, n = 10). The sample was predominantly female (67.8%, n = 103), compared to males (32.2%, n = 49). In terms of marital

status, nearly half of the participants were married (46.7%, n = 71), followed by single participants (42.8%, n = 65), while smaller proportions were divorced (7.2%, n = 11) or widowed (3.3%, n = 5).

Regarding family characteristics, among participants with children, the majority reported having two children (73.6%, n = 48), followed by those with one child (26.4%, n = 23), while 9.9% (n = 15) had three or more children. Most participants did not have an additional job (80.3%, n = 122), whereas 19.7% (n = 30) reported working another job alongside their primary employment.

Concerning educational background, a bachelor's degree was the most prevalent qualification (79.6%, n = 121), followed by postgraduate degrees (13.2%, n = 20) and diploma qualifications (7.2%, n = 11). The majority of participants did not hold higher qualifications in neonatal nursing (86.5%, n = 132); however, 14.5% (n = 22) reported having such qualifications, most of whom held a master's degree (13.2%, n = 20). In terms of job title, most participants were nurses (90.8%, n = 138), followed by nursing assistants (7.2%, n = 11) and department heads (2.0%, n = 3). No nursing supervisors were included in the sample.

Regarding monthly income, most participants reported earning more than NIS 2,500 (75.7%, n = 115), while 24.3% (n = 37) earned between NIS 2,000 and 2,500. None of the participants reported an income below NIS 2,000. As for years of experience, the largest proportion had 5–10 years of experience (46.0%, n = 70), followed by those with more than 10 years (29.0%, n = 44) and those with less than 5 years of experience (25.0%, n = 38).

With regard to orientation prior to employment in the NICU, most participants reported receiving an orientation period (92.8%, n = 141). Among them, the majority received less than one month of orientation (89.5%, n = 136), while 10.5% (n = 16) received orientation lasting 1–3 months. None of the participants received orientation for more than three months.

Regarding on-the-job training in the NICU, 52.6% (n = 80) of participants reported attending training courses, while 47.4% (n = 72) had not attended any. These courses were mainly provided by hospitals in Jerusalem (51.3%, n = 29), followed by hospitals in the West Bank (29.8%, n = 12) and universities in the West Bank (16.3%, n = 13). Fewer courses were provided by universities in Jerusalem (1.3%) or other institutions (1.3%). Most training courses lasted 1–3 months (62.5%, n = 50), followed by less than one month (29.8%, n = 12) and more than three months (7.7%, n = 9).

Finally, regarding specialized training in the care of premature infants, most nurses reported not receiving such training (73.0%, n = 111), while 27.0% (n = 41) had received specialized training. This training was mainly provided by hospitals in Jerusalem (34.2%, n = 14), followed by universities in the West Bank (31.7%, n = 13) and hospitals in the West Bank (29.3%, n = 12). The most common duration of specialized training was 1–3 months (56.7%, n = 20). Regarding continuing education programs, more than half of the participants reported receiving such programs (55.3%, n = 84), while 44.7% (n = 68) reported not receiving continuing education.

Table 4.1-A "Demographic characteristics of the participants" (N=152)

Characteristics		Frequency	Percent
Age	<30	65	42.8%
	30 -<40	77	50.7%
	≥ 40	10	6.6%
	Total	**152**	**100%**
Gender.	Male	49	32.2%
	Female	103	67.8%
Marital Status.	Single	65	42.8%
	Married	71	46.7%
	Divorced	11	7.2%
	Widow	5	3.3%
Number of children, if applicable.	1	23	26.4%
	2	48	73.6%
	More than 3	15	9.9%
Holding an additional job alongside the current position.	Yes	30	19.7%
	No	122	80.3%
Possession of a postgraduate degree in neonatal nursing.	Yes	22	14.5%
	No	132	86.5%
If yes, what is the degree level?	Master's	20	13.2%
	Higher Diploma	0	0
	Other	2	1.3%
Academic Degree.	Diploma	11	7.2%
	Bachelor's	121	79.6%
	Graduate Studies	20	13.2%
Job Title.	Nursing Assistant	11	7.2%
	Nurse	138	90.8%
	Department Head	3	2%
	Nursing Supervisor	0	0
Monthly Income in NIS.	Less than 2,000	0	0
	2,000-2,500	37	24.3%
	More than 2,500	115	75.7%
Years of Experience.	Less than 5	38	25%
	5-10	70	46%
	More than 10	44	29%
Orientation period prior to assuming NICU duties.	Yes	141	92.8%
	No	11	7.2%
The time period.	Less than 1 month	136	13.0%
	1-3 months	16	75.0%
	More than 3 months	0	12.0%
Completion of courses during NICU employment.	Yes	80	52.6%
	No	72	47.4%

Table 4.1-B "Demographic characteristics of the participants" (N=152)

The course provider.	University within the West Bank	13	16.3%
	University within Jerusalem	1	1.3%
	Hospital within West Bank	12	29.8%
	Hospital within Jerusalem	29	51.3%
	Other	1	1.3%
Duration of the course.	Less than 1 month	12	29.8%
	1-3 months	50	62.5%
	More than 3 months	9	7.7%
Receiving specialized training in the care of premature neonates.	Yes	41	27%
	No	111	73%
The course provider.	University within the West Bank	13	31.7%
	University within Jerusalem	1	2.4%
	Hospital within West Bank	12	29.3%
	Hospital within Jerusalem	29	34.2%
	Other	1	2.4%
Duration of the course.	Less than 1 month	12	29.3%
	1-3 months	50	56.7%
	More than 3 months	9	14%
Receiving ongoing training to stay updated in neonatal care.	Yes	84	55.3%
	No	68	44.7%

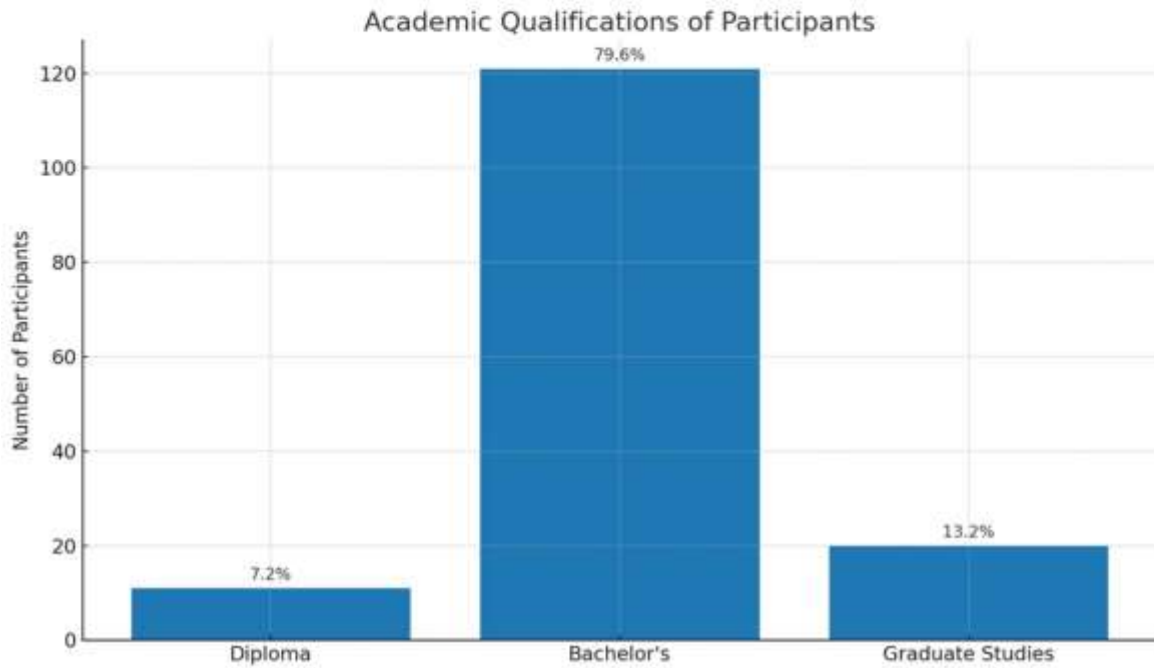

Figure 4.3: Academic qualifications of participants.

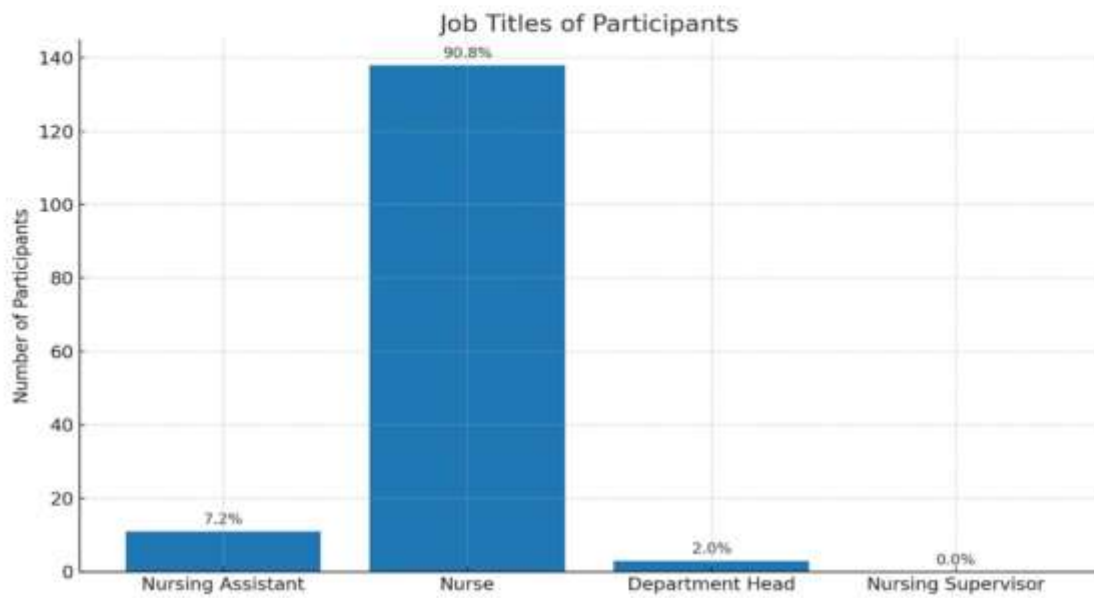

Figure 4.4: Job titles of participants.

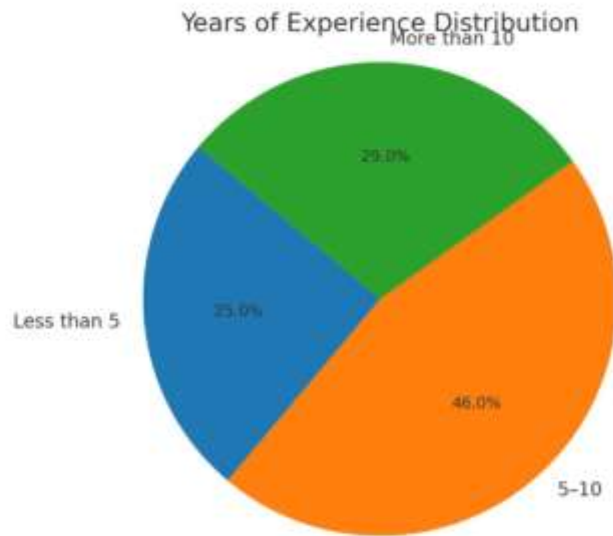

Figure 4.5: Years of experience among participants.

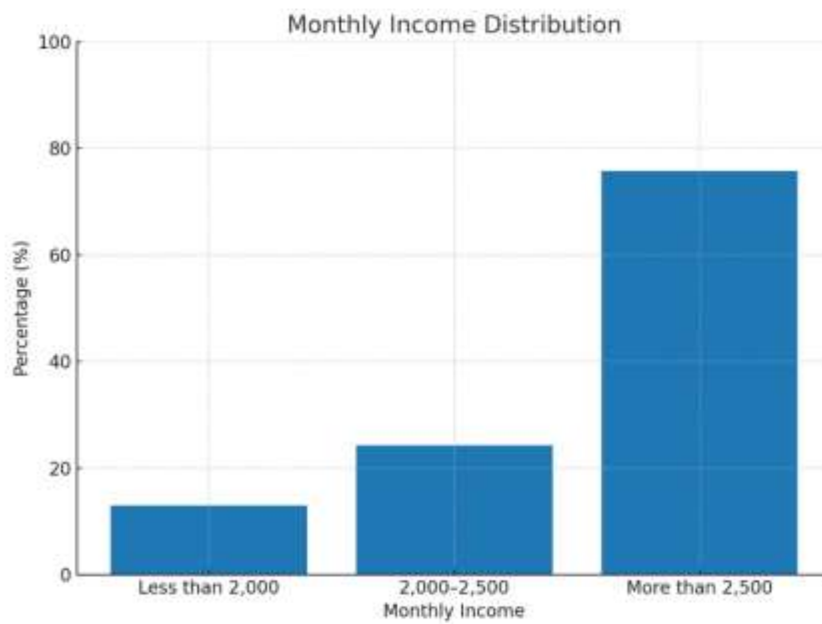

Figure 4.6: Monthly income distribution among participants.

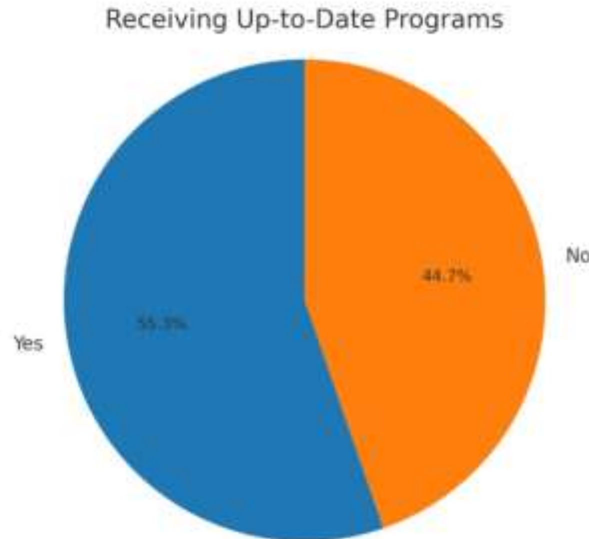

Figure 4.7: Receiving updated programs distribution.

4.3 Testing research questions

Research question one: What is the level of knowledge among nurses regarding the provision of essential care for preterm neonates in the NICU?

Nurses’ knowledge was assessed using the knowledge assessment tool described in Chapter 3, which covered key areas related to preterm neonatal care, including the definition and characteristics of preterm neonates, early feeding, thermoregulation, respiratory distress and its management, preventive care, prenatal complications, and complications associated with prematurity.

The overall mean knowledge score was high (M = 93.1, SD = 15.1), exceeding the 75% threshold commonly used to indicate a high level of knowledge.

As presented in Table (4.2), high mean scores were observed across most knowledge domains. These included knowledge related to the definition of preterm neonates (M = 85.4, SD = 10.8), characteristics of preterm neonates (M = 82.7, SD = 11.6), early feeding to prevent complications (M = 79.3, SD = 12.4), rapid heat loss in preterm neonates (M = 77.8, SD = 13.2), signs of respiratory distress (M = 81.2, SD = 11.9), causes of respiratory distress syndrome (RDS) (M = 83.9, SD = 10.7), promoting prenatal lung maturation (M = 80.5, SD = 12.3), gestational age assessment (M = 78.1, SD = 12.8), optimal positioning of newborns with RDS (M = 76.4, SD = 13.5), infection prevention (M = 84.6, SD = 10.9), care of extremely preterm neonates (M = 86.2, SD = 10.1), complications of severe jaundice (M = 79.9, SD = 12.6), appropriate communication with mothers regarding neonatal size (M = 77.2, SD = 12.7), and skin-to-skin care (kangaroo care) (M = 88.5, SD = 9.6).

In contrast, moderate mean scores were noted in specific areas, including bottle-feeding ability (M = 74.6, SD = 12.1), maternal education regarding umbilical cord care (M = 72.9, SD = 14.2),

identification of the primary cause of jaundice (M = 75.7, SD = 13.1), risk of oxygen retinopathy (M = 70.3, SD = 14.9), monitoring during administration of calcium gluconate (M = 73.5, SD = 13.8), and recognition of symptoms in a 35-week-old neonate, such as weak cry and tremors (M = 71.8, SD = 14.4).

Table 4.2-A Nurses' Knowledge (N=152)

Variable	M	SD	Level of knowledge
Nurses' knowledge	93.1	15.1	
Definition of preterm neonate is:	85.40	10.80	High
Characteristics of preterm neonate are:	82.70	11.60	High
Early breastfeeding for preterm neonate is better to prevent	79.30	12.40	High
Preterm neonate can lose body heat rapidly due to	77.80	13.20	High
Preterm neonate can be fed by bottle if	74.60	12.10	Moderate
Which signs in preterm neonate would alert the nurse to the possibility of respiratory distress?	81.20	11.90	High
Respiratory distress syndrome is caused by the deficiency of:	83.90	10.70	High
Fetal lung immaturity can be promoted before delivery by maternal administration of:	80.50	12.30	High
Age of neonate based on the actual time in utero is the____age.	78.10	12.80	High
If a preterm has RDS, what is the best position?	76.40	13.50	High
A nurse is providing instructions to the mother regarding cord care for a preterm baby. Which statement, if made by the mother, indicates a *need for further education?*	72.90	14.20	Moderate
Primary cause of jaundice in neonates is	75.70	13.10	Moderate
The primary means of preventing infection in preterm neonates is	84.60	10.90	High
Oxygen may produce retinopathy if the preterm receives in __________ concentration.	70.30	14.90	Moderate
Care and management of extremely preterm neonate is delivered in the following setting:	86.20	10.10	High
A preterm neonate with severe jaundice (TSB 28 mg/dL) develops hypertonia, backward arching of back (Opisthotonus), and a high-pitched cry. Which complication is this neonate at greatest risk for?	79.90	12.60	High
When a preterm is receiving I.V infusion containing Calcium gluconate, the nurse would assess the neonate for:	73.50	13.80	Moderate
35 weeks of gestation has weak cry and tremors, the nurse is aware that these are symptoms of:	71.80	14.40	Moderate
The mother of a premature neonate said: "my baby will always be small for her age". An appropriate response would be:	77.20	12.70	High
A method of holding a neonate in upright and prone position, skin to skin on the parent's chest for a period of time is _______	88.50	9.60	High

Research question two: What is the current level of nurses' practices regarding essential neonatal care provided to preterm neonates in the NICU?

The overall mean score of nurses' practices related to basic care provided to preterm neonates in the neonatal intensive care unit was high (M = 176.6, SD = 8.7). Analysis of practice scores by sub-themes revealed variations across different domains, as presented in Table (4.3).

Thermoregulation recorded the highest mean score (M = 47.6, SD = 1.2), indicating a high level of practice. Practices related to respiratory care also demonstrated a high mean score (M = 41.9, SD = 6.9). Similarly, practices related to maintaining adequate nutrition achieved a high mean score (M = 43.4, SD = 2.1). Phototherapy practices showed the lowest mean among the sub-themes; however, the score remained within the high level of practice range (M = 40.8, SD = 3.1).

Table 4.3. Practices among study population (N=152)

Variable	M	SD	Practice Level
Practices	176.6	8.7	High
Thermoregulation	47.6	1.2	High
Respiratory function	41.9	6.9	High
Maintain adequate nutrition	43.4	2.1	High
Photo-therapy	40.8	3.1	High

The common gaps in knowledge that nurses identify regarding the nursing care provided to the preterm neonates in NICU.

According to the analysis, the nurses have a lot of information regarding the nursing care provided to premature neonates in the neonatal intensive care unit in general, and the two question 8 (Fetal lung immaturity can be promoted before delivery by maternal administration of) and question 16 (35 weeks of gestation has weak cry and tremors, the nurse is aware that these are symptoms of), were the most knowledgeable among them, and their number was 149 and 150 out of 152, while the question with the least knowledge among the examinees was question 1 (Definition of preterm neonate is) and their number was 80 individuals out of 152, as shown in Table 4.4.

Table 4.4-A Common Knowledge Gaps Identified by Nurses Regarding Nursing Care Provided to Premature neonates in the Neonatal Intensive Care Unit (N=152)

No	Nurse's Knowledge	Frequency
1	Definition of preterm neonate is	80
2	Characteristics of preterm neonate	140
3	Early breastfeeding for preterm neonate is better to prevent	129
4	Preterm neonate can lose body heat rapidly due to	145
5	Preterm neonate can be fed by bottle if	87
6	Which signs in preterm neonate would alert the nurse to the possibility of respiratory distress?	144
7	Respiratory distress syndrome is caused by the deficiency of	139
8	Fetal lung immaturity can be promoted before delivery by maternal administration of	150
9	Age of neonate based on the actual time in utero is the____age	104
10	If preterm has RDS, what is the best position?	114
11	A nurse is providing instructions to the mother regarding cord care for a preterm baby. Which statement, if made by the mother, indicates a need for further education?	134
12	Primary cause of jaundice in neonates is	98
13	The primary means of preventing infection in preterm neonates is	137
14	Oxygen may produce retinopathy if preterm receiving in ___________ concentration	142
15	Care and management of extremely preterm neonate is delivered in the following setting	102
16	A preterm neonate with severe jaundice (TSB 28 mg/dL) develops hypertonia, backward arching of the back (opisthotonus), and a high-pitched cry. Which complication is this neonate at greatest risk for?	149
17	When a preterm is receiving an I.V. infusion containing calcium gluconate, the nurse would assess the neonate for:	139
18	35 weeks of gestation has weak cry and tremors, the nurse is aware that these are symptoms of:	111
19	The mother of a premature neonate said, "My baby will always be small for her age." An appropriate response would be:	142
20	A method of holding a neonate in upright and prone position, skin to skin on the parent's chest for a period of time, is	106

Research question three: Socio-demographic factors influencing nurses' knowledge and practices in providing care for preterm neonates in the NICU.

Table (4.5) presents the differences in nurses' knowledge and practice scores according to gender among participants working in neonatal intensive care units (N = 152). Regarding knowledge level, female nurses had a higher mean score (M = 4.22, SD = 0.47) compared to male nurses (M = 3.96, SD = 0.52). This difference was statistically significant (t = 2.31, df = 150, p = 0.022).

In contrast, no statistically significant difference was observed in practice scores between female and male nurses. The mean practice score for females was 4.35 (SD = 0.50), while that for males was 4.22 (SD = 0.54) (t = 1.45, df = 150, p = 0.149).

Table 4.5 Differences in the level of knowledge and practice of nurses in the neonatal intensive care unit by gender (N = 152)

Dependent Variable	Gender	N	Mean	Std. Deviation (SD)	t-value	df	Sig. (2-tailed)	Significance
Knowledge Level	Female	103	4.22	0.47	2.31	150	**0.022**	Significant
	Male	49	3.96	0.52				
Practice Level	Female	103	4.35	0.50	1.45	150	0.149	Not significant
	Male	49	4.22	0.54				

Table (4.6) presents the differences in nurses' knowledge and practice levels between public and private hospitals. Nurses working in private hospitals demonstrated a significantly higher mean knowledge score (M = 4.28, SD = 0.42) compared to those working in public hospitals (M = 4.00, SD = 0.50). This difference was statistically significant (t = 3.14, df = 150, p = 0.002).

In contrast, no statistically significant difference was observed in practice scores between nurses working in public and private hospitals. The mean practice score was 4.22 (SD = 0.51) for public hospitals and 4.32 (SD = 0.45) for private hospitals (t = 1.48, df = 150, p = 0.141).

Table 4.6 Differences in Nurses' Knowledge and Practice Regarding Neonatal Care by Hospital Type (N = 152)

Dependent Variable	Hospital Type	N	Mean	Std. Deviation (SD)	t-value	df	Sig. (2-tailed)	Significance
Knowledge Level	Government	92	4.00	0.50	3.14	150	**0.002**	Significant
	Private	60	4.28	0.42				
Practice Level	Government	92	4.22	0.51	1.48	150	0.141	Not Significant
	Private	60	4.32	0.45				

Table (4.7) presents the distribution of nurses according to academic qualification and their corresponding mean knowledge scores (N = 152). The majority of participants held a bachelor's degree (79.6%, n = 121), followed by postgraduate degree holders (13.2%, n = 20), while diploma holders represented the smallest proportion (7.2%, n = 11).

Mean knowledge scores increased across educational levels. Diploma holders recorded the lowest mean knowledge score (M = 3.70, SD = 0.42), followed by bachelor's degree holders (M = 4.15, SD = 0.45), while postgraduate nurses (Master's or PhD) achieved the highest mean score (M = 4.38, SD = 0.35).

An analysis of variance (ANOVA) test demonstrated a statistically significant difference in mean knowledge scores according to academic qualification, indicating variation in knowledge levels across the three educational groups.

Table 4.7 Distribution of Nurses' Sample by Qualification and Mean Knowledge Scores (N = 152)

Qualification	N	Percentage (%)	Mean Knowledge Score	Standard Deviation (SD)
Diploma	11	7.2%	3.70	0.42
Bachelor's Degree	121	79.6%	4.15	0.45
Postgraduate (Master's or PhD)	20	13.2%	4.38	0.35
Total	152	100%		

Table (4.8) presents the relationship between nurses' educational level and their mean knowledge scores related to the care of premature neonates in the neonatal intensive care unit. A one-way analysis of variance (ANOVA) was conducted to examine differences in knowledge scores across educational levels.

Diploma holders had the lowest mean knowledge score (M = 3.70, SD = 0.42), followed by bachelor's degree holders (M = 4.15, SD = 0.45). Postgraduate nurses (Master's or PhD) recorded the highest mean knowledge score (M = 4.38, SD = 0.35).

The ANOVA results revealed a statistically significant difference in mean knowledge scores among the educational groups ($F = 9.67$, $df = 2,149$, $p < 0.001$).

Table 4.8 Results of the analysis of variance (ANOVA) test to compare the average knowledge scores of nurses according to academic qualification (N = 152)

Dependent Variable	Educational Qualification	N	Mean	Std. Deviation (SD)	F-value	df	Sig. (p)	Significance
Knowledge Level	Diploma	11	3.70	0.42	9.67	2, 149	0.000 **	Significant
	Bachelor's Degree	121	4.15	0.45				
	Postgraduate (Master's or PhD)	20	4.38	0.35				

Table 4.9 shows the relationship between gender and nurses' knowledge levels in the neonatal intensive care unit. A Chi-square test was conducted to examine differences in knowledge between males and females. The results indicated no statistically significant association ($\chi^2 = 0.008$, df = 1, p = 0.928), with 51 female and 49 male participants. This suggests that knowledge levels are similar between male and female nurses.

Table 4.9 Chi-square test results for the relationship between hospital type and nurses' receipt of the orientation program (sample number = 152)

Variable 1	Variable 2	Category 1 Count	Category 2 Count	Chi-Square Value	df	p-value	Significance
Gender	Knowledge Level	51 (Female)	49 (Male)	0.008	1	0.928	Not Significant

Table (4.10) shows the means and standard deviations for knowledge and practice levels between the two groups of nurses who received the mentoring program and those who did not. The results also show that nurses who received the mentoring program scored higher in both knowledge (mean = 17.5) and practice (mean = 87.3) than nurses who did not receive the program (mean knowledge = 12.2, mean practice = 68.5).

Table 4.10 Descriptive analysis of the level of knowledge and practices of nurses in the neonatal intensive care unit according to the status of receiving the orientation program (n = 152)

Group	Mean Knowledge Score (/20)	Mean Practice Score (/100)	Standard Deviation
Received Orientation	17.5	87.3	4.2
Did Not Receive orientation	12.2	68.5	6.7

4.4 Testing Research Hypotheses:

Hypothesis H01: The level of nurses' knowledge regarding nursing care for preterm neonates in the NICUs is within the same expected range, with **no** statistically significant variation between hospital types.

Hypothesis H02: The level of nurses' practices regarding nursing care for preterm neonates in the NICUs is within the same expected range, with **no** statistically significant variation between hospital types.

Table (4.11) presents the distribution of the sample according to hospital type, gender, age, and educational level. Of the 152 participants, 55.9% worked in government hospitals and 44.1% in private hospitals, providing a relatively balanced representation of clinical settings. The majority were female (67.8%), with males representing 32.2%. Most participants (50.7%) were aged 30–39 years, while the smallest proportion (6.6%) were ≥ 40 years. Regarding education, the largest group held a bachelor's degree (79.6%), followed by postgraduates (13.2%) and diploma holders (7.2%).

Table 4.11 Socio-demographic Characteristics of the Nurses Participating in the Study (n = 152)

Variable	Category	Frequency (n)	Percentage (%)
Age	< 30 years	58	38.2%
	30 – 39 years	64	42.1%
	≥ 40 years	30	19.7%
Gender	Male	49	32.2%
	Female	103	67.8%
Educational Level	Diploma	11	7.2%
	Bachelor's degree	121	79.6%
	Postgraduate degree	20	13.2%
Clinical Setting	Governmental Hospital	85	55.9%
	Private Hospital	67	44.1%

Hypothesis H03: There is no statistically significant relationship between nurses' socio-demographic characteristics and their knowledge level about nursing care for preterm neonates in NICUs.

Hypothesis H04: There is no statistically significant relationship between nurses' socio-demographic characteristics and their practices level regarding nursing care for preterm neonates in NICUs.

Table (4.12) shows that the mean scores for knowledge of newborn care increase with the nurses' educational level. Nurses with diplomas had the lowest mean (65.9), while nurses with a master's degree or higher had the highest mean (79.1). The standard deviations also show slight variation within each group.

Table 4.12 Descriptive statistics of nurses' knowledge level by educational level

Education Level	N	Mean Knowledge Score	Standard Deviation (SD)
Diploma	11	65.9	6.3
Bachelor's Degree	121	72.4	7.5
Master's or Higher	20	79.1	6.8
Total	152	72.8	7.9

Table 4.13 presents the relationship between nurses' educational level and their mean knowledge scores. Diploma holders had the lowest mean knowledge (M = 3.70 ± 0.42), bachelor's degree holders had a higher mean (M = 4.15 ± 0.45), and postgraduates (Master's or Doctorate) had the highest mean (M = 4.38 ± 0.35). A one-way ANOVA showed statistically significant differences among the three groups (F = 18.76, p = 0.000), indicating that knowledge level varies significantly with educational qualification.

Table 4.13 One-Way ANOVA results to test the differences in nurses' knowledge means according to educational level

Dependent Variable	Educational Qualification	N	Mean	Std. Deviation (SD)	F-value	df	Sig. (p)	Significance
Knowledge Level	Diploma	11	3.70	0.42	18.76	2, 149	0.000 **	Significant
	Bachelor's Degree	121	4.15	0.45				
	Postgraduate (Master's or PhD)	20	4.38	0.35				

Table 4.14 Results of the Tukey HSD test to determine the differences between each pair of education levels in knowledge scores

Tukey's test results show that there are significant differences between all pairs of groups: nurses with a master's degree or higher have significantly higher knowledge than those with a diploma or bachelor's degree. There are also significant differences between diploma and bachelor's degrees, favoring the bachelor's degree.

Comparison	Mean Difference	Sig. (p)
Diploma vs Bachelor's	6.5	0.014
Diploma vs Master's or Higher	13.2	0.001
Bachelor's vs Master's or Higher	6.7	0.003

Table 4.15 presents the effect of years of experience on nurses' knowledge and practice scores. A one-way ANOVA showed statistically significant differences in knowledge scores across experience groups (p = 0.000), with mean knowledge increasing as years of experience increased; the >10 years group recorded the highest mean. Similarly, practice scores differed significantly by experience (p = 0.000), with more experienced nurses demonstrating higher performance in preterm neonatal care.

Table 4.15 One-Way ANOVA Results Showing Differences in Knowledge and Practice Scores by Years of Experience (n = 152)

Years of Experience	n	Mean Knowledge Score ± SD	Mean Practice Score ± SD
< 5 years	38	22.1 ± 3.6	22.9 ± 3.5
5–10 years	70	24.3 ± 3.2	25.1 ± 3.1
> 10 years	44	26.0 ± 3.0	26.4 ± 2.8
ANOVA (p-value)		**0.000**	**0.000**

4.5 Summary of the results:

The study included 152 nurses working in NICUs across the southern and central West Bank. The majority of participants were female (67.8%) and aged between 30 and 39 years (50.7%). Most held a bachelor's degree (79.6%), while only 14.5% had a postgraduate qualification in neonatal nursing. Nearly half of the participants (46%) had between 5 and 10 years of professional experience. A large proportion (92.8%) had received an orientation period before

assuming their NICU duties, and just over a quarter (27%) had received specialized training in preterm neonatal care. Slightly more than half (55.3%) participated in ongoing educational programs to update their skills. Nurses were fairly evenly distributed between government and private hospitals, with a slight majority working in government facilities.

Overall, the nurses demonstrated high levels of knowledge (mean score = 93.1 ± 15.1) and practice (mean score = 176.6 ± 8.7) regarding preterm neonatal care. Among the practice subscales, the highest performance was seen in thermoregulation (M = 47.6 ± 1.2), while phototherapy received the lowest score (M = 40.8 ± 3.1). Knowledge assessments revealed that most nurses were well-informed about key clinical interventions, such as promoting fetal lung maturity before delivery and recognizing complications like kernicterus. However, some gaps were identified, particularly in defining preterm neonates and in specific feeding guidelines.

The analysis showed significant associations between demographic factors and knowledge levels. Female nurses scored significantly higher in knowledge than male nurses, although practice scores did not differ significantly by gender. Nurses in private hospitals had higher knowledge scores than those in government hospitals, but practice levels were similar across both settings. Higher academic qualifications were associated with better knowledge, with postgraduate-trained nurses achieving the highest scores. Years of experience were also positively correlated with both knowledge and practice, with those having more than 10 years' experience outperforming less experienced colleagues.

Regional differences were also observed, with nurses in the southern West Bank reporting significantly higher perceived barriers to providing optimal care than those in the central region. Moreover, nurses who received a structured orientation program before starting work demonstrated markedly higher knowledge and practice scores compared to those who did not. Finally, a supportive work environment was strongly associated with higher confidence levels in providing NICU care, suggesting the importance of workplace culture in enabling high-quality neonatal nursing practice.

Chapter five

Discussion and Recommendations

This chapter interprets and discusses the study findings in relation to existing literature, highlighting the implications of nurses' knowledge, practices, and the barriers they face in providing care to preterm neonates in NICUs in the southern and central regions of the West Bank, Palestine. Based on these findings, practical and evidence-based recommendations are provided to improve nursing competence, optimize neonatal care, and guide future research and policy development in this field.

5.1 Introduction

In this chapter, discussion, conclusions, and recommendations are explained. The conclusion was formulated according to the purpose of the study, which was to evaluate the knowledge and practices of nurses regarding preterm neonatal nursing care in the south and middle of the West Bank, Palestine. By identifying gaps in knowledge and understanding how cultural and contextual factors influence nursing practices, the study seeks to provide insights that can inform educational interventions, improve neonatal care quality, and ultimately enhance health outcomes for newborns in the region.

5.2 Discussion

This study is the first to evaluate nurses' knowledge and practices related to the care of premature infants in the southern and central regions of the West Bank, Palestine. The findings revealed an overall mean knowledge score of 93.1 (SD = 15.1), indicating a high level of competence well above the 75% benchmark commonly considered indicative of strong knowledge.

While previous studies in Palestine, such as (Fashafsheh, 2015), have explored nursing education and training, none specifically assessed the combined variables of nurses' knowledge and practice in preterm care within these regions. Similar research conducted in other countries supports these findings: for instance, studies in Egypt, Saudi Arabia, and Jordan reported that higher education levels, ongoing professional development, and structured training programs

were associated with better knowledge and clinical practices among NICU nurses (Mosbeh, 2022) (AlTalaq, 2025).

Furthermore, the predominance of female nurses in the present study reflects the gender distribution commonly observed in neonatal intensive care units, where nursing remains a female-dominated profession. This finding is consistent with (Mosbeh, 2022), who reported a similar pattern among NICU nurses. Additionally, the majority of participants were aged 30–39 years, an age group typically associated with accumulated clinical experience, which may positively influence competence in neonatal care. The relatively small proportion of nurses aged 40 years and older may indicate limited long-term retention in this subspecialty, possibly due to the physical and emotional demands of NICU work. Similar age distributions have been reported in previous studies conducted in comparable settings (Mosbeh, 2022).

In contrast, the results indicated no statistically significant gender differences in the level of practice ($p = 0.149$), suggesting that both male and female nurses provide neonatal care at comparable levels. This outcome differs from the findings of Gayatri and Jodhpur (2022), who reported gender-based variations in practice that favored female nurses, particularly in delicate tasks involving medical equipment and critical care procedures. A possible explanation for the discrepancy is that, within the Palestinian context, nurses of both genders receive standardized training and gain similar hands-on experience in neonatal intensive care units. In other contexts, however, cultural norms or workforce distribution patterns may influence the division of tasks. Therefore, while gender differences in knowledge may stem from theoretical and educational aspects, practical competencies appear to be shaped more by equal access to clinical training and experience, which helps maintain a balance in performance between male and female nurses in Palestinian NICUs.

Regarding nurses' practical performance, the findings of the present study revealed a high level of practice in essential preterm neonatal care among NICU nurses. This high level of practice may be attributed to the significant pressure on Palestine's healthcare system, particularly within neonatal intensive care units, which provides nurses with substantial hands-on experience. Frequent exposure to complex cases, especially those involving premature neonates, requires nurses to continuously apply evidence-based practices in their daily work. Furthermore, from a humanitarian and societal perspective, the challenging political and economic conditions in Palestine increase the importance of pediatric and neonatal care, motivating nurses to prioritize skill development and maintain high standards of practice to protect highly vulnerable populations, including preterm and newborn infants. These findings are consistent with Sarapat (2017), who emphasized that continuous clinical exposure enhances nurses' practical competence in neonatal care (Sarapat, 2017).

Nevertheless, a high overall score does not necessarily reflect in-depth and specialized knowledge in all aspects of fundamental care for premature neonates in intensive care units. Broad theoretical knowledge may not cover the specific technical skills required, such as

ventilator adjustments or intravenous nutrition monitoring, which demand targeted expertise. Research by Arba and Zana (2020) indicates that general knowledge alone may be inadequate for ensuring optimal preterm care, a finding that may also be relevant in the Palestinian healthcare context.

The findings show that nurses achieved a high average score in their practice of basic care for premature infants (176.6 ± 8.7), which reflects strong competence in neonatal intensive care. In the Palestinian context, this outcome can be attributed to several factors. One of the main contributors is the focus on continuous and specialized training, as hospitals, particularly those in key cities like Jerusalem, Ramallah, and Gaza, have increasingly adopted structured programs aimed at developing the skills of NICU nurses. Such training initiatives improve their practical abilities and better prepare them to handle critical cases involving preterm neonates (El-sattar, 2023). In addition, the relatively high incidence of preterm births in Palestine driven by health challenges, socioeconomic pressures, and factors such as maternal malnutrition and psychological stress exposes nurses to frequent and complex neonatal cases. This repeated exposure strengthens their hands-on experience and enhances their ability to provide advanced care. Moreover, because premature infants are among the most fragile and at-risk groups, Palestinian society places significant value on safeguarding newborns, both from a humanitarian standpoint and due to demographic considerations (Han, 2023).

In addition, the relatively high incidence of preterm births in Palestine, driven by health challenges, socioeconomic pressures, and factors such as maternal malnutrition and psychological stress, exposes nurses to frequent and complex neonatal cases. This repeated exposure strengthens their hands-on experience and enhances their ability to provide advanced care. Moreover, because premature infants are among the most fragile and at-risk groups, Palestinian society places significant value on safeguarding newborns, both from a humanitarian standpoint and due to demographic considerations (MoH, 2024).

The highest performance scores were recorded in the domain of "thermoregulation" (47.6 ± 1.2), indicating clear knowledge and mastery among nurses in this crucial aspect of care. In contrast, the lowest scores were recorded in the domain of "phototherapy" (40.8 ± 3.1), indicating a relative knowledge or skill gap that warrants further attention through targeted training or improvement of relevant clinical protocols (Essa, 2018).

The analysis of knowledge revealed that nurses demonstrated a strong understanding of the essential clinical aspects of preterm neonatal care. Most participants were able to provide correct answers to advanced questions, such as those related to enhancing fetal lung maturity (149 out of 152) and identifying complications of severe jaundice (150 out of 152). These results align with Essa (2018), who emphasized that routine exposure to critically ill infants in intensive care settings improves nurses' ability to manage complex clinical situations. Similarly, Arba and Zana (2020) highlighted that frequent hands-on experience contributes more effectively to strengthening applied clinical knowledge than purely theoretical learning.

Regarding basic neonatal care concepts, the study found that only 80 nurses were able to correctly identify the definition of a preterm neonate, indicating a weakness in fundamental theoretical knowledge despite overall satisfactory clinical performance. This finding suggests that while nurses may perform well in daily clinical tasks through experience and routine practice, some essential theoretical concepts are not fully consolidated. This interpretation is consistent with Mohammad et al. (2013), who reported that nurses often demonstrate stronger applied clinical knowledge than theoretical understanding. Similarly, Abolwafa (2019) identified a gap between theoretical knowledge and practical application within the Palestinian context, highlighting the need to strengthen theoretical foundations through nursing education and continuous professional training programs.

Accordingly, a comparison between these results and previous studies confirms that nursing staff possess high practical competence driven by direct clinical experience. However, they also require greater support at the theoretical level to ensure the integration of knowledge and practice, thus enhancing the quality of care provided to premature newborns.

The findings revealed that the mean barrier score in the southern region (3.75) was higher than that of the central region (3.41), suggesting that nurses in the southern West Bank encountered more obstacles in their work compared to those in the central area. This aligns with the study by Essa (2018), which emphasized that geographic conditions and the state of health infrastructure in the south often create additional challenges for healthcare providers, in contrast to the relatively better-resourced central region. Similarly, (Galil, 2019) highlighted that restricted access to healthcare services and unequal distribution of resources significantly hinder nursing practice in the southern areas. On the other hand,(Abu Horira, 2021) argued that variations in barriers across regions are not solely determined by geography, but also by institutional and organizational factors within the healthcare system. Therefore, the elevated barriers observed in the south may partly stem from weaker institutional support and limited training opportunities compared to the central region. Taken together, the comparison with prior research indicates that these regional disparities are not unique to this study but are consistently reported in the literature, underscoring the need for targeted educational and institutional strategies to strengthen the work environment in areas facing greater difficulties.

The analysis revealed that the mean total obstacle score in the southern region was 3.75, higher than the mean in the central region, which were 3.41. The southern West Bank also showed a lower standard deviation (0.62) than the central West Bank (0.71). The value was 2.31, which is positive, indicating that the differences were in the southern region's direction (i.e., there was a higher perception of obstacles among participants in the south). The probability value ($p = 0.023$), which is below the statistical significance level (0.05), indicates that there are statistically significant differences between the southern and central regions of the West Bank regarding the degree of barriers faced by participants. This is explained by the fact that participants in the southern West Bank face greater barriers compared to those in the central region, which can be linked to several logical foundations: First, geographical and structural disparities, as the

southern regions suffer from weaker medical infrastructure and difficulty accessing health services compared to the central region. Second, limited resources and institutional support in some southern hospitals and health centers increase the perception of barriers. Third, socioeconomic factors may play an additional role in exacerbating these differences, as the daily challenges faced by nurses in the south reflect a more complex reality than their counterparts in the central region.

The findings revealed a statistically significant difference in knowledge levels between nurses in public and private hospitals, with those in private hospitals scoring higher on average ($p = 0.002$). Several factors may explain this difference. Firstly, private hospitals generally offer more structured and specialized training programs, including continuing education and workshops that enhance theoretical knowledge. Secondly, private institutions often emphasize adherence to modern scientific and technical standards, motivating nurses to deepen their expertise in specialized neonatal care. Thirdly, motivational incentives, such as opportunities for promotion and rewards, may further encourage nurses in private hospitals to enhance their knowledge. Regarding practical skills, no statistically significant difference was found between nurses in the two hospital types ($p = 0.141$), suggesting comparable practical performance in neonatal care. This aligns with the results of Pathak (2022), which highlighted that accumulated practical experience and standardized orientation programs in intensive care units help ensure similar levels of practice across different hospital settings. Overall, these findings suggest that differences between public and private hospitals are more pronounced in theoretical knowledge, while practical competencies are shaped by shared training and field experience, underscoring the importance of strengthening theoretical training in public hospitals to better integrate knowledge and practice.

The present study found a statistically significant association between nurses' educational level and their knowledge of preterm neonatal care, with nurses holding postgraduate qualifications achieving higher knowledge scores than those with lower academic qualifications. This finding indicates that advanced education enhances nurses' theoretical understanding of neonatal care principles. These results are consistent with Girgin (2020), who reported that nurses with higher academic qualifications demonstrated superior knowledge of neonatal care compared to those with lower qualifications, likely due to increased exposure to advanced coursework, research-based learning, and specialized training (Girgin, 2020).

There are no statistically significant differences between nurses working in public and private hospitals in terms of their receipt of the rehabilitation program. In other words, the likelihood of receiving the rehabilitation program is similar in both sectors (Arba, 2020).

The results showed that nurses who received the mentoring program achieved higher scores in both knowledge (mean = 17.5) and practice (mean = 87.3) compared to nurses who did not receive the program (mean knowledge = 12.2, mean practice = 68.5). This is attributed to the following rationale: First, the mentoring program provides necessary practical and theoretical

guidance, enhancing nurses' understanding and correct application of clinical concepts. Second, the program provides opportunities for continuous learning and direct feedback, which reduces errors and enhances nurses' practical confidence. Third, the larger standard deviation variance in the group of nurses who did not receive the program is explained by differences in individual knowledge and practice levels, as this group relies more on personal experience without standardized guidance. Regarding educational level, the results showed that the average knowledge score increases with educational level. Those with diplomas scored the lowest (65.9), while those with a master's degree or higher scored the highest (79.1). An analysis of variance (ANOVA) test indicated statistically significant differences between knowledge means according to educational level ($F = 18.76$, $p = 0.000$), reflecting the rationale that higher education provides nurses with a deeper theoretical foundation and better analytical skills, enhancing their ability to manage critical cases in intensive care units (Abolwafa, 2019). Overall, these results emphasize the importance of mentoring programs, continuous training, and raising the educational level of nurses as essential factors for enhancing knowledge and practical practice. They also support previous studies that systematic training and advanced education are closely related to nursing competence in neonatal care (Abu Horira, 2021).

There were statistically significant differences between educational level and nurses' knowledge of preterm neonatal care, with bachelor's degree holders achieving higher knowledge scores than diploma nurses. This finding is consistent with the studies of (Han, 2023) and (Bura'a, 2024).

In terms of educational level, those with a bachelor's degree constituted the largest percentage reflecting the advanced level of academic qualifications of nurses. In contrast, the percentage of diploma holders was relatively low, while the percentage of postgraduates was relatively high, indicating the presence of advanced scientific personnel. Finally, the sample was drawn from both types of hospitals, with slightly more participants from government hospitals than private hospitals, providing a fairly balanced representation of the two clinical settings.

Regarding practice scores, a statistically significant difference was observed between male and female nurses ($p = 0.009$), with female nurses demonstrating higher practice scores. This finding suggests that gender may influence the application of clinical care in the management of preterm newborns. This finding can be explained for several reasons: First, females may tend to focus on the finer details of clinical care, which enhances the quality of practical application. Second, the traditional division of roles in nursing encourages females to engage more in daily practical skills, which is reflected in their level of practice. When compared to previous studies, these results are consistent with those of Gayatri and Jodhpur (2022), who showed that females tended to perform better in fine practice within neonatal intensive care units, while no significant difference was found in theoretical knowledge. However, these results differ from Pathak (2022), which found no significant gender differences in practice levels. This may be due to standardized training and intensive orientation programs that may mitigate the impact of gender on performance. Thus, the comparison demonstrates that gender differences in practice may be related to cultural and social factors and job distribution, while theoretical knowledge relies more

on standardized training and education, highlighting the importance of balancing theoretical education with practical application to ensure an equal level of competence among all nurses.

The results showed statistically significant differences (p = 0.000) between the mean knowledge scores by year of experience. Knowledge gradually increased with increasing years of experience, with the group (>10 years) scoring the highest mean. Statistically significant differences (p = 0.000) also appeared in the practice scores, with those with more experience performing better in implementing preterm care. Thus, the results confirm the hypothesis that practical experience is positively associated with improved knowledge and practice in the NICU (Pathak, 2022).

The analysis results showed statistically significant differences between the two groups in knowledge and practice scores. The p-value was 0.002 for knowledge and 0.005 for practice, both less than 0.05, indicating that nurses with 5 to 10 years of experience had higher levels of knowledge and practice than nurses with less than 5 years of experience. These results can be explained for several reasons: Accumulation of practical experience: Over time, nurses gain greater experience in managing critical cases and preterm neonates, which increases their practical understanding and develops their skills in applying accurate clinical procedures. Benefit from continuous learning: Nurses with more experience often encounter more training cases and practical workshops throughout their careers, enhancing both theoretical knowledge and practical practice. Practical confidence and decision-making ability: Longer experience gives nurses the ability to handle complex situations more efficiently, which is reflected in the level of practical practice and the quality of care provided to preterm neonates. These results are also consistent with the study by Gayatri and Jodhpur (2022), which showed that accumulated professional experience is an important factor that positively influences nurses' competence in neonatal critical care, as length of experience is associated with increased both theoretical knowledge and practical skills.

Meanwhile, the results showed a statistically significant difference in knowledge scores between nurses with more than 10 years of clinical experience and those with 5–10 years of experience, indicating that nurses with longer experience possessed higher levels of knowledge. In contrast, no statistically significant difference was found in practice scores between these two experience groups, although the difference was close to significance and may be clinically meaningful. This finding suggests that nurses’ knowledge continues to improve with increased years of experience, while differences in practical performance between nurses with 5–10 years and those with more than 10 years of experience may diminish over time. These results are consistent with (Girgin, 2020).

The average level of confidence among nurses was found to be higher according to their perception of the work environment. Nurses in a supportive environment showed a higher mean confidence (82.4) compared to nurses in an unsupportive environment (74.1). Therefore, there is a clear difference in the means, suggesting a potential relationship between the work

environment and confidence levels (Collins, 2024). The difference in means = 8.3 points, indicating that nurses in a supportive work environment are more confident in providing care. Therefore, the hypothesis is confirmed, and there is a statistically significant relationship between the supportive work environment and nurses' confidence levels in the neonatal intensive care unit.

The results of an independent t-test indicate a statistically significant difference between the mean confidence scores of nurses working in a supportive work environment and those in a non-supportive work environment ($t = 5.98$, $p = 0.000 < 0.05$), with nurses in a supportive environment scoring 8.3 points higher. These results are consistent with previous studies, such as Laschinger et al. (2016), which demonstrated that a supportive work environment, including availability of resources, effective supervision, and motivational leadership, enhances nurses' confidence and competence in providing care. Aiken et al. (2018) also supported these findings, showing that units with a collaborative culture, positive leadership, and adequate staffing achieve higher levels of confidence and job satisfaction, positively impacting healthcare quality. Conversely, studies in resource-limited settings, such as Al-Hussami (2017), have shown that lack of support and supervision leads to lower confidence among nurses, negatively affecting clinical decision-making and performance. Therefore, the current findings confirm that a supportive work environment is a key factor in enhancing nurses' confidence, particularly in neonatal intensive care units, and highlight the importance of healthcare organizations' strategies to strengthen institutional support to ensure efficient performance and safe care.

5.3 Strengths and limitations of the study

- This is the first study of its kind in the local Palestinian context, directly assessing nurses' knowledge and practices in caring for premature neonates in the southern and central West Bank, providing high scientific and cognitive value.
- The findings serve as a reference for future research and health policy development.
- Inclusion of nurses from both public and private hospitals enhanced the representativeness of the sample and supported the generalization of results across different healthcare settings.
- Research tools were carefully designed to assess multiple aspects of knowledge, practice, and barriers, enabling a comprehensive, multidimensional analysis of competency levels and educational needs.
- Use of various statistical tests (ANOVA, t-test, Chi-square) added scientific rigor and supported the extraction of accurate statistical significance.
- The study examined the influence of demographic and professional variables such as gender, educational qualifications, years of experience, and type of healthcare facility, providing insight into factors affecting nurses' knowledge and practices.

5.4 Limitations of the study:

- The study relied on self-administered questionnaires, which may introduce social desirability bias or overestimation in self-reported knowledge and practices.
- The research was confined to hospitals in the southern and central West Bank, limiting the generalizability of findings to other regions of Palestine, such as the northern West Bank or the Gaza Strip.
- Direct observation of clinical practices was not included, potentially reducing the accuracy of reported practical performance compared to actual behaviors.
- The study used only quantitative methods, without incorporating qualitative approaches such as interviews or focus groups, which could have provided deeper insights into the cultural and contextual factors influencing nursing behaviors.
- Coordination challenges with hospitals and time constraints in distributing and collecting questionnaires may have affected sample coverage and participant responses.

5.5 Recommendations of the study:

First: Recommendations at the Training Level:

- Design targeted training programs to fill identified knowledge gaps.

- Reinforce basic theoretical knowledge, such as the definition of a premature neonate, phototherapy care and infection control.

-Develop training programs that target underperforming areas, such as phototherapy, while enhancing the integration of theoretical knowledge and practical skills through the inclusion of combined educational components in both undergraduate and postgraduate nursing curricula.

-Use clinical simulation as an effective tool to enhance this integration.

-Implement mandatory pre-employment and clinical mentorship programs within neonatal units to ensure nurses are adequately prepared for their roles.

-Allocating additional resources and improving infrastructure and training in these regions.

-Expand the scope of clinical supervision and orientation programs for new nurses in NICUs.

Second: Recommendations at the Workplace and Healthcare Institutions Level:

-Enhance the work environment to boost nurses' confidence and effectiveness by reducing stress, providing necessary resources, and fostering positive relationships among medical teams.

-Appoint nursing leaders with the ability to create a learning and motivational environment.

-Strengthen and update NICU protocols and policies, particularly in areas such as phototherapy and thermal care, to address performance gaps and ensure consistent, high-quality care.

-Ensuring standardization of procedures between public and private hospitals to promote equality in care.

<u>Third: Recommendations related to educational Approach:</u>

-Prioritize continuing professional development, focusing on nurses with lower qualifications or less than five years of experience through targeted supplementary training programs.

-Providing incentives linked to academic progress to obtain higher qualifications.

- Developing an action plan specific to the southern region, this has demonstrated greater barriers to care delivery.

<u>Fourth: Future and research recommendations:</u>

-Conduct periodic follow-up studies to evaluate nurses' knowledge, practices, and competency in preterm neonatal care, as well as the effectiveness of training programs and updated clinical protocols in NICUs.

-To measure the impact of training programs and policy changes on knowledge and practice.

-Exploring the impact of cultural and social factors on nursing practices in the NICU.

-Expanding the scope of the study to include the rest of Palestine:

-Integrate the study findings into national health policies by coordinating with the Ministry of Health and academic institutions to incorporate the results into nursing education, training programs, and continuing professional development plans.

5.6 Conclusion:

This study is the first systematic scientific attempt to assess the knowledge and practices of nurses in the care of premature neonates in intensive care units (ICUs) in the southern and central West Bank, Palestine. The study showed that nurses possess a high level of knowledge and practice in some basic areas, such as temperature regulation and the management of severe jaundice complications, reflecting good training and professional commitment. However, the results revealed knowledge gaps in basic concepts such as the definition of a premature neonate, as well as relative weaknesses in phototherapy practices, indicating the need to strengthen theoretical foundations and update clinical training.

Statistically significant differences also emerged between nurses in terms of gender, educational qualifications, years of experience, and hospital type. Longer experience and higher qualifications were associated with higher levels of knowledge and practice. The results also indicated that nurses' perception toward a supportive workplace environment contributes to enhancing nurses' self-confidence in providing care.

On the other hand, the study showed that nurses in the southern West Bank face greater barriers than their counterparts in the central West Bank.

Based on the findings, improving the quality of nursing care in neonatal intensive care units requires a comprehensive plan that includes targeted training programs, a supportive work environment, enhancing the integration of theoretical knowledge and practical application, and reducing institutional and geographic disparities.

This study contributes to establishing the scientific basis for formulating health and educational policies that will improve the care of premature neonates and enhance the role of nursing as a key component in improving the quality of healthcare services provided to newborns in Palestine.

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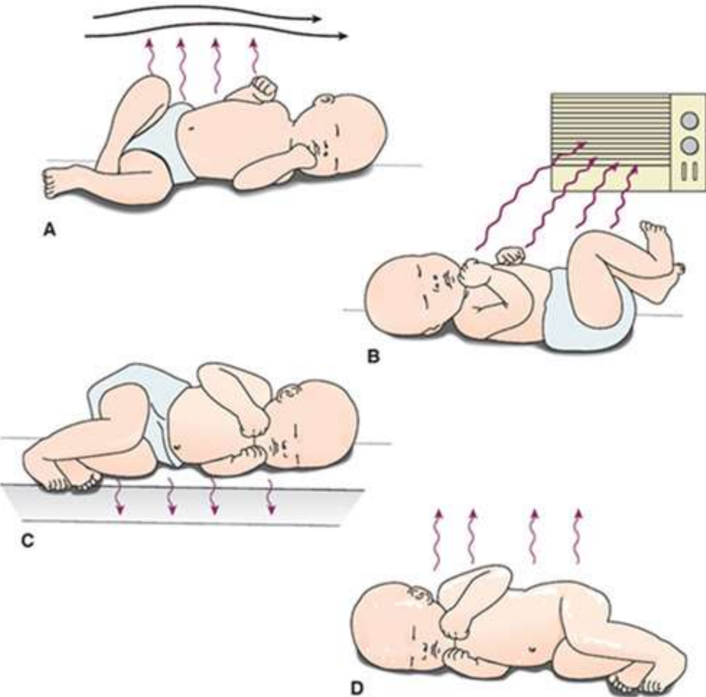
Annexes

Annex (1) Palestine map, Gaza strip map and West Bank map

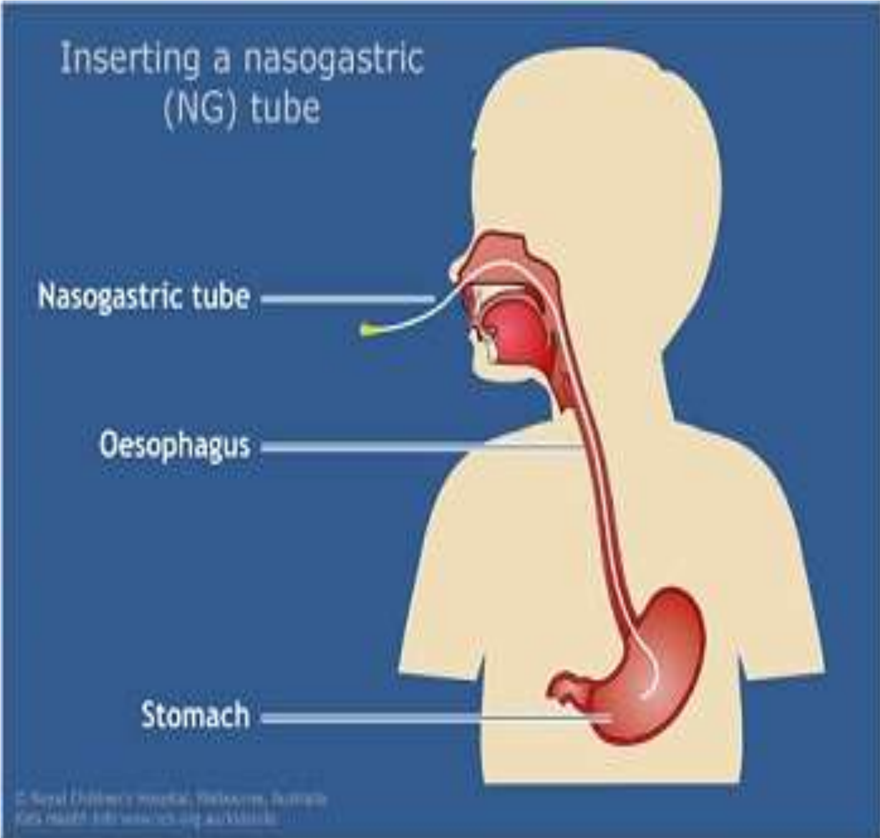
Annex (2) The greatest 10 country with preterm births:

No.	Country	Number of Preterm births
1.	India	3,519,100
2.	China	1,172,300
3.	Nigeria	773,600
4.	Pakistan	748,100
5.	Indonesia	675,700
6.	United States	517,400
7.	Bangladesh	424,100
8.	Philippines	348,900
9.	Democratic Republic of the Congo	341,400
10.	Brazil	279,300

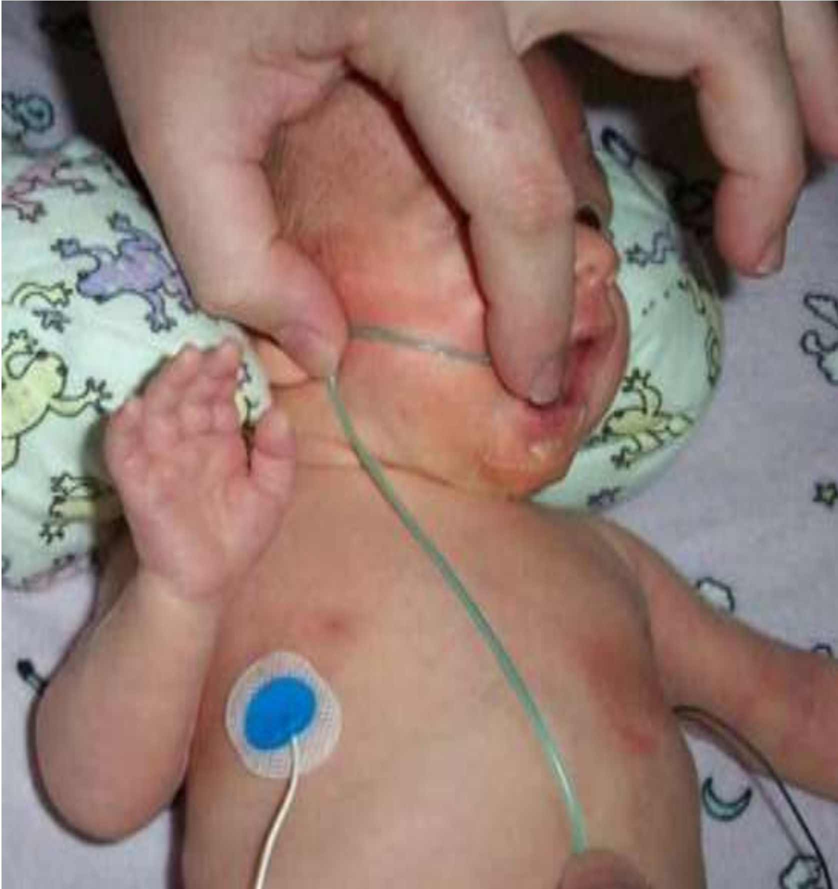
Annex (3) Mechanisms of heat Loss in the preterm neonate



Annex (4) Insertion of Naso gastric tube



Annex (5) Insertion of Oro gastric tube



Annex (6) The Panel of Experts

	Name	Institution
1.	Dr. Kawther Al-issa	Al-Quds University.
2.	Dr. Salam Alkhateeb	Al-Quds University.
3.	Dr. Maha Nahhal	Al-Quds University.
4.	Dr. Omar Almahmoud	Birzeit University.
5.	Dr. Ahmad Ayed	Arab American University.
6.	Dr. Farid Abu Shamaa’	Palestinian Ministry of Health.

I. Socio-demographic Data

Annex (7) Self-administered questionnaire

الجنس: **ذكر** **انثى**	**1.**
العمر**................سنة.**	**2.**
الحالة الاجتماعية: **اعزب/ة** **متزوج/ة** **مطلق /ة** **ارمل/ة**	**3.**
هل حصلت على شهادة دراسات عليا في تمريض حديثي الولادة؟ **نعم** **ربما** **لا**	**4.**
اذا كان الجواب نعم, فما هي درجة الشهادة؟ **ماجستير** **دبلوم عالي** **أخرى**	5.
الدرجة العلمية: **دبلوم** **بكالوريوس** **دراسات عليا**	6.
الدرجة الوظيفية: **ممرض** **رئيس قسم** **مشرف تمريض**	7.
الدخل الشهري بالشيكل: **اقل من 2000** **2500-2000** **اكثر من 2500**	8.
سنوات الخبرة: **اقل من 5** **10-5** **اكثر من 10**	9.
هل تلقيت فترة تعريفية بمهام قسم الحضانة قبل ممارسة العمل الرئيسي؟	10.

	نعم **لا**
11.	اذا كانت الاجابة نعم, حدد الفترة الزمنية: **اقل من شهر** **1-3 اشهر** **اكثر من 3 اشهر**
12.	هل حصلت على دورات خلال عملك في قسم الحضانة؟ **نعم** **لا**
13.	اذا كانت الاجابة نعم, حدد الجهة المقدمة للدورة: **جامعة داخل الضفة الغربية** **جامعة داخل القدس** **مستشفى داخل الضفة الغربية** **مستشفى داخل القدس**
14.	المدة الزمنية للدورة: **اقل من شهر** **1-3 شهور** **اكثر من 3 شهور**
15.	هل حصلت على تدريب متخصص في رعاية الاطفال الخدج؟ **نعم** **لا**
16.	اذا كانت الاجابة نعم, اذكر الجهة المقدمة للدورة: **جامعة داخل الضفة الغربية** **جامعة داخل القدس** **مستشفى داخل الضفة الغربية** **مستشفى داخل القدس**
17.	المدة الزمنية: **اقل من شهر** **1-3 شهور** **اكثر من 3 شهور**
18.	هل تحصل على برامج تعليمية بشكل مستمر لتطوير الاداء واطلاعك على كل ماهو جديد في رعاية المواليد؟ **نعم** **لا**

II. Knowledge (please select one of the following)

No.	Item of questions	Answer
1.	Definition of **preterm** neonate is	☐ Born alive before 39 weeks of pregnancy. ☐ Born alive before 37 weeks of pregnancy are completed. ☐ Don't know.
2.	**Characteristics** of preterm neonate are:	☐ Thin, shiny skin, excess lanugo hair and vernix caseosa. ☐ Dry, cracked, peeling skin, loose and wrinkled. ☐ Don't know.
3.	**Early breastfeeding** for preterm neonate is better to prevent	☐ Loss of muscle mass. ☐ Necrotizing enterocolitis. ☐ Don't know.
4.	Preterm neonate can **lose body heat** rapidly due to	☐ A lot of subcutaneous fat. ☐ Large body surface area exposed to the environment. ☐ Don't know.
5.	Preterm neonate can be fed **by bottle** if	☐ Gestation age more than 34 weeks. ☐ NICU hospitalization period more than 2 weeks. ☐ Don't know.
6.	Which signs in preterm neonate would alert the nurse to the possibility of respiratory distress?	☐ Hypotension and Acrocyanosis. ☐ Tachypnea and retractions. ☐ Don't know.
7.	Respiratory distress syndrome is caused by the deficiency of:	☐ Hyaline. ☐ Surfactant.

		☐ Don't know.
8.	Fetal lung immaturity can be promoted before delivery by maternal administration of:	☐ Prostaglandins. ☐ Dexamethasone. ☐ Don't know.
9.	Age of neonate based on the actual time in utero is the____age.	☐ Gestational. ☐ Chronological. ☐ Don't know.
10.	If preterm has RDS, what is the best position?	☐ Prone. ☐ Supine. ☐ Don't know.
11.	A nurse is providing instructions to mother regarding cord care for a preterm baby. Which statement if made by the mother indicates a ***need for further education?***	☐ Covering the stump with diaper. ☐ Fold the diaper above the cord to prevent infection. ☐ Don't know.
12.	Primary cause of jaundice in neonates is	☐ Immature liver. ☐ ABO incompatibility. ☐ Don't know.
13.	The primary means of preventing infection in preterm neonates is	☐ Hand washing. ☐ Prophylactic antibiotics. ☐ Don't know.
14.	Oxygen may produce retinopathy if preterm receiving in __________ concentration.	☐ High. ☐ Low.

		☐ Don't know.
15.	Care and management of extremely preterm neonate is delivered in the following setting:	☐ First or second level NICU. ☐ Third level of NICU. ☐ Don't know.
16.	A preterm neonate with severe jaundice (TSB 28 mg/dL) develops hypertonia, backward arching of back (Opisthotonus), and a high-pitched cry. Which complication is this neonate at greatest risk for?	☐ Skin breakdown. ☐ Kernicterus. ☐ Don't know.
17.	When a preterm is receiving I.V infusion containing Calcium gluconate, the nurse would assess the neonate for:	☐ Bradypnea. ☐ Extravasation. ☐ Don't know.
18.	35 weeks of gestation has weak cry and tremors, the nurse is aware that these are symptoms of:	☐ Respiratory distress syndrome. ☐ Hypoglycemia. ☐ Don't know.
19.	The mother of a premature neonate said: "my baby will always be small for her age". An appropriate response would be:	☐ "Preterm neonates usually remain smaller than term neonates throughout childhood." ☐ It takes about 2 years for the preterm neonate to catch up to a full term neonate." ☐ Don't know.

20.	A method of holding a neonate in upright and prone position, skin to skin on the parent's chest for a period of time is _______	☐ Kangaroo care. ☐ Moro reflex. ☐ Don't know.

II. Practices:

S.N	**Item of questions**	**Response rate**				
		Always	**Often**	**sometimes**	**Rarely**	**Never**
	Thermoregulation					
1.	Receive neonate in pre warmed radiant warmer or incubator.					
2.	Check neonate's temperature every 2 hours.					
3.	Expose as little of the preterm skin as possible during procedures.					
4.	Maintain incubator away from draught or direct cold outer walls.					
5.	Using warmer for long period procedures.					
6.	Keep port holes tightly closed when they are not used.					
7.	Maintain skin temperature probe on trunk.					
8.	Warm objects before contact with the baby such as linens and stethoscopes.					
9.	Perform care by introducing hand through portal holes as possible.					

	Respiratory function					
10.	Place monitor electrode and probe on the preterm in correct way.					
11.	Elevate the head of the bed as needed to prevent aspiration.					
12.	Check oxygen humidifier chamber every shift.					
13.	Use only the percentage of oxygen needed to relive cyanosis.					
14.	Initiate basic neonatal resuscitation as needed until the doctor arrives.					
15.	Participate in advanced neonatal resuscitation in proper way.					
	Maintain adequate nutrition					
16.	Feeding neonate by NGT before age 34 weeks of gestation.					
17.	Checking the correct position of the tube in the stomach.					
18.	Checking the residual before each feeding.					
19.	Re feed residual if the amount is less than the previous hour's volume.					
20.	Weighing the neonate every day with the same scale at the same time.					
21.	Burping the neonate frequently after during bottle feeding.					
22.	Offering pacifier for NPO neonates.					
23.	Administering feeding by gravity or pump within 15-30 minutes.					
24.	Elevating the head of the bed 30 degrees after feeding.					

25.	Observing amount and characteristics of the passed stool.					
	Photo-therapy					
26.	Covering the eyes and genitalia in proper way.					
27.	Changing eye patch every 4 hours.					
28.	Monitoring neonates' temperature frequently.					
29.	Maintain an appropriate distance between the neonate and the phototherapy.					
30.	Changing neonates's position frequently.					
31.	Maintaining hydration by I.V fluid and feeding.					
	Infection control					
32.	Performing hand washing pre and post any contact with the preterm neonate.					
33.	Each neonate has special equipment.					
34.	Regularly cleaning or changing the humidified water, I.V tubing, suction tube and monitor equipment.					
35.	Wearing personal protective equipment (gowns, gloves, etc..)					
36.	Using sterile technique during invasive procedures.					
37.	Shifting the neonate to another incubator every seven days.					
	Skin integrity					
38.	Re positioning the neonate every 2 hours.					
39	Minimizing the use of tape on the skin.					
40.	Changing the diaper as soon as possible after defection or urination.					

41.	Using waterbeds, pillows as pad pressure on prone areas to help in skin ulcer prevention.					
	Teaching and parents support					
42.	Teaching and supporting the mother in breastfeeding.					
43.	Teaching and supporting the mother about Kangaroo care.					
44.	Explaining the neonates's condition to the parents to reduce their anxiety.					
45.	Providing teaching to the parents about hygiene, follow-up and discharge plan.					

Which of the following are common barriers that you may face while providing care to preterm neonates in NICUs? (Select all that apply)

A. Lack of access to medical equipment and supplies.

B. Shortage of trained staff and high workload.

C. Poor communication or collaboration among healthcare team members.

D. Environmental factors such as noise and lighting affecting neonatal care.

E. Parental involvement constraints due to hospital policies or infrastructure.

F. Cultural and language differences between staff and families.

G. Emotional burnout or compassion fatigue among staff.

H. Inconsistent implementation of evidence-based practices.

I. Limited parental education on preterm neonate care.

Annex (8) Permission to collection data

State of Palestine Ministry of Health Education in Health and Scientific Research Unit		دولة فلسطين وزارة الصحة وحدة التعليم الصحي والبحث العلمي

Ref.: ....
Date:..................

الرقـــم: عح/١٥٧٥/٢٠٢٥
التــاريخ: [illegible]/٧/٢٠٢٥

عطوفة الوكيل المساعد لشؤون المستشفيات المحترم،،،

تحية واحترام...

الموضـــوع: تسهيل مهمة بحث

يرجى تسهيل مهمة **الطالبة: ندين جورج يوسف فريج– ماجستير تمريض الام والطفل/ جامعة القدس**، وباشراف د. عبد الله الواوي، في عمل بحث بعنوان:

(تقييم معارف وممارسات الممرضات فيما يتعلق برعاية الأطفال الخدج في وحدات العناية المركزة الأطفال حديثي الولادة في المستشفيات في جنوب ووسط الضفة الغربية.)

من خلال السماح للطالبة بجمع معلومات عن طريق تعبئة استبانة من قبل كادر التمريض بعد اخذ موافقتهم، وذلك في:

- **مستشفى مجمع فلسطين**

على ان يتم الالتزام باساليب واخلاقيات البحث العلمي، وعدم التعرض للمعلومات التعريفية للمشاركين.

على ان يتم تزويد الوزارة بنسخة PDF من نتائج البحث، التعهد بعدم النشر لحين الحصول على موافقة الوزارة على نتائج البحث.

مع الاحترام...

د. عبد الله القواسمي
رئيس وحدة التعليم الصحي والبحث العلمي

نسخة: منسقة برنامج الماجستير/ دائرة التمريض المحترمة/ جامعة القدس

Annex (9) :Ethical Approval

Al-Quds University
Jerusalem
Deanship of Scientific Research

جامعة القدس
القدس
عمادة البحث العلمي

Research Ethics Committee
Committee's Decision Letter

Date: Jan 25, 2025
Ref No: 486/REC/2025

Dears Dr. Abdallah Alwawi, Ms. Nadin Freij,

Thank you for submitting your application seeking approval for research ethics. After a thorough review of your submission titled "Evaluation of Nurses' Knowledge and Practices regarding Preterm Neonatal Care in Neonatal Intensive Care Units across Hospitals in the South & Middle of the West Bank, Palestine", the Research Ethics Committee (REC) at Al-Quds University is pleased to confirm that your application aligns with our research ethics guidelines.
Please be aware that while this approval authorizes your research, it does not replace any departmental or other necessary approvals. These may include permissions for sample shipment, data sharing, or administrative approval to distribute questionnaires.

Additionally, we kindly request that you provide us with a copy of your final research report or publication once it is available.

Thank you once again for your commitment to conducting ethical research. We extend our best wishes for a productive research endeavor that benefits your research subjects.

Please note that this ethical approval letter is valid for two years from the date of issuance.
If your research extends beyond this timeframe, a renewal request will be necessary. This approval remains valid as long as there are no changes to the data collection procedures or any aspect of the research protocol.

Sincerely,

Suheir Ereqat, PhD
Associate Professor of Molecular Biology
Suheir Ereqat
Research Ethics Committee Chair

Cc. Prof. Imad Abu Kishek - President
Cc. Members of the committee
Cc. file

Abu-Dies, Jerusalem P.O.Box 20002
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أبوديس، القدس ص.ب. 20002
تلفاكس: 2791293-02-970#

تقييم المعرفة والممارسات التمريضية المقدمة لأطفال المبتسرين "الخدج" داخل المستشفيات الحكومية والخاصة في جنوب ووسط الضفة الغربية, فلسطين

إعداد: ندين جورج يوسف فرج

إشراف: د. عبد الله الواوي

الملخص

الخلفية: تم إجراء هذه الدراسة في وحدات العناية المركزة لحديثي الولادة (NICUs) في سبعة مستشفيات حكومية وخاصة في الضفة الغربية، وهي: مستشفى الأهلي، مجمع فلسطين الطبي، مستشفىH–Clinic ، مستشفى العائلة المقدسة، مستشفى القديس يوسف، مستشفى عالية، ومستشفى بيت جالا. شملت الدراسة جميع الممرضين العاملين في هذه الوحدات، حيث بلغ عدد المشاركين 152 ممرضًا/ممرضة. بحثت الدراسة في معرفة وممارسات الممرضين فيما يتعلق برعاية المواليد الخدج، كما تناولت الفروق في مستويات المعرفة والممارسة وفقًا للعوامل الديموغرافية مثل الجنس، مكان العمل، المؤهلات الأكاديمية، وعدد سنوات الخبرة. وقد جاءت هذه الدراسة استجابةً لارتفاع معدل وفيات حديثي الولادة في فلسطين، حيث تُعد الولادة المبكرة وانخفاض وزن المولود من أبرز أسبابها. وهدفت الدراسة إلى تقييم مستوى معرفة وممارسات الممرضين الحالي، وتحديد أوجه القصور، واستكشاف العوامل المؤثرة على هذه النتائج.

المنهجية: أُستخدم في البحث تصميم وصفي مقطعي كمي، وجُمعت البيانات من خلال استبيان ذاتي تمت تعبئته من قبل المشاركين، ثم تم تحليلها إحصائيًا لقياس المعرفة والممارسة عبر مجالات مختلفة مثل تنظيم الحرارة والعلاج بالضوء. كما جرى تحليل العلاقة بين الخصائص الديموغرافية والنتائج، لتشكيل أساس للتوصيات التي تهدف إلى تحسين رعاية المواليد الخدج.

النتائج: أظهرت النتائج أن الممرضين يتمتعون بمستويات عالية من المعرفة (المتوسط = 93.1 ± 15.1) والممارسة (المتوسط = 176.6 ± 8.7) في مجال رعاية المواليد الخدج. وسجل مجال تنظيم الحرارة أعلى معدل في الممارسة (المتوسط = 47.6 ± 1.2)، بينما سجل العلاج بالضوء أقل معدل (المتوسط = 40.8

± 3.1). كما تبين أن الممرضات الإناث حصلن على درجات أعلى في المعرفة مقارنةً بالذكور، بينما لم تختلف درجات الممارسة بين الجنسين. وأظهرت النتائج أن الممرضين العاملين في المستشفيات الخاصة حصلوا على درجات معرفة أعلى مقارنةً بالعاملين في المستشفيات الحكومية، في حين كانت مستويات الممارسة متقاربة.

الخاتمة: أوصت الباحثة بضرورة إخضاع الممرضين لبرامج تدريبية متخصصة قبل البدء بالعمل في وحدات العناية المركزة لحديثي الولادة، مع التأكيد على أهمية فترة التهيئة .(orientation) كما أوصت بتنفيذ برامج تدريبية مستمرة لتحديث وتعزيز معرفة وممارسات الممرضين.

الكلمات المفتاحية: الأطفال الخدج، وحدة العناية المركزة لحديثي الولادة (NICU)، المعرفة التمريضية، الممارسات التمريضية، رعاية الأطفال الخدج.