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Assessment of Nurses' Knowledge and Practices Regarding Care Provided for Preterm Neonates in Governmental Hospitals: a Nurse's perspective

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Assessment of Nurses' Knowledge and Practices Regarding Care Provided for Preterm Neonates in Governmental Hospitals: a Nurse's perspective

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Dedication

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

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

To My beautiful grandmother Halima.

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

To my brothers and sisters Nisreen, Mohammed, Doa'a, Abrar, Waleed, Obada, promising Dr. Eshraq and Fattom, thank you for being my cheerleaders and for showing patience and tolerance with my busy schedule.

To the souls of my ancestors, martyrs brothers

To my homeland Palestine

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

All of them I dedicate this work.

Signed: ……

Bra'a K. M. Al habbash

Date: / /

Declaration

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

Signed: **……**

Baraa k. M. Alhabbash

Date…/…/….

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Abstract

Preterm neonates may be exposed to a number of life threatening problems that are associated with increased morbidity and mortality, due to failure of adjustment to extra uterine environment. Therefore, the neonatal intensive care unit should be staffed with highly qualified nurses, and advanced equipment to provide effective care with high quality performance and decrease number of neonatal deaths. The study aimed to assess nurse's knowledge and practices regarding to care of preterm neonates in governmental hospitals from nurse's perspective. The study design was quantitative, descriptive cross sectional, the study was conducted at neonatal intensive care units (NICUs) affiliated to the governmental hospitals " Al Shifa' Complex - Al Nassr Pediatric Hospital - European Gaza Hospital ". The sample consisted of all available nurses working in NICUs at the previously mentioned hospitals "a census sample". The total number of nurses was 101. The researcher used a self-administered questionnaire to collect data from study participants. The study participants' response rate were (100%). The findings of this study revealed that the mean percentages were (75.39%) for knowledge and (76.07%) for practice which were categorized as moderate level. There was significant weak correlation between nurse's knowledge and practices. There was significant differences in the nurses' knowledge and practices between their different places of work, in favor to those who are working in Al Nassr Pediatric Hospital. There was significant differences in the participants' knowledge between who received general courses in NICU and who didn't receive ($P<0.05$). There was no statistical differences in knowledge and practices related to other factors: age, gender, marital status, education level, job title, and years of work in NICU, qualification and special training courses regarding preterm during work in NICU (P-value>0.05). This study revealed that there was moderate nurses' knowledge and practices toward preterm care. The researcher recommended that: Nurses should be enrolled in special training program before starting work in NICU. Orientation period to work in NICUs is crucial. A specialized continuing education program to updating nurses knowledge and practices.

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List of Abbreviations

AAP	American Academy of Pediatrics
ANOVA	One way Analysis of Variance
CDC	Centers for Disease Control and Prevention
CPAP	Continuous positive airway pressure
FRC	Function Residual Capacity
G6PD	Glucose-6-phosphate dehydrogenase
GRs	Gastric Residuals
GNN	Gaza Neonatal Network
GS	Gaza Strip
HMD	Hyaline Membrane Disease
IgG	Immunoglobulin G
Km	Kilometer
KMC	Kangaroo Mother Care
L/S	Lecithin/Sphingomyelin
MoH	Ministry of Health
NEC	Necrotizing Enterocolitis
NG	Naso Gastric
NICU	Neonatal Intensive Care Unit
OG	Oro Gastric
OPT	Occupied Palestinian Territory
PCBS	Palestinian Central Bureau of Statistics
PHCA	Palestinian Health Information Center.
RDS	Respiratory Distress Syndrome
ROP	Retinopathy of Prematurity
SGA	Small for Gestational Age
SIDS	Sudden infant death syndrome
SPSS	Statistical Package of Social Science
TIOP	Toward Improving the Outcome of Pregnancy
WHO	World Health Organization

Chapter one: Introduction

1.1 Research Background

According to world health organization (WHO), preterm neonate is one born alive before 37 completed weeks of gestation (WHO, 2017). Preterm neonates considered a high-risk group due to their physiological immaturity and instability, which required prolonged intensive care for their survival. Major health problems stem from immaturity of body systems and the degree of this immaturity is related to gestational age (Sarapat et al., 2017). According to Centers for Disease Control and Prevention (CDC), prematurity is the leading cause of neonatal mortality as well as significant factor in mortality among children who are under five years. An estimated 15 million babies are born preterm every year, and this number is rising globally. Preterm and low birth weight accounted about 17% of infant deaths (Centers for Disease Control and Prevention, 2017). Therefore, the neonatal mortality rate is widely considered as a significant population health indicator (Blencowe et al., 2016).

Preterm neonates are at great risk for numerous problems and require special care since they remain in the uterus for short period. As the result, body systems of preterm neonates may be immature and affect the proper transition from intrauterine to the extra uterine environment and placing them at risk for complications and death (Ricci et al, 2017). Preterm neonates usually need a long period of hospitalization due to a breathing problem, feeding difficulties, temperature instabilities (hypothermia), jaundice and delayed brain development, also a preterm neonate who survives is at risk for serious lifelong health problem including cerebral palsy, blindness, hearing loss, learning disabilities, and other chronic conditions (WHO, 2017).

According to American Academy of Pediatrics (AAP), the availability of neonatal intensive care unit (NICU) improve outcomes of high-risk neonates including those born preterm (American Academy of Pediatrics, 2012). These units are specialized care units require competent staff. Nurses are one of the most important health workers in NICU, and they must be proficient in providing

nursing care to preterm neonate (Montanholi et al., 2011). In addition, the development of research and science have provided new high-tech equipment for use in NICU (Madeline et al., 2017). This created neonatal healthcare environment require nursing professionals who possess highly specialized clinical knowledge and skills to provide competent nursing care also the technical expertise to manage medical technology (Essani & Ali, 2011).

The nurse has a special role in assessing a fragile and powerless preterm neonates when they start their extra uterine life, the nurse evaluates the adequacy and inadequacy of preterm system function, also provides useful information about treatment plan, decide whether to stay in a health center or next to the family (Cetinkaya & Kusdemir, 2018). Nursing care of preterm is requiring alert, skillful, compassion and sensitive nurse. Therefore, there is a great need for updating nursing knowledge and practice toward care provided in NICU, to assure that the holistic nursing care needs of preterm neonates are met (Madeline et al., 2017).

The awareness of nurses about special aspects of care in preterm neonates is very important to prevent long-term complications in the neonate and play a significant role in quality, safety, and cost-effectiveness of care provided to a preterm neonate. Nursing care provided to preterm neonates by the competent nurse is equivalent or greater than that provided by pediatric resident house staff and physician assistants (Stanik et al., 2013). Undoubtedly, nursing care is a key factor in the high survival rates experienced by preterm neonate in their care (Michelle, 2016).

Assessing and improving the quality of nursing care is a major focus of neonatal health care (Kliegman, 2016). Therefore, the aim of this study was to assess the knowledge and practices of nursing care provided to preterm neonates admitted to the governmental hospitals in NICUs in Gaza Strip (GS). As a result, the findings of this study may be used to provide evidence to assist nurse managers, educators, and organizations for developing appropriate programs that adequately support the needs of nurses working in the NICUs.

1.2 Research Problem

Prematurity is truly a global health problem, and the complications of prematurity are considering the main leading cause of child deaths. In the low-income countries, on average, 12% of babies are born preterm compared with 9% in high-income countries (WHO, 2017). According to Palestinian ministry of health annual report, infant mortality rate in Palestine in 2016 was 10.7 per 1,000 live births. Preterm birth and low birth weight infant deaths accounted about 16.8% of infant mortality in the (GS) (MoH, 2016).

Due to work burden in NICU, the nurses have not enough time to upgrade their knowledge and practice regarding preterm care, which may lead to a possible gap in the integration of knowledge into practice. Therefore, there is a great need to assess the level of knowledge and practice among NICU nurses to strengthen vulnerability of nursing care, providing continuing education for nurses to remain up to date, maintain their competence and to meet the standards of nursing practice (Mariette & Elisabeth, 2015).

By reviewing the available academic nursing programs in GS, the researcher found that the various nursing colleges and academic institutions provide a general nursing program. No available nursing subspecialty programs concerned with neonatal nursing care. Therefore, nurses who have a bachelor's degree in nursing or even just a diploma in general nursing provide neonatal nurse care. Nursing care provided without any pre-training courses in hospital leads to weakness in nursing care outcome, as well as health worker shortages and poorly equipped facilities, and a lack of knowledge and competencies in dealing with preterm neonates lead to inadequate care for the preterm neonates (WHO, 2014).

Nurses' role in neonatal care is very essential to improve the outcome in preterm neonates. The efficiency and effectiveness of neonatal services rely on adequate numbers of well-prepared neonatal nurses working in the NICU. It has been estimated that about 70% of neonatal deaths could be prevented if simple interventions such as preventing hypothermia by maintaining warm chain, using skin-to-skin contact, kangaroo mother care, and promoting breastfeeding are

implemented effectively by the nursing personnel (WHO, 2014). Several nurse researches has shown that nurse practitioners provide safe, competent, and cost-effective care with a high degree of patient and staff satisfaction. This study tries determining the gaps in the knowledge and practice of NICU nurses in order to improve preterm neonates' health outcomes.

1.3 Justification and Significant of the study

A high quality, safe, competent, and cost-effective nursing care for preterm neonates is crucial in NICU. The associated complications of preterm increase the length of hospitalization in NICU, which require high quality nursing care. Expansion of nurse knowledge and practice are important to improve the quality of nursing care provided by new high-tech equipment in NICUs (Madeline et al., 2017). The high occupancy rates of NICU in GS increase the need for more attention and care for preterm neonates who are the most vulnerable babies stay for long periods. This study assess the knowledge and practices of NICU nurses regarding those vulnerable babies.

As a nurse in NICU, the researcher deals with many challenges in caring with preterm which include lack of standardization of nursing care, inadequate training regarding preterm care, suffering of preterm and families, the poor outcomes of preterm babies with resultant of lifelong complications. These challenges in preterm care motivate the researcher to deeply study the knowledge and practice of the most care providers for preterm; the nurses.

Therefore, the results of this study will add an important value to the nursing profession in clinical, administration, research and academic issues. These results could detect the degree of weaknesses in nursing practice, and the actual demand of specialize nursing training programs which will improve the competence of nurses' practices. As well as, these results will provide a clear view about the reality of nursing care provided to a preterm neonate, and the demand for new policies and strategies that will help in improve preterm neonates' outcomes. Also the results of this study will explore the nurses' knowledge outcome during academic study and the demand for modifying training program that offers in

colleges and universities, guide governmental and non-governmental health organizations to focus on training newly graduate nurse to provide competent nursing care. Finally, the result of the study will detect the gap between nurses' knowledge and practices and will provide important recommendations for a new research studies. Therefore, the researcher assesses nurse's knowledge and practice regarding care of a preterm neonate to strengthen vulnerability of nursing care.

1.4 Aim of the study

The overall aim of this study was to assess nurses' knowledge and practice regarding nursing care of preterm neonates admitted in NICUs at governmental hospital in GS.

1.5 Objectives of the study

1. To assess the nurses' knowledge regarding nursing care provided for preterm neonates in NICUs at governmental hospital in GS.

2. To assess the nurse's practice regarding nursing care provided for preterm neonates in NICUs at governmental hospital in GS.

3. To examine the relationship between nurses' characteristics in terms of age, gender, experience, qualification, place of working and their knowledge and practice provided to preterm neonate in NICUs at governmental hospital in GS.

4. To identify the readiness of nurses regarding nursing care provided for preterm neonates in NICUs at governmental hospital in GS.

5. To set recommendations for decision makers to improve the quality of care provided to preterm neonates in NICUs at governmental hospitals in G.S.

1.6 Research Questions of the study

1. What is the level of nurses' knowledge regarding nursing care for preterm neonates in NICUs at the governmental hospital in G.S?

2. What is the level of nurses' practice regarding nursing care for preterm neonates in NICUs at the governmental hospital in G.S?

3. Does nurses' knowledge and practice regarding nursing care for preterm neonates differ between nurses working at different NICUs at the governmental hospital in G.S?

4. Does nurses' age play a role in the level of knowledge and practices regarding nursing care provided to preterm neonates in NICUs at the governmental hospitals in G.S?

5. Does knowledge and practices regarding nursing care provided to preterm neonates in NICUs at the governmental hospitals in G.S affected by nurses' gender?

6. Does nurses' qualification affect knowledge and practices regarding nursing care provided to preterm neonates in NICUs at the governmental hospitals in G.S?

7. Is there a relationship between nurses' job title and knowledge and practices provided to preterm neonates in NICUs at the governmental hospitals in G.S?

8. Did the nurses working in NICUs of the governmental hospital at GS receive any formal or informal training before/during their working period in this area?

9. Dose formal or informal training play a role in improving the level of knowledge and practices of nurses working in NICUs at the governmental hospitals in G.S?

10. Did the nurses working in NICUs of the governmental hospital in G.S receive an orientation programme before starting work in this area?

11. Dose orientation programme before starting work play a role in improving the level of knowledge and practices of nurses working in NICUs at the governmental hospitals in G.S?

1.7 The context of the Study

The researcher provided an overview of the context where the study was performed and variables that influence the topic under the study. The context involves socio-demographic variables, economic, political and the health care system in which the study concerning with nurse's knowledge and practice regarding nursing care of preterm neonate in NICUs in Gaza GS.

1.7.1 Socio-demographic Context

The occupied Palestinian territories consists of two geographically separated areas; West Bank and the GS. GS is a narrow zone of land bounded by Egypt at south, at west by the Mediterranean Sea, and at the east and north by the occupied territories in 1948 (Annex1). GS has a total area of 365 sq. km with 46 kilometers length and 5–12 kilometers wide and representing 6.1% of the total area of the occupied Palestinian territories, with estimated population of 2 million. GS is considered as one of the most overcrowded areas in the world with a population density of 5,154 inhabitants/sq.km. GS is geographically divided into five governorates: Gaza, Mid-Zone, Khan-Younis, Rafah, and North Gaza (Palestinian Central Bureau of Statistics-PCBS, 2017).

1.7.2 Socio-economic and Political Context

In 2017 marked the 50th year of Israeli military occupation of the West Bank, including East Jerusalem, and the GS. Humanitarian needs throughout the occupied Palestinian territory remain extensive, particularly in the GS. Increase number of unemployment, low incomes, the elevated cost of living (particularly for food) resulted in continued high levels of food insecurity in the occupied Palestinian territory; 1.6 million people need health and nutrition support, and 1.9 million people require some form of protection assistance (OPT, 2015). In 2017, more deterioration in the Gaza Strip, in particular, its chronic energy crisis, exacerbating an already-fragile humanitarian situation as a consequence of the further deepening of the internal Palestinian political divide on top of the 10 years of Israeli blockade and periodic escalations of hostilities. The Gaza Strip has suffered from three wars in eight years resulted in hundreds of fatalities and thousands of injuries; and further badly affected the already weakened status of the water, sanitation, health, and power sectors in the GS (PHIC, 2017).

1.7.3 Health Care system Context

Years of low socioeconomic status, conflict and repeated attacks and Israeli siege, left the health sector across the GS lacking adequate physical infrastructure, supplies and training opportunities. Health facilities are overstretched, and service is frequently interrupted by the power crisis. These challenges further threaten the health of the population. There is also a chronic shortage of essential lifesaving drugs and medical disposables in Gaza's hospitals, where care for newborn babies, particularly those cared in intensive care Medical supplies were in very short supply and health facilities were often not able to treat the sick during the crisis. The overall bad economic status of the Palestinians in GS increases the load on the government hospitals to provide secondary care especially in case of emergency and violence. This also increases the need for efficient healthcare provision and effective clinical supervisory system to effectively managing the services (OPT, 2015).

1.7.4 Governmental Hospital Services

The main provider of secondary care in the GS is MoH. It is responsible for 13 hospitals across the five governorates and the number of hospital beds in GS is about 1593 and percent of the hospital bed per 1000 capita is about 1.4. The average occupancy rate at hospitals in the GS is about 78%. The unstable Palestinian political situation increases the load on the healthcare services in Gaza and West Bank. There is also a great load on the health care workers in the hospitals especially nurses that already undergo shortages. The total number of nurses working at governmental hospitals in GS is about 1788, and this is relatively not the satisfactory number in relation to a large number of the population served in the GS. Shortage of nursing may influence the quality of care provided and greatly stress the need for an effective clinical supervisory system in governmental hospitals. (MoH, 2010).

1.7.5 Neonatal Intensive Care Unit in Gaza Governmental Hospitals

According to the last update of Gaza Neonatal Network (GNN) in 2013, there is eight hospitals have neonatal nurse units in GS; three of this hospital (Al Shifa' Complex - Al Nassr Pediatric Hospital - European Gaza hospital) have the third level of NICUs. The total number of nurses 101 nurses " Al Nassr Pediatric Hospital (44) - Al Shifa' Complex (40) - European Gaza hospital (17) “with different academic level (Diploma, baccalaureus, Master). In addition, the total number of incubators 74, only 32 of this is intensive neonatal incubators and 18 is high dependency cots. The total numbers of admissions to NICUs per year in hospitals; Al Nassr Pediatric Hospital (1500), Al Shifa' Complex (2400), European Gaza hospital (528) (GNN, 2013).

1.8 Definition of Terms

1.8.1 Preterm Neonates:

A live born baby whose gestation period is less than 37 weeks regardless of the birth weight and admitted to NICUs at the governmental hospitals during the period of this study.

1.8.2 Knowledge:

The nurses' theoretical understanding of preterm nursing care issues acquired through education or experience and measure through the questionnaires constructed by the researcher of this study.

1.8.3 Practice

The nurses' practices application with preterm nursing care issues acquired through education or experience and measure through the questionnaires constructed by the researcher of this study.

1.9 Layout of the study

1.9.1 Chapter one (Introduction)

This chapter presents a general introduction including the problem statement, justification and significant of the study. Also the aim of study and the overall objectives and research questions of the study. Context of the study include demographic, socioeconomic political, health care system, NICUs in Gaza governmental hospitals context. Finally, operational definition discussed.

1.9.2 Chapter two (Literature review)

This chapter discuss the conceptual framework of the study, define preterm neonate, epidemiology of preterm globally, in the developed and developing country, in Arab countries and especially in Palestine. Also the characteristics and risk factors of preterm neonate. Common health problems result from prematurity, in addition to developmental care, sleep position and kangaroo care, were discussed in details. Finally, this chapter explore the teamwork in NICU and the levels of NICU.

1.9.3 Chapter three (Methodology)

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

1.9.4 Chapter four (Results and Discussion)

This chapter illustrates the results of statistical analysis of the data from 101 nurse participants, including descriptive analysis that presents the socio -demographic characteristics of the study sample and answers to the study questions. The researcher used simple statistics including frequencies, means and percentages.

Also independent sample *t* test, One-way ANOVA and Pearson correlation were used.

1.9.5 Chapter five (Conclusion and recommendations)

This chapter conclude the overall study result, an overview of the research process clearly formulate the findings and conclusions regarding the research problem. Finally, the recommendation result from this study.

Chapter Two: Literature Review

2.1 Conceptual Framework

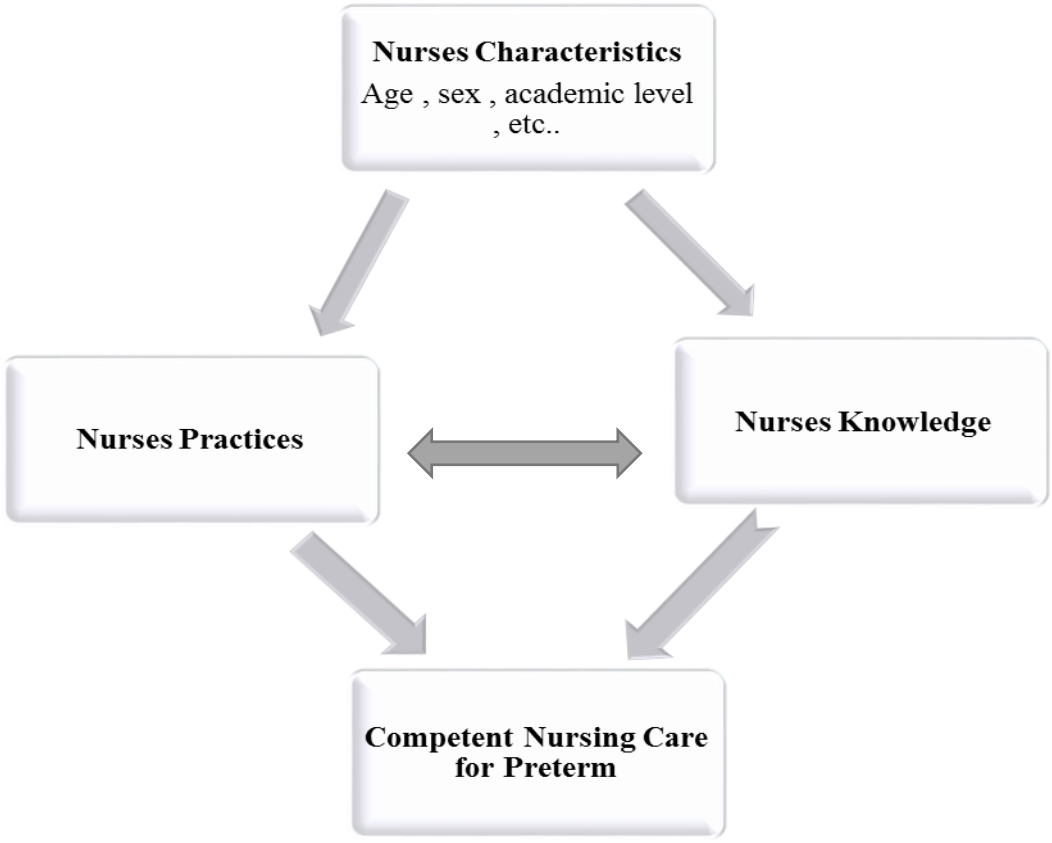

Figure2.1: Conceptual framework of the study "self-development".

This conceptual framework was developed by the researcher to illustrate the effect of three dimension; (a) Nurses Characteristics (b) Nurses Knowledge (c) Nurse practice, on providing competent nursing care for preterm neonates. The details of the framework displayed in the Figure (2.1). As depicted in the diagram that there are three major elements lead to competent nursing care among preterm. The first element is the nurse's characteristics, each of these characteristics effects on nurse's knowledge and practice in caring preterm neonates. The second element is the nurse knowledge, which consist of university study, academic qualification, and special nurse courses before and during working in the NICU. The third element is the nurse practice. The researcher suppose that the interaction between these the three elements can establish the competent nursing care toward preterm.

2.2 Background

Preterm neonates considered a high-risk group due to their physiological immaturity and instability, which required prolonged intensive care for their survival. Major health problems stem from immaturity of body systems and the degree of this immaturity is related to gestational age (Sarapat et al., 2017). Preterm neonates are at great risk for numerous problems and require special care since they remain in the uterus for short period. As the result, body systems of preterm neonates may be immature and affect the proper transition from intrauterine to the extrauterine environment and placing them at risk for complications and death (Ricci et al., 2017). The nurse has a special role in assessing a fragile and powerless preterm neonates when they start their extra uterine life, the nurse evaluates the adequacy and inadequacy of preterm system function, also provides useful information about treatment plan, decide whether to stay in a health center or next to the family (Cetinkaya & Kusdemir, 2018). Nursing care of preterm is requiring alert, skillful, compassion and sensitive nurse. Therefore, there is a great need for updating nursing knowledge and practice towered care provided in NICU, to assure that the holistic nursing care needs of preterm neonates are met (Madeline et al., 2017).

2.3 Definition of preterm

The (WHO) defines a preterm as babies whom born alive before 37 weeks of pregnancy are completed (less than 259 days). There are sub-categories of preterm birth, based on gestational age; extremely preterm (less than 28 weeks), very preterm (28 to 32 weeks) and moderate to late preterm (32 to 37 weeks) (WHO, 2017).

The mean duration of pregnancy, calculated from the first day of the last normal menstrual period, is approximately 280 days, or 40 weeks. As well as gestational age is typically measured in weeks: preterm newborn is one who born before completion of 37 weeks, a post term is one born after completion of 42 weeks. A baby born from the first day of the 38th week through 42 weeks is classified as a term newborn. The late preterm newborn (near term) is a new classification has

been added. Late preterm is one that born between 34 weeks and 36 weeks, 6 days of gestation. It is necessary to note that some similar definitions, which can mislead to the correct definition as: Small for Gestational Age (SGA), Newborns are considered SGA when their weight falls below the 10th percentile on a growth chart for gestational age. These infants can be preterm, term, or post term (Ricci et al., 2017).

2.4 Epidemiology of preterm

Globally, preterm is consider a major determinant of neonatal mortality and morbidity and has long-term adverse consequences for health (Shapiro & Lackritz, 2012). WHO estimates an important resource for assessing the level of burden of preterm birth at global, regional and national levels. Moreover, how preterm birth burden is changing over time. In addition, WHO estimates aid in development and implementation of health policies, inform resource allocation in health systems, and can be used to assess the impact of interventions (Vogel et al., 2016). Every year, an estimated 15 million babies are born preterm, and this number is rising. Globally, prematurity is the leading cause of death in children under the age of five years. In the low-income countries, on average, 12% of babies are born too early compared with 9% in high-income countries. More than 60% of preterm births occur in Africa and South Asia. The ten countries with the greatest number of preterm births (Annex 2) (WHO, 2017).

In developed countries; such as United States; according to CDC, preterm birth in the United States affected about one of every 10 infants born in 2016. African-American women had (14%) preterm birth; it was about 50 percent higher than the rate of white women (9%). Preterm birth rates decreased from 2007 to 2014. According to CDC, research shows this decrease in prematurity is due to decrease in the number of births to teens girls and young mothers. Then in 2016, the prematurity rate rose for the second straight year (CDC, 2017).

In developing countries; reliability of data and medical records usually do not exist; due to the estimates of preterm birth rate influenced by a range of factors. In Sri Lanka, neonatal deaths have been estimated be approximately 4 million

while the infant mortality rate is 11.2 per 1000 live births. Neonates are at risk for death due to various health problems, even though they have been born with average birth weights, thus, the morbidity and mortality rates in newborn infants are higher (Kumar, et al., 2014)

In Arab countries**;** half of the infant born at or less than 32 weeks (2 months early) die due to a lack of feasible, as well cost-effective care include warmth, breastfeeding, and basic care for infection control and breathing problems. There is a dramatic difference in survival of preterm neonates depending on the place of born. Data from several countries show significant variations on the contribution of preterm births to under five deaths. Deaths due to preterm birth complications as percentage of all under five deaths, Jordan 24 %, Lebanon 22%, Libya 21%, Iraq 20%, Egypt 20% and Palestine 16% (WHO, 2017).

In Palestine the reported infant mortality rate in 2016 was 10.7 per 1,000 live births; preterm birth and low birth weight accounted "24.6% in the west bank and 16.8% in the Gaza Strip "of infant deaths (MoH, 2016).

2.5 Risk factor of preterm

Factors leading to preterm birth are still not completely understood. Multifactorial elements can be the etiology of preterm birth, a complex interaction between fetal, placental, uterine, and maternal factors. The most preterm births are "spontaneous" without an identifiable cause but the genetic predisposition may increase the risk of prematurity. Strong positive correlation exists between both preterm birth and low socioeconomic status. Low socioeconomic status have higher rates of maternal under nutrition, anemia, and illness, inadequate prenatal care, drug misuse, obstetric complications, and maternal history of reproductive inefficiency (abortions, stillbirths, premature or low birth weight infants). Although other associated factors; single-parent families, teenage pregnancies, short interval between pregnancy, and mothers who have borne more than four previous children, are also encountered more frequently in such families, systematic differences in fetal growth have also been described in association

with maternal size, birth order, sibling weight, social class, maternal smoking, and other factors (Kliegman, 2016).

In highly developed countries, when maternal complications, such as anemia or hypertensive disorders, are present, the impact on preterm delivery is difficult to reduce (Morisaki, et al., 2014). In Northern Australia a new study applied, indicate that the risk factors for preterm birth were teenage motherhood, previous preterm birth, inadequate antenatal visits, having pregnancy-induced hypertension, antepartum hemorrhage or placental complications (Kildea, et al., 2017).

2.5.1 Risk factor of preterm in Palestine

Study applied in Palestine identified many risk factors lead for preterm birth in Palestinian Women. There is multi risk factors found by this study; (a) social factor as living with a nuclear family. (b) Medical factors: having a previous history of preterm birth, having a family history of preterm birth, a previous delivery by cesarean section. Having a multiple pregnancy, having a congenital gynaecological problem in the cervix, uterus and placental problems, maternal smoking, vaginal infection, Premature Rupture of Membrane, vaginal bleeding during pregnancy, a disorder caused by pregnancy mainly hypertensive disorder, a disorder associated with pregnancy such as Genitourinary tract infection, Diabetes, and renal disease. Also, (c) psychological problems during current pregnancy (Sarhan & Anini, 2015). In Gaza Stripe study applied by Abu Hamad, identified the significant risk factors for preterm birth. These risk factors include; maternal age ≥35 years, living as refugee increase risk for preterm, inadequate antenatal care, failure to gain adequate weight during pregnancy and previous history of preterm birth. Other significant maternal risk factors include; short stature, short interval between the last two pregnancies, the presence of congenital gynecological abnormalities, previous history of cesarean delivery and previous history of stillbirth (Abu Hamad, 2007).

2.6 Characteristics of preterm neonates

The nurse work with preterm neonates must be aware about common physical characteristics of preterm neonate and be able to identify any deviation from the expected. Most of preterm have low birth weight less than 5.5 pounds (2.4 kg), baby appear scrawny , head disproportionately larger than chest circumference and fontanels wide and soft with overriding sutures, soft and spongy skull bones, especially along suture lines. Preterm neonate appear poor muscle tone and flexion with minimal subcutaneous fat. Poorly formed ear pinna, with soft, pliable cartilage. Plentiful lanugo (soft, downy hair), especially over the face and back, scalp hair wooly in appearance. Preterm neonates skin appear thin, transparent with visible veins, abundant vernix caseosa, absent to a few creases in the soles and palms, eyelids are fused. Breast and nipples not clearly delineated, in genital, testes are undescended with minimal scrotal rugae in male infants; prominent labia and clitoris in female infants (Mattson & Smith, 2011).

2.7 Preterm common health problem and nursing care

Preterm complications are the most common cause of death in children aged five years or less. According to CDC, an estimated 15 million babies are born preterm every year, and this number is rising globally, preterm and low birth weight accounted about 17% of infant deaths (CDC, 2017).

Preterm neonate remain short period in utero, which lead to immature of body system, as the result affecting the newborn's transition from intrauterine to extra uterine life and facing many complication. Without full development, organ systems are not capable of functioning at the level needed to maintain extra uterine homeostasis (Ricci et al, 2017). Preterm neonates passing from a comfortable, intrauterine environment to a stressful environment including bright lights, noise, painful procedure, sleep disturbances, low temperature and the ceasing of continuous placental nourishment can adversely affect neurological development. As the result of stressful environment is linked to cognitive, motor and behavioral problems during childhood, adolescence and extend to adulthood

as low IQ score, attention deficit and hyperactivity disorder, among others (Sánchez-Rodríguez et al., 2010).

2.7.1 Respiratory Distress Syndrome (RDS)

The respiratory system is one of the last body systems to mature. Therefore, the preterm neonate is at high risk for respiratory complications. These complications affect the preterm neonate's breathing ability and adjustment to extra uterine life. One of the most complication of prematurity is respiratory distress syndrome, which develop from surfactant deficiency (Ricci et al., 2017). Respiratory distress syndrome, also known as Hyaline Membrane Disease (HMD), it is the life threatening lung disorder result from immature lung with undeveloped alveoli and insufficient level of surfactant in pulmonary. RDS remains single leading cause of morbidity and mortality in preterm infants, especially before 34 weeks gestation. Affecting about 70% of all infants born <33 weeks' gestational age (Loutfy et al., 2014).

The cause of RDS is mainly from insufficient of a protective substance called surfactant, this substance help the lungs to inflate with air and keeps the alveoli from return collapsing (Elsayed et al., 2013). Preterm neonate with RDS have poor lung compliance, they usually need for respiratory support with oxygen supplement and may need mechanical ventilation for long period, leading to interstitial edema and epithelial injury (Loutfy et al., 2014). The stem of the RDS problem is the imbalance ratio between ventilation-perfusion, which lead to hypercapnia and hypoxemia. Surfactant is a substance that fetus' lungs start production at around 26 to 34 weeks of pregnancy. Delaying birth extra time gives lung tissue chance to mature, and improves lung function of preterm neonates at birth. During the delay, mothers of preterm neonates may be prescribed steroids, which can help in speed the development of a preterm neonate's lungs. Steroids help in increase the production of surfactant (Jeenakeri & Drayton, 2009).

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.

As the result, the preterm neonates require attention by neonatal caregivers. It is important to evaluate the level of fetal lung maturity before birth, lab tests used to evaluate fetal lung maturity are Phosphatidyl Glycerol; is synthesized from mature lung alveolar cells and Lecithin/Sphingomyelin (L/S) ratio which are detected in the amniotic fluid. To establish RDS diagnosis the clinical picture of preterm and x-ray findings is necessary with other lab test (Elsayed et al., 2013).

Most neonates who show signs of RDS are quickly moved to NICU, to receive treatment from health care professionals who specialized in treating premature neonates. Management of RDS range from oxygen supplement to relive RDS symptoms, continuous positive airway pressure (CPAP) can keep the airways open, or may extend to a mechanical ventilation and surfactant therapy, especially for preterm with respiratory acidosis manifestation. Nurses play an important role in caring for preterm neonates with RDS. It is necessary to assure that all preterm neonates with RDS receive maximum supportive care which include; gentle handling, also its important to maintaining body temperature and careful fluid management, physical examination to note any early signs of RDS, count respiratory rate and asses level of grunting to assess the severity of RDS. additionally the nurse should asses the readiness of emergency equipment's for any emergency situation as the event of cardiac or respiratory arrest (Loutfy et al., 2014).

2.7.2 Apnea of prematurity

Apnea of prematurity is consider a developmental disorder, preterm gestational age inversely proportional with the frequency and severity of symptoms, especially extreme prematurity. Which occurs because of immature respiratory

control center in the brain. In particular, poor myelination of the immature brainstem, and for that reason it spontaneously improves as GA increases (Picone et al., 2014). According to study published by American Academy of Pediatrics, An apneic spell is usually defined as a cessation of breathing for 20 seconds or longer or a shorter pause accompanied by bradycardia (<100 beats per minute), cyanosis, or pallor . Apnea classified as central (cessation of breathing effort), obstructive (airflow obstruction usually at the pharyngeal level), or mixed. The majority of apneic episodes in preterm infants are mixed events, in which obstructed airflow results in a central apneic pause, or vice versa (Eric, 2016).

Nursing care given for these preterm neonates are observation and assessment the infant's response to respiratory therapy. Close observation with continuous monitoring are mandatory because a neonatal status can change rapidly. Identify the cause of preterm apnea is important for treatment and management of apnea. Although it is important to take in consideration other potential factors in treatment of apnea includes:

- Tactile stimulation. If the infant does not respond to tactile stimulation; suctioning, positioning, or bag and mask ventilation may be needed.
- Pharmacological treatment may include methylxanthines, such as caffeine or theophylline. Methylxanthines work on the central nervous system by blocking adenosine receptors, which can stimulate the respiratory drive.
- Treating the underlying cause, such as correcting metabolic imbalances, maintaining thermoregulation, etc. (Eric, 2016).

2.7.3 Temperature control in preterm neonates

Thermal stability for preterm neonate requiring special and continues attention from caregiver (Dein, 2017). Silverman et al first one report that hypothermia was associated with increased mortality in preterm infants (Jobe, 2016). In 1997, the world health organization (WHO) provided the following definitions of normothermia and hypothermia. Normal range is 36.5-37.5°C, potential cold stress 36.0-36.5°C cause for concern, Moderate hypothermia: less than 32.0-36.0°C danger, immediate warming of the baby is needed, severe hypothermia:

less than 32°C , outlook is grave and skilled care is urgently needed (WHO, 2017).

Preterm neonates experience heat loss more than heat production capabilities. These special problems in thermoregulation in preterm result from the following characteristic of preterm neonates:

- A large body surface area in comparison to body weight.
- Highly permeable skin, which leads to increased trans epidermal water loss.
- Less insulative capacity due to decreased subcutaneous fat.
- Less developed stores of brown fat.
- Decreased glycogen stores.
- The inability to take in enough calories to provide nutrients for thermogenesis and growth.
- Limited oxygen consumption when pulmonary problems exist (Eichenwald et al., 2017).

Early signs of hypothermia are the feet are cold to the touch, they become cold before any part of the body, preterm neonate demonstrate weak sucking ability - inability to nurse; reduction in activity - lethargy; and a weak cry (Eichenwald et al., 2017).

Mechanisms of heat loss in the preterm neonate mainly through their skin and respiratory tract to the environment by way of radiation, conduction, convection and evaporation (Annex 3) (Dail, 2018).

1. **Evaporation:** Heat loss by evaporation occurs when fluid (amniotic fluid, water) evaporates from the wet skin to the air. This happens if the newborn is not dried immediately after birth. It also happens later during bathing. Dry newborn immediately and thoroughly reduced heat loss by evaporation (Dail, 2018).

2. **Conduction:** Loss of body heat by conduction occurs when there is direct contact of the skin with a cooler object or surface. For example, if the infant is

placed in direct contact with a cold surface - a table, weighing scale, or rubber sheet - heat will be lost to the cold surface, particularly if the surface is metallic (Dail, 2018).

3. **Radiation:** Heat loss occurs by radiation from the infant to cooler objects in the surrounding environment, even though they are not in contact with the infant, for example if an infant in a cot is placed close to a cold wall, a window or other cold object. The colder the object or the closer it is to the infant, the greater the loss of heat by radiation (Dail, 2018).

4. **Convection:** when the newborn is exposed to cool surrounding air or to a draft from open doors, windows or fans, the transfer of heat from the newborn to air or liquid is affected by the newborn's large surface area, airflow (drafts, ventilation systems, etc.) (Dail, 2018).

3.7.3.1 Effects of cold stress in the preterm neonates:

There is a close association among temperature maintenance, oxygen consumption, and glucose utilization. Cold stress leads to increased demand of oxygen consumption, which can result in tissue hypoxia and metabolic acidosis. Metabolic acidosis result in inhibit the formation of surfactant. Norepinephrine released from brown fat can cause systemic and pulmonary vasoconstriction. Pulmonary vasoconstriction lead to increased pulmonary vascular resistance with decreased oxygen delivery to the cells and tissues. Hypothermia can lead to increased glucose consumption, and can result in exhaustion of glycogen stores. Untreated hypothermia eventually leads to altered physiology and may cause seizure or death (Roychoudhury & Yusuf, 2017).

2.7.3.2 Standard thermal care guidelines to prevent heat loss in preterm neonates immediately after delivery:

1. Maintaining the delivery room temperature at 25°C.
2. Immediately drying the infant especially the head.
3. Removing wet blankets.

4. Wrapping the infant in pre warmed blankets. It is also important to pre warm contact surfaces and minimize drafts.
5. A cap is useful in preventing significant heat loss through the scalp, although evidence suggests that only caps made of wool are effective (Dail, 2018).

3.7.3.3 Additional interventions can optimize thermoregulation include:

1. External heat sources, including skin-to-skin care.
2. A polyethylene bag used to place preterm neonates immediately after birth; the wet body is placed in the bag from the neck down.
3. A radiant warmer is necessary during resuscitation and stabilization, and heated incubator should be used for transport.
4. Preterm neonate require a thermo neutral environment in the NICU to minimize energy expenditure; the incubator should be kept at an appropriate temperature.
5. Humidification of incubators can reduce evaporate heat loss and decrease insensible water loss.
6. Open warmer beds may be used for when there is need for long period procedure.
7. Double-walled incubators not only limit radiant heat loss but also decrease convective and evaporative losses.
8. Stable preterm neonate can be dressed as soon as possible in clothes and caps and covered with a blanket (Eichenwald et al., 2017).

2.7.4 Hyperbilirubinemia in preterm

Hyperbilirubinaemia is one of the most common conditions requiring medical attention in neonate. Approximately 60% of term and 80% of preterm develop jaundice in the first week of life (Ullah, et al., 2016). Most neonate with jaundice there is no pathological disease, and this is harmless physiological jaundice. Neonatal jaundice refers to yellow coloration of the skin and the sclera of neonate that result from accumulation of bilirubin in the skin and mucous membranes. This is associated with a raised level of bilirubin in the circulation.

Hyperbilirubinaemia occurs when there is an imbalance between bilirubin production, conjugation and elimination (Queensland Health, 2017).

Bilirubin is result from a breakdown of the red cells in the blood stream. Red cell breakdown produces unconjugated bilirubin, which is mostly bound to albumin then metabolized in the liver to produce conjugated bilirubin, which then passes excreted in the stool. Unbound unconjugated bilirubin is lipid soluble and can cross the blood-brain barrier. Lifespan of red blood cells in newborn is shorter than those of adults, and concentration of red blood cells in the circulation is higher in newborns than it is in adults, in addition the metabolism, circulation and excretion of bilirubin is slower than in adults. As the result, bilirubin levels in newborn are higher than they are later in life. Thus, a degree of hyperbilirubinaemia occurring because of this normal physiological mechanism is common in newborn babies and usually harmless (Queensland Health, 2017).

2.7.4.1 Types of Hyperbilirubinemia

There is several types of hyperbilirubinemia in neonates including; physiological, pathological jaundice, jaundice due to breastfeeding or breast milk and hemolytic jaundice including three subtypes due to Rh factor incompatibility, ABO blood group incompatibility and Jaundice associated with Glucose-6-phosphate dehydrogenase (G6PD) deficiency (Ullah et al., 2016).

2.7.4.1.1 Physiological Jaundice

It is the most type of newborn hyperbilirubinemia, having no serious consequences. The major cause of jaundice is physiological immaturity, which usually appears between 24–72 hr. of age, it disappears by 10–14 days of life. Unconjugated bilirubin is the predominant form (serum level is less than 15 mg/dl) (Ullah et al., 2016).

2.7.4.1.2 Pathological Jaundice

Appearance of jaundice within 24 hr. due to increase in serum bilirubin beyond five mg/dl/day .Bilirubin levels requiring intervention, presence of clinical jaundice more than two weeks and conjugated bilirubin. This type of jaundice described as pathological jaundice (Ullah et al., 2016).

2.7.4.1.3 Breast Feeding and Breast Milk Jaundice

Breast Feeding caused by decreased frequency of breastfeeding and associated with exaggeration of physiological jaundice. Breast milk jaundice caused by certain substances in the milk of mother (Ullah et al., 2016).

2.7.4.1.4 Hemolytic Jaundice

The most common causes of hemolytic jaundice include (a) Rh hemolytic disease, (b) ABO incompatibility and (c) Glucose-6-phosphate dehydrogenase (G-6-PD) deficiency and minor blood group incompatibility (Ullah et al., 2016).

2.7.4.2 Treatment of Jaundice

Once the level of bilirubin result is known, the caregiver team will determine whether the infant requires treatment. The need for management of jaundice depends on several factors, including:

- Age of the infant.
- Weight of the baby
- Degree of prematurity
- Bilirubin level, and
- Other medical conditions.

When an infant's bilirubin concentration is high for that baby's age, weight, and degree of prematurity, treatment will be started so that the bilirubin does not continue to increase. Extremely high bilirubin levels might be dangerous because

they may cause injury to the baby's brain or nervous system. There is different options for treatment of jaundice include phototherapy (conventional, intensive), exchange transfusion, and pharmacological treatment (phenobarbitone, intravenous immunoglobulin) (Cortey, 2014).

2.7.4.2.1 Phototherapy

Phototherapy can treat hyperbilirubinemia easily without adverse effect. The efficacy of phototherapy depends on surface area exposed to phototherapy, Double phototherapy more effective than single phototherapy. To provide better effect of phototherapy should be continuous rather than intermittent phototherapy. Phototherapy should not be interrupted except during breast-feeding or nappy change (Harris, 2001).

2.7.4.2.2 Exchange Transfusion

An exchange transfusion involves removing aliquots of patient blood and replacing with donor blood in order to remove abnormal blood components and circulating toxins whilst maintaining adequate circulating blood volume. It is primarily performed to remove antibodies and excess bilirubin in isoimmune disease, the incidence of exchange transfusion is decreasing secondary to the prevention, and improved prenatal management of alloimmune haemolytic disease and improvements in the management of neonatal hyperbilirubinaemia. Through exchange transfusion, bilirubin and hemolytic antibodies are removed (Harris, 2001).

2.7.4.2.3 Pharmacological Treatment

-Phenobarbitone enhance bilirubin processing including hepatic uptake, conjugation and its excretion. The effect of phenobarbitone may be show when used for 3–5 days in a dose of 5 mg/kg. phenobarbitone effective in preterm without any significant side effects (Cortey, 2014).

-Intravenous Immunoglobulin has shown to be effective in decreasing the needs of exchange transfusion and phototherapy in babies with Rh hemolytic disease (Cortey, 2014).

2.7.5 Gastrointestinal problems

Development and maturation of the gastro-intestinal system is a continuous process that starts in early fetal life and continues even after term delivery. Understanding the gastro-intestinal development of the preterm important to the accretion of nutrients availed to the preterm, which later determines the rest of physical and neurodevelopment. Feed intolerance and necrotizing enterocolitis are common complication among preterm. (Dasgupta, 2015).

2.7.5.1 Necrotizing Enterocolitis (NEC)

This is the most common and destructive problem of the gastro-intestinal system of the preterm neonates, in this case the preterm gastrointestinal system has increased microbial reactivity, which cause inflammation leads to mucosal destruction and mesenteric hypo perfusion and eventually necrosis. There is an inverse relation between gestational age and severity NEC. A preterm born at ~27 weeks of gestation has a substantially higher risk of NEC development than preterm born at closer to 37 weeks of gestation (Niño, et al., 2016). Three key factors can lead to NEC:

1. Prematurity- incidence inversely with gestational age
2. Bacterial colonization
3. Type of feeding; mother's own milk exerts a protective role compared to formula (Niño, et al., 2016).

To confirm diagnosis of NEC abnormal X-ray can be done, which show an abnormal gas pattern characterized by a bubbly appearance of gas in the walls of the intestine (pneumatosisintestinalis), large veins of the liver, or the presence of air outside of the intestines in the abdominal cavity. A preterm neonate with NEC suddenly presents with the following gastrointestinal symptoms: feeding

intolerance (defined as the volume that remains in the stomach before the next enteral feeding) of ≥2 ml/kg or >50% of the previous feeding volume), abdominal distension, and pass bloody stools. An abdominal radiograph reveals intramural gas (pneumatosisintestinalis) as the early stages of confirmed NEC, in advanced cases of the NEC have pneumoperitoneum (Niño, et al., 2016).

2.7.5.2 Feeding problem

Suckling reflex need to development of structures and functions to it take place. In clinical practice, it is necessary to an examination of the oral part and an assessment of oral reflexes before start oral feeding. However, research suggests that the presence of oral reflexes do not necessarily indicate that the infant is ready for oral feeds. In preterm neonates, nonnutritive sucking is common type of sucking; it is the type of sucking seen when an infant is not feeding, it is generally seen as a precursor to nutritive sucking. To elicit nonnutritive sucking, a finger or pacifier is generally placed in the infant's mouth. Nutritive sucking is the type of sucking seen when an infant is feeding and results in the infant drawing milk into their mouth from the breast or bottle. Development of Suck–Swallow–Breath Coordination important to swallowing and breathing utilize a common space, and hence, prevent aspiration. Preterm neonates often immature to coordinate Suck–Swallow–Breath, which may lead to swallow preferentially at different phases of respiration. Based on research recommendation, that nurses consider delaying the start of oral feeding until infants are at least 34 weeks. Therefore, most preterm neonates will require some degree of tube feeding until they are mature enough and stable enough to feed exclusively by mouth (Pickler et al., 2015).

I. Insertion of Oro gastric / Naso gastric tube

- For naso gastric tube insertion - measure from the nose to ear lobe to midway between xiphoid process and umbilicus (Annex 4) (SKtnHR, 2018).
- For oro gastric measure from lip to ear to midpoint between xiphoid process and umbilicus (Annex 5) (SKtnHR, 2018).

Insert NG/OG gently, following anatomical curve to posterior pharynx (down and back). May be felt slight resistance when tube reaches the posterior pharyngeal wall. If not contraindicated, flex head slightly forward and have infant suck soother or older patient take small sips of water (if permitted) while continuing to advance NG/OG to premeasured depth (SKtnHR, 2018).

II. Gastric Residuals (GRs)

Gastric residuals discard or re-feed often based upon individual nurse's judgment, beliefs, and experiences as well as unit tradition. If GRs are discarded, important elements including hydrochloric acid and pepsin may also be lost. Hydrochloric acid is essential in limiting the intestinal bacterial overgrowth of intestinal bacteria, leading to intestinal inflammation and possibly increasing the risk of late onset sepsis and NEC. (Kaminski, et al., 2014)

Re feeding decisions are made based on Gastric Residuals volume, no consensus exists regarding these issue. Large variation exists regarding the definition of an abnormal Gastric Residuals volume which may be based upon the total GR volume or more commonly upon a percentage of the previous feeding. Published definitions have included 10% of the daily feeding volume, greater than 30% of the previous feeding. The most commonly cited parameter is a Gastric Residuals volume greater than 50% of a single feeding (Norman, 2017).

2.7.6 Immune system problems in preterm

Infectious diseases, especially hospital-acquired infection, are an important lead of morbidity and mortality in preterm neonates. Preterm neonates at high risk for infection due to immature defense mechanisms. There is an inverse relation between gestational age and incidence of infectious disease, so that extreme premature neonates (< 28 weeks) can show 5-10 times higher rates of infection than term newborns. Which is due to immaturity of the mechanisms of antibacterial protection of the fetus and the undeveloped bacteriostatic properties of the amniotic fluid in preterm pregnancy. Passive immunity acquired through trans placental transfusion of immunoglobulin G (IgG) during the third trimester

of gestation, therefore neonates born preterm acquired lower levels of IgG, that lead to defenseless against the spectrum of pathogens that may be resident in the NICU environment or on the hands of caregivers. In addition, preterm neonates have thin skin, which consider the first barrier from microorganisms resulting in an ineffective barrier against these pathogenic microorganisms (Aryaev et al., 2017).

Preterm during hospitalization often exposure to numerous medical treatments and invasive procedures that may increase their risk for infection. Preterm experience frequent blood drawing, frequent needle sticks, mechanical ventilation and surgical intervention. Nurse work in NICU consider the direct care giver for preterm, which may place preterm in high risk for transmitting potentially pathogenic microorganisms from nurse providing care. The result of different study found that a significant increase in bacteria on the fingertips of nurses shortly after the initiation of care. As the result the most important mean to prevent cross infection is hand washing. Nurse who fail to clean their hand before any contact with preterm spread microorganism which lead to serious critical disease (Ryan, 2012).

2.7.7 Retinopathy of Prematurity

Retinopathy of Prematurity (ROP) is a multifactorial vaso proliferative retinal disorder that increases in incidence with decreasing gestational age. Possible risk factors can lead to ROP has been consistently associated with low gestational age, low birth weight, and prolonged oxygen exposure. In addition, the potential or confirmed risk factors include lability in oxygen requirement as well as markers of neonatal illness severity, such as mechanical ventilation, systemic infection, blood transfusion, intraventricular hemorrhage, and poor postnatal weight gain. Because no early clinical signs or symptoms indicate developing ROP, early and regular retinal examination is necessary. The timing of the occurrence of ROP is related to the maturity of retinal vessels and, therefore, postnatal age. ROP is diagnosed by retinal examination with indirect ophthalmoscopy. If ROP is diagnosed, the frequency of examination depends on the severity and rapidity of the progression of the disease (Eichenwald et al., 2017).

2.7.7.1 Management of Retinopathy of Prematurity

Current treatment is not preventative but deals with the second proliferative phase and not the first phase of ROP, which sets the stage for neovascularization. The first treatment option in Phase II ROP was cryocoagulation of the avascular retina. However, today, laser photocoagulation has replaced cryotherapy in most countries. (Eichenwald et al., 2017).

2.8 Sleep Position

Sleep position in preterm neonates still a debate issue in various researcher. The prone position is associated with a higher lung volume and a better ventilation/perfusion matching (1% increase in baseline oxygenation or a 10–15% increase in FRC). The prone position is predominantly applied in neonatal intensive care units throughout the world and there is no reason to change this practice, particularly as SIDS is not an issue in these infants during their first few weeks of life in the NICU. However, soon after discharge SIDS becomes the leading cause of death. Because of this situation, *"it has become our practice to nurse all infants <32 weeks' gestation initially in the prone position, but to turn them over to the supine position approximately one week prior to discharge.*" At the same time, the nurse explain where supine is the recommended sleeping position for their baby in the home (Poets & Bodman, 2007).

2.9 Kangaroo care

Preterm neonate require special care in NICU, and may spend long time isolated in incubator until stabilization of their health status, as the result preterm separated from her mother for several days and week, and usually deprived from maternal contact (Deng et al., 2018). Kangaroo care is a technique practiced on newborn, usually preterm neonates where in the infant is held, skin to skin، with a caregiver specially her mother. This technique provide and restore sense of closeness with mother or father. Theoretically, the preterm should be kept in the skin-to-skin position for as long as possible. Continuous kangaroo care, when skin-to-skin care is practiced for more than 20 hours a day. If practiced for a few

hours a day is called intermittent kangaroo care. Responsibility of healthcare provider in kangaroo care are to teach, coach, offer expert counseling, and closely monitor the mother and her infant. Kangaroo care has physiological benefits for the preterm neonates such as thermoregulation, enhance oxygen saturation in intubated infants, KMC has a positive effect on breastfeeding and more quiet sleep. It has also been shown to work as pain treatment, at the total decrease hospitalization time (Campbell et al., 2015).

2.10 Developmental Care

Developmentally supportive care is the common philosophy in most NICUs in the United States (Vergara & Bigsby, 2004). Developmental care is defined as abroad category of interventions designed to minimize the stress placed on the infant and the family by the NICU environment. Developmental care based on the principle of understanding each infant's neurological capacities to provide interventions that are developmentally supportive, family-centered, sensitive, evidence-based, and collaborative (Barbosa, 2013).

2.11 Neonatal Intensive Care Unit

The Neonatal Intensive Care Unit is consider a therapeutic environment appropriate for treatment of the newborn in a serious condition. The fragility and powerless of these newborns lead to increasing implementation of high-risk procedures and the low tolerance to medication errors are some of the concerns of nursing professionals working in the NICU. These units are specialized branches, which require competent employees. Nurses are included among the employees working in NICUs, and they must be proficient in providing proper care to preterm newborns and the use of high-tech equipment, among other things. The availability of NICU has improved the outcomes of high-risk infants born either preterm or with serious medical or surgical conditions (Montanholi, 2011).

2.12 Teamwork in NICU

Physicians and nurses working in the NICU who are responsible for the infant's primary health care. Other professionals involved in the medical aspects of care are respiratory therapists, nutritionists, and pharmacists. Nurses are the front line in providing care for neonate and implementing care plans in the NICU. Nursing practice in NICU consists of at least three elements: Implementing nursing therapy, assisting with medical care, and collaborating with other health care providers. The interrelationship of these three components centers on improving or maintaining neonatal and family health (Kaur, 2013).

2.13 Preparedness of nurses to work in neonatal intensive care unit

Level I (well newborn nurseries) Nurseries working in this level have the least amount of nursing care and support. May be no nursery, and the baby stays with its mother to provide care, nurse occasional assessment babies and teaching mothers (AAP, 2012).

Level II Nursery is for full term infants and may for stable preterm. Has a 1:3 patient ratio, and complete care provided by nurses with occasional visits and cares from the parents. There is range of management include; intravenous therapy, respiratory support and treatment, and infant medication administration (AAP, 2012).

Level III. The highest level of nursing care, and have a 1:1, 1:2, or 1:3 patient to nurse ratio. A level-III provide care for extremely preterm and the most acute full term infants with critical condition such as critical care respiratory support, critical medication administration, and surgical procedures (AAP, 2012).

2.14 Levels of NICU

The Neonatal Intensive Care Unit is classified as a level of care according to specific criteria. Two classification mentioned by Toward Improving the Outcome of Pregnancy (TIOP). In the 1976 March (TIOP) report included criteria

that classified neonatal care into 3 levels of complexity and recommended referral of high-risk patients to centers with the personnel and resources needed for their degree of risk and severity of illness. In 1993, (TIOP) change classification from levels I, II, and III to basic, specialty, and sub-specialty, respectively, and the criteria were expanded. In 2004, the American Academy of Pediatrics (AAP) classified neonatal levels of care into three levels with subdivisions in two of the levels. Level I provided basic care; level II provided specialty care, with further subdivisions of IIA and IIB; and level III centers provided sub-specialty care for critically ill newborn infants with subdivisions of level IIIA, IIIB, and IIIC. The last updated classification consists of basic care (level I), specialty care (level II), and subspecialty intensive care (level III, level IV) (Annex 6). Each level reflects the minimal capabilities, functional criteria, and provider type required (AAP, 2012).

2.15 Summary

Preterm is neonate born alive before 37 weeks of pregnancy are completed. An estimated 15 million babies are born preterm every year (WHO, 2017). Multifactorial elements can be the etiology of preterm birth. Preterm facing many complications when starting extra trine life. Nurses are the front line in providing care for neonate and implementing care plans in the NICU. The NICU is consider a therapeutic environment appropriate for treatment of the newborn in a serious condition. NICU is classified as a level of care according to specific criteria. Nurses work in NICUs must have special preparedness to provide competent care towered preterm neonates.

Chapter Three: Methodology

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

3.1 Study Design

This is a quantitative descriptive cross-sectional study conducted to assess nurse's knowledge and practices regarding care of a preterm neonate provided by nurses working in NICUs of the governmental hospital at G.S. This design was suitable for the nature of the problem in this study, effective, less time and money consuming.

3.2 Study population

The population of this study consists of all nurses working in third level in NICUs of the governmental hospitals (Al Shifa' Complex - Al Nassr Pediatric Hospital - European Gaza hospital) at G.S. The total number of nurses working in these departments are 101 nurses " Al Nassr Pediatric Hospital (44) - Al Shifa' Complex (40) - European Gaza hospital (17) "with different academic level (Diploma, baccalaureus, Master). From different academic level diploma, baccalaureus, master (GGN, 2013).

3.3 Study setting

The setting of the study is in third level in NICUs of the governmental hospital (Al Shifa' Complex - Al Nassr Pediatric Hospital - European Gaza hospital) at G.S; these three hospital have third level of NICUs. The researcher select these three hospital as a setting of study due to these hospitals have third level NICU which necessary to provide care and management for preterm neonate.

3.4 Period of the Study

The study was conducted in the period between Jan. 2018 to Octo. 2018. after obtaining approval for the study proposal from the College of health professions at Al-Quds University, and ethical approval from Helsinki Committee. An administrative letter was sent to the department of human resource development at MoH in Sep 2018 to offer facilitation for conducting the study in MoH hospitals. Data collection have two weeks to complete in Sep. 2018. Data analysis and discussion were finished at October 2018. The study took approximately 10 month in total from its beginning

3.5 Sample size and sampling

All nurses (101) working in in third level in NICUs at the governmental hospital (Al Shifa' Complex - Al Nassr Pediatric Hospital - European Gaza hospital) in G.S, were included in the study "census sample".

3.5.1 Inclusion Criteria

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

3.5.2 Exclusion Criteria

Other nurses working at the selected governmental hospitals who does not work in the NICUs as well as nurse students and volunteers working in NICUs.

3.6 Study instruments and tools

A self-administered questionnaire constructed by the researcher based on the review of the literature and past experiences to assess the knowledge and practices of the nurses regarding care of preterm neonates at governmental hospitals in (G.S). The questionnaire validated by disseminating this questionnaire to a panel of experts.

(Annex 7). The first part of the questionnaire covered the respondent's socio-demographic information; which included gender, age, marital status, academic

level, job title, workplace, and work experience in NICU. In addition orientation period before start work in NICU, long of orientation period, general courses through your work in NICU, place of general course were received and period of general courses. As well 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 developed by the researcher to assess knowledge of the participants towards preterm neonate care. It was composed of 20-item multiple-choice questions, each item in the knowledge section of the questionnaire had three possible responses, namely True, False, and Don't know. One mark well be awarded for every correct response, zero otherwise. The total score ranged from 0-20 and it was then converted into percentage. The higher scores indicated the higher level of knowledge.

The third part of the questionnaire developed by the researchers to assess practices of the participants towards preterm neonate care. Each item in the practice section of the questionnaire had three possible responses, namely No Never = zero, Sometimes = one, and Yes, Always = two. The possible scores ranged from 0-90. These scores were then converted into a percentage. The higher scores indicated the higher level of practice.

3.7 Scoring of the questionnaire

McDonald's standard of learning outcome-measured criteria were used to categorize nurses' level of Knowledge/Practice regarding care of a preterm neonate. The level of Knowledge/Practice were categorized into five groups (McDonald, 2002): Level of Knowledge/Practice Composite percent of scores

- Very low < 60%
- Low 60% - 69.99%
- Moderate 70% - 79.99%
- High 80% - 89.99%
- Very high 90% - 100%

3.8 Validity and Reliability of the instrument

3.8.1 Content validity

The constructed questionnaires were sent to seven experts (Annex 8) to validate the questions and its relation to the domains that reflect the study. Comments of the experts were considered and modification was performed accordingly.

3.8.2 Reliability

Reliability refers to the consistency of a measure. A test is considered reliable if we get the same result repeatedly. To measure the internal consistency of the instruments, the researcher conducted “Cronbach alpha coefficient". Cronbach’s alpha reliability coefficient normally ranges between 0 and 1. However, there is actually no lower limit to the coefficient. The closer Cronbach’s alpha coefficient is to 1.0, the greater the internal consistency of the items in the scale. George and Mallery (2003) provide the following rules of thumb: If the Cronbach’s alpha coefficient > 0.9 = Excellent, – > 0.8 = Good, – > 0.7 = Acceptable, – > 0.6 = Questionable, – > 0.5 = Poor, and – < 0.5 = Unacceptable. Cronbach's Alpha equation was used to compute the reliability coefficient, it was 0.837. It is considered as good reliability coefficient. Table (3.1) shows the reliability estimated of the derived factors for the questionnaire.

Table 3.1 Reliability Statistics

Cronbach's Alpha	N of Items
.837	82

3.9 Pilot study

The researcher performed a pilot study in Al Nassr Pediatric Hospital and Al Shifa' Complex hospital after receiving the approval to perform it from the hospitals general directorate. The researcher conducted the pilot study in order to refine the methodology of the larger study by using the same subjects, settings, and methods of data collection and analysis as those used in large study as recommended by (Fitzpatrick and Wallace, 2006). Ten questionnaires for nursing

working in NICU were distributed then collected. Cronbach's Alpha equation was used to compute the reliability coefficient for both questionnaires; it was more than 0.80; it is considered as good reliability coefficient. The subjects asked to determine any ambiguity or misunderstanding in words or sentences to avoid it in the study. Some minor change and modification were performed without any effect on the main domains.

3.10 Data collection

Data were collected by using self-administered questionnaires; to assess nurse's knowledge and practices regarding care of a preterm neonate provided by nurses in NICUs of the governmental hospital in G.S. The researcher distributed the questionnaires to the participants at the working hours in the day and evening work shifts and then receiving them after completion of the questionnaires. The average time for filling the questionnaire was 20 minutes. The covering letter of the questionnaire outlined the title and the purpose of the study and the identity of the researcher.

3.11 Response Rate

The total number of target population was 101 subjects. 101 of them are positively responded with response rate of 100%.

3.12 Ethical and administrative considerations

The researcher maintained all ethical and administrative requirements to conduct this study. Approval from the School of from the College of health professions at Al-Quds University, Helsinki committee (Annex 9) and General Directorate of Hospitals at the Palestinian MoH (Annex 10) were obtained before conducting the study. Subjects under the study received guarantee of privacy and knew about voluntary participation.

3.13 Data Management

3.13.1 Data entry and statically analysis

The collected data entered into the computer software "Statistical Package for Social Sciences" SPSS program by the researcher after coding of the questions and then cleaning of the entered data. The collected data were analyzed by using the SPSS software program. After data entry and data cleaning, the researcher performed frequency distribution for all variables of the questionnaires. After that, the researcher performed recoding for continuous variables. The researcher used simple statistics including frequencies, means and percentages. Also independent sample t test, One-way ANOVA and Pearson correlation were used.

Chapter Four: Results and Discussion

This chapter illustrates the results of statistical analysis of the data from 101 nurses' participants, including descriptive analysis that presents the socio-demographic characteristics of the study sample and answers to the study questions. In this chapter, the results of this study are presented under the following headings:

1. Characteristics of the study participants

2. Levels of nurses' knowledge and practice regarding preterm neonates care.

3. The relationship between nurses' knowledge and practices towards preterm neonates

4. The relationship between socio-demographic variables and nurses knowledge and practices towards preterm neonates

4.1 Characteristics of the study participants

This section presents description of study sample socio-demographic characteristics including age of subjects, gender, marital status, education level, job position, as well as, variables about workplace, year of work in NICU, qualification and special training courses regarding preterm during work in NICU.

Table 4.1 Characteristics of the study participants (n=101)

Variables	categories	Frequency	Percent
Age	<30	42	41.6
	30 -<40	50	49.5
	≥ 40	9	8.9
	Total	101	100
Gender	Male	60	59.4
	Female	41	40.6
	Total	101	100
Marital status	Single	34	33.7
	Married	67	66.3
	Total	101	100
Education level	Diploma	20	19.8
	Bachelor	76	75.2
	Postgraduate	5	5.0
	Total	101	100
Job position	Nurse	97	96.0
	Head nurse	4	4.0
	Total	101	100

Table (4.1) shows that slightly less than the half (49.5%) of study participants' ages were at age group (30-<40). The big numbers of employees retired in the last years could explain this result, and there was no newly employment of nurses since several years. These result matched with the study result conducted by Ibrahim and Kambal (2016) who found that (60%) of the nurses were at age group (31- 40). In addition, this table shows that (59.4%) of the study participants were male, compared to (40.6%) were female. This result considered against the historical background of female dominant in nursing profession (Christensen, 2017). This result inconsistent with study conduct by Ibrahim and Kambal (2016) who found all nurses working in NICU were female. Regarding the marital status, two third of study participants (66.3%) were married. This result congruent with Issa et al. (2018) who found that most (70%) of study sample were married. Also these results show that most of the study participants (75.2%) had bachelor degree which consider positive point to provide competent care towered preterm, on the other hand that only (5%) of the study participant had postgraduate degree but not

related to pediatric field. These result similar to result of study conduct by Babeker (2015) how found that (66%) of nurses carried bachelor degree, and (22%) of sample were postgraduate level and (12%) were diploma level.

4.1.1 Workplace

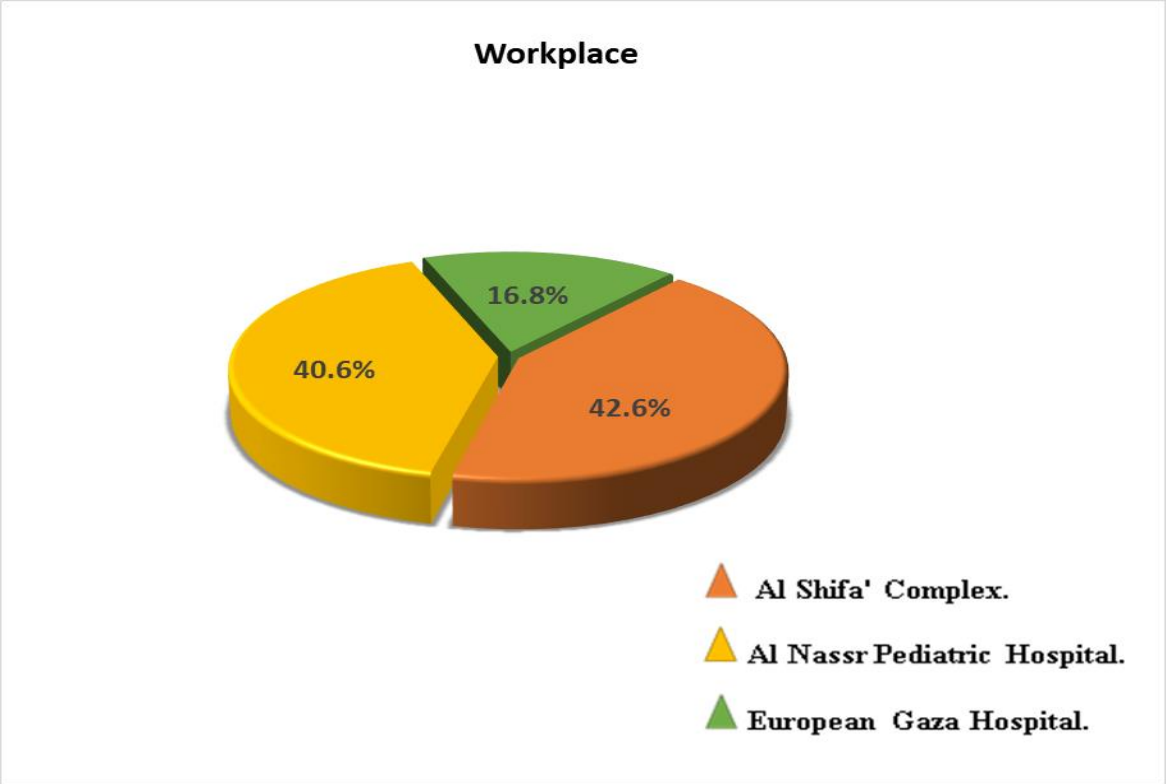

Figure 4.1: Distribution of the study participants according to workplace (n=101)

In terms of work place Figure (4.1) shows that (42.6%) of study participants were working in Al Shifa' Complex, and (40.6%) of study participants were working in Al Nassr Pediatric Hospital, and lastly (16.8%) were working in European Gaza Hospital. The distribution and number of nurses working in different hospitals depend on the occupancy ratio and the number of incubators in different NICUs. In addition, these percentages of the study participants reflect only the employed nurses.

4.1.2 Years of work in NICU

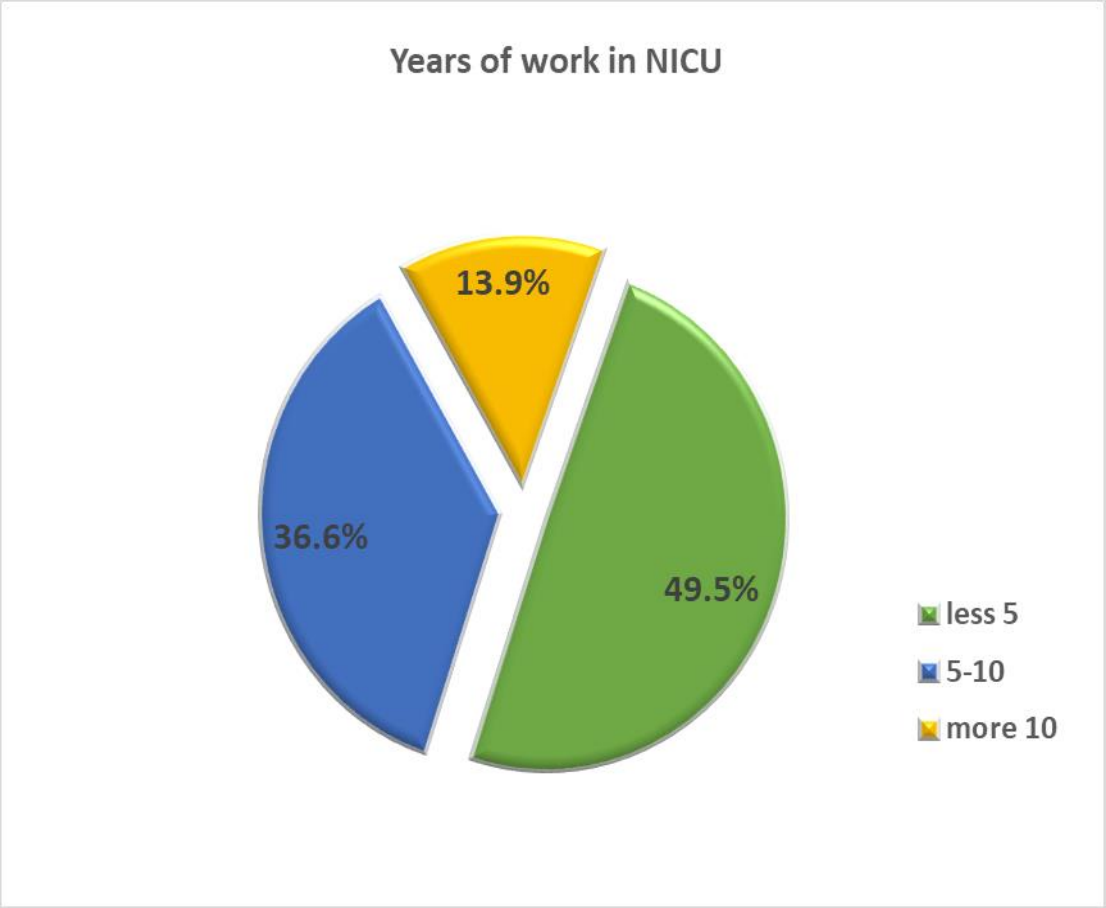

Figure 4.2: Distribution of the study participants according to work experience in NICU (n=101)

Figure (4.2) shows that (49.5%) approximately half of study participants had years of experience in NICU less than five years. This result inconsistent with study conducted by Issa et al. (2018), who found that (25%) had years of experience in NICU between one to five years. The big numbers of employees retired in the last years could explain the few years of unit experience. In addition may be result to rotating nurses from one unit to another within the hospital. This few years of study participants' experiences may be considered an important chance for building their capacities to meet practices depends on evidence based practices rather than traditional department experiences.

4.1.3 Orientation to NICUs nursing care

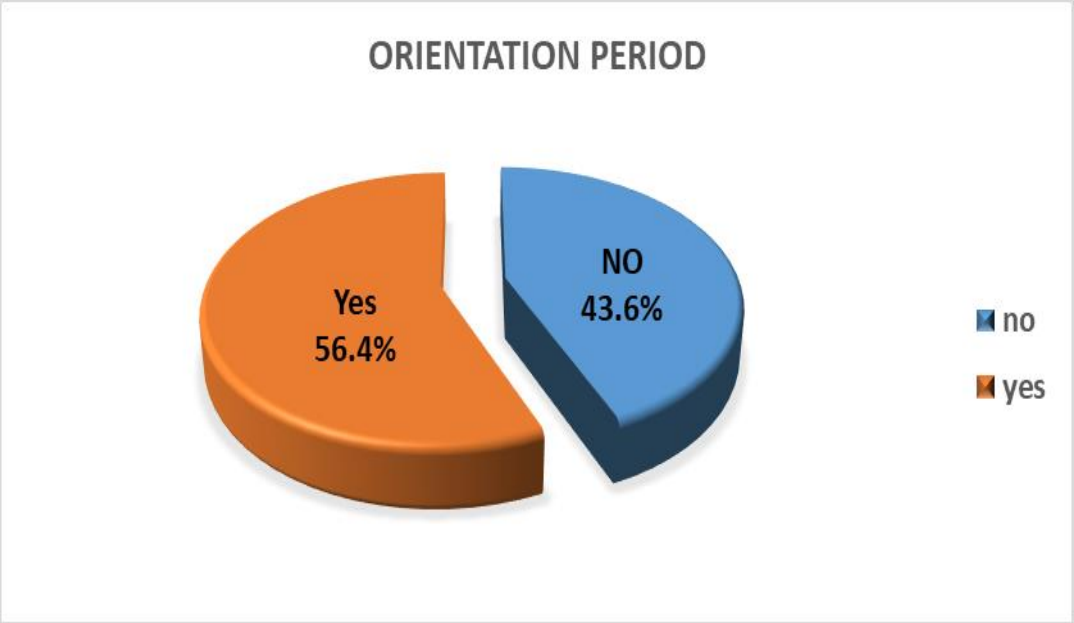

Figure 4.3: Distribution of the study participants' according to orientation to NICUs nursing care (n=101)

Figure (4.3) shows that more than the half (56.4%) of study participants received orientation period before start working in NICU, while (43.6%) of nurses didn't receive. These results congruent with WHO (2006) which stated that there was lack of orientation program prior to work. These finding may be attributed to the shortage of nurses' number, as well as increased workload in NICUs and lack of orientation program for newly employed nurses by continuing education department in the studied hospitals.

4.1.4 Participation in general courses during working in NICU

Table 4.2 Participation in general courses, place and period (n=101)

Variables	categories	Frequency	Percent
General courses during work in NICU	No	33	32.7
	Yes	68	67.3
	Total	101	100
Place of general course	University in Gaza	10	14.7
	Hospital in Gaza	53	77.9
	Hospital out Gaza	5	7.3
	Total	68	100
Period of general course	Less than 1 month	56	65.11
	1-6 months	9	13.2
	More than 6 months	3	4.4
	Total	68	100

Table (4.2) shows that two third (67.3%) of study participants received general courses during working in NICU. This result inconsistent with study conducted by Issa et al. (2018), who found that (7.5%) of nurses had a participation in training session during working in NICU. The current study results reflect availability of general training. Workload and lack of motivation may considered the cause of this percentage in participation in general courses. In addition, this table shows that above two third (77.9%) of study participants "who received general courses" received it in hospital in GS, only (7.3%) of study participants received courses in hospital out of GS. This results explained by the consequences of the siege imposed around GS and the universities in GS didn't provide this courses. However, (65.11%) of study participants received less than one month training courses. This short period of courses couldn't produce significant impact on the participants' knowledge and practices. The credit hours for both theory and practice should be increased to produce effective improvement.

4.1.5 Participation in special training for preterm care

Table 4.3 Participation in special training for preterm care, place and period (n=101)

Variables	categories	Frequency	Percent
Special training for preterm care	No	61	60.4
	Yes	40	39.6
	Total	101	100
Place of the special training for preterm care	University in Gaza	10	25
	Hospital in Gaza	26	65
	University out Gaza	1	2.5
	Hospital out Gaza	3	7.5
	Total	40	100
Period of special training for preterm care	Less 1 month	35	87.5
	1-6 month	4	10
	More 6 months	1	2.5
	Total	40	100

About participation in special training for preterm care, Table (4.3) shows that only (39.6%) of study participants received special training for preterm care, while more than the half (60.4%) of nurse's participants didn't receive. This result congruent with study conducted by Ibrahim and Kambal (2016) who found that (44%) of nurses work in NICU received training in the management of preterm neonate. On the other hand these result incongruent with study conducted by El Sharkawy, et al. (2013) who found that (12.9 %) of nurses have attended specific course training in neonatology, and the majority of them (87.1%) did not attain any course or training. In addition, this table shows that (65%) of study participants (who received special training), received it at hospital in GS, and only (7.5%) received this special training in hospital out of GS. These results explained by the consequences of the siege imposed around GS, which reflect little opportunities for exchange of experience regarding preterm management with other nurses in the other countries. However, the majority (87.5%) of study

participants received less than one month special training for preterm neonates care. This short period, of courses, couldn't produce significant impact on the participants' knowledge and practices.

4.1.6 Distribution of study participants according to participation in continuous education regarding preterm care

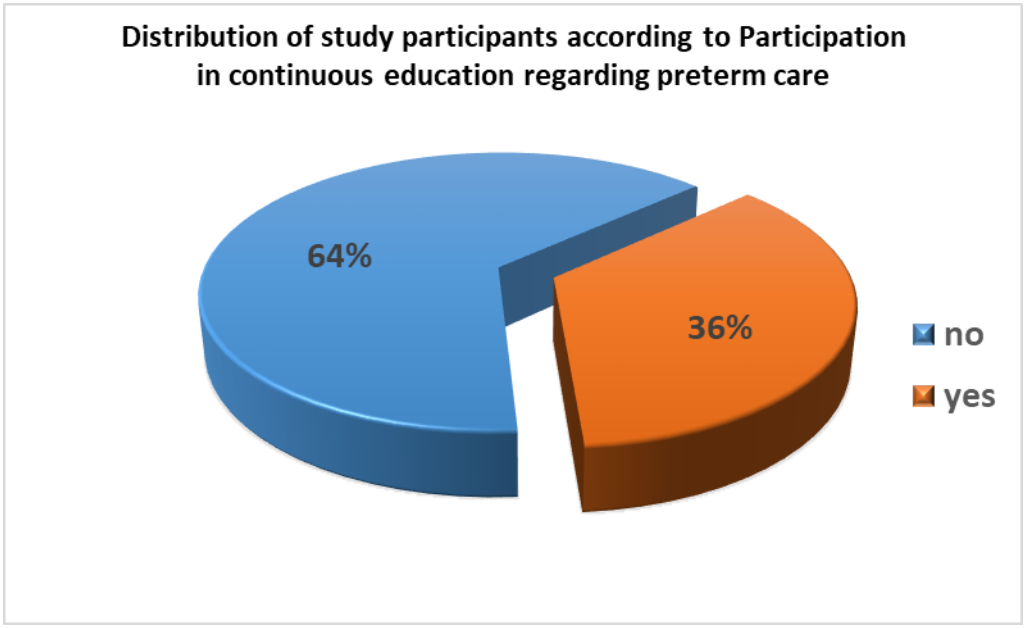

Figure 4.4 Distribution of study participants according to participation in continuous education (n=101)

The above Figure (4.4) shows that more than half (64%) of study participants hadn't engage in continuing education program to remain up to date, and the other (36%) had engage in continuing education program to remain up to date. These result incongruent with study conducted by Dhanorkar and Mathew (2015) who found that (46%) of the staffs had attended the in-service education whereas remaining (53.3%) had not attended. On the other hand, these results congruent with WHO (2006) which stated that lack of nursing care conference during work. These findings may be attributed to the shortage of nurses' number, insufficient fund to establish in-service educational programs, lack of motivation for training due to economic crisis, as well as increased workload in NICUs.

4.1.7 Distribution of study participants according to the level of knowledge and practice regarding preterm neonate care

Table 4.4 Distribution of study participants according to the level of knowledge and practice (n=101)

Categories of level	Knowledge		Practice	
	Frequency	Percent	Frequency	Percent
Very low < 60%	12	11.9 %	7	6.9 %
Low 60% - 69.99%	12	11.9 %	19	18.8 %
Moderate 70% - 79.99%	28	27.7 %	36	35.6 %
High 80% - 89.99%	28	27.7 %	34	33.7 %
Very high 90% - 100%	21	20.8 %	5	5.0%
Total	101	100.0 %	101	100.0 %

Table (4.4) shows that (76.2%) of study participants knowledge at the moderate level and above, and approximately a quarter (23.8%) at the low level and below. On the other hand, (74.3%) of study participants practice at the moderate level and above, and nearly a quarter (25.7%) at the low level and below. These results incongruent with study conducted by Joshi et al. (2018) they that found the majority (91.1%) of their study participants' knowledge at the moderate level and above. In addition, they found above the half (58.3%) of their study participants practice at the moderate level and below.

There was a great harmony between levels of participants' knowledge and practices toward preterm neonates, this corresponds to the theory that knowledge and practice have mutual effect. In addition, NICUs department considered closed area, which lead to direct interaction between the nursing staff and other different medical team. This interaction leads to the interchange of experiences and knowledge between various health disciplines and acquisition of knowledge regarding preterm care. On the other hand, it is important to explore points of weakness in the nurses' knowledge to improve in the light of evidence-based practices.

4.2 Level of nurses' knowledge and practice regarding preterm care

Table 4.5 Levels of nurses' knowledge and practice regarding preterm care

Study domains	Max score	Mean score	Mean percentage	Level category
Knowledge	20	15.07	75.39*	Moderate
Practice	90	68.47	76.07**	Moderate

***** Math by 5 X Mean score
****** Math by 1.11 X Mean score

Table (4.5) shows that the knowledge and practices mean scores of study participants were (15.07) and (68.47) respectively. The mean percentages were (75.39%) for knowledge and (76.07%) for practice which were categorized as moderate level depend on McDonald's standard.

These results approximately matched with the study conducted by Issa, et al. (2018) who found the mean score of knowledge (73.9%). Also, the result of this study congruent with Mohamed (2009) who found the total nurses' knowledge and practice regarding preterm were (70%) and (63.3%) respectively. While the results of this study inconsistent with the study conducted by Babeker (2015), who showed there was poor nurses' knowledge (42.2%) and practice (40.04%). Moreover, the result of this study inconsistent with Joshi et al. (2018) who found the mean score of knowledge in his study was (59 %) and practice (56.9%).

This moderate level of nurses' knowledge regarding preterm care, which considered not enough to provide nursing care toward preterm neonate, and reflect the need for enhancing nurses' knowledge regarding preterm care. This may be related to the lack of regular education courses and evidences supported by research, inadequate of continuous clinical supervision and evaluation. In addition, it may be due to unavailability of hospital policy or standard guidelines for preterm nursing care. Other reasons may be related to work overload, lack of nurses' incentives to improve their knowledge and lack of the desire to update knowledge. As well limited time to upgrade their knowledge and skills with current advancement in technology. In addition, from the researcher point of view, this result due to an absence incorporation of preterm care course in a nursing curriculum of the taught nursing program in colleges.

Regarding moderate level of nurses' practice, from the researcher point of view, this moderate practice level may be related to moderate level of nurses' knowledge. In addition, this result could be explained by inappropriate ratio of number of nurses to patients, lack of facilities and equipment in NICUs, and inadequate environmental space in the NICU. Also this level of practices reflect the status of training offered to nurses working in NICUs, lack of special training, short period of training courses, lack of clinical expertise, and other factors affect the impact of training offered to neonatal nurses. As well, lack of nursing care conference during work, invariability of procedure, and books especially in the studied area. Lack of supervision, and nurses' evaluation against identified standards of preterm neonates care. In addition, the Palestinian health care system, job autonomy in nursing is an evident problem, which direct the nursing care to be based on medical orders, rather than using nursing process and evidence based nursing.

4.3 The relationship between nurses' knowledge and practices towards preterm

Table 4.6 Relationship between nurses' knowledge and practices

Variable	Mean knowledge	
Mean practices	Pearson Correlation	0.343
	P-value	0.0001*

*Correlation is significant at the 0.01 level (2-tailed)

There is significant weak correlation between nurse's knowledge and nurses practices $r = (0.343)$, $p < 0.01$. These results congruent with study conducted by Joshi P. et al. (2018) they found there was good positive correlation between nurses knowledge and skills ($r = 0.68$, $p < 0.05$). In addition, these results congruent with study conducted by Borji, et al. (2018) they found there was a significant positive correlation between knowledge-skill. This result of current study demonstrates that there is no gap between nurses' knowledge and their practices. Thus, it can be said that practice is depended on knowledge of preterm neonates. To provide effective, efficient, and holistic care, nurses must rely on sound theoretical principles to develop and implement the plan of care. As

progress into the 21st century, nurse scholars, scientists, researchers, and practitioners must place theory-guided practice at the core of nursing.

4.4 The relationship between socio-demographic variables and nurses' knowledge and practices towards preterm

This section presents relationship between socio-demographic variables and nurses' knowledge and practices towards preterm including age, gender, marital status, education level, job position, as well as, variables about workplace, year of work in NICU, qualification and special training courses regarding preterm during work in NICU.

4.4.1 Age and nurses' knowledge and practices relationship

Table 4.7 Relationship between age and nurses' knowledge and practices

Variable	N	Mean (SD)	df	F*	P value
Nurses' Knowledge					
< 30 years	42	15.07(2.50)	2, 98	0.025	0.976
30 -<40 years	50	15.12(2.82)			
≥ 40 years	9	14.88(4.62)			
Nurses' Practice					
<30 years	42	68.95(9.42)	2, 98	0.310	0.734
30 -<40 years	50	68.56(9.97)			
≥ 40 years	9	65.77(20.63)			

*One-way ANOVA

Table (4.7) shows that there was no statistically significant differences in the level of nurses' knowledge and practices between their different age groups (P>0.05). These results is similar to study conduct by Joshi et al. (2018) who found that there was no association between nurses' knowledge and practices with their ages. In addition, these result congruent with the study conduct by Issa et al. (2018) who found that there was no statistically significant differences in the nurses' knowledge between their different age groups. While these result inconsistent with study conducted by Prasanna et al. (2016) who found that a significant differences in the nurses' knowledge between their different age groups.

Based on researchers' point of view, the older existing staff knowledge and practices might influence the knowledge and practice of new nurses. In clinical areas, the preferred method of learning is through observation and emulating a role model who is 'the expert' of the ward. Thus, it is disconcerting that novice nurses may follow inappropriate practices of ward staff rather than the theory taught in college. In addition, NICU considered isolated and closed area, which lead to exchange knowledge and practices between nurses worked in NICU despite their ages.

4.4.2 Gender and nurses' knowledge and practices relationship

Table 4.8 Relationship between gender and nurses' knowledge and practices

Variable	Mean (SD)		t statistics (df)	p value*
	Male	Female		
Nurses' Knowledge	14.93 (3.01)	15.29 (2.63)	- 0.618 (99)	0.538
Nurses practices	68.80 (10.59)	68.00 (11.58)	0.356 (99)	0.721

*Independent sample *t* test

Table (4.8) shows that there was no statistically significant differences in the nurses' knowledge and practice between male and female (P>0.05). These results is similar to study conduct by Joshi et al. (2018) who found that there was no association between nurses' knowledge and practice with their gender. Also this result congruent with the study conduct by Issa et al. (2018) who found that there was no statistically significant differences in the nurses' knowledge between their different gender.

4.4.3 Social status and nurses' knowledge and practices relationship

Table 4.9 Relationship between social status and nurses' knowledge and practices

Variable	Mean (SD)		t statistics (df)	*p* value*
	Single	Married		
Nurses' Knowledge	15.26(2.47)	14.98(3.05)	0.462(99)	0.645
Nurses practices	67.23(13.02)	69.10(9.79)	-0.809(99)	0.421

*Independent sample *t* test

Table (4.9) shows that there was no statistically significant differences in the nurses' knowledge and practice between single and married (P>0.05). These results is similar to study conduct by Joshi et al. (2018) who found that there was no association between nurses' skills with their social status. Also this result congruent with the study conduct by Issa et al. (2018) who found that there were no significant differences in the nurses' knowledge between their different social statuses.

4.4.4 Job position and nurses' knowledge and practices relationship

Table 4.10 Relationship between job position and nurses' knowledge and practices

Variable	Mean (SD)		t statistics (df)	p value*
	Nurse	Head nurse		
Nurses' Knowledge	15.11(2.77)	14.25(5.05)	0.589(99)	0.557
Nurses practice	68.57(10.09)	66.00(27.11)	0.190(3.034)	0.862

*Independent sample *t* test

Table (4.10) shows that there was no statistically significant differences in the nurses' knowledge and practices between nurse and head nurse (P>0.05). These results is similar to study conduct by Joshi et al. (2018) who found that there was no association between nurses' knowledge and practices with their posting in NICU.

These results could be explained by that the head nurses played managerial role and coordination the work within NICU rather than provided direct care for preterm neonates. This role of head nurses placed them distance from knowledge and practices, which lead to decrease their levels of knowledge and practices,

which may affected the quality of care provided toward preterm, and the clinical supervision role of head nurses.

4.4.5 Qualification and nurses' knowledge and practices relationship

Table 4.11 Relationship between qualification and nurses' knowledge and practices

Variable	N	Mean (SD)	df	F	P value*
Nurses' Knowledge					
Diploma	20	14.80(3.42)	2, 98	0.350	0.706
Bachelor	76	15.09(2.70)			
Postgraduate	5	16.00(3.16)			
Nurses' Practice					
Diploma	20	69.65(11.47)	2, 98	1.108	0.334
Bachelor	76	68.61(9.66)			
Postgraduate	5	61.60(23.61)			

*One-way ANOVA

Table (4.11) shows that there was no statistically significant differences in the study participants' knowledge and practices between their different qualifications (P>0.05). These result congruent with the study conduct by Mohamed (2009) who found that no statistically significant differences between "nurses knowledge and practices" and their qualification.

Based on researchers' point of view, these results could be explained by that all study participants' received their knowledge from similar sources. In addition, the nurses usually didn’t reflects their nursing education in university in their actual nursing care. After they are hired by a healthcare organization nurses are often taught “how we work here” by “older” experienced nurses. Nurses graduated from colleges by different qualification had little number of clinical hours to sharpen and brighten their hands on skills specifically related to preterm neonates. Also, the level of clinical exposure afforded to nursing students during rotations is considered typically limited by the participants because of which they lack clinical expertise. Nursing students must be adequately prepared to carry out clinical skills competently and efficiently and educators and practitioners must display the knowledge and skills required to promote theory-practice integration

to enhance nursing education, which in turn will optimize high standards of preterm care.

4.4.6 Place of work and nurses' knowledge and practices relationship

Table 4.12 Relationship between place of work and nurses' knowledge and practices

Variable	N	Mean (SD)	df	F	P value*
Nurses' Knowledge					
Al Shifa' Complex	43	14.11(3.19)	2, 98	8.026	0.001
Al Nassr Pediatric Hospital	41	16.36(2.21)			
European Gaza Hospital	17	14.41(2.23)			
Nurses' Practice					
Al Shifa' Complex	43	65.18(12.39)	2, 98	3.562	0.032
Al Nassr Pediatric Hospital	41	71.07(5.86)			
European Gaza Hospital	17	70.52(14.49)			

*One-way ANOVA

Table (4.12) shows that there was statistically significant differences in the nurses' knowledge between their different places of work (P<0.05). Tukey Post hoc was conducted to know the differences between which groups, the test shows that the difference is between the nurses' who are working in Al Shifa' Complex and Al Nassr Pediatric Hospital in favor to those who are working in Al Nassr Pediatric Hospital. In addition, the test shows that the difference is between the nurses' who are working in Al Nassr Pediatric Hospital and European Gaza Hospital in favor to those who are working in Al Nassr Pediatric Hospital. On other hand this table show there was significant differences in the nurses' practices between their different places of work (P<0.05). Tukey Post hoc was conducted to know the differences between which groups, the test shows that the difference is between the nurses' who are working in Al Shifa' Complex and Al Nassr Pediatric Hospital in favor to those who are working in Al Nassr Pediatric Hospital.

Based on researchers' point of view, the workload, occupancy ratio within different NICUs, daily work pressure as well as other factors may lead to decrease quality of care provided by nurses' toward preterm neonates. In addition, these circumstances lead to decrease nurses' ability to acquire newly knowledge and update their practices. Al Shifa' Complex had the highest occupancy ratio and

workload, which may lead to negative effect on their levels of knowledge and practices, and decrease opportunity of staff to participate in training courses. On the other hand, Al Nassr Pediatric Hospital considered an academic hospital, and had Board program, which influenced the overall management, provided toward preterm from different caregivers.

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

Table 4.13 Relationship between work experience and nurses' knowledge and practices

Variable	N	Mean (SD)	df	F*	P value
Nurses' Knowledge					
Less than 5 years	50	14.96 (2.44)	2, 98	.102	0.903
5-10 years	37	15.24 (3.04)			
More than 10 years	14	15.07 (2.86)			
Nurses' Practice					
Less than 5 years	50	68.06 (10.89)	2, 98	.850	0.431
5-10 years	37	67.70 (9.51)			
More than 10 years	14	72.00 (14.49)			

*One-way ANOVA

Table (4.13) shows that there was no statistically significant differences in the study participants knowledge between their different work experiences (P>0.05). This result is inconsistent with the study conduct by Issa et al. (2018) who found that there was statistical significant correlation between the nurses' knowledge and the years of their experiences. On the other hand this table shows that there was no statistically significant differences in the participants' practices between their different work experience (P>0.05).This result is inconsistent with the study conduct by Babeker (2015), the study showed that there was statistically highly significant relationship between the years of experiences of nurses and their performance.

These results could be explained by the larger part of the study participants had less than 5 years' work experience in NICU. Theorized that the higher scores of the nurses’ with less experience may be related to their more recent formal

education. On the other hand, the longer a nurse works in the NICU the more opportunity there may be to increase knowledge through both experience and education. In addition, NICU considered a closed area, which may lead to share knowledge and practices between the overall nurses work within the department.

4.4.8 Orientation to NICUs nursing care and nurses' knowledge and practices relationship

Table 4.14 Relationship between orientation and nurses' knowledge and practices

Variable	Mean (SD)		*t* statistics (df)	*p* value*
	No	Yes		
Nurses' knowledge	15.68(2.70)	14.61(2.92)	1.882(99)	0.063
Nurses' practice	67.86(11.35)	68.94(10.71)	-.491 (99)	0.625

*Independent sample *t* test

Table (4.14) shows that there was no statistically significant differences in the study participants knowledge and practices between who received orientation period before start work in NICU and who didn't receive (P>0.05). This result congruent with study conduct by Joshi et al. (2018) who found no association in terms of knowledge and skills of nurses with clinical training in NICU at pre-service level.

Based on researchers' point of view, the orientation period had little impact on nurses' knowledge and practices, and limited effect to short period in the beginning of employment. Also, instructors during orientation period not available, instructors should be available for at least the initial months on shifts so that if the staff nurses are busy they can come to help or guide the novice nurses in the unit. The clinical nurse monitor-ship should constantly plane continuing education for the nurses on the ward, not only when novice nurses come on the ward.

4.4.9 Participation in general courses and nurses' knowledge and practices relationship

Table 4.15 Relationship between participation in general courses and nurses' knowledge and practices

Variable	Mean (SD)		t statistics (df)	p value*
	No	Yes		
Nurses' Knowledge	14.18(2.86)	15.51(2.77)	-2.238 (99)	0.027
Nurses' practice	66.33(12.08)	69.51(10.30)	-1.375 (99)	0.172

*Independent sample *t* test

Table (4.15) shows that there was statistically significant differences in the participant knowledge between who received general courses in NICU and who didn't receive ($P<0.05$). In addition, this table shows that there was no statistically significant differences in the participant practices between who received general courses in NICU and who didn't receive ($P>0.05$).

Based on researchers` point of view, the training offered to the professionals addresses the theoretical knowledge rather than practice issues, which may bring the professionals closer to the knowledge, but distance them from the practice. Training programs should include skills development components and the opportunity for supervised practice. Routine and periodic training program must be done to all nurses' work in critical area such as NICU.

4.4.10 Participation in special courses regarding preterm in NICU nurses' knowledge and practices relationship

Table 4.16 Relationship between participation in special courses and nurses' knowledge and practices

Variable	Mean (SD)		t statistics (df)	p value*
	No	Yes		
Nurses' Knowledge	14.86 (2.93)	15.38 (2.76)	-0.810 (99)	0.420
Nurses' practice	67.72 (11.22)	69.52 (10.60)	-0.893 (99)	0.374

*Independent sample *t* test

Table (4.16) shows that there was no statistically statistically significant differences in the study participant' knowledge and practices between who received specific training regarding preterm in NICU and who didn't receive (P>0.05). This result consistent with Mohamed (2009) who found that no statistically significant differences between nurses perceived knowledge and practice and their attending to training courses regarding high risk neonates "preterm". On the other hand, these result inconsistent with Negussie et al. (2017) who found that statistically significant difference between those who trained and not trained.

The findings of the current study may be explained by the ineffectiveness of implementation training programs for health care providers in hospital settings, less frequent sessions to sustain their impact, and short period of training. In addition, the researcher suggests either that the content of preterm neonate care taught in the training course was limited or that this group of nurses had difficulty in translating theory into practice. Proper and continues monitoring and supervision of nurses' performance is essential. Routine and periodic training program must be done to all nurses' work in critical area such as NICU.

4.4.11 Participation in continuous education and nurses' knowledge and practices relationship

Table 4.17 Relationship between continuous education and nurses' knowledge and practices

Variable	Mean (SD)		t statistics (df)	p value*
	No	Yes		
Nurses' Knowledge	15.06 (2.95)	15.11(2.73)	-0.083 (99)	0.934
Nurses' practice	67.87(11.43)	69.55(10.11)	-0.736 (99)	0.464

*Independent sample *t* test

Table (4.17) show there was no statistically significant differences in the nurses' knowledge and practices between who received update program during work in NICU and who didn't (P>0.05). These result congruent with study conducted by Dhanorkar and Mathew (2015) who found that no statistically significant association between in-service education and nurses' knowledge and practices. These results could be explained by the lack of nurses' motivation due to workover loud, shortage of nurses. In addition, lack of opportunity to participation in continuous education regarding preterm care. Also, lack of availability of recent materials like books and journals in the wards so that they couldn't be utilized as references when needed during free time, to clarify some day-to-day issues.

Chapter Five: Conclusion and Recommendations

This chapter provide the main conclusion and recommendations for the decision makers to focus on improving nurses' knowledge and practices regarding care provided for preterm neonates in governmental hospitals.

5.1 Conclusion

Preterm neonates considered a high-risk group due to their physiological immaturity and instability, which required prolonged intensive care for their survival. Prematurity is the leading cause of neonatal mortality as well as significant factor in mortality among children who are under five years. The nurse has a special role in assessing a fragile and powerless preterm neonate when they start their extra uterine life; the nurse evaluates the adequacy and inadequacy of preterm system function.

This study aimed to assess nurses' knowledge and practices regarding care provided for preterm neonates in governmental hospitals. It was a quantitative descriptive cross-sectional study. Three hospitals were selected " Al Shifa' Complex - Al Nassr Pediatric Hospital - European Gaza Hospital ". The target population of this study consists of all nurses working in these three NICUs. The response rate of the study participants was 100%. The study tool was a self-administered questionnaire constructed by the researcher himself. The first part of the questionnaire covered the respondent’s demographic information. The second part of the questionnaire was composed of 20-item multiple-choice questions, each item in the knowledge section of the questionnaire had three possible responses, namely True, False, and don’t know. The third part of the questionnaire developed to measure practices of the participants towards preterm neonate care.

The study revealed that slightly less than the half (49.5%) of study participants' ages were young, at age group (30-<40). percentage of male nurses working in NICUs (59.4%) were more than females. The most of the study participants (75.2%) had bachelor degree, only (5%) had postgraduate degree. Approximately

half of study participants' had years of experience in NICU less than five years. Also, slightly above the half (56.4%) of study participants received orientation period before start work in NICU. About participation in special training for preterm care, only (39.6%) of study participants received special training for preterm care. Also little number received this special training in hospital out of GS.

The results showed that the study participants had moderate levels in knowledge and practices towered preterm neonates care, the mean percentage were (75.39%) for knowledge and (76.07%) for practices. The moderate level of nurses' knowledge regarding preterm care considered not enough and reflect the need for enhance the total nurses' knowledge regarding preterm care. Moreover, finding showed that there is significant weak correlation between nurse's knowledge and nurses' practices.

In addition, when comparing the socio-demographic variables and nurses' knowledge and practices towards preterm neonates the results shows that there were no significant relationship between most of them except participation in general courses during work in NICU and the place of work. Regarding the study participants place of work the result showed that the difference is between the nurses' who are working in Al Shifa' Complex and Al Nassr Pediatric Hospital in favor to those who are working in Al Nassr Pediatric Hospital. Also these result showed that the difference is between the nurses' who are working in Al Nassr Pediatric Hospital and European Gaza Hospital in favor to those who are working in Al Nassr Pediatric Hospital.

5.2 Recommendations

Based on findings of the current study, the researcher would emphasize many useful recommendations that may help in promoting and improving nursing care toward preterm neonates.

1. Increase number of female nurses working in NICU, female nurses have sense of mother, which is necessary to care preterm neonates.

2. Nurses should be enrolled in special training program before starting work in NICU.

3. Developing an effective orientation programe before starting work in NICU.

4. Postgraduate specialized program are needed to qualify nurses work on NICUs.

5. A continues education specialized program are needed to frequent update the knowledge and practices.

6. Advanced research studies are needed using other methodology approaches to assess and improve performance of nurses working in NICU.

7. Establishing applicable modules in nursing colleges, which can prepare nurses to work in NICU especially with preterm neonates.

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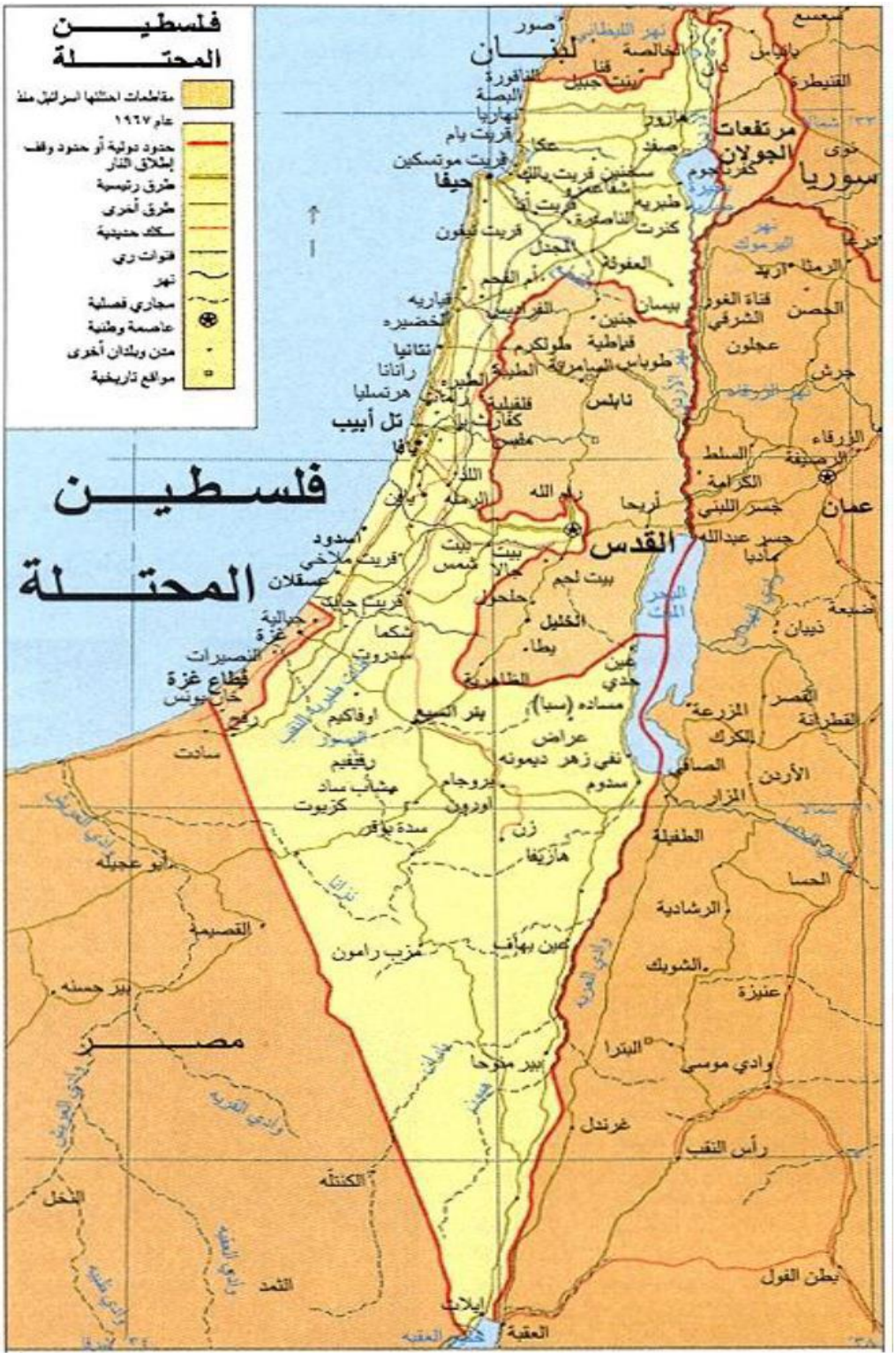
Annexes

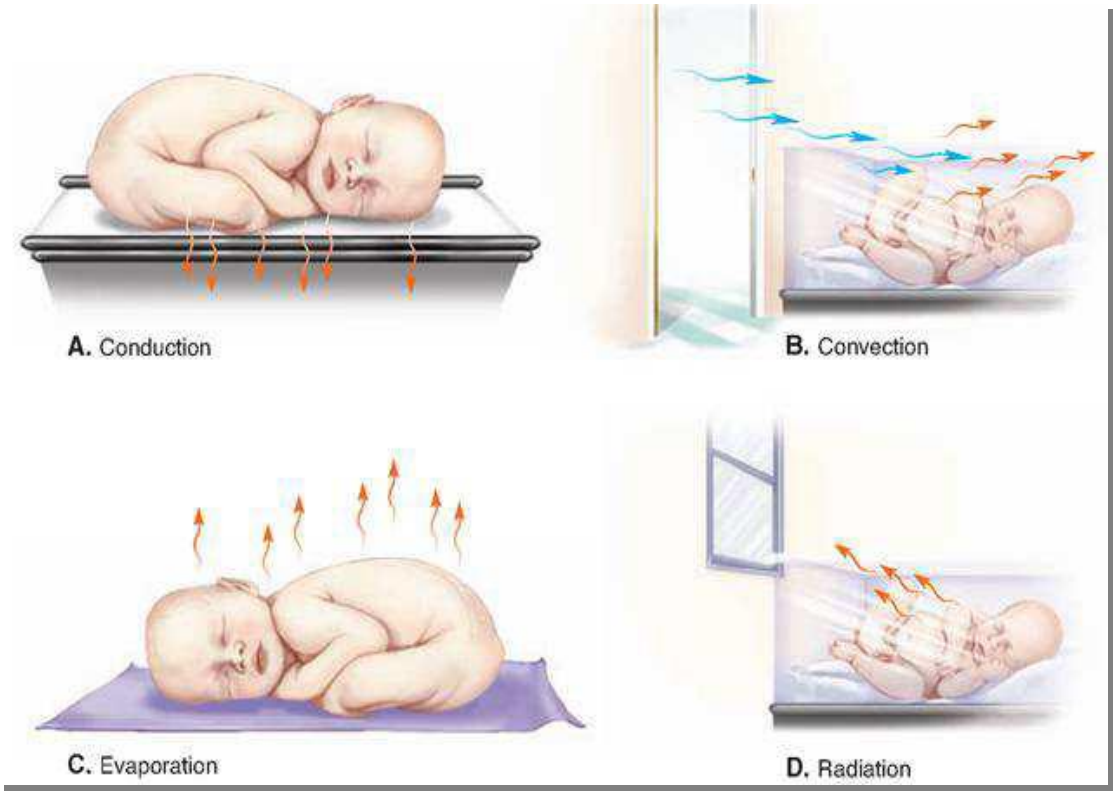
Annex (1) Palestine map, Gaza strip map and West Bank map



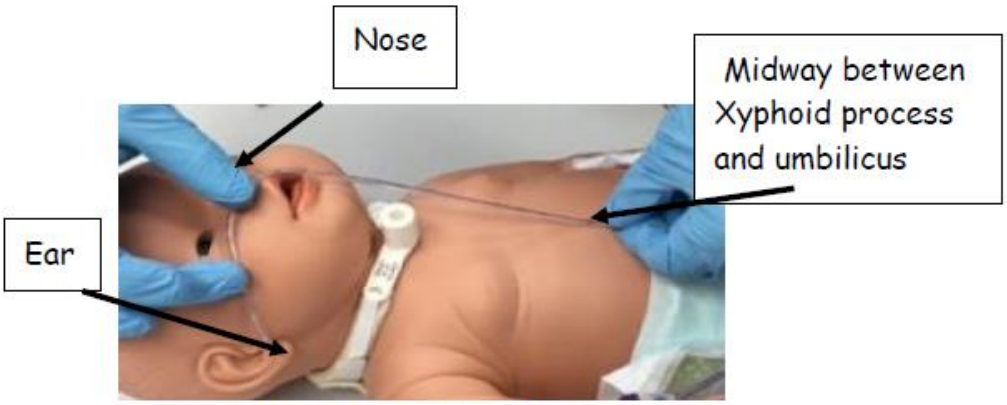
Annex (2) The greatest 10 country with preterm births

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

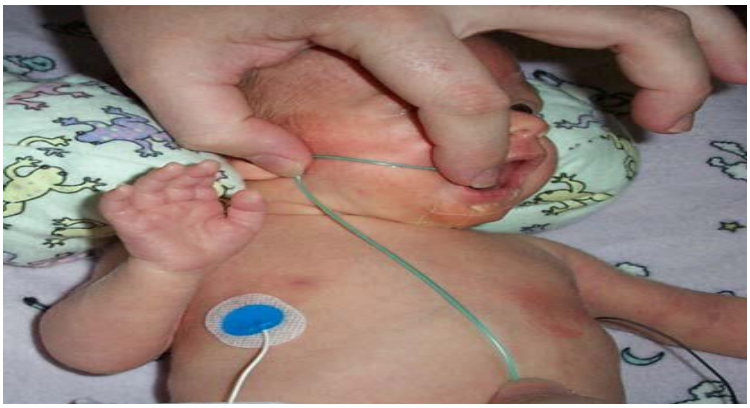
Annex (3) Mechanisms of heat Loss in the preterm neonate



Annex (4) Insertion of Naso gastric tube



Annex (5) Insertion of Oro gastric tube



Annex (6) Neonatal Levels of Care, Definitions, Capabilities, and Provider Types

Level of Care	Capabilities	Provider Types
Level I Well newborn nursery	• Provide neonatal resuscitation at every delivery • Evaluate and provide postnatal care to stable term newborn infants • Stabilize and provide care for infants born 35–37 gestation who remain physiologically stable • Stabilize newborn infants who are ill and those born at <35wk gestation until transfer to a higher level of care	Pediatricians, family physicians, nurse practitioners, and other advanced practice registered nurses
Level II Special care nursery	*Level I capabilities plus:* • Provide care for infants born ≥32 wk. gestation and weighing≥1500 g who have physiologic immaturity or who are moderately ill with problems that are expected to resolve rapidly and are not anticipated to need subspecialty services on an urgent basis • Provide care for infants convalescing after intensive care • Provide mechanical ventilation for brief duration (<24 hr.) or continuous positive airway pressure or both • Stabilize infants born before 32 wk. gestation and weighing less than 1500 g until transfer to a neonatal intensive care facility	*Level I health care providers plus:* Pediatric hospitalists, neonatologist, and neonatal nurse practitioners.
Level III NICU	*Level II capabilities plus:* • Provide sustained life support • Provide comprehensive care for infants born <32 wks. gestation and weighing <1500 g and infants born at all gestational ages and birth weights with critical illness • Provide prompt and readily available access to a full range of pediatric medical subspecialists, pediatric surgical specialists, pediatric anesthesiologists, and pediatric ophthalmologists • Provide a full range of respiratory support that may include conventional and/or high-frequency ventilation and inhaled nitric oxide • Perform advanced imaging, with interpretation on an urgent basis, including computed tomography, MRI, and echocardiography	*Level II health care providers plus:* Pediatric medical subspecialists، pediatric anesthesiologists، pediatric surgeons, and pediatric ophthalmologists.
Level IV Regional NICU	*Level III capabilities plus:* • Located within an institution with the capability to provide surgical repair of complex congenital or acquired conditions • Maintain a full range of pediatric medical subspecialists, pediatric surgical subspecialists, and pediatric anesthesiologists at the site • Facilitate transport and provide outreach education	*Level III health care providers plus:* Pediatric surgical subspecialists

Annex (7) Self-administered questionnaire

استبانة

Assessment of Nurses Knowledge and Practices Regarding Care Provided for Preterm Neonates in Governmental Hospitals: a Nurse's perspective

عزيزي/عزيزتي المشارك/ة

انا الباحث/ **براء خالد محمود الهباش** طالب ماجستير بجامعة القدس أبو ديس كلية المهن الصحية تخصص تمريض أطفال، اقوم بإجراء هذا البحث كمتطلب رئيس من متطلبات الحصول على شهادة الماجستير. إن الهدف الرئيسي لهذه الدراسة هو تقييم الجانب المعرفي والعملي للرعاية التمريضية المقدمة للأطفال –المبتسرين (الخدج) من وجهة نظر الممرضين والممرضات العاملين داخل أقسام العناية المركزة لحديثي الولادة في مستشفيات قطاع غزة الحكومية.

أثمن عاليا مشاركتكم الهامة في هذه الدراسة والتي من ممكن أن تستغرق حوالي 20 دقيقة. مع العلم أن المشاركة اختيارية ولك حق الانسحاب متى تشاء مع ضمان سرية المعلومات المقدمة. وإن هذا البحث لن يستخدم إلا لأغراض البحث العلمي فقط.

يرجي اجابة جميع الاسئلة الواردة في الاستبانة وفقاً لما لديك من معرفة وممارسة عملية.

ولكم جزيل الشكر والتقدير

الباحث / براء الهباش

جوال رقم: 0599738982

I. Socio-Demographic Data

1.	**العمر: ..... سنة**			
2.	**الجنس**	☐ ذكر	☐انثى	
3.	**الحالة الاجتماعية**	☐ غير متزوج	☐ متزوج	☐ أرمل / ة ☐ مطلق/ ة
4.	**الدرجة العلمية**	☐ دبلوم	☐ بكالوريوس	☐ دراسات عليا
5.	**الدرجة الوظيفية**	☐ ممرض	☐ رئيس قسم	☐ مشرف تمريض
6.	**الدخل الشهري بالشيكل**	☐ أقل من 1000	☐ 1000- 2500	☐ أكثر من 2500
7.	**مكان العمل**	☐ حضانة مجمع الشفاء	☐ حضانة مستشفى النصر	☐ حضانة مستشفى الأوروبي
8.	**سنوات الخبرة داخل قسم عناية الحضانة للمواليد**	☐ أقل من 5	☐ 5 – 10	☐ أكثر من10
9.	**هل تلقيت فترة تعريفية بمهام العمل بقسم عناية الحضانة قبل ممارسة العمل كموظف أساسي؟** ☐ نعم ☐ لا			
10.	إذا كانت الإجابة " نعم " حدد الفترة الزمنية؟	☐ اقل من شهر	☐ 1 -3 شهر	☐ أكثر من 3 شهور
11.	**هل حصلت على دورات خلال عملك في قسم عناية الحضانة؟**		☐ نعم	☐ لا
12.	إذا كانت الاجابة " نعم " حدد الجهة المقدمة لدورة:			
	جامعة داخل قطاع غزة	مستشفى داخل قطاع غزة	جامعة خارج قطاع غزة	مستشفى خارج قطاع غزة
13.	المدة الزمنية لدورة:	☐ اقل من شهر	☐ 1- 6 شهور	☐ أكثر من 6 شهر
14.	**هل حصلت على تدريب متخصص في رعاية الأطفال الخدج؟**		☐ نعم	☐ لا
15.	إذا كانت الاجابة " نعم " اذكر الجهة المقدمة لدورة:			
	جامعة داخل قطاع غزة	مستشفى داخل قطاع غزة	جامعة خارج قطاع غزة	مستشفى خارج قطاع غزة
16.	المدة الزمنية:	☐اقل من شهر	☐ 1- 6 شهور	☐ أكثر من 6 شهر
17.	**هل تحصل على برامج تعليمية بشكل مستمر لتطوير الاداء واطلاعك على كل ما هو جديد في رعاية المواليد؟** ☐ نعم ☐ لا			

II. Knowledge **(please select one of the following)**

No	**Item of questions**	**Answer**
1.	Definition of **preterm** baby is	☐ Born alive before 39 wks. of pregnancy. ☐ Born alive before 37 wks. of pregnancy. ☐ Don't know
2.	**Characteristics** of preterm baby are	☐ Thin,shiny skin, excess lanugo hair & vernix caseosa. ☐ Dry, cracked, peeling skin, loose and wrinkled. ☐ Don't know
3.	**Early breast feeding** for preterm baby is better to prevent	☐ Loss of muscle mass ☐ Necrotizing enterocolitis. ☐ Don't know
4.	Preterm baby can **lose body heat** rapidly because	☐ A lot of subcutaneous fat ☐ Large body surface area in comparison to body Wt. ☐ Don't know
5.	Preterm baby can be fed **by bottle** if	☐ Gestation more than 34 weeks ☐ Stayed in NICU more than 2 weeks. ☐ Don't know
6.	Which signs in preterm infant would alert the nurse to the possibility of **respiratory distress**?	☐ Hypotension and Acrocyanosis ☐ Tachypnea and retractions ☐ Don't know
7.	**Respiratory distress syndrom**e is caused by deficiency of:	☐ Hyaline. ☐ Surfactant. ☐ Don't know
8.	**Fetal lung maturity** can be accelerated before delivery by maternal administration of:	☐ Prostaglandins. ☐ Dexamethasone. ☐ Don't know
9.	**Age of a neonate** based on the actual time in utero is the _____ age.	☐ Gestational ☐ Chronological ☐ Don't know
10.	Please select the best **sleep position** for premature infants in NICU	☐ 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?**	☐ Alcohol may be used to clean the cord. ☐ Fold the diaper above the cord to prevent infection. ☐ Don't know
12.	Primary causes of **jaundice** in	☐ Immature liver

	preterm newborns are	☐ ABO incompatibility ☐ Don't know
13.	The primary means of **preventing infection** in preterm infant 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 infant delivered in the following **setting:**	☐ First or second level NICU ☐ Third level NICU ☐ Don’t know
16.	A preterm infant has a **yellow skin color** and a rising bilirubin level. The nurse is aware that this infant is at risk for …	☐ Skin breakdown. ☐ Kernicterus ☐ Don’t know
17.	When a preterm is receiving an intravenous infusion containing **calcium gluconate**, the nurse would assess this infant for	☐ Bradypnea. ☐ Extravasation ☐ Don’t know
18.	35 weeks of gestation has **a tremor and a weak cry.** The nurse is aware that these are symptoms of:	☐ Respiratory distress syndrome. ☐ Hypoglycemia. ☐ Don’t know
19.	The mother of premature infant said, “my baby will always be small for her age.” An appropriate nursing response would be:	☐ "Preterm infants usually remain smaller than term infants throughout childhood." ☐ "It takes about two years for the preterm infant to catch up to a full-term infant." ☐ Don’t know
20.	Method of holding an infant 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

III. Practices

Instruction -Please! Read the following practice items and put (√) mark under the column of the option (No never, Sometimes, Yes always) you select according to what you do for each items. Only one option is possible for each question

S.N	Item of questions	Response rate		
		No, Never	**some times**	**Yes, Always**
	Thermoregulation			
1.	Receive baby in a pre-warmed radiant warmer or incubator.			
2.	Check infant temperature every 2 hours.			
3.	Expose as little of the preterm skin as possible during procedures			
4.	Maintain incubator away from draught or direct or cold outer walls			
5.	Using warmer for long period procedure.			
6.	Keep portholes tightly closed when they are not used			
7.	Maintain skin temperature probe on trunk.			
8.	Warm objects contact with infant, such as stethoscopes, linens. etc.			
9.	Perform care by introducing hand through portal holes as possible			
	Respiratory function			
10.	Place monitor electrode and probe on the preterm on 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 necessary to relive cyanosis			
14.	Initiate basic neonatal resuscitation as need until Dr. arrive			
15.	Participate in advance neonatal resuscitation in proper way.			
	Maintaining Adequate Nutrition			
16.	Feeding infant by NGT before age of 34 weeks of gestation.			
17.	Check the correct position of the tube in the stomach.			
18.	Check residual before each feeding.			
19.	Re feeding residual if less 1hour volume			
20.	Weight baby daily with same scale at the same time			
21.	Burp infant frequently during bottle feeding			
22.	Offer Pacifier for NPO infant.			
23.	Administer feeding by gravity or pump within 15-30 min.			
24.	Elevating the head of the bed 30 degrees after feeding			
25.	Observe amount and characteristic of passed stool.			

	Photo-therapy			
26.	Cover eyes and genitalia on proper way			
27.	Change eye patch every 4hours.			
28.	Monitor infant temperature frequently.			
29.	Maintain appropriate distance between infant and phototherapy			
30.	Turn infant position frequently			
31.	Maintain hydration by I.V fluid and feeding			
	Item of questions	**Response rate**		
	Infection control	**No, Never**	**some times**	**Yes, Always**
32.	Perform hand washing before and after any contact with infant.			
33.	Each baby has especial equipment			
34.	Regular cleaning or changing of humidifier water, IV tubing, and suction, respiratory, and monitoring equipment.			
35.	Wear personal protective equipment (gown, gloves etc.)			
36.	Use sterile technique with invasive procedure			
37.	Shifted baby to another incubator every seven days			
	Skin Integrity			
38.	Re positioning the newborn every 2 hours			
39.	Minimize the use of tape on the skin			
40.	Changing the diaper as soon as possible after soiling			
41.	Using waterbeds, pillows as pad pressure on prone areas to help prevent skin ulcer			
	Teaching and parents support			
42.	Teaching mother about breastfeeding.			
43.	Teaching and help mother about kangaroo position.			
44.	Explain baby condition to the parents to reduce their anxiety.			
45.	Explain to the parent’s environmental hygiene, follow-up plan, and high alert problem before discharge.			

Annex (8) Name of panels of expert

1. Dr. Sherine Abed (Al Nassr Pediatric Hospital)
2. Dr. Enas Abo mailaq (Al Nassr Pediatric Hospital)
3. Dr. Raed Mahdi (Al Nassr Pediatric Hospital)
4. Dr. Mohammed Al Anqar (Al Nassr Pediatric Hospital)
5. Mr. Ramadan Hassan (Al Nassr Pediatric Hospital)
6. Dr. Mohamed Aljerjawy (Palestine College of Nursing)
7. Dr. Ali alkhteab. (University Collage of Applied Science)

Annex (9) Helsinki committee for ethical approval

المجلس الفلسطيني للبحث الصحي

Palestinian Health Research Council

تعزيز النظام الصحي الفلسطيني من خلال مأسسة استخدام المعلومات البحثية في صنع القرار

Developing the Palestinian health system through institutionalizing the use of information in decision making

Helsinki Committee
For Ethical Approval

Date: 05/02/2018 **Number:** PHRC/HC/318/18

Name: BRAA K. ALHABBASH الاسم:

We would like to inform you that the committee had discussed the proposal of your study about:

نفيدكم علماً بأن اللجنة قد ناقشت مقترح دراستكم حول:

Assessment of Nurses Knowledge and Practices Regarding Care Provided for Preterm Neonates in Governmental Hospitals: a Nurses perspective

The committee has decided to approve the above mentioned research. Approval number PHRC/HC/318/18 in its meeting on 05/02/2018

و قد قررت الموافقة على البحث المذكور عاليه بالرقم والتاريخ المذكوران عاليه

Signature

Member **Member**

5/2/2018

Chairman

Genral Conditions:-

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

Specific Conditions:-

E-Mail:pal.phrc@gmail.com

Gaza - Palestine غزة - فلسطين

شارع النصر - مفترق العيون

Annex (10) Permission to collection data

State of Palestine
Ministry of health

دولة فلسطين
وزارة الصحة

التاريخ:18/09/2018
رقم المراسلة 244062

السيد : رامي عيد سليمان العبادله المحترم

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

السلام عليكم ,,,

الموضوع/ تسهيل مهمة الباحث//براء الهباش

التفاصيل //
بخصوص الموضوع أعلاه، يرجي تسهيل مهمة الباحث/ **براء خالد الهباش**
الملتحق ببرنامج ماجستير تمريض الأطفال - كلية الصحة العامة- جامعة القدس أبوديس في إجراء بحث بعنوان:-
"Assessment of Nurses Knowledge and Practices Regarding Care Provided for Preterm Neonates in Governmental Hospitals: a Nurses perspective"
حيث الباحث بحاجة لتعبئة استبانة من عدد من الممرضين العاملين في اقسام الحضانة في مستشفيات قطاع غزة (مستشفى النصر -مجمع الشفاء الطبي -مستشفى غزة الأوربي)، بما لا يتعارض مع مصلحة العمل وضمن أخلاقيات البحث العلمي، ودون تحمل الوزارة أي أعباء أو مسئولية.
وتفضلوا بقبول التحية والتقدير،،،
ملاحظة/ البحث حصل على موافقة لجنة اخلاقيات البحث الصحي
ملاحظة / تسهيل المهمة الخاص بالدراسة أعلاه صالح لمدة 6 شهر من تاريخه.

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

أ. زهير محمود نوفل
مدير تمريض مجمع الشفاء الطبي

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تلفون. 2846949-8 (970+)
فاكس. 2826295-8 (970+)

Annex (11) Participant's answers to knowledge questions, frequent and percent of three choice "Correct, Incorrect, Don't know" (n=101).

	Items	Correct		Incorrect		Don't know	
		F	%	F	%	F	%
1.	Definition of preterm baby	99	98.02	2	1.98	0	0.00
2.	Characteristics of preterm baby	77	76.24	22	21.78	2	1.98
3.	Early breast feeding for preterm baby is better to prevent	61	60.40	25	24.75	15	14.85
4.	Preterm baby can lose body heat rapidly because	74	73.27	23	22.77	4	3.96
5.	Preterm baby can be fed by bottle if	80	79.21	14	13.86	7	6.93
6.	Which signs in preterm infant would alert the nurse to the possibility of respiratory distress?	93	92.08	8	7.92	0	0.00
7.	Respiratory distress syndrome is caused by deficiency of	90	89.11	9	8.91	2	1.98
8.	Fetal lung maturity can be accelerated before delivery by maternal administration of	93	92.08	7	6.93	1	0.99
9.	Age of a neonate based on the actual time in utero is the _____ age	91	90.10	7	6.93	3	2.97
10.	Please select the best sleep position for premature infants in NICU	45	44.55	54	53.47	2	1.98
11.	Which statement if made by the mother indicates a need for further education?	55	54.46	44	43.56	2	1.98
12.	Primary causes of jaundice in preterm	77	76.24	23	22.77	1	0.99
13.	The primary means of preventing infection in preterm infant is	97	96.04	4	3.96	0	0.00
14.	Oxygen may produce retinopathy if preterm receiving in concentration	87	86.14	9	8.91	5	4.95
15.	Care and management of extremely preterm infant delivered in the following setting:	41	40.59	48	47.52	12	11.88
16.	A preterm infant has a yellow skin color and a rising bilirubin level.	94	93.07	5	4.95	2	1.98
17.	When a preterm is receiving an intravenous infusion containing calcium gluconate, the nurse would …	62	61.39	28	27.72	11	10.89
18.	35 wks. of gestation has a tremor& a weak cry. The nurse is aware that these	84	83.17	16	15.84	1	0.99
19.	The mother of premature infant said, "my baby will always be small for her age."	60	59.41	27	26.73	14	13.86
20.	Method of holding an infant in upright and prone position, skin to skin on the parent's chest for a period of time is	63	62.38	18	17.82	20	19.80

Annex (12) Participants response according to practices towards preterm neonates (n=101)

Domain				
Thermoregulation		**response**	**Frequency**	**Percent**
1.	Receive baby in a pre-warmed radiant warmer or incubator.	No, Never	8	7.9
		some times	22	21.8
		Yes, Always	71	70.3
2.	Check infant temperature every 2 hours.	No, Never	10	9.9
		some times	53	52.5
		Yes, Always	38	37.6
3.	Expose as little of the preterm skin as possible during procedures	No, Never	11	10.9
		some times	41	40.6
		Yes, Always	49	48.5
4.	Maintain incubator away from draught or direct or cold outer walls	No, Never	6	5.9
		some times	40	39.6
		Yes, Always	55	54.5
5.	Using warmer for long period procedure.	No, Never	13	12.9
		some times	20	19.8
		Yes, Always	68	67.3
6.	Keep portholes tightly closed when they are not used	No, Never	7	6.9
		some times	26	25.7
		Yes, Always	68	67.3
7.	Maintain skin temperature probe on trunk.	No, Never	3	3.0
		some times	42	41.6
		Yes, Always	56	55.4
8.	Warm objects contact with infant, such as stethoscopes, linens. etc.	No, Never	10	9.9
		some times	47	46.5
		Yes, Always	44	43.6
9.	Warm objects contact with infant, such as stethoscopes, linens. etc.	No, Never	9	8.9
		some times	50	49.5
		Yes, Always	42	41.6
Respiratory function			Frequency	Percent
10.	Place monitor electrode and probe on the preterm on correct way.	No, Never	4	4.0
		some times	18	17.8
		Yes, Always	79	78.2
11.	Elevate the head of the bed as needed to prevent aspiration.	No, Never	4	4.0
		some times	13	12.9
		Yes, Always	84	83.2
12.	Check oxygen humidifier chamber every shift.	No, Never	1	1.0
		some times	30	29.7

		Yes, Always	70	69.3
13.	Use only the percentage of oxygen necessary to relive cyanosis	No, Never	5	5.0
		some times	27	26.7
		Yes, Always	69	68.3
14.	Initiate basic neonatal resuscitation as need until Dr. arrive	No, Never	5	5.0
		some times	25	24.8
		Yes, Always	71	70.3
15.	Participate in advance neonatal resuscitation in proper way.	No, Never	5	5.0
		some times	31	30.7
		Yes, Always	65	64.4
Maintaining Adequate Nutrition			Frequency	Percent
16.	Feeding infant by NGT before age of 34 weeks of gestation.	No, Never	5	5.0
		some times	28	27.7
		Yes, Always	68	67.3
17.	Check the correct position of the tube in the stomach.	No, Never	2	2.0
		some times	11	10.9
		Yes, Always	88	87.1
18.	Check residual before each feeding.	No, Never	4	4.0
		some times	16	15.8
		Yes, Always	81	80.2
19.	Re feeding residual if less 1hour volume	No, Never	12	11.9
		some times	37	36.6
		Yes, Always	52	51.5
20.	Weight baby daily with same scale at the same time	No, Never	11	10.9
		some times	42	41.6
		Yes, Always	48	47.5
21.	Burp infant frequently during bottle feeding	No, Never	9	8.9
		some times	27	26.7
		Yes, Always	65	64.4
22.	Offer Pacifier for NPO infant.	No, Never	33	32.7
		some times	48	47.5
		Yes, Always	20	19.8
23.	Administer feeding by gravity or pump within 15-30 min.	No, Never	18	17.8
		some times	41	40.6
		Yes, Always	42	41.6
24.	Elevating the head of the bed 30 degrees after feeding	No, Never	5	5.0
		some times	29	28.7
		Yes, Always	67	66.3
25.	Observe amount and characteristic of passed stool.	No, Never	6	5.9
		some times	28	27.7
		Yes, Always	67	66.3

Photo-therapy			Frequency	Percent
26.	Cover eyes and genitalia on proper way	No, Never	3	3.0
		some times	11	10.9
		Yes, Always	87	86.1
27.	Change eye patch every 4hours.	No, Never	38	37.6
		some times	41	40.6
		Yes, Always	22	21.8
28.	Monitor infant temperature frequently.	No, Never	3	3.0
		some times	21	20.8
		Yes, Always	77	76.2
29.	Maintain appropriate distance between infant and phototherapy	No, Never	5	5.0
		some times	21	20.8
		Yes, Always	75	74.3
30.	Turn infant position frequently	No, Never	3	3.0
		some times	24	23.8
		Yes, Always	74	73.3
31.	Maintain hydration by I.V fluid and feeding	No, Never	1	1.0
		some times	11	10.9
		Yes, Always	89	88.1
Infection control			Frequency	Percent
32.	Perform hand washing before and after any contact with infant.	No, Never	9	8.9
		some times	9	8.9
		Yes, Always	83	82.2
33.	Each baby has especial equipment	No, Never	12	11.9
		some times	31	30.7
		Yes, Always	58	57.4
34.	Regular cleaning or changing of humidifier water, IV tubing, and suction, respiratory, and monitoring equipment.	No, Never	4	4.0
		some times	37	36.6
		Yes, Always	60	59.4
35.	Wear personal protective equipment (gown, gloves etc.)	No, Never	8	7.9
		some times	44	43.6
		Yes, Always	49	48.5
36.	Use sterile technique with invasive procedure	No, Never	5	5.0
		some times	19	18.8
		Yes, Always	77	76.2
37.	Shifted baby to another incubator every seven days	No, Never	29	28.7
		some times	24	23.8
		Yes, Always	48	47.5
Skin Integrity			Frequency	Percent
38.	Re positioning the newborn every 2 hours	No, Never	4	4.0
		some times	37	36.6

		Yes, Always	60	59.4
39.	Minimize the use of tape on the skin	No, Never	3	3.0
		some times	35	34.7
		Yes, Always	63	62.4
40.	Changing the diaper as soon as possible after soiling	No, Never	4	4.0
		some times	22	21.8
		Yes, Always	75	74.3
41.	Using waterbeds, pillows as pad pressure on prone areas to help prevent skin ulcer	No, Never	11	10.9
		some times	36	35.6
		Yes, Always	54	53.5
Teaching and parents support			Frequency	Percent
42.	Teaching mother about breastfeeding.	No, Never	13	12.9
		some times	26	25.7
		Yes, Always	62	61.4
43.	Teaching and help mother about kangaroo position.	No, Never	44	43.6
		some times	26	25.7
		Yes, Always	31	30.7
44.	Explain baby condition to the parents to reduce their anxiety.	No, Never	12	11.9
		some times	32	31.7
		Yes, Always	57	56.4
45.	Explain to the parent's environmental hygiene, follow-up plan, and high alert problem before discharge.	No, Never	7	6.9
		some times	27	26.7
		Yes, Always	67	66.3

Annex (13) Levels of Nurses' Practices Regarding preterm neonate care by each Domain

Domain	M*	S.D	Mean percentage	Level of Nurses' Practices
Thermoregulation	1.4554	.31564	72.77	Moderate
Respiratory function	1.6832	.31225	84.10	High
Maintaining Adequate Nutrition	1.4881	.30242	74.41	Moderate
Photo-therapy	1.6122	.33342	80.60	High
Infection control	1.5067	.40682	75.33	Moderate
Skin Integrity	1.5675	.42914	78.38	Moderate
Teaching and parents support	1.3525	.52235	67.60	Low
Level of Nurses' Practices (Total)	**1.5243**	**.25132**	**76.02**	**Moderate**

تقييم المعرفة والممارسات التمريضية المقدمة للأطفال المبتسرين "الخدج" داخل المستشفيات الحكومية: من وجهة نظر الممرضين

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ملخص:

يتعرض المواليد الخدج لعدد من المشاكل التي تهدد حياتهم والتي ترتبط بزيادة المراضة والوفيات، وذلك بسبب عدم قدرتهم على التكيف خارج الرحم. ولهذا من المهم وجود ممرضين مهنين يعملون في وحدات العناية المكثفة للمواليد، وأن تكون هذه الوحدات مجهزة بأحدث الأجهزة والتقنيات الحديثة، والتي بدورها توفر رعاية ذات جودة متقدمة وبالتالي تقلل من أعداد وفيات المواليد.

وهدفت الدراسة الحالية إلى تقييم معرفة وممارسات الممرضين فيما يتعلق برعاية المواليد الخدج في المستشفيات الحكومية من منظور الممرضين. وكانت هذه الدراسة وصفية مقطعية، وقد أجريت هذه الدراسة في وحدات العناية المكثفة للمواليد التابعة للمستشفيات الحكومية "مستشفى مجمع الشفاء–مستشفى النصر للأطفال–مستشفى غزة الأوروبي". وشملت جميع الممرضين والممرضات العاملين في وحدات العناية المكثفة للمواليد، وكان العدد الإجمالي للعينة "101" ممرض وممرضة. استخدم الباحث استبيانًا ذاتيًا لجمع البيانات من المشاركين في الدراسة وكان معدل استجابة المشاركين في الدراسة (100 ٪).

وبينت نتائج هذه الدراسة أن متوسط المعرفة والممارسات التمريضية المقدمة للأطفال الخدج كان متوسطا " (75.39٪) للمعرفة و(76.07٪) للممارسات التمريضية "، وأظهرت النتائج ارتباطاً ضعيفاً بين المعرفة والممارسات التمريضية. وكما أظهرت النتائج وجود اختلافات في المعرفة والممارسات التمريضية وفقا لأماكن عملهم المختلفة، وكانت هذه الاختلافات لصالح العاملين في مستشفى النصر للأطفال. وبينت نتائج هذه الدراسة وجود علاقة ذات دلالة إحصائية بين المعرفة والممارسات التمريضية وتلقيهم لدورات عامة في التمريض. وكما أظهرت نتائج هذه الدراسة عدم وجود علاقة ذات دلالة إحصائية بين أغلب المتغيرات الاجتماعية–الديموغرافية " العمر، الجنس، الحالة الاجتماعية، مستوى التعليم، المركز الوظيفي، سنوات العمل في العناية المكثفة للمواليد، دورات المتخصصة للخدج، المؤهل العلمي" ومعرفة وممارسات الممرضين. بشكل عام بينت النتائج أن مستوى المعرفة والممارسات التمريضية باتجاه الأطفال الخدج كان متوسطاً.

أوصت الدراسة بتوفير برامج تعليمية وتدريبية للممرضين والممرضات العاملين في وحدات العناية المكثفة للمواليد، واعداد فترة تعريفية للعاملين قبل البدء بممارسة عملهم، وان يشارك العاملين في برامج تعليمية مستمرة لتحديث معرفتهم وممارستهم التمريضية وذلك لرفع مستوى جودة الرعاية المقدمة للأطفال الخدج.