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كلية التمريض  
ماجستير الرعاية الحثيثة

## **Impact of Workload on Quality of nurses Performance in Neonatal Intensive Care Units at Governmental Hospitals in Gaza Strip**

تأثير عبء العمل على جودة أداء الممرضين في وحدات العناية  
المركزة لحديثي الولادة في المستشفيات الحكومية في قطاع غزة

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إقرار

أنا الموقع أدناه مقدم الرسالة التي تحمل العنوان:

## Impact of Workload on Quality of Nursing Performance in Neonatal Intensive Care Units at Governmental Hospitals in Gaza Strip

تأثير عبء العمل على جودة أداء التمريض في وحدات العناية المركزة لحديثي  
الولادة في المستشفيات الحكومية في قطاع غزة

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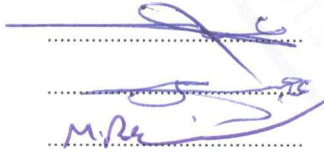
## نتيجة الحكم على أطروحة ماجستير

بناء على موافقة عمادة البحث العلمي والدراسات العليا بالجامعة الإسلامية بغزة على تشكيل لجنة الحكم على أطروحة الباحثة/ نور حسن محمد ابو مغصيب لنيل درجة الماجستير في كلية التمريض/ قسم تمريض العناية الحثيثة وموضوعها:

تأثير عبء العمل على جودة أداء الممرضين في وحدات العناية المركزة لحديثي الولادة في المستشفيات الحكومية في قطاع غزة

### Impact of Workload on Quality of Nurses Performance in Neonatal Intensive Care Units at Governmental Hospitals in Gaza Strip

وبعد المناقشة التي تمت اليوم الثلاثاء 9 جمادي الأولى 1443 هـ الموافق 2021/12/14م الساعة التاسعة صباحاً، في قاعة مبنى قاعة مؤتمرات مبنى طبية اجتمعت لجنة الحكم على الأطروحة والمكونة من:



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واللجنة إذ تمنحها هذه الدرجة فإنها توصيها بتقوى الله تعالى ولزوم طاعته وأن تسخر علمها في خدمة دينها ووطنها.

والله ولي التوفيق،،،

عميد البحث العلمي والدراسات العليا

أ.د. يوسف إبراهيم الجيش



## **Dedication**

**For my parents, wishing them wellness and good health**

**For my success' partner, my dear husband Tariq**

**For my daughters Lana & Masa**

**For my brothers Mohammed & Islam**

**To Dr. Abdalkarim Said Radwan for his efforts**

**To all my teachers, friends and colleagues**

**To all who encouraged me to accomplish this study**

**I dedicate the fruit of this effort**

**Researcher**

**Noor Hassan Abu Meghesieb**

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## **Abstract**

This study aims to assess the impact of workload on quality of nursing performance in Neonatal Intensive Care Units at governmental hospitals in Gaza strip. It was descriptive cross-sectional study. Five hospitals were selected " Al Nassr Pediatric Hospital - Al Shifa' Complex - European Gaza hospital – Al-Aqsa hospital and Nasser Medical Complex hospital ". The population of the study were all nurses who working in NICU IN these five hospitals. Data were collected using a self-administered questionnaire distributed among all nurses working in the neonatal intensive care units at governmental hospitals in the Gaza Strip. 104 from 113 NICU nurses participated in this study with a response rate 92%. To measure the validity of the instrument, the questionnaire was submitted to (11) of research and neonatal care experts to evaluate the face and content validity, and internal consistency was done. To measure the reliability of the instrument, Cronbach alpha coefficient was used (0.891). The study shows the major governmental hospitals in Gaza Strip have high quality of nursing care provided for infants in the NICU. The highest score was in hygiene and safety with mean score 4.40 and mean percent 88.10% while, the lowest score was in the documentation with mean score 3.26 and mean percent 65.22%. The overall mean score was 4.20 with mean percent 84.10% which, indicated that the quality of nursing care at NICU was high.

The results showed that the highest score was in workload lead to imbalance between work tasks and social time with mean score 4.153 and mean percent 83.06%, The overall mean score was 3.731 with mean percent 74.62%, which indicated that workload was above moderate. There were statistically significant differences in hygiene and safety ( $F= 3.159$ ,  $P= 0.017$ ) , post hoc LSD test indicated that hygiene and safety were higher in Al Nassr hospital compared to Al shifa and Al Aqsa hospital. The study recommended to increase number in nursing staff in NICU to decrease workload on the department and to meet shortage and need . In addition of that repeated the postgraduate specialized program on neonatal nursing to qualify nurses work on NICUs.

## التلخيص

تهدف هذه الدراسة إلى تقييم أثر عبء العمل على جودة أداء التمريض في وحدات العناية المركزة لحديثي الولادة في المستشفيات الحكومية في قطاع غزة. كانت دراسة وصفية مقطعية. تم اختيار خمس مستشفيات هي "مستشفى النصر للأطفال - مجمع الشفاء - مستشفى غزة الأوروبي - مستشفى الأقصى و مجمع ناصر الطبي". كان مجتمع الدراسة جميعاً من الممرضين العاملين في أقسام العناية المركزة لحديثي الولادة في هذه المستشفيات الخمس. تم جمع البيانات باستخدام استبيان ذاتي وزع على جميع الممرضين العاملين في وحدات العناية المركزة لحديثي الولادة في المستشفيات الحكومية في قطاع غزة. شارك 104 من أصل 113 ممرضاً من أقسام العناية المركزة لحديثي الولادة في هذه الدراسة بمعدل استجابة 92%. لقياس صحة الأداة، تم تقديم الاستبيان إلى (11) من خبراء البحث ورعاية الأطفال حديثي الولادة لتقييم صحة الصدق الظاهري والمحتوى ، وتم إجراء الاتساق الداخلي. لقياس موثوقية الأداة، تم استخدام معامل ألفا كرونباخ (0.891). تظهر الدراسة أن المستشفيات الحكومية الرئيسية في قطاع غزة تقدم رعاية تمريضية عالية الجودة للأطفال الرضع في وحدة العناية المركزة لحديثي الولادة. كانت أعلى درجة في النظافة والسلامة بمتوسط درجة 4.40 ومتوسط الدرجة الأولى 88.10% بينما كانت أقل درجة في التوثيق بمتوسط درجة 3.26 ومتوسط الدرجة الأولى 65.22%. كان المعدل العام للنتيجة 4.20 بمتوسط 84.10% مما يشير إلى أن جودة الرعاية التمريضية في وحدة العناية المركزة لحديثي الولادة كانت عالية.

أظهرت النتائج أن أعلى درجة كانت في عبء العمل تؤدي إلى عدم التوازن بين مهام العمل والوقت الاجتماعي بمتوسط درجة 4.153 ومتوسط النسبة 83.06% ، وكان المتوسط العام للدرجة 3.731 بمتوسط 74.62% مما يدل على أن عبء العمل كان أعلى من المتوسط. كانت هناك فروق ذات دلالة إحصائية في النظافة والسلامة (  $P = 0.017$  ,  $F = 3.159$  ). أشار اختبار LSD اللاحق إلى أن النظافة والسلامة كانت أعلى في مستشفى النصر مقارنة بمستشفى الشفاء والأقصى.

وقد أوصت الدراسة بزيادة عدد طاقم التمريض في وحدة العناية المركزة لحديثي الولادة لتقليل عبء العمل على القسم وتلبية النقص والحاجة، بالإضافة إلى ذلك تكرار برنامج الدراسات العليا المتخصص في تمريض حديثي الولادة لتأهيل الممرضات للعمل في وحدات العناية المركزة لحديثي الولادة.

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## **List of abbreviations**

ABGs	Arterial Blood Gases
BSN	Bachelor Of Science in Nursing
DVT	Deep Vein Thrombosis
GDP	Gross Domestic Product
GI	Gastrointestinal
GNN	Gaza Neonatal Network
GS	Gaza Strip
HAI	Health Care Associated Infection
HCP	Health Care Professional
ICU	Intensive Care Unit
KM	Kilo Meter
MMS	Military medical services
MOH	Ministry of Health
NANNP	National Association of Neonatal Nurse Practitioners
NGOs	Non-Governmental Organizations
NICU	Neonatal Intensive Care Unit
OPC	Oulu Patient Classification
PCBS	Palestinian Central Bureau of Statistics
RN	Registered Nurse
SPSS	Statistical Package for Social Science
UNCTAD	United Nations Conference on Trade and Development
UNRWA	United Nations Relief and Works Agency for Palestine Refugees in the Near East
WHO	World Health Organization

# **Chapter One**

## **Introduction**



# Chapter 1

## Introduction

### 1.1 Background

Neonatal intensive care unit (NICU) is a high special and sensitive department, that need to provide safe, effective, and highly quality of nursing care. The staff of a NICU special nurses deals with a wide range of difficult situations on caring of neonates, lifesaving and reduction of neonatal mortality, so this needs specific and updated skills and knowledge.

The inadequate number of the nursing staff leads to increase workload so that increase infection incidents, ulcer pressure, error during patient care and prolonged hospitalization. (Nunes &Toma 2013). Also, workload reduced quality of care, reduce patient satisfaction and lead to nurse anxiety and nursing job stress (Azadi et al.,2020)

The definition of nurse workload is “the amount of care required to carry out nursing activities which , measured by infant-to-nurse ratios or difficult condition of patient , has a relationship with infant outcomes in NICUs, including risk of hospital-acquired infection, adverse events, and mortality rate. (Tubbs-Cooley et al., 2019) .

The high workload of nurses is a major problem for the American health care system. Nurses are reported higher workloads than before because four reasons: (1) high demand for nurses, (2) decrease supply of nurses, (3) inadequate staffing and high overtime, and (4) decrease in patient length of stay. (Carayon & Gurses 2008 )

Nursing performance is an important measure of work productivity and patient safety , so nurses are responsible for caring the patient by assessing , administering medications and monitoring patients 'conditions. When nurses work for long hours are more likely to perform decrements during work hours that affect the safe delivery of patient care. (Sagherian et al.,2018)

Neonatal nursing is specialty of nursing that care to infants born with many of problems from prematurity , defect , infections , surgical problems and cardiac

malformation . The definition of neonatal period is the first month of life and may still sick for many months . Neonatal nursing care with newborns who have a problem immediately or for longer time . ( NANN , 2020)

Nurse budgeting and staffing decisions depend on precise evaluation of nurse workload, which depends on the quality and matchmaking of workload distribution among nurses. Consistently balanced workloads, help nursing managers expect the needing of staffing levels and evaluate high staffed units more easily. moreover, fair distribution of work among nurses is necessary for high and optimal quality of care. (Mullinax & Lawley , 2002)

### **1.2 Problem Statement**

The quality of nursing care given in any hospitals is gauged by performance of health care professionals such as nurses which play important role in providing high quality of nursing performance to patient who need health care during illness. (TOQAN, 2010)

### **1.3 Significance of problem**

The lack of researches on workload in the NICU and its effect on quality of nursing performance. The high workload in NICU needs to increase attention and to assess workload and its effect on the quality of nursing performance.

Thus, the results of this study will provide an necessary value to the nursing performance in a scientific and practical issues. As well as, these results will add a clear and new view about the reality of level of workload on nursing care provided to infants in NICU.

This study will assist in high light on the impact of workload on quality of nursing care and performance in NICUs on governmental hospitals on GS, it will be a good tool for enhancing nursing staff knowledge about quality of care and how it could be improved for better patients' outcomes and for researchers.

Finally, the results of this study will provide some recommendations to deal with workload , and improve nursing performance for achieving a high neonatal quality of health care.

## **1.4 Study objectives**

### **1.4.1 General objective**

To assess the impact of workload on quality of nursing performance in Neonatal Intensive Care Units at governmental hospitals in Gaza strip.

### **1.4.2 Specific objectives**

- To assess the workload in NICUs at governmental hospitals in the Gaza strip .
- To determine the level of quality of nursing performance in NICUs at governmental hospitals in the Gaza Strip.
- To identify the relationship between workload and quality of nursing performance in NICUs at governmental hospitals in the Gaza Strip.
- To examine the differences in quality of nursing care in NICUs related to sociodemographic characteristics.
- To suggest recommendations about the way to decrease workload and improve nursing performance among nurses in NICU departments

### **1.4.3 Research Questions of the study:**

- What is the degree of workload in NICUs at governmental hospitals in the Gaza Strip?
- What is the level of quality of nursing performance in NICUs at governmental hospitals in the Gaza Strip?
- Is there a relationship between workload and quality of nursing performance in NICUs at governmental hospitals in the Gaza Strip?
- Are there statistically significant differences in quality of nursing care in NICUs related to sociodemographic characteristics?
- What are the recommendations to decrease workload and improve nursing performance in NICUs at governmental hospitals in the Gaza Strip?

## **1.5 Context of the study**

The context involves geographical and socio-economic and political context , the health sector and neonatal intensive care unit in Gaza governmental hospitals in which the study concerning the impact of workload on quality of nursing performance in NICUs in Gaza strip (GS) .

### **1.5.1 Geographical context**

The space of Palestine is 27,000 KM<sup>2</sup> in which from Ras Al-Nakoura within the north to Rafah within the south. Palestine bounded by Egypt at south , occupied territories in 1948 at north an east , and at the west by Mediterranean sea. (PCBS, 2020). GS is geographically divided into five governorates: Gaza, Mid-Zone, Khan-Younis, Rafah, and North Gaza (PCBS, 2019).

The population of Palestine 5.23 million Palestinians in the State of Palestine, 2.66 million males and 2.57 million females , which the population of the West Bank is estimated at 3.12 million, including 1.59 million males and 1.53 million females. While the population of the GS is estimated at 2.11 million, of whom 1.07 million are male and 1.04 million are female. (PCBS , 2021)

### **1.5.2 Socio-economic and Political Context**

The unemployment rate in Gaza is the highest in the world. More than half of the population lives below the poverty line. Most of the population lack access to safe and safe water, regular electricity supplies, and does not even have a proper sanitation network. As a result of the collapse of Gross Domestic Product (GDP), between 2007 and 2018, the poverty rate in the GS jumped from 40% to 56%. The poverty gap rose from 14% to 20%, and the annual cost of lifting individuals out of poverty quadrupled from 209 million dollars to 838 million dollars. (UNCTAD , 2020)

### **1.5.3 Health sector in Gaza strip:**

Ministry of health (MOH) is the main health provider in GS beside other health providers, United Nations Relief and Work Agency (UNRWA), Military medical services (MMS), Non-Governmental Organizations (NGOs), and private health

sector . The total number for hospitals in GS is 36, 14 for MOH, 17 for NGOs, 2 for MMS and 3 private hospitals. These hospitals have 3338 beds in total.2616 for MOH , 172 or MMS and 45 for private hospitals .The total of neonatal departments bed in GS 146 , 124 for MOH .On 2020 the rate of admission on MOH hospitals was 161,965 . (MOH 2020)

In addition, GS has many of primary health care centers. 52 of these centers owned and supervised by MOH and 22 of centers owned by UNRWA and supervised by MOH. (MOH 2019 )

#### **1.5.4 Neonatal Intensive Care Unit in Gaza Governmental Hospitals:**

According to the last update of Gaza Neonatal Network (GNN) in 2020, there is eight hospitals have neonatal nurse units in GS; five of this hospital (Al Shifa' Complex - Al Nassr Pediatric Hospital - European Gaza hospital – Al-Aqsa hospital – Nasser hospital ) have NICUs department . The total number of nurses 118 nurses " Al Nassr Pediatric Hospital (33) - Al Shifa' Complex (33) - European Gaza hospital (17) – Al-Aqsa hospital (12) – Nasser hospital (23) “with different academic level (Diploma, baccalaureus, Master). (GNN 2020)

The total number of births in the Ministry of Health was 537,33, of which 2.76% were born naturally. And 8.23% caesarean section, and the highest birth rate was 1.39% in Al Shifa' Medical Complex, followed by 9.24% in Nasser Medical Complex.( MOH 2020)

In addition, the total numbers of admissions to NICUs in 2020 is 7424 infants and total of death in NICUs is 442 infants. (GNN 2020) . In 8 Augustus 2020 the Neonatal Intensive Care Unit was opened at Al-Aqsa Hospital, with a capacity of 6 beds, and this reduced the risk and complications of transferring cases to other hospitals .

The number of neonatal intensive care beds in the hospitals of the Ministry of Health has reached 124 beds and constitutes more than half of the special care beds (1.56), at a rate of 2.5 neonatal intensive care beds for every 10 beds births in hospitals of the Ministry of Health. All cases of newborns (preterm infants) in non-governmental

hospitals are referred to intensive care departments for newborns in hospitals of the Ministry of Health. ( MOH 2020)

## **1.6 Definition of Terms:**

### **1.6.1 Theoretical definitions:**

**Workload:** It is described because the time and care that a caregiver spends (at once and indirectly) at the patient, workplace, and expert development. (Alghamdi,2016)

**Quality of care :** Is that the degree to that health services for people and populations increase the likelihood of desired health outcomes. It's supported evidence-based skilled data and is vital for achieving overall health coverage. (WHO, 2021).

**Performance:** Is the total behavior of individual, the utilization of specialized data, and attitudes gained from coaching, additionally the organization and combination of performance. (Bargagliotti, 1999)

The concept of performance has a differentiated between an activity facet associated an outcome facet of performance. The activity facet refers to what a personal will within the operating condition and not each behavior is assessed underneath the performance idea, however it's connected to the structure goals. As for the end result facet refers to the result or results of the individual's behavior. (Sonntag & Frese , 2002)

**Neonatal Intensive Care Unit (NICU):** compose a curative environment appropriate for treatment of the infants in an exceedingly vital condition. The fragility of those infants, the increasing enforcement of insecure procedures and therefore the low tolerance to medication errors are a number of the attentions of nursing professionals operating within the neonatal intensive care unit (Montanholi et al., 2011)

### **1.6.2 Operational definitions:**

**Workload:** is the amount of work assigned per nurse , per day and per week.

The workload is increasing the number of patients, the number of care hours per patient and highly stressful nursing work.

**Nursing performance:** nursery care and activity toward patients.

Is important measurement of work productivity and patient safety.

# **Chapter Two**

## **Conceptual framework and Literature review**



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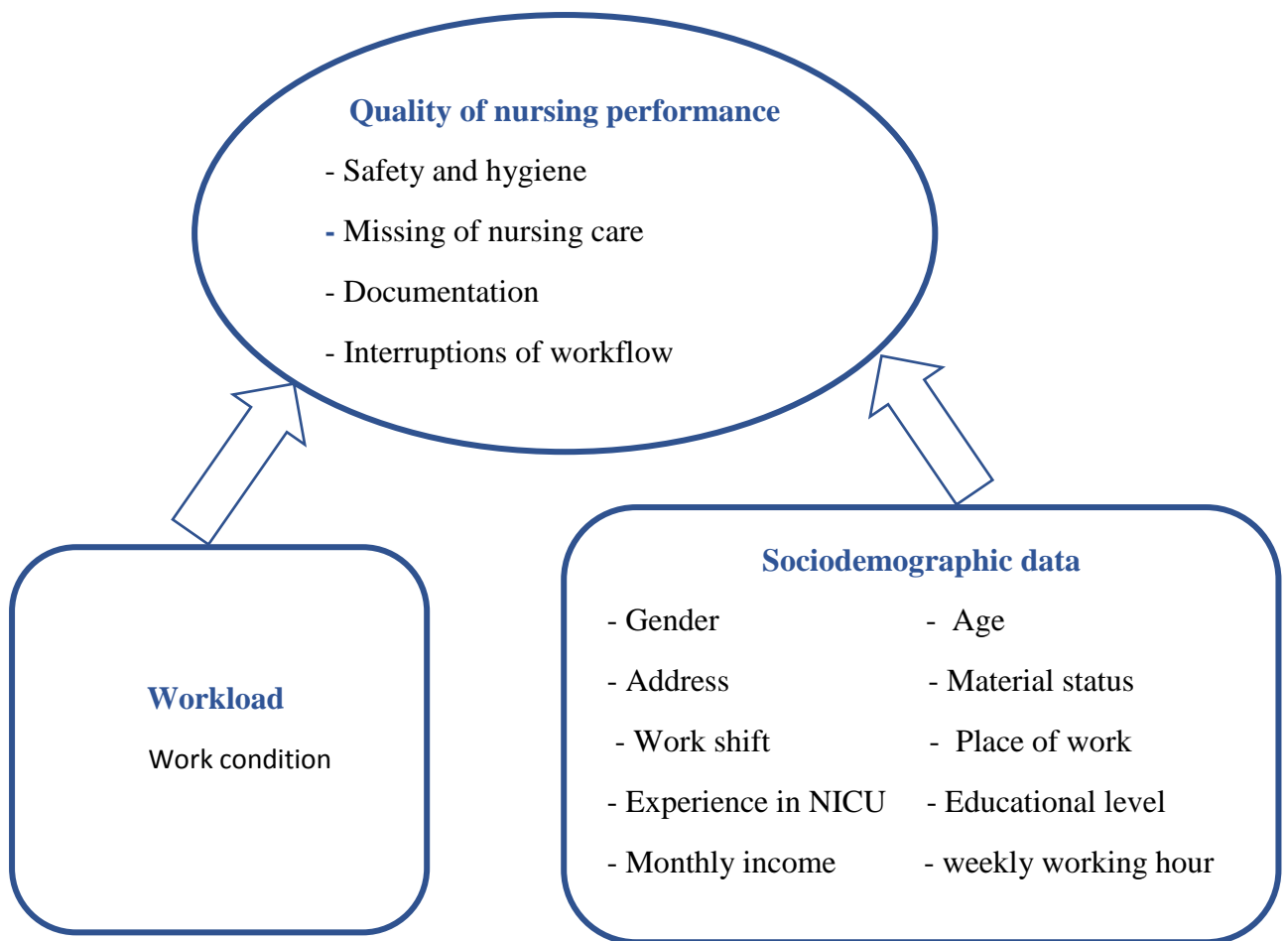
#### **2.1 Conceptual framework**

The conceptual framework for this study was built on literature review and past studies related to the topic and personal experience of the researcher. The framework depicts how the workload impact on quality of nursing performance .

The figure below presented the main domains of the study. The researcher assessed the impact of workload on quality on nursing performance in NICU. The diagram showed two main types of variables, dependent: quality of nursing performance and independent variables : workload

Sociodemographic characteristics of responders (NICU nurses) include: Age, gender, Experience in NICU, Address , Work shift , monthly income , Weekly working hour, Educational level , Marital status and place of work .

Indicators of quality of nursing performance include: Safety and Hygiene, Missing nursing care, Interruptions to workflow, Documentation of nursing care.



**Figure (2.1): Conceptual framework  
Self-development**

## **2.2 Literature review**

### **2.2.1 Introduction**

There are many literature interested and discussed the impact of workload on quality of nursing performance and care. This chapter involve literature related to workload and quality of nursing care . Always in an NICU, newborns area unit in danger for developing adverse outcomes that area unit in theory and by trial and error related to medical care. Studies linking medical care and patient outcomes within the ICU or different departments have primarily targeted on associations between nurse workloads and patient outcomes like in-hospital mortality and hospital-acquired infection. (Tubbs- Cooley et al., 2015)

### **2.2.2 Purpose of Assessing Nurses' performance:**

Appreciation of nurse care have a necessary function in reach of high quality practical care to implement the patient outcomes (Kahya & Oral , 2018) . Assessment of nursing care is providing an important practical instrument to increase the quality of performance and upgrade the professional nurses' gauges (Marsland & Gissane, 1992)

In addition, the care that gives to infants after delivery and first hours of birth is very important and critical for survival, so the survival depends on knowledge and practice must be professional to give the infants good and appropriate interventions and care . (Abdu et al., 2019)

### **2.2.3 Workload and quality of care:**

Distribution of work on NICU is important to decrease workload and provide safe and high quality of nursing care to infants. Many of previous studies conducted to identify the impact on nurse / patient ratio on quality of nursing performance.

A retrospective study was performed to identify if the number of nurses play role in relation in quality of nursing care that give to patient in intensive care unit ( ICU ). The results showed that unplanned extubated occurred on average 3-5.7 % of cases and this in relation to nurse – patient ratio , also there was a positive relation between length of stay in ICU and increase patients- nurse ratios (Falk&wallin, 2016).

Chang et al., (2019) conducted a study to analyze the correlation between work and quality of medical care and nursing payment in ICU. The results showed that the bed percentage, the direct nursing hours, and therefore the nursing hours were statistically considerably related to with rate, have a positive correlation between higher occupancy rates and patient severity and therefore the rate of mortality.

An observational analysis using a cross-sectional conducted by Fitriani, (2019) to examine the caring behavior of nurses if related to their employment and therefore the commitment of the nurses in providing medical aid. The results showed that there was no relationship between workload and caring behavior . (Fitriani et al., 2019)

In addition , there was a study performed by Sochalski, (2004) , to discuss the impact of quality of nursing care .The results showed that increase of each patient to the nurse workload was related with 0.07 decrease in quality score from (excellent / good ) to ( good / fair ) , also unfinished care had effect on quality of care which decrease 0.24 point. So, the researcher found that quality of nursing care associated with patient / nurse ratio, task left undone and frequency of patient safety problems. (Sochalski, 2004)

Observational studies were reviewed to evaluate the association of nurse / patient ratio and nurse work hour with patient outcomes , the factors that influences on nurses staffing policies and nurse staffing strategies to improve patient outcomes .

The results showed increase in number of nurse staffing was associated with less hospital-related mortality, failure and inability to rescue, cardiac arrest, hospital acquired pneumonia, and many of adverse effect. Also in the ICU units and surgical patient the effect of increased in number of registered nurse gave strong effect on patient safety. Limited evidence suggests that the higher number of registered nurses with BSN degrees was associated with decrease in mortality rate and inability to rescue. Increase in nursing work hours were related in increase hospital mortality rate , nosocomial infections, shock, and bloodstream infections (Kane et al., 2007)

A longitudinal cohort study was conducted by McCue, (2003) to evaluate the impact of nurse / patient ratio on the quality of care, they found that increase in number of nurses staff had decrease in mortality and complications rate among patients.( McCue et al., 2003)

#### **2.2.4 Quality of nursing care in NICU:**

Neonatal nurses are facing many challenges to increase the quality of care and maintain safe health status to neonate in NICU.

Quality of care is providing basic health care services to people who need them and keep them safe and prevent harm .The high quality of care must be Effective , Safe , People-centred , Timely , Equitable , Integrated and Efficient . (WHO, 2021)

To upgrade the quality of health care , the special neonatal nurses must have knowledge and practice about quality health services to improve the neonates outcomes . (TOQAN,2010)

Some of past studies was performed to measure the quality of nursing care in NICU According a researches studies in the GS, there was a study conducted by Elshanti, (2020), to evaluate the quality of nursing care provided to newborns in NICUs .The researchers used a quantitative, descriptive cross-sectional design and the data collection was from nurses who worked in Governmental hospitals on GS. The results showed that the quality of nursing care in NICUs was 75.8%. The highest level associated with quality of nursing care on infection and inflammation 78.6% and the lowest on professional issues in NICU nursing 73.6%. Also, there was statistically significant difference between in the average of ethics and quality of nursing care. With regard the educational level, the quality of nursing care in diploma degree was lower than the quality of nursing in bachelors and master's degrees. Also, there no statistically significant difference to nurse's age in NICUs. (Elshanti et al., 2020)

As well, there was a study was performed to evaluate the best of nursing care in the NICU in Mina university hospital. The researcher used descriptive observational design and used structured interview questionnaire and observational checklist to collect data . The results showed that ( 35%) of nurses have a baccalaureate degree and nearly a half did not take a special course or training in neonatology . Also more than (32%) of them have 5 years' experience in NICU. More than half of the nurses had a bad knowledge on infants care ( 52.2%) and more of them showed poor performance related to neonatal care , but (23.7%) just showed good and correct performance in neonatal care .( Masood ,2018)

Toqan (2010) performed a study to evaluate the criteria of quality nursing care of nurses who worked on neonatal departments in the West Bank in Palestine. The researcher used a quantitative descriptive design . The results showed that the nurse who was old had a higher experience year, and had a lower educational degree of application standard s of quality of nursing care than younger who had less experience but high educational degree. Also, there wasn't a significant difference

between gender and address of nurses and application of quality of nursing care . In addition , of results there was a positive relation between nurses/ beds ratio and the implementation of criterions of quality nursing care and criterions of practice among the nurses on neonatal units.

Another study that was conducted to evaluate quality of nursing care in NICU of Khartoum city .The researchers used descriptive cross sectional design . The results showed that half of the NICUs had a protocols and guidelines but there were no national standards for NICUs in the country and no national protocols or guidelines. Ventilators, Arterial Blood Gases (ABGs) machine, and Syringe - Infusion Pumps were obtainable in NICUs. The number of nurses in the NICUs in relation to the incubators and patients was 77.7%. (56.7%) of the nurses were bachelor degree, 7.2% were secondary school certificate degree and the remains were diploma certificate degree. Also the nurses had inadequate knowledge, training and skills. The results revealed significant association between number of neonatal death and NICUs settings score for the availability of national protocols, equipment and machines which showed that the death number increase in the low score NICUs. (Eljack, 2016)

### **2.2.5 Meaning of NICU :**

The infants who born early, and have health issues, or a tough birth they admitted to NICU. NICU mean "neonatal intensive care unit." There, infants get day-and-night care from a team of consultants. Most of those infants visit the NICU among twenty-four hours of birth. The length of their keep depends on their health condition. Some babies keep solely a number of hours or days , that others keep weeks or months.( Mary L. Gavin, MD , 2019)

According to ( GNN , 2020) , there were five of hospital have NICU in GS (Al Shifa' Complex - Al Nassr Pediatric Hospital - European Gaza hospital – Al-Aqsa hospital – Nasser hospital ) and the total numbers of admissions to NICUs in 2020 is 7424 infants. This hospital provide three level of neonatal care which was (Basic neonatal care, special care newborn nursery and Intensive neonatal care) . Intensive neonatal care was a high level of neonatal care which cares about infants of all

gestational ages and weights; Mechanical ventilation support, and possibly inhaled nitric oxide, for as long as required directly incoming to the all of professional consultants. (GNN,2020)

According to governmental hospitals on GS , there was 14 hospitals related to ministry of health and this hospitals provide patients care for all members of society .On 2020 the rate of admission on governmental hospitals were 161,965 patients . (MOH , 2020)

### **2.2.6 : Safety and Hygiene**

Safety and hygiene is consider as a best way to maintain health status to infants in NICU and prevent infection and complication of hospitalization . premature and sick infants need to high attention on safety and hygiene to prevent mortality and decrease long stay in hospital .

According to WHO, patient safety is preventing and reduce risks, errors and harm that occur to patient during health care (WHO, 2019)

Needleman and colleagues discovered that among patients, a higher number of hours of care consistent with day given and supplied by nurses was associated with lower urinary tract infection rates Also, retrospective cohort look at in a neonatal ICU found out that the occurrence of E cloacae contamination withinside the unit turned into higher while there has been scarcity of nursing staff (Carayon & Gurses , 2008). A quantitative, analytical, cross-sectional research through review of medical records was used to assess the relationship between the workload of the nurse / patient ratio and the incidence of patient safety incidents in public hospitals in Chile, patient safety included medication errors, patient falls, self-withdrawal of invasive devices, and incidents associated with mechanical containment so , the results showed that overall incident rate was 71.1% , medication error rate obtained for the study sample was 0.9% ,while the fall rate was 2.0 per 1,000 days of hospitalization , the overall rate of self-removal of invasive devices was 5.5 per 1,000 days of hospitalization, and finally the overall rate of incidents associated with mechanical restraint was 2.5 per 1,000 days of hospitalization. (Carlesi et al., 2017)

Zehnder et al., (2020) performed a study among health care providers at Royal Alexandra Hospital, Canada, to identify that healthcare professionals' (HCP) perceived workload during neonatal resuscitation. Interventions at delivery were stimulation (73%), suction (64%), continuous positive airway pressure (59%), positive pressure ventilation (52%), intubation (16%), chest compression (5%), and epinephrine (2%), so they found that HCPs who presented on deliveries of infants who need any delivery room interventions perceived higher workload, compared with who not need to delivery room interventions. Furthermore, in the researches about the infant to staff ratio and mortality in very low birth weight infants, there a retrospective study that was used by Calloghan, 2003 to evaluate the effect of infant to staff ratios, and the relationship of it on very low birthweight infants outcomes. the results showed that there was a positive relationship between mortality rate of newborns in NICU and the number of nurses who provide health care of them, which mean that decrease in nurses' staff in NICU lead to more mortality rate among the infants with very low birth weight. In addition, when staffing increase the survival of very low birthweight infants was improved. (Calloghan et al., 2003)

A sequential explanatory design was used to analyze the relationship between workload and patient safety in Southern Brazil. The results show that the relationship between nursing work and patient safety is adversely affected as it leads to bed-related falls, central venous catheter-related bloodstream infections, fluctuations in nursing staff, and increased absenteeism. (Magalhaes et al.,2013)

A study in China which conducted from January 2016 to June 2016, the researcher used a cross-sectional study to investigate the impact of caregiver workload on hand hygiene compliance. Researchers have found that the workload of nursing staff is negatively linked to hand hygiene. Therefore, the high workload of nursing staff reduces compliance with hand hygiene. (Zhang et al., 2019)

El-Soussi and Asfour, (2017) conducted a study in Egypt to assess the nurse's level of practice and knowledge of patient hygiene and identify barriers to patient hygiene practices in the intensive care unit.. The researchers used descriptive research design. The results showed that the obstacles for implementing hand hygiene are workload (71.79%), insufficient resources (61.53%), and decrease of knowledge (10.25%).



Magalhaes et al., (2019) highlighted the details of the nurse's working organization related to the drug administration procedure and their impact on the workload and patient safety of these specialists were highlighted. The results show that the high workload associated with disability, interruption, and adverse events interferes with the safe process of drug delivery, leading to rapid task execution, stress, and diminished attention.

Fagerstrom et al., (2018) performed a study to investigate whether the daily workload per nurse correlates with different types of patient safety incidents and with patient mortality. The results show the odds for a patient safety incident were 10%–30% higher, and for patient mortality about 40% higher, if the nursing workload is above optimal level . if OPC ( Oulu patient classification ) was below the level, the odds for a patient safety incident and for mortality were approximately 25% lower .

Finally, when the nurses have more time for caring and observe the patient , this may reduce the risk for adverse events and prevent patient condition from deteriorating .

A single-centre retrospective observational study was conducted by Sink ,2011 from January to June 2008 aimed to examine the relationship between nurse : patient ratio achievement of oxygen saturation goals in preterm infants at NICU. The researcher use a single – centre retrospective observational study linking existing quality improvement oximeter data with NICU at Connecticut children medical center . the results show that lower patients / nurse ratio was significantly associated with higher saturation target achievement among patient on high frequency ventilation and reduce hyperoxaemia among patients on nasal cannula. (Sink et al.,2011)

A cross sectional quantitative method was conducted in 2012 to determine the relationship between the workload of nursing staff and the nursing outcome index for patient safety. The results showed that when the patient / nurse ratio exceeded 7:1 , the patient fall , pressure ulcer , near error in medication , medication error , unplanned extubating, hospital - acquired pneumonia, and hospital-acquired urinary tract infection were increased .( Liu et al., 2012).

Cho et al.,(2003) conducted a study to evaluate the impact of nurse staffing on adverse events morbidity , mortality and medical costs . The results showed that increase one hour worked nurse per patient associated with decrease an 8.9% in the odds of pneumonia and increase a 10% in RN was associated with a 9.5% decrease in the odds of pneumonia. Also increase number of nursing hour per patient was linked with increase in probability of pressure ulcer .

A case study using retrospective hospital data conducted by Shuldham ,2009 to discuss the relationship between nurse staffing and patient outcomes " pressure ulcer, patient falls , upper gastrointestinal bleed (GI) , pneumonia , sepsis , shock and deep vein thrombosis(DVT)" .The results showed there was a weak association between nurse staffing and the outcomes . The rate of falls, gastrointestinal (GI) bleed, sepsis and DVT were reduced when nursing hours per patient increased and the rate of pressure sores and shock increased by more than three times with increase nursing hours per patient day. (Shuldham et al .,2009)

A cross sectional study conducted to study the impact of performance barrier on intensive care nurse's workload, quality and safety of care and quality of working life. The researchers use questionnaire to collect data which distributed to nurses in 17 ICU of seven hospitals in Wisconsin . the results showed that workload have a negative correlation with perceived quality and safety of care and quality of working life . Nurses who have higher workload reported lower level of quality of care , nursing care and safe care and experiencing higher fatigue and stress . Nurses who worked with two patient , admitted a patient and worked on day shift reported that facing higher workload .( Gurses et al., 2009)

Daud-Gallotti et al., (2012) conducted a study to evaluate the role of nursing workload as a risk factor of health care associated infections ( HAI) in ICU . It was a prospective cohort study and the population of study was all patients who admitted to 3 medical ICU and one step – down unit . The results showed that increase workload was associated with HAI among patients , followed by the seriousness of patient condition .

A prospective cohort study was conducted to evaluate the workload and adverse effects like , accidental extubating , obstruction of endotracheal tube and accidental disconnection of the ventilation circuit. The results showed that adverse effects happen 117 times during study period . The high number of infants per nurse and nurse technicians, more likely happen of adverse effects linked to mechanical ventilation . (Lamy Filho et al., 2011)

Hamilton et al., (2007) performed a study to examine if mortality rate in very low birthweight or preterm infants is associated with provide enough nursing staff .The researchers used Prospective study .The results showed that increasing number of nurses with neonatal specializations to intensive care and high dependency infants to 1:1 was associated with a decrease in risk adjusted mortality (48%). The study concluded that survival in neonatal care for very low birthweight or preterm infants was related to number of nurses with neonatal specializations per shift.

### **2.2.7 Missing nursing care :**

On NICU completing the nursing care very important to reach high quality of care and prevent complications. any missing of nursing care may led to many of problems prevent good recovery of infants .

Missed Care is defined in the Missed Nursing Care Model as any aspect of necessary patient care that is (partially or completely) canceled or delayed. Categories reported by caregivers contributes to (1) a history that catalyzes the need for prioritization, (2) elements of the care process, and (3) caregiver awareness and values ( Kalisch et al., 2009)

Cho et al.,(2015) performed a study to assess the relationship between workload on NICU and missing nursing care , they founded that increase in nurses staffing is associated with decrease missing care but little nurses staffing has more missing care so the results show that seven out of 24 nursing care elements were missed significantly less often in increasing nurses staff (vs. decreasing nurses staff).

A prospective design was used to evaluate association of NICU nurse workload with missing nursing care , the results showed that increasing the ratio of infants to nurses

leads to an increase in the odds of missing care, so that when nurses cared for 3 or more infants during the shift, it was 2.51 times more likely compared to the 1:1 task.( Tubbs-Cooley et al., 2019)

A cross sectional design was used to examine the character and prevalence of care left undone by nurses in English National Health Service Hospitals and to assess whether or not the quantity of missing care related to nurse staffing levels .The results show that nurse area unit a lot of probably to report care being left undone or missing after they area unit operating with high variety of patients. (86%) of nurses rumored that one or a lot of care activity had been left undone thanks to lack of your time on their last shift. The activity that left undone were comforting or talking with patients (66%), educating patients (52%) and developing / change medical aid plans (47%). (Ball et al.,2015)

Cho et al.,(2020) conducted a study to examine the relations among RNs staffing, nurses prioritizing of nursing activities, missed nursing care, quality of nursing care, and nurses' outcomes. The researchers was used missed nursing care survey to measure how frequently nurses had missed each of 24 activities. The results showed that nurses who cared for more that 8 to 12 patients and more than 12 patients were likely to have a higher number of missed activities than those who perceived it as (very) sufficient. In addition of that decrease in nurse staffing was associated with an increased number of missed activities and an increase number of missed activities and decrease staffing were associated with weakness in patient safety, quality of nursing care and job satisfaction, and a higher intent to leave. The nurses give the maximum priority to the patients' reassessments, timely medications, and patients' education, under hypothetical conditions of enhanced staffing.

Cho et al., (2016) performed a study to examine the association of nurse staffing and over time with nurse perceived of patient safety , nurse – perceived quality of care and care left undone . The researchers used cross – sectional survey and random sampling method . The results showed that when comparison with nurses who did not work overtime, when nurses worked overtime reported an 88% increase in failing or poor patient safety , a 45% increase in fair or poor quality of nursing care , and an 86% increase in care left. The average of care activities left undone was

‘Comfort/talk with patients’ (57.1%), ‘Teach/counsel patients and family’ (44.1%), ‘Develop or update care plans’ (29.7%), ‘Coordinate patient care’ (27.8%), and ‘adequately document nursing care’ (22.7%) . Finally the conclusion of the study was a higher number of patients per RN was significantly associated with higher odds of reporting poor/failing patient safety and poor/fair quality of care and of having care left undone due to lack of time.

A descriptive study was performed to nurses who worked in NICU in USA. The researchers was use self – reported of missing care and the data collected by cross sectional web based survey . The aim of study was to describe the frequency of nurse reported missed care in NICU and the factors that effect on missing care. The results showed that 52% nurses reported missing care at least one of 35 nursing care items on their last shift. 90.5% reported never missed high risk medication, 89.4% never missed patient assessment, 82.7% never missed reassessment to infants on their last shift , 20% reported missed hand hygiene was rarely / occasionally and 28.2% reported missed central line site care was rarely / occasionally and 40.6% reported missed oral care for ventilated infants was rarely / occasionally . So very little of nurses reported missing care in their last shift. Half of nurses reported that decrease number of nurses and equipment and supplies were one of causes to missing care. (Tubbs- Cooley et al.,2015)

Al- Kandari et al., (2009) conducted a study to assess workload of nurses who work on five governmental hospitals and the factors that contributing to tasks incomplete by the nurses working on medical and surgical departments. The researchers used exploratory survey by self – administered questionnaire. They found that three most nursing activities left incomplete were comfort talk with patient and family ( 26.8%) , adequate documentation of nursing care (23.3%) and oral hygiene (17.7%) while the most tasks were incomplete during night shift.

The results revealed nursing and non-nursing workload contributed to task incompleteness and the nurses were unable to complete during their shift because workload. The tasks were completed when increase number of nurses in the departments.

Also , Friese et al., (2013) performed a study to identify the frequency of missed care in oncology unit and compared between oncology and non – oncology and the relationship between staffing and missed care. The population of study was nursing assistants and nurse ( registered and licensed practical). The researcher found that increase one patient in the assignment of nurses was associated with 2.1% increase in missed nursing care, so they found a relationship between higher patient workload and reported missing nursing care .

A correlation research design was conducted to examine the relationship between workload, teamwork and missed nursing care at ICU. The researchers were used self-administered questionnaire and the population of study was 207 nurses in Egypt at 2020 . They found that 45.9% of nurses had moderate missed care and 20.3% had high missed care while 36.7% had high moderate workload and 50.2% had moderate workload . The results revealed positive correlation between workload and missed care .( Soliman & Eldeep, 2020)

A cross-sectional study was conducted by Gathara , 2020 to examine nursing care to sick newborns and determine missing care . Results exhibited that nursing tasks were most completed on average (97%) handing over between shifts , ( 96%) checking and changing a diapers while the lowest completion rate on nursing reviews on newborns and assessment babies on phototherapy . Also the results showed that one nurse cared 3 to 7 newborns in private sector while nurses cared 10 to 25 newborns in public sector so they suggesting that nurses perform better in the private sector , another findings of this study that 24% reduction in nursing care index when there was 1 nurse per 12 or more newborns compared with 1 nurse to up to 3 newborns. (Gathara et al., 2020)

### **2.2.8 interruptions to workflow:**

Workload may led to interruption on work and this impact on nurses concentration and prevent to complete tasks. Many of nurses complain of interruptions from alarms. family of patient or others medical team and this impact on quality of care and delayed it .

Sasaki et al., (2019) conducted a study to investigate interruption and nursing workload during medication administration process. It was observational study that timed 121 medication rounds technicians in NICU in Brazil . The results showed that the preparation phase have the most interruptions on average ( 48%) and the main causes of interruptions information's exchanges ( 42.4%) , conversations (22.1%) and alarms (11.8%) . All occurred during medication preparation phase and the main time (in second) taken to accomplish medication rounds without and with interruptions was increase in the mean time ranged from 53.7 to 64.3% (preparation phase) and from 18.3 to 19.2% (administration phase) .So the conclusion of this study was Interruptions during the practice of nursing, especially during the administration of medication, associated directly on patient safety, the quality of care and workload.

MacPhee et al., (2017) performed a study to investigated the impact of heavy nurse workload on patient and nurse outcomes . It was a cross sectional correlational study of 472 nurses from Canada . the results showed their relationship between workload and interruptions on patient outcomes (medications error – falls – urinary tract infection ) . So the heavy workload and interruptions influence on patient outcomes indirectly by effect on nurse performance and ability to complete the nursing tasks. the researchers found that heavy workload and interruption influence on nurse out come through tasks left undone and this affect on professional nursing standards.

An observation – based prospective study was conducted on 2018 to describe interruptions experienced by emergency nurses and how interruptions affect emergency – nurse workload. The results showed there was moderate positive association between the number of interruptions experienced during a shift and the increased overall workload reported at end-shift and frequency of interruptions increased the nursing staff workload. (Forsyth et al., 2018)

Trbovich et al., (2010) performed a study to assess the nature and frequency of interruptions during medication administration and the interruptions' effects on task efficiency to guide healthcare managers in improving patient safety and staff productivity. The method was used is direct observation study to document the nature, frequency, and timing interruptions during o medication administration in

chemotherapy in daily care in Canada . The nurses caring for up to 5 patients at once and the numbers of interruptions was up to 14 interruptions which were from staff , patients , family of patients , equipment's and alarms . The results showed that interruptions in work places lead to inefficiency in work practice that nurses are often interrupted during work and these interruptions need more time and decrease nurses' efficiency to complete nursing tasks.

Kalisch et al., (2010) performed a study to identify the number and type of interruptions and multitasking reported by nurses and associated with patient error. The researchers used a natural-setting observational field design. The results showed that the nursing environment was interruptive and fragmented. The nurses reported they were suffering from a high number of interruptions (from 4.3 to 18 in one hour), and a high load of multiple tasking. But although of that the results showed no significant relationship between interruption, multitasking and patient error.

A study was performed to assess the impact of interruptions on perceptions of performance and irritation . The results showed that workflow interruptions have a bad effect on satisfaction , nurse performance , forgetting of intentions and irritations . Also decrease in the time and mental demands have a relationship with interruptions . (Baethge & Rigotti , 2013)

### **2.2.9 Documentation:**

To achieve safe and high quality of nursing practice must implement clear and accurate nursing documentation.

One of the challenges facing the nurses on implementing good and accurate nursing documentation is heavy workload which may impact on documenting nursing care or infants' conditions consciously.

Shihundla et al., (2016) conducted a study to describe the effects of increased nurse's workload on the quality of documentation of patient information. The researcher used an explorative , descriptive and contextual design . The population of this study was all nurses who work at primary health care facilities in Vhembe and the data collection by face to face interview . The results showed that primary health care was



faced multiplies of effect due to increase nurse workload like : incomplete patient information , un availability of patient information was observed , some of patient information was found to be illegible , inaccurate and incomplete and the nurses have difficulty to deal with increase workload and documentation the patient information on the multiple records that are utilized at Primary Health Care facilities, which lead to incomplete information .

A observational analytic cross sectional design was used to identify the factors of documentation of the completeness of nursing care that done by nurses in the emergency room . The results showed that there is relationship between workload , knowledge and complete of documentation . (Fatmawati et al., 2018 )

Tasew et al., (2019) Conducted a study to evaluate documentation practice and factors affecting documentation among nurses . The results showed that 52.2% of nurses had poor documentation practice and 40.5% don't document ever care given to the patient . They reported the reasons of poor nursing documentation was lack of time , shortage of documenting sheet , inadequate staff and lack of motivation from supervisors.

Another study conducted by Bijani et al., (2016) to determine affecting factors on poor nursing documentation . The research used descriptive – analytic study of 80 nurse who work in hospital in Fasa .The results showed that nurses who worked on Gynecology and Cardiac care unit , reported personal shortage (72.7%) , lack of time ( 57.1% ) and fatigue ( 54.5%) , this were the most factors affect on poor nursing documentation . Also nurse who work on others wards , reported that high number of patients (70.1%) , and high volume of tasks (62.3%) were influences on poor nursing documentation .

#### **2.2.10 Workload and work condition :**

A good and comfortable environment led to provide high quality of care and increase nurses and patients outcomes .There was many researches conducted to study the impact of workload and work conditions on nursing care .

An analytical quantitative study that was conducted at Pro. Dr. R.D Kandu Hospital . The aim of this study to determine the effect of job motivation , job satisfaction and attitude towards profession on nurse performance .The population of this study was all nurses in the out patient clinic of Pro. Dr. R.D Kandu Hospital. The results showed that job motivation has a positive effect on nurse performance which mean that job motivation had a significant direct influence on nurse performance . (Kapantow et al., 2020)

Yosiana *et al.*, (2020) conducted a study to analyze the effect of workload and work environment on nurse performance. The results show that direct effect of workload on nurse performance leads to a negative and significant effect on nurse performance, so workload at high level lead to low nurse performance. The researchers also studied whether the work environment have an effect on nursing performance and they found a good work environment could produce better nurse performance and would make them more motivated at work.

Another study in Indonesia which study the effect of workload, work stress, and supervision to clinical nurse performance. The researchers found that workload have positive effect on nurse performance if it was not excessive but effect of high work stress has an impact on poor nurse performance. Saputera & Suhermin, (2020)

Ragab *et al.*, (2013) conducted a study to measure nurses workload at trauma and post operation intensive care units and identifying the impact of nurses workload on nursing productivity, the results show that there was negative correlation between workload and productivity, so the results conducted that workload is higher in trauma ICU due to patients need more care, while workload was medium in post-operative due to patients were more conscious and independent in most activities. Also, the results show that nurse performance in trauma ICU was medium, while it was high in post-operative ICU.

Liu et al., (2019) performed a study to evaluate the impact of work environment on nurse outcomes and quality of care in ICU , also the effect on nursing care left undone . The results showed that good and supportive environment lead to less nursing care left undone , better nurse outcomes and higher quality of care in ICU

departments . Also that positive work environment associated with decrease nurse burnout and lower job dissatisfaction .

In addition, there is a study performed to identify the relationship between the departments-level nursing working environments and individual-level health-promoting behaviors of hospital nurses in South Korea and their perceived quality of nursing performance . The results showed that nurse who work with good nursing managers , high skills and a support nursing staff , they show more responsibility for health and physical activity. Nurses with sufficient staff and resources reported good stress management. Nurses who work in enough staffing and resources and have high levels responsibilities on health and spiritual growth were more likely to understanding their nursing performance is high . (Cho et al., 2019)

Purdy et al., (2010) performed a study to identify the association between nurse perceptions of work environment and consequences of patients and nurses . The results showed that good work environment had a positive effects on quality of nursing care and decrease of falls and risks , also lead to positive effect on nurse psychological empowerment and had direct effect on job satisfaction and quality of nursing care . So good work environment reinforce the patient and nurse outcomes .

Abdalkader and Hayajneh conducted a study to identify the effect of night shift on Jordanian nurses at critical care units. The results showed that 78% reported that night shift have a high workload than day shift and 73% of nurses reported that patient / nurse ratio not appropriate on night shift . Also 50% of nurses of nurses reported that incidents happen on night shift due to nurse is busy , drowsy or tired and this lead to decrease concentration and cause accidents .Also findings of this study that nurses had a health problems and quality of performance affected by night shift .( Abdalkader & Hayajneh , 2008)

Lake et al., (2016) performed a study to assess the associations between the NICU work environment, quality of care, safety, and patient outcomes. The results showed that a good work environment was associated with higher odds of nurses reporting poor quality, safety and outcomes. Also a good work environment may be a promising strategy to achieve safer settings for infants on risks .

Aiken et al., (2016) performed a study to identify the impact of hospital nurse staffing , nurse education and work environment on patient outcomes . The results showed that the effect of decrease workload by one patient / nurse on death and failure to rescue is very low or nil in hospital with poor environment but it was decrease on death and failures in hospital with average environments by 4% and decrease 9% and 10% on good environments . Also bachelors nursing degree decrease happening of death and failures regardless the nature of work environment on average 4% .

(Susiarty el al., 2019) conducted a study to analyze the effect of workload and work condition on job stress and nurse performance at Mataram city general hospital . the researcher used causal research type and the participants of study were 128 nurses who working on inpatient unit .The results showed that workload has a negative effect but no significant effect on performance and working Environment has a positive and significant impact on performance .

### **Summary:**

The chapter presented the conceptual framework of the study, and previous researches that study the relationship of workload , nurse / patient ratio and quality of nurse care and performance. The effect of workload on safety and hygiene , missing nursing care , interruption of workflow and documentation . In addition , the impact of work condition on nurse performance and quality of care .

After reviewing the previous studies, I found the following :

Many of researchers as Elshanti et al., (2020 ) , toqan ,(2010) and Gurses et al., 2009) Were used descriptive cross sectional design while , Sasaki et al., (2019) was used observational study and Daud-Gallotti et al., (2012) was used prospective cohort study design .

As for study tool , in my study and others studies as Elshanti et al ., (2020) used self - administered questionnaire while Masood (2018 ) was used structured interview questionnaire and observational checklist.

In addition, according setting study , in my study and others stidies as Elshanti et al ., (2020) , Masood (2018 ) and toqan ,(2010) have been conducted their studies in neonatal intensive care units but , Soliman & Eldeep, (2020) and Daud-Gallotti et al., (2012) were conducted on adult ICU.

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# **Chapter Three**

## **Methodology**

## **Chapter 3**

### **Materials and Methods**

#### **3.1 Study design**

The researcher used descriptive cross-sectional study to assess the impact of workload on quality of nursing performance supplied, by nurses working in NICUs of the governmental hospital at G.S.

This design was appropriate for the kind of the problem in this study, efficient, less time consuming, easily applied and less money need.

#### **3.2 Study population**

The population of the study consist of all nurses working in NICUs of the governmental hospitals. The total number of nurses working in NICUs " Al Nassr Pediatric Hospital (32) - Al Shifa' Complex (32) - European Gaza hospital (13) – Al-Aqsa hospital (11) – Nasser Medical Complex hospital (16) “with different academic level (Diploma, baccalaureus, Master). 104 from 113 NICU nurses participated in this study with a response rate 92%.

#### **3.3 Sample size and sampling process**

The sample of this study was a census sample, so the researcher select all members of the population, consisting all staff who are working in NICUs governmental hospitals in GS. The number of nurses who answer the questionnaire was 104 .

#### **3.4 Study setting**

The setting of the study is in NICUs of the governmental hospital(Al Shifa' Complex hospitals - Al Nassr Pediatric Hospital - European Gaza hospital - Nasser Medical Complex hospital – Al-Aqsa hospital) at G.S.

#### **3.5 Data collection technique**

A self-report structured questionnaire distributed among all nurses working in the NICUs at governmental hospitals in the GS was used to collect the data . (Annex 2)

The researcher collect data by him self and gave the nurses who working on NICU some instructions and explanations about questionnaire .Also ,the researcher met with head nurses and straight morning team and give instructions and some directions about the questions in questionnaire .

### **3.6 Study instrument**

A self-administered questionnaire constructed by the researcher based on the performance appraisal form for the position of nurse / General Personnel Council and from review of the researches and past experiences . The questionnaire validated by panel of experts. (Annex 7)

### **3.7 Study period**

The study was performed in the period between April 2021, and September 2021.

### **3.8 Pilot study**

Pilot study on (30) nurses work in NICUs at the selected governmental hospitals that randomly selected to explore the appropriateness of the study instruments and let the researcher train for data collection, the clarity of meanings and scales and the time taken to fill the questionnaire and for expecting response rate. The pilot study has been added to sample size.

### **3.9 Validity**

To measure the validity of the instrument, the questionnaire was submitted to eleventh of research and NICU experts to evaluate face and content validity .

The questionnaire was modified according to experts' suggestions. The experts decided that the items in the questionnaire are relevant and appropriate to study goal and the questionnaire is valid to be used in this study

The researcher calculated the correlation between each item and the total score of the domain as follows:



**Table (3.1): Correlation between each item and total score of hygiene and safety domain**

No.	Items Table of hygiene and safety	Correlation
1	Perform hand washing before and after contact with infants.	0.401 *
2	Use sterile technique with invasive procedure	0.456 *
3	Regular changing of humidifier water, Intravenous Fluids and suction	0.577 **
4	Regular mouth and eye care for infants	0.689 **
5	Wear personal protective equipment between each infant	0.472 **
6	Use the equipment's specific to each infant	0.412 *
7	Using waterbeds, pillows on prone areas to prevent skin ulcer	0.708 **
8	workload may affect to preforming safety procedure correctly	0.683 **

\*\*significant at 0.01      \*significant at 0.05

As shown in table (1), all the items of hygiene and safety domain have statistically significant correlation with the total score of the domain.

**Table (3.2): Correlation between each item and total score of missing of some nursing care domain**

No.	Items of missing of some nursing care	Correlation
9	Hourly Intravenous Fluids site assessment	0.583 **
10	Double check for high-risk medications	0.457 *
11	Use 7 rights during medications administration	0.616 **
12	Weight baby daily with same scale at the same time	0.662 **
13	Check the equipment and alarms	0.686 **
14	Feeding infant by NGT before age of 34 weeks	0.552 **
15	Burp infant frequently during bottle feeding	0.370 *
16	Changing the diaper as soon as possible after soiling.	0.623 **
17	Check vital signs every 1 hour	0.457 **
18	Place monitor electrode and probe on the infants on correct way.	0.710 **
19	Teaching mother about breast feeding.	0.412 *
20	Obtain laboratory samples.	0.446 *
21	Perform ventilator-associated respiratory infection prevention	0.723 **
22	Workload may lead to missing some of nursing care steps.	0.395 *

\*\*significant at 0.01      \*significant at 0.05

As shown in table (2), all the items of missing of some nursing care domain have statistically significant correlation with the total score of the domain.

**Table (3.3): Correlation between each item and total score of documentation of nursing care domain**

No.	Items of documentation of nursing care	Correlation
23	Document vital signs measures every 3 hrs.	0.563 **
24	Document nursing notes clearly at beginning of each shift	0.490 **
25	Document all information related the infant in his file.	0.643 **
26	Sign and title any documentation of nursing care	0.607 **
27	Document baby name & wt. and date of birth in his bracelet	0.841 **
28	Workload may lead to missing some documentation of nursing care procedure.	0.520 **
29	Workload may affect the accuracy of documentation.	0.663 **

\*\*significant at 0.01

As shown in table (3), all the items of documentation of nursing care domain have statistically significant correlation with the total score of the domain.

**Table (3.t3 4): Correlation between each item and total score of interruption of workflow domain**

No.	Items of interruption of workflow	Correlation
30	Workflow interruption increases the time required for nursing activities.	0.579 **
31	Workload interrupts follow up admission and discharge of patient	0.581 **
32	Workload interrupts health education to parents about their infant care.	0.532 **
33	Workload may lead to medication preparation & administration error	0.797 **
34	Workflow interruption increases probability for malpractice.	0.732 **

\*\*significant at 0.01

As shown in table (4), all the items of interruption of workflow domain have statistically significant correlation with the total score of the domain.

**Table (3.5): Correlation between each item and total score of workload and working conditions domain**

No.	Items of workload and working conditions	Correlation
35	Workload considered tolerable to me.	0.521 **
36	Nurse / patient ratio is appropriate	0.536 **
37	Workload fairly distributed among shifts	0.686 **
38	There is enough break-time during shifts	0.726 **
39	Work conditions (noise and loud, ventilation alarms , light) may affect nursing performance .	0.644 **
40	Workload leads to delays in carrying out required tasks	0.511 **
41	Workload leads to imbalance between work tasks and social time	0.548 **
42	Supporting colleagues and supervisor may decrease workload	0.631 **
43	Work awards and motivation have a role in reducing the workload	0.592 **
44	Workload affects my performance.	0.628 **

\*\*significant at 0.01 // not significant

As shown in table (5), all the items of workload and working conditions domain have statistically significant correlation with the total score of the domain .

**Table (3.6): Correlation between each domain and total score of the scale**

No.	Domain	Correlation
1	Hygiene and safety	0.774 **
2	Missing of some nursing care	0.669 **
3	Documentation of nursing care	0.804 **
4	Interruption of workflow	0.554 **
5	Workload and working conditions	0.724 **

\*\*significant at 0.01 \*significant at 0.05

As shown in table (6), all the domains have statistically significant correlation with the total score of the scale.

### 3.10 Reliability

#### Internal consistency

- Cronbach alpha method was used to test the reliability for each domain of the questionnaire. The results are shown in the table:

#### Cronbache alpha coefficient

No.	Domain	No. of items	Alpha coefficient
1	Hygiene and safety	8	0.663
3	Missing of some nursing care	14	0.815
4	Documentation of nursing care	7	0.810
4	Interruption of workflow	5	0.653
5	Workload and working conditions	11	0.793
<b>Total score</b>		<b>45</b>	<b>0.891</b>

As presented in table , the items of the questionnaire showed high reliability as Cronbache alpha coefficient was 0.891. Therefore, the questionnaire had good validity and reliability, and suitable to be used in this study.

### 3.11 Inclusion Criteria

All nurses working 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.

### 3.12 Exclusion Criteria

Head nurses of NICU in governmental hospitals and 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.

### 3.13 Ethical and administrative considerations

An approval letter was obtained from the Islamic University of Gaza (Annex 3) to the MOH asking for permission (informed consent) and approval letters were obtained from MOH (Annex 5) and Helsinki Committee(Annex 4) to access the hospitals to conduct the study and collect data from NICU nurses .The informed consent was be distributed to the 113 questionnaires; participants were be confirmed

that the information's will only be used for research goal, and privacy was be kept. Moreover, respondents have the right to reject to share or retreating from the study at any time. Annex (1)

### **3.14 Statistical analysis:**

The information was analyzed by using the SPSS program (SPSS version 25). the following statistical tools were utilized:

1. Mean and SD.
2. Cronbach's Alpha test.
3. Pearson coefficient of correlation
4. T-test.
5. ANOVA.
6. Post Hoc Test
7. LSD (least significant degree) test

### **3.15 Limitations of study**

- Lack of research studies related to impact of workload on quality of nursing performance.
- Lack of research studies about neonatal and NICU
- The financial limitation since the study is self-funded.
- Transportation obstacles during distribution of questionnaires to the hospital due to covid19 situation in GS.

# **Chapter Four**

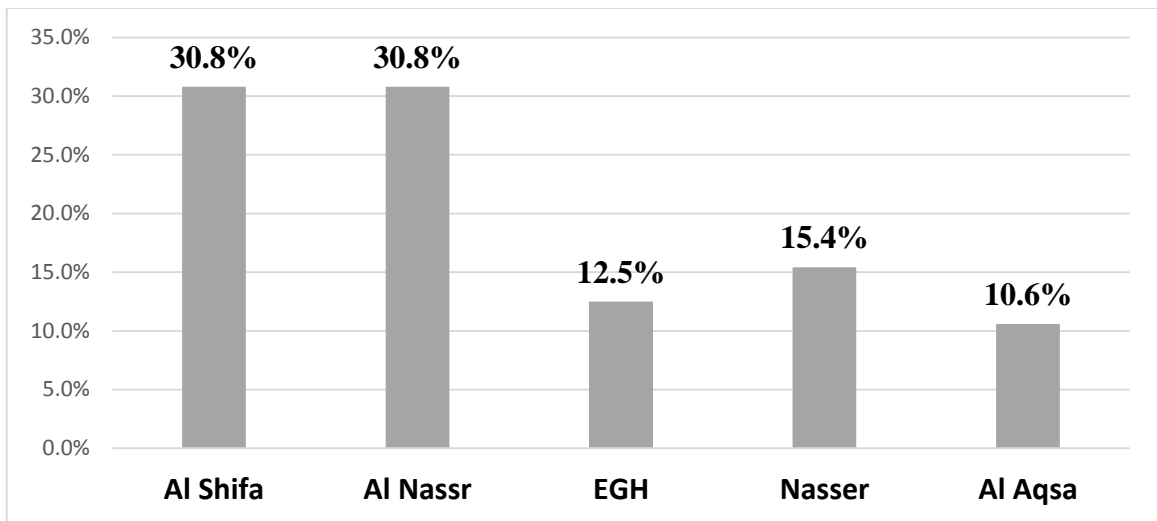
## **Results and Discussion**

## Chapter Four

### Results and Discussion

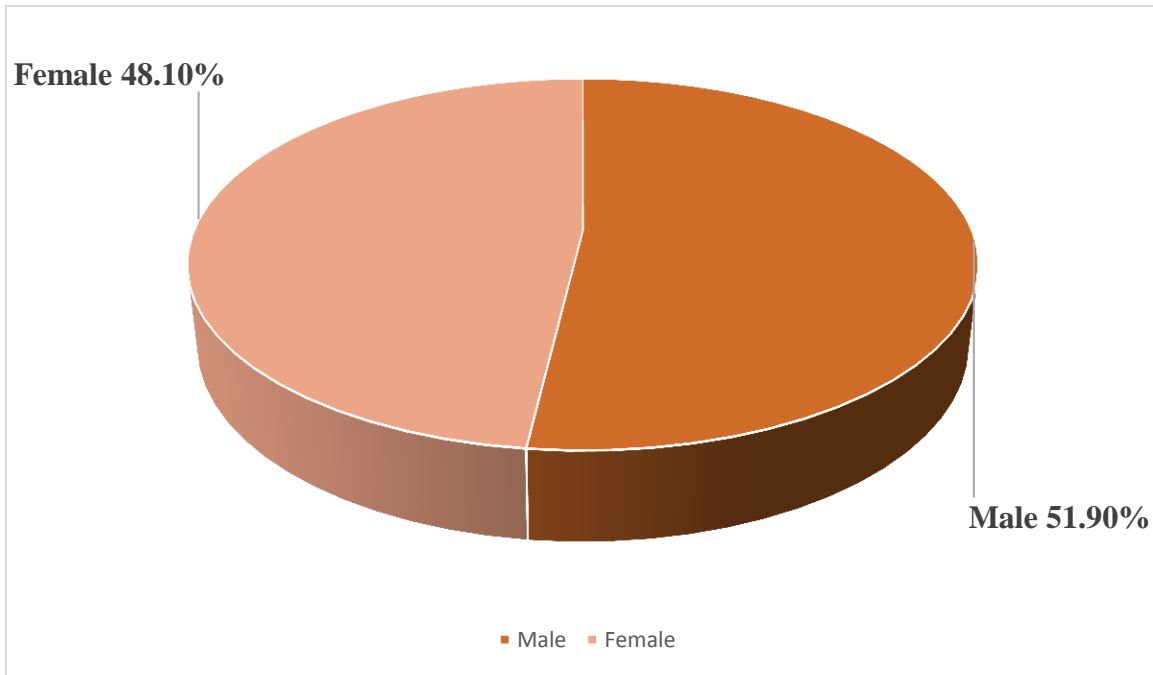
#### 4.1 Descriptive results

##### 4.1.1 Sociodemographic characteristics of study participants



**Figure (4.1): Distribution of study participants by hospital**

Figure (4.1) showed that 32 (30.8%) of study participants were from Al Shifa hospital, 32 (30.8%) were from Al Nassr Pediatric hospital, it could be due to equal number of beds capacity in the NICUs at Al Shifa hospital and Al Nassr Pediatric hospital , 13 (12.5%) were from EGH, due to covid -19 situation in EGH, the number of nurses who working in NICU has been reduced, 16 (15.4%) were from Nasser hospital, due to some of nurses refuse to participate of the study and 11 (10.6%) were from Shohada Al Aqsa hospital , it could be due to less beds capacity in the NICUs than the NICUs in the other hospitals.



**Figure (4.2): Distribution of study participants by gender**

Figure (4.2) showed that 54 (51.9%) of study participants were male nurses and 50 (48.1%) were female nurses. The reason of this convergence of proportions is the nature of work environment in NICU is preferred from female nurses due to it is a close department and dealing and caring to infants is easier and more interesting from other departments. Also, male nurses are more than female in MOH. This result consistent with study conduct by El shanti et al., (2020) who found 60% male and 40% female working in NICU but , inconsistent with study conducted by Ibrahim & Kambal (2016) and Zhang et al., (2016) who found all nurses working in NICU were female .



**Table (4.1): Sociodemographic characteristics of study participants (n= 104)**

Variable	Number	Percentage (%)
<b>Age</b>		
22 - 29 years	35	33.7
30 - 39 years	57	54.8
40 – 49 years	12	11.5
Total	104	100.0
Mean age= 32.663 years SD= 5.578 years		
<b>Place of residency</b>		
North governorate	11	10.6
Gaza governorate	41	39.4
Middle governorate	20	19.2
Khanyounis governorate	22	21.2
Rafah governorate	10	9.6
Total	104	100.0
<b>Level of education</b>		
Diploma	16	15.4
Bachelor	79	76.0
Master / PhD	9	8.7
Total	104	100.0
<b>Marital status</b>		
Single	18	17.3
Married	86	82.7
Total	104	100.0
<b>Income</b>		
Less than 1500 NIS*	27	26.0
1500 – 2000 NIS	66	63.5
More than 2000 NIS	11	10.6
Total	104	100.0

Table (4.1) showed that the mean age of study participants was  $32.663 \pm 5.578$  years, more of half 57 (54.8%) of study participants were from the age group 30 - 39 years. In past few years, nursing employment has been very low , could explain this result. These result inconsistent with the study result conducted by El shanti et al., (2020) who found that 54.5% of nurses age group (20-30) but consistent with Ibrahim and Kambal (2016) who found that (60%) of the nurses were at age group (31- 40) .

Also, the most of the study participants , 79 (39.4%) were from the Gaza governorate and this due to most of participants work in Al Shifa hospital and Al Nassr Pediatric hospital which have high number of participants in the study , 22 (21.2%) were from Khan Younis governorate, and 79 (76.0%) have bachelor degree which consider positive point to provide good and high quality of care to infants in NICU, furthermore, that only (8.7%) of the study participant had postgraduate degree who

most specialized on neonatal diploma from Palestine college of nursing and this support the knowledge and practice in neonatal departments .These result matched with the study result conducted by El shanti et al., (2020) who found that (75.4%) of nurses have bachelor degree and with Al habbash , (2018) who found ( 75.2%) on nurses on NICU have bachelor degree . But inconsistent with Eljack, (2016) who found (56.7%) on nurses who work on NICU have bachelor degree . Also 86 (82.7%) are married, and 66 (63.5%) have an income of 1500 – 2000 NIS. These results due to most of employments in governmental hospital was employment last 15 years and belonging to Gaza governmental.

**Table (4.2): Work-related conditions of study participants (n= 104)**

Variable	Number	Percentage (%)
<b>Years of experience</b>		
Less than 5 years	51	49.0
5 – 10 years	29	27.9
11 years and more	24	23.1
Total	104	100.0
Mean= 6.528 years SD= 5.450 years		
<b>Working shift</b>		
Morning shift only	17	16.3
Mixed shifts	87	83.7
Total	104	100.0
<b>Work hours / week</b>		
35 hours	55	52.9
36 hours and more	49	47.1
Total	104	100.0
<b>Received training about NICU</b>		
Yes	84	80.8
No	20	19.2
Total	104	100.0

Table (4.2) showed that the mean years of experience in NICU was 6.528±5.450 years, 49% of study participants have less than 5 years of experience in NICU and these results may due to the rotating the nurses from one department to another's in the hospital. This result consistent with Al habbash , (2018) who found 49.5 % of nurses who work on NICU had less than 5 years' experience .

Also , 83.7% work mixed shifts (morning, evening, and night) and this due to that all head nurse and supervisors who work straight mourning excluded from the study. In addition , 52.9% work 35 hours per week, and 80.8% of study participants received training about NICU and this because the role of administration of nursing in qualifying all new nurses before working in NICU to know how to provide high quality and practice to neonates and this results matched with Zhang et al., (2016) who found that all nursing working in NICU had received a training in NICU and this results inconsistent with Al habbash ( 2018) who found (67.3%) of nurses who working in NICU had received training in NICU.

#### Criteria for measurements of variables

score	Cell length	Weighted percent	Interpretation
1	1.0 – 1.80	20% - 36%	Very low
2	1.81 – 2.60	>36% - 52%	Low
3	2.61 – 3.40	>52% - 68%	Moderate
4	3.41 – 4.20	>68% - 84%	Above moderate
5	4.21 – 5.0	>84% - 100%	High

Source: (2004، تميمي)

#### 4.1.2 Quality of nursing performance

**Table (4.3): Hygiene and safety (n= 104)**

No	Items of hygiene and safety	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	SD	%	Rank
1	Perform hand washing before and after contact with infants.	0	0	0	10.6	89.4	4.894	0.309	97.88	1
2	Use sterile technique with invasive procedure	0	0	2.9	20.2	76.9	4.740	0.502	94.80	2
3	Regular changing of humidifier water, Intravenous Fluids and suction	0	1.0	3.8	42.3	52.9	4.471	0.622	89.42	4
4	Regular mouth and eye care for infants	0	0	7.7	34.6	57.7	4.500	0.638	90.00	3
5	Wear personal protective equipment between each infant	0	4.8	16.3	42.3	36.5	4.105	0.846	82.10	7
6	Use the equipment's specific to each infant	0	1.9	8.7	38.5	51.0	4.384	0.728	87.68	5
7	Using waterbeds, pillows on prone areas to prevent skin ulcer	0	12.5	17.3	39.4	30.8	3.884	0.988	77.68	8
8	workload may affect to performing safety procedure correctly	1.9	6.7	5.8	31.7	53.8	4.288	0.982	85.76	6
<b>Overall</b>							<b>4.408</b>	<b>0.404</b>	<b>88.16</b>	

In this domain, the researcher gave the participant some explanations and instructions that strongly agree, agree and neutral mean yes always, yes sometimes, yes rarely, respectively.

Table (4.3) showed that the highest score was in performing hand washing before and after contact with infants with mean score 4.894 and mean percent 97.88%, followed by using sterile technique with invasive procedure with mean score 4.740 and mean percent 94.80%. The lowest score was in using waterbeds, pillows on prone areas to prevent skin ulcer with mean score 3.884 and mean percent 77.68%, followed by wearing personal protective equipment between each infant with mean score 4.105 and mean percent 82.10%. The overall mean score was 4.408 with mean percent 88.16% which indicated that the NICU nurses perform hygiene and safety activities to high extent and the researcher believes that most of nurses who working in NICU had received a training about neonate's care and the nature of working in neonatal department is very sensitive department and need more attention. In addition, neonates who admitted on the NICU has low immunity, have serious problems need to more care and high level of hygiene and safety, also hand washing and alcohol-based hand rub are the most frequently used hand hygiene strategies and it is easy to used. In addition of that the role of infection control team on awareness of the importance of hand hygiene and safety on NICUs. On other hand, the high rates in the scores of safety and hand hygiene are related to the international epidemiological situation of COVID 19, which led to increasing the commitment and application of hand hygiene strategies, using antiseptic and wearing personal protective equipment's and this aiming to decrease the spread of the infection and improving outcome. This study consistent with Alharbi (2018) who found that the majority of nurses reported that patient safety and quality of care were very good to excellent (78.5% and 74.2%, respectively) and with Raskind et al., (2007) who found that rate of hand hygiene was 94%. And the study inconsistent with El shanti et al., (2020) who found that safety level on NICU was 76.2% and with Zhang et al., (2019) who found the rate of hand hygiene was 26.6%.

**Table (4.4): Missing some nursing care (n= 104)**

No.	Items of missing some nursing care	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	SD	%	Rank
9	Hourly Intravenous Fluids site assessment	0	1.9	14.4	46.2	37.5	4.192	0.751	83.84	9
10	Double check for high-risk medications	0	1.0	4.8	40.4	53.8	4.471	0.637	89.42	3
11	Use 7 rights during medications administration	0	1.0	5.8	33.7	59.6	4.519	0.653	90.38	2
12	Weight baby daily with same scale at the same time	0	0	22.1	36.5	41.3	4.192	0.776	83.84	10
13	Check the equipment and alarms	0	1.9	4.8	27.9	65.4	4.567	0.679	91.34	1
14	Feeding infant by NGT before age of 34 weeks	1.0	3.8	14.4	40.4	40.4	4.153	0.878	83.06	11
15	Burp infant frequently during bottle feeding	0	0	6.7	48.1	45.2	4.384	0.612	87.68	5
16	Changing the diaper as soon as possible after soiling.	0	1.0	8.7	41.3	49.0	4.384	0.687	87.68	6
17	Check vital signs every 1 hour	1.9	15.4	37.5	27.9	17.3	3.432	1.012	68.64	14
18	Place monitor electrode and probe on the infants on correct way.	1.0	1.0	6.7	39.4	51.9	4.403	0.744	88.06	4
19	Teaching mother about breast feeding.	1.0	5.8	25.0	31.7	36.5	3.971	0.970	79.42	12
20	Obtain laboratory samples.	0	1.0	13.5	44.2	41.3	4.259	0.724	85.18	7
21	Perform ventilator-associated respiratory infection prevention	0	2.9	10.6	44.2	42.3	4.259	0.763	85.18	8
22	Workload may lead to missing some of nursing care steps.	10.6	18.3	8.7	29.8	32.7	3.557	1.385	71.14	13
<b>Overall</b>							<b>4.196</b>	<b>0.395</b>	<b>83.92</b>	

In this domain, the researcher gave the participant some explanations and instructions that strongly agree, agree and neutral mean yes always, yes sometimes, yes rarely, respectively.

Table (4.4) showed that not missing nursing care was 83.92% with the overall mean score was 4.196 which indicated above moderate and the highest score was in checking the equipment and alarms with mean score 4.567 and mean percent 91.34%. the researcher believes that each equipment has a special and importance purpose in infants treatment and any alarm on NICU help the nurses to provide immediate responses to any change in infants condition. Followed by using 7 rights during medications administration with mean score 4.519 and mean percent 90.38% and this due to the fragility of infants who admitted to NICU, the increasing enforcement of high-risk procedures and the low tolerance to medication errors need more attentions of nursing professionals working in the NICU. Also nurses who working in NICU department don't rotating to other departments which makes the nurses more experience and high practice about neonates. In addition of that in others departments the relatives of patient bedside him so any missing of care relatives may alert the nurses but, in NICU the infant doesn't have parents bedside him so the nurses need to be more attention. Any missing of care in NICU may lead to high risk on infant's condition. These results consistent with Swart, et al., (2015), who found that, almost threequarters of nurses had good level of performance and with. (Toqan,2010) who found that neonatal nurses were on moderate level in application of standards of performance. Also consistent with Tubbs-Cooley et al., (2015) who found that 89.4% never missed patient assessment, 82.7% never missed reassessment to infants on their last shift which, very little of nurses reported missing care in their last shift. And the results of the study inconsistent with Tubbs-Cooley et al., (2019) and Cho et al., (2020) who found when increase patient / nurse ratio lead to increase in missing nursing care.

The lowest score was in checking vital signs every 1 hour with mean score 3.432 and mean percent 68.64% this due to the distribution of work is overloaded which international ratio in the NICU was 1:1 but this ratio wasn't achieved in governmental hospitals in Gaza, where the ratio is 1:4. Followed by that the

participants reported that workload may lead to missing some of nursing care steps with mean score 3.557 and mean percent 71.14%.

**Table (4.5): Documentation of nursing care (n= 104)**

No.	Items of documentation of nursing care	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	SD	%	Rank
23	Document vital signs measures every 3 hrs.	1.9	25.0	13.5	41.3	18.3	3.490	1.114	69.80	7
24	Document nursing notes clearly at the beginning of each shift	0	4.8	4.8	29.8	60.6	4.461	0.799	89.22	1
25	Document all information related the infant in his file.	0	9.6	2.9	33.7	53.8	4.317	0.927	86.34	4
26	Sign and title any documentation of nursing care	0	2.9	4.8	41.3	51.0	4.403	0.717	88.06	3
27	Document baby name & wt. and date of birth in his bracelet	0	4.8	5.8	28.8	60.6	4.451	0.811	89.02	2
28	Workload may lead to missing some documentation of nursing care procedure.	1.9	12.5	3.8	38.5	43.3	4.086	1.071	81.72	6
29	Workload may affect the accuracy of documentation.	1.0	10.6	5.8	38.5	44.2	4.144	0.999	82.88	5
<b>Overall</b>							<b>3.261</b>	<b>0.412</b>	<b>65.22</b>	

Table (4.5) The overall mean score was 3.261 with mean percent 65.22%, which indicated that documentation of nursing care was at moderate level.

Also, showed that the highest score was in documenting nursing notes clearly at the beginning of each shift with mean score 4.461 and mean percent 89.22%, it could be due to the importance to document the conditions and health status to infants in the beginning of shift to knowing how to deal with infants. Followed by documenting baby name, weight, and date of birth in his bracelet with mean score 4.451 and mean percent 89.02%, it could be due to the high awareness of participants on importance to document infant information on his bracelet and because to prevent the errors in the patient identification process and this may lead to the situations in which medications and procedures are not administered or performed on the right infants. these results consistent with Borsato et al., (2011) who found that 82.2% of documentation completed.

And inconsistent with Shihundla et al., (2016) who found that incomplete patient information, unavailability of patient information was observed, some of patient information was found to be illegible, inaccurate and incomplete and with Tasew et al., (2019) who found that 52.2% of nurses had poor documentation practice and 40.5% don't document ever care given to the patient.

The lowest score was in documenting vital signs measures every 3 hrs. with mean score 3.490 and mean percent 69.80%, followed by workload may lead to missing some documentation of nursing care procedure with mean score 4.086 and mean percent 81.72%, it could be due to nurses on NICU had on high infants number with little nurses care of them this may lead to lack of time to document every nursing care do it to infants.



**Table (4.6): Interruption of workflow (n= 104)**

No.	Items of interruption of work flow	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	SD	%	Rank
30	Workflow interruption increases the time required for nursing activities.	35.6	53.8	8.7	1.9	0	4.230	0.685	84.60	1
31	Workload interrupts follow up admission and discharge of patient	23.1	61.5	11.5	3.8	0	4.038	0.709	80.76	3
32	Workload interrupts health education to parents about their infant care.	31.7	53.8	11.5	2.9	0	4.144	0.729	82.88	2
33	Workload may lead to medication preparation & administration error	18.3	42.3	19.2	17.3	2.9	3.557	1.068	71.14	5
34	Workflow interruption increases probability for malpractice.	25.0	36.5	18.3	17.3	2.9	3.634	1.123	72.68	4
<b>Overall</b>							<b>3.921</b>	<b>0.608</b>	<b>78.42</b>	

In this domain the participants expressed of their opinions about that the interruptions of workflow have effect of some performance and care that provided to infants on NICU.

Table (4.6) showed that the highest score was the participant's reported that they disagree with workflow interruption increases the time required for nursing activities with mean score 4.230 and mean percent 84.60%, it could due to the planning and distributions the work on nurses equally at the beginning of the shift which this organize the time . Followed by workload interrupts health education to parents about their infant care with mean score 4.144 and mean percent 82.88% which participants reported disagree on this point and this could due to the importance of every nurse activity and every care such as health education of parents on NICU who be worry and fearful about his neonate condition and long period of hospitalization .

This results was consistent with El shanti et al., (2020) who found that the quality of nursing care according to family-centered care was 74% and inconsistent with Cooper et al., (2007) who found that most nurses implement family centered care (93%)

The lowest score was in workload may lead to medication preparation and administration error with mean score 3.557 and mean percent 71.14. It could due to the prosses of medication preparation and administration is sensitive processes need more attention and concentration. The overall mean score was 3.921 with mean percent 78.42%, which indicated that most of the nurses do not agree that interruptions of workflow and workload effect on the performance and care, this results consistent with Toqan, (2010) who found that neonatal nurses had moderate level on Medication management, use and Family education. And this results inconsistent with Sasaki et al., (2019) who found that Interruptions during the practice of nursing, especially during the administration of medication, associated directly with workload, also, Baethge & Rigotti , (2013) who found that workflow interruptions have a bad effects on satisfaction , nurse performance , forgetting of intentions and irritations.

**Table (4.7): Overall quality of nursing performance (n= 104)**

Domain	Mean	SD	%	Rank
Hygiene and safety	4.408	0.404	88.10	1
Missing some nursing care	4.196	0.395	83.92	2
Documentation of nursing care	3.261	0.412	65.22	4
Interruption of work flow	3.921	0.608	78.42	3
<b>Overall</b>	<b>4.205</b>	<b>0.337</b>	<b>84.10</b>	

Table (4.7) showed that the highest score was in hygiene and safety with mean score 4.408 and mean percent 88.10%, due to it's the top priority for all health care systems and workers to prevent harming infants and complications, followed by not missing of some nursing care with mean score 4.196 and mean percent 83.92%, which indicated the importance every activity and care provide to infants in NICU was very critical and have impact on access high degree of optimal health to infants. Also interruption of work flow with mean score 3.921 and mean percent 78.42%, while the lowest score was in documentation of nursing care with mean score 3.261

and mean percent 65.22%. The overall mean score was 4.205 with mean percent 84.10%, which indicated high quality of nursing care in NICU. This due to the nurses who work on NICU , 76% of them had bachelor degree and 80.8% had a training about NICU and this will improve the practice interventions in NICU. Also, the nurses who graduate from high diploma on neonate that has been taught at Palestine college of nursing support and enhance the knowledge and practice in neonatal units . In addition of that, GNN who responsible on follow up all neonatal departments in GS such as : update knowledge and practice on specialty neonates , training all staff on NICUs special neonatal life support training which provided periodically and responsible on follow up the uses of high risk medications .

The results consistent with El shanti et al., (2020) who found the quality of nursing care in NICUs was 75.8% , with Toqan, (2010) who found that 77.0% the quality care for neonatal nurses and inconsistent with Sochalski, (2004) who that found nurse workload was associated with 0.07 decrease in quality score from (excellent / good ) to ( good / fair ) and unfinished care had effect on quality of care which decrease 0.24 point. Also inconsistent with Fadlalmola & Mohammed, (2020) who found that nurses who work on NICU had poor knowledge and practice .

#### 4.1.3 Workload and work condition

**Table (4.8): Workload (n= 104)**

No.	Items of workload and work conditions	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	SD	%	Rank
35	Workload considered tolerable to me	1.9	12.5	15.4	44.2	26.0	3.798	1.027	75.96	7
36	Nurse / patient ratio is appropriate	13.5	25.0	19.2	32.7	9.6	3.000	1.230	60.00	9
37	Workload fairly distributed among shift	3.8	26.9	22.1	38.5	8.7	3.211	1.058	64.22	8
38	There are enough break time during shifts	7.7	35.6	24.0	27.9	4.8	2.865	1.061	57.30	10
39	Work conditions (noise and loud, ventilation alarms , light) may affect nursing performance	1.9	4.8	13.5	37.5	42.3	4.134	0.955	82.68	2
40	Workload leads to delays in carrying out required tasks	0	3.8	14.4	47.1	34.6	4.125	0.796	82.50	3
41	Workload lead to imbalance between work tasks and social time	0	5.8	11.5	44.2	38.5	4.153	0.844	83.06	1
42	Supporting colleagues and supervisor may decrease workload	1.0	5.8	14.4	56.7	22.1	3.932	0.827	78.64	6
43	Work awards and motivation have a role in reducing the workload	4.8	3.8	10.6	42.3	38.5	4.057	1.041	81.14	4
44	Workload may affect my performance.	2.9	7.7	10.6	40.4	38.5	4.038	1.032	80.76	5
<b>Overall</b>							<b>3.731</b>	<b>0.501</b>	<b>74.62</b>	

In this domain the participants expressed of their opinions about their experience with the workload and work conditions.

Table (4.8) showed that the highest score was in workload lead to imbalance between work tasks and social time with mean score 4.153 and mean percent 83.06%, it could due to that overload on shifts and high working hour prevent the nurses to communicate with their families and friends and may lead to weak social relationships. Followed by work conditions (noise and loud, ventilation alarms , light) may affect nursing performance with mean score 4.134 and mean percent 82.68%.It could due to the importance of work environment in improve nursing performance and this consistent with Liu et al., (2019) who found that good and supportive environment lead to less nursing care left undone , better nurse outcomes and higher quality of care in ICU departments.

The lowest score was in presence of enough break time during shifts with mean score 2.865 and mean percent 57.30% . These results due to that high hours of working shift need break times and rest. The overall mean score was 3.731 with mean percent 74.62%, which indicated that workload was above moderate. This results consistent with Diab & Hamad, (2015) who found that moderate scores of workload and the answer on direct question 90% nurses believed that they are work overloaded . Also consistent with Carayon & Gurses, (2008) who found that high workload of nurses is a major problem for the American health care system.

## 4.2 Inferential results

### 4.2.1 The relationship between workload and quality of nursing performance

Table (4.9): The relationship between workload and quality of nursing performance

Domains of quality of nursing care		Workload and work conditions
Hygiene and safety	r	0.294**
	Sig.	0.002
Missing of some nursing care	r	0.223*
	Sig.	0.023
Documentation of nursing care	r	0.314**
	Sig.	0.001
Interruption of work flow	r	0.409**
	Sig.	0.000
Total	r	0.401**
	Sig.	0.000

\*\* significant at 0.01 \* significant at 0.05

Table (4.9) showed that there was statistically significant relationship between workload and work conditions and all the domains of quality of nursing performance; hygiene and safety ( $r= 0.294$ ), missing of some nursing care ( $r= 0.223$ ), documentation of nursing care ( $r= 0.314$ ), interruption of work flow ( $r= 0.409$ ), and the total score of quality of nursing performance ( $r= 0.401$ ).It could due to that the values were weak , so the quality of nursing care high and the impact of workload was low. It consistent with chang et al., (2019) and sochalski , (2004) who found there was a relationship between workload and quality of nursing care .And , It inconsistent with Fitriani et al., (2019) who found that there was no relationship between workload and caring behavior

#### 4.2.2 Differences in perception about quality of nursing care related to sociodemographic factors

**Table (4.10): Differences in quality of nursing performance related to age (n= 104)**

Age (years)		n	Mean	SD	F	P value
Hygiene and safety	22-29	35	4.378	0.382	0.999	0.372
	30-39	57	4.394	0.397		
	36-42	12	4.562	0.495		
	Total	104	4.408	0.404		
Missing of some nursing care	22-29	35	4.118	0.416	1.599	0.207
	30-39	57	4.213	0.363		
	36-42	12	4.345	0.459		
	Total	104	4.196	0.395		
Documentation of nursing care	22-29	35	3.288	0.326	0.571	0.567
	30-39	57	3.226	0.471		
	36-42	12	3.351	0.331		
	Total	104	3.261	0.412		
Interruption of work flow	22-29	35	4.034	0.640	0.929	0.389
	30-39	57	3.870	0.575		
	36-42	12	3.833	0.670		
	Total	104	3.921	0.608		
Total score	22-29	35	4.189	0.339	0.696	0.501
	30-39	57	4.192	0.332		
	36-42	12	4.313	0.367		
	Total	104	4.205	0.337		

Table (4.10) showed that there were statistically no significant differences in all domains of quality of nursing performance related to age of nurses; hygiene and safety ( $F= 0.999$ ,  $P= 0.372$ ), missing of some nursing care ( $F= 1.599$ ,  $P= 0.207$ ), documentation of nursing care ( $F= 0.571$ ,  $P= 0.567$ ), interruption of work flow ( $F= 0.929$ ,  $P= 0.389$ ), and the total score ( $F= 0.696$ ,  $P= 0.501$ ). This due to that NICU considered isolated and closed area, which lead to exchange knowledge and practices between nurses worked in NICU regardless their ages , also the ages of nurses who working in NICU was somewhat similar .This results consistent with Al habbash, B . (2018) who found that there was no statistically significant differences in the level of nurses' practices between their different age groups in NICUs.

**Table (4.11): Differences in quality of nursing performance related to gender (n= 104)**

Domain	Gender	n	Mean	SD	T	P value
Hygiene and safety	Male	54	4.370	0.409	-1.003	0.318
	Female	50	4.450	0.399		
Missing of some nursing care	Male	54	4.154	0.407	-1.118	0.266
	Female	50	4.241	0.381		
Documentation of nursing care	Male	54	3.230	0.417	-0.803	0.424
	Female	50	3.295	0.407		
Interruption of work flow	Male	54	3.933	0.605	0.211	0.833
	Female	50	3.908	0.617		
Total score	Male	54	4.172	0.365	-1.026	0.307
	Female	50	4.240	0.303		

Table (4.11) showed that there were statistically no significant differences in all domains of quality of nursing performance between male and female nurses; hygiene and safety ( $t= -1.003$ ,  $P= 0.318$ ), missing of some nursing care ( $t= -1.118$ ,  $P= 0.266$ ), documentation of nursing care ( $t= -0.803$ ,  $P= 0.424$ ), interruption of work flow ( $t= 0.211$ ,  $P= 0.833$ ), and the total score ( $t= -1.026$ ,  $P= 0.307$ ). It could due to all of nurses male and female have same working condition and environment. This results consistent with Al habbash, B . (2018) who found that there was no statistically significant differences in the level of nurses' practices between male and female nurses in NICUs.

**Table (4. 12): Differences in quality of nursing care related to residency (n= 104)**

Residency		n	Mean	SD	F	P value
Hygiene and safety	North	11	4.534	0.262	2.026	0.097
	Gaza	41	4.466	0.412		
	Middle	20	4.200	0.340		
	Khanyounis	22	4.386	0.453		
	Rafah	10	4.500	0.416		
	Total	104	4.408	0.404		
Missing of some nursing care	North	11	4.129	0.295	0.994	0.414
	Gaza	41	4.285	0.364		
	Middle	20	4.117	0.376		
	Khanyounis	22	4.123	0.485		
	Rafah	10	4.221	0.431		
	Total	104	4.196	0.395		
Documentation of nursing care	North	11	3.313	0.364	0.791	0.534
	Gaza	41	3.319	0.378		
	Middle	20	3.261	0.378		
	Khanyounis	22	3.131	0.527		
	Rafah	10	3.255	0.385		
	Total	104	3.261	0.412		
Interruption of work flow	North	11	3.709	0.553	0.912	0.460
	Gaza	41	4.000	0.584		
	Middle	20	3.780	0.550		
	Khanyounis	22	3.945	0.668		
	Rafah	10	4.060	0.736		
	Total	104	3.921	0.608		
Total score	North	11	4.189	0.270	1.286	0.281
	Gaza	41	4.282	0.306		
	Middle	20	4.102	0.266		
	Khanyounis	22	4.139	0.438		
	Rafah	10	4.255	0.374		
	Total	104	4.205	0.337		

Table (4.12) showed that there were statistically no significant differences in all domains of quality of nursing performance related to place of residency; hygiene and safety (F= 2.026, P= 0.097), missing of some nursing care (F= 0.994, P= 0.414), documentation of nursing care (F= 0.791, P= 0.534), interruption of work flow (F= 0.912, P= 0.460), and the total score (F= 1.286, P= 0.281). It consistent with Toqan,



(2010) who found that there were no significant differences in application of standards of performance among nurses working in neonatal units at governmental hospitals in West Bank and place of residence.

**Table (4.13): Differences in quality of nursing care related to qualification (n= 104)**

Qualification		n	Mean	SD	F	P value
Hygiene and safety	Diploma	16	4.445	0.454	0.290	0.749
	Bachelor	79	4.392	0.385		
	Postgraduate	9	4.486	0.505		
	Total	104	4.408	0.404		
Missing of some nursing care	Diploma	16	4.312	0.326	1.280	0.282
	Bachelor	79	4.189	0.400		
	Postgraduate	9	4.055	0.448		
	Total	104	4.196	0.395		
Documentation of nursing care	Diploma	16	3.402	0.391	2.148	0.122
	Bachelor	79	3.215	0.421		
	Postgraduate	9	3.419	0.282		
	Total	104	3.261	0.412		
Interruption of work flow	Diploma	16	3.812	0.503	1.384	0.255
	Bachelor	79	3.908	0.638		
	Postgraduate	9	4.222	0.429		
	Total	104	3.921	0.608		
Total score	Diploma	16	4.283	0.301	0.658	0.520
	Bachelor	79	4.184	0.346		
	Postgraduate	9	4.251	0.327		
	Total	104	4.205	0.337		

Table (4.13) showed that there were statistically no significant differences in all domains of quality of nursing performance related to qualification of nurses; hygiene and safety (F= 0.290, P= 0.749), missing of some nursing care (F= 1.280, P= 0.282), documentation of nursing care (F= 2.148, P= 0.122), interruption of work flow (F= 1.384, P= 0.255), and the total score (F= 0.658, P= 0.520). It consistent with Toqan, (2010) who found that there were no significant differences in application of standards of performance among nurses working in neonatal units at governmental hospitals in West Bank related to education level.

Therefore researcher' opinion , these results could be explained by that all

study participants' received their learning and practice from same sources. Most of nurses were taught by older nurses on the department .

**Table (4.14): Differences in quality of nursing care related to place of work (n=104)**

Hospital		n	Mean	SD	F	P value
Hygiene and safety	Al Shifa	32	4.269	0.404	3.159	0.017*
	Al Nassr	32	4.562	0.301		
	EGH	13	4.500	0.492		
	NMC	16	4.437	0.449		
	Aqsa	11	4.215	0.335		
	Total	104	4.408	0.404		
Missing of some nursing care	Al Shifa	32	4.133	0.353	0.366	0.832
	Al Nassr	32	4.252	0.400		
	EGH	13	4.214	0.440		
	NMC	16	4.183	0.475		
	Aqsa	11	4.214	0.364		
	Total	104	4.196	0.395		
Documentation of nursing care	Al Shifa	32	3.256	0.321	0.894	0.471
	Al Nassr	32	3.361	0.389		
	EGH	13	3.230	0.552		
	NMC	16	3.138	0.468		
	Aqsa	11	3.202	0.452		
	Total	104	3.261	0.412		
Interruption of work flow	Al Shifa	32	3.875	0.663	0.898	0.468
	Al Nassr	32	3.887	0.563		
	EGH	13	3.984	0.506		
	NMC	16	4.150	0.675		
	Aqsa	11	3.745	0.580		
	Total	104	3.921	0.608		
Total score	Al Shifa	32	4.138	0.295	0.943	0.442
	Al Nassr	32	4.285	0.310		
	EGH	13	4.235	0.453		
	NMC	16	4.207	0.404		
	Aqsa	11	4.125	0.265		
	Total	104	4.205	0.337		

Table (4.14) showed that there were statistically no significant differences in all domains of quality of nursing performance related to place of work; missing of some nursing care (F= 0.366, P= 0.832), documentation of nursing care (F= 0.894, P= 0.471), interruption of work flow (F= 0.898, P= 0.468), and the total score (F= 0.943, P= 0.442), while there were statistically significant differences in hygiene and safety

( $F= 3.159$ ,  $P= 0.017$ ). post hoc LSD test indicated that hygiene and safety were higher in Al Nassr hospital compared to Al shifa and Al Aqsa hospital. It could be due to AlNasser hospital was a first neonatal department on GS and have oldest neonatal staff who have experience and practice. Also, when any hospital open new neonatal department is send the staff nurses and doctors to gain educational and practical experience from AlNasser hospital staff. So , Al Nassr Paediatric Hospital considered an academic hospital, and had Board program, which has an effect on provide high level of quality on health care , provided toward infants from different caregivers. It consistent with Al habbash, (2018) who found that there was significant differences in the nurses' knowledge and practices between NICUs in GS, in favor to those who are working in Al Nassr Pediatric Hospital.

**Table (4.15): Differences in quality of nursing care related to marital status (n= 104)**

Domain	Marital status	n	Mean	SD	T	P value
Hygiene and safety	Single	18	4.486	0.358	0.893	0.374
	Married	86	4.392	0.413		
Missing of some nursing care	Single	18	4.162	0.359	-0.396	0.693
	Married	86	4.203	0.404		
Documentation of nursing care	Single	18	3.191	0.353	-0.795	0.428
	Married	86	3.276	0.423		
Interruption of work flow	Single	18	3.833	0.629	-0.672	0.503
	Married	86	3.939	0.605		
Total score	Single	18	4.178	0.270	-0.375	0.709
	Married	86	4.211	0.350		

Table (4.15) showed that there were statistically no significant differences in all domains of quality of nursing performance between single and married nurses; hygiene and safety ( $t= 0.893$ ,  $P= 0.374$ ), missing of some nursing care ( $t= -0.396$ ,  $P= 0.693$ ), documentation of nursing care ( $t= -0.795$ ,  $P= 0.428$ ), interruption of work flow ( $t= -0.672$ ,  $P= 0.503$ ), and the total score ( $t= -0.375$ ,  $P= 0.709$ ). These

results is similar to study conduct by Al habbash, (2018) who found no statistically significant differences in the nurses' knowledge and practice between single and married.

**Table (4.16): Differences in quality of nursing care related to income (n= 104)**

Income (NIS)*		n	Mean	SD	F	P value
Hygiene and safety	Less than 1500	27	4.347	0.365	1.171	0.314
	1500-2000	66	4.407	0.409		
	More than 2000	11	4.568	0.458		
	Total	104	4.408	0.404		
Missing of some nursing care	Less than 1500	27	4.206	0.326	0.014	0.986
	1500-2000	66	4.191	0.415		
	More than 2000	11	4.201	0.457		
	Total	104	4.196	0.395		
Documentation of nursing care	Less than 1500	27	3.189	0.374	2.059	0.133
	1500-2000	66	3.319	0.391		
	More than 2000	11	3.090	0.568		
	Total	104	3.261	0.412		
Interruption of work flow	Less than 1500	27	3.829	0.657	0.645	0.527
	1500-2000	66	3.972	0.578		
	More than 2000	11	3.836	0.680		
	Total	104	3.921	0.608		
Total score	Less than 1500	27	4.162	0.319	0.354	0.703
	1500-2000	66	4.225	0.329		
	More than 2000	11	4.187	0.442		
	Total	104	4.205	0.337		

\*NIS= New Israeli Shekel

Table (4.16) showed that there were statistically no significant differences in all domains of quality of nursing performance related to income of nurses; hygiene and safety (F= 1.171, P= 0.314), missing of some nursing care (F= 0.014, P= 0.986), documentation of nursing care (F= 2.059, P= 0.133), interruption of work flow (F= 0.645, P= 0.527), and the total score (F= 0.354, P= 0.703). It could due to the most of nurses have a same income approximately.

**Table (4.17): Differences in quality of nursing care related to experience in NICU (n=104)**

Experience in NICU		n	Mean	SD	F	P value
Hygiene and safety	Less than 5 years	51	4.340	0.37003	1.806	0.170
	5-10 years	29	4.517	0.35153		
	11 years and more	24	4.421	0.50917		
	Total	104	4.408	0.40448		
Missing of some nursing care	Less than 5 years	51	4.148	0.39093	0.871	0.422
	5-10 years	29	4.268	0.34766		
	11 years and more	24	4.211	0.45784		
	Total	104	4.196	0.39561		
Documentation of nursing care	Less than 5 years	51	3.228	0.41301	0.429	0.652
	5-10 years	29	3.318	0.39477		
	11 years and more	24	3.263	0.44058		
	Total	104	3.261	0.41224		
Interruption of work flow	Less than 5 years	51	3.839	0.69630	1.739	0.181
	5-10 years	29	4.096	0.44919		
	11 years and more	24	3.883	0.54984		
	Total	104	3.921	0.60830		
Total score	Less than 5 years	51	4.148	0.32912	1.922	0.152
	5-10 years	29	4.301	0.28985		
	11 years and more	24	4.209	0.39205		
	Total	104	4.205	0.33752		

Table (4.17) showed that there were statistically no significant differences in all domains of quality of nursing performance related to experience in NICU; hygiene and safety ( $F= 1.806$ ,  $P= 0.170$ ), missing of some nursing care ( $F= 0.871$ ,  $P= 0.422$ ), documentation of nursing care ( $F= 0.429$ ,  $P= 0.652$ ), interruption of work flow ( $F= 1.739$ ,  $P= 0.181$ ), and the total score ( $F= 1.922$ ,  $P= 0.152$ ). These results could be explained by the larger number of the nurses who work on NICU have less than 5 years' work experience in NICU. In addition of that NICU considered a closed area, which may lead to share learning and practice between the nurses work within the unit.

**Table (4.18): Differences in quality of nursing care related to working shifts (n= 104)**

Domain	Work shifts	n	Mean	SD	T	P value
Hygiene and safety	Straight morning	17	4.647	0.412	2.740	0.007*
	Mixed shifts	87	4.362	0.388		
Missing of some nursing care	Straight morning	17	4.340	0.422	1.654	0.101
	Mixed shifts	87	4.168	0.386		
Documentation of nursing care	Straight morning	17	3.346	0.404	0.925	0.357
	Mixed shifts	87	3.245	0.414		
Interruption of work flow	Straight morning	17	4.223	0.499	2.286	0.024*
	Mixed shifts	87	3.862	0.612		
Total score	Straight morning	17	4.387	0.353	2.495	0.014*
	Mixed shifts	87	4.169	0.324		

\*significant at 0.05

Table (4.18) showed that nurses who are working morning shift reported statistically significant higher scores in hygiene and safety ( $t= 2.740$ ,  $P= 0.007$ ), and interruption of work flow ( $t= 2.286$ ,  $P= 0.024$ ), and the total score ( $t= 2.495$ ,  $P= 0.014$ ), while there were statistically no significant differences in missing of some nursing care, and documentation of nursing care. It could due to that morning shift

have sufficiency staff and head nurse who distribution the work on nurses equally. In addition of that morning shift there is adequate equipment's and supplies. Also, the nurses who work morning shift number of hours less than who work mixing shift so, they didn't work a long time such as who work on night shift. It consistent with Abdalkader and Hayajneh, (2008) who found that 78% reported that night shift has a high workload than day shift and 73% of nurses reported that patient / nurse ratio not appropriate on night shift.

**Table (4.19): Differences in quality of nursing care related to weekly working hours (n= 104)**

Domain	Weekly working hours	n	Mean	SD	T	P value
Hygiene and safety	35 hours	55	4.418	0.438	0.253	0.801
	36 hours and more	49	4.398	0.366		
Missing of some nursing care	35 hours	55	4.162	0.424	-0.930	0.354
	36 hours and more	49	4.234	0.361		
Documentation of nursing care	35 hours	55	3.252	0.403	-0.241	0.810
	36 hours and more	49	3.272	0.426		
Interruption of work flow	35 hours	55	4.101	0.510	3.366	0.001*
	36 hours and more	49	3.718	0.649		
Total score	35 hours	55	4.217	0.363	0.393	0.695
	36 hours and more	49	4.191	0.308		

Table (4.19) showed that there were statistically no significant differences in all domains of quality of nursing performance related to weekly working hours in NICU; hygiene and safety ( $t= 0.253$ ,  $P= 0.801$ ), missing of some nursing care ( $t= -0.930$ ,  $P= 0.354$ ), documentation of nursing care ( $t= -0.241$ ,  $P= 0.0.810$ ), and the total score ( $t= 1.922$ ,  $P= 0.152$ ) interruption of work flow ( $t= , P= 0.181$ ). While there were statistically significant differences in interruption of work flow in favor of nurses who are working 35 hours per week. It could due to those nurses who work 35

hours per week can follow up the infants' conditions and alert to every nursing activity because don't has workload on hours and shifts.

**Table (4.20): Differences in quality of nursing care related to training (n= 104)**

	Received training about NICU	n	Mean	SD	T	P value
Hygiene and safety	No	20	4.418	0.361	0.124	0.902
	Yes	84	4.406	0.416		
Missing of some nursing care	No	20	4.160	0.439	-0.447	0.655
	Yes	84	4.204	0.386		
Documentation of nursing care	No	20	3.316	0.322	0.661	0.510
	Yes	84	3.248	0.431		
Interruption of work flow	No	20	3.900	0.715	-0.172	0.864
	Yes	84	3.926	0.584		
Total score	No	20	4.204	0.346	-0.013	0.989
	Yes	84	4.205	0.337		

Table (4.20) showed that there were statistically no significant differences in all domains of quality of nursing performance related to training about NICU; hygiene and safety ( $t= 0.124$ ,  $P= 0.902$ ), missing of some nursing care ( $t= -0.447$ ,  $P= 0.655$ ), documentation of nursing care ( $t= 0.661$ ,  $P= 0.510$ ), interruption of work flow ( $t= -0.172$ ,  $P= 0.864$ ), and the total score ( $t= -0.013$ ,  $P= 0.989$ ). It could due to that large number of participants had a training about NICU . Also any new nurses work in NICU take orientation about NICU whether from head nurse, supervisor or others nurses who have experience in the units. This results consistent with Al habbash, (2018) who found that there no statistically significant differences in the nurses knowledge and practices between who received specific training in NICU and who didn't receive .



### 4.2.3 Differences in perception about workload related to sociodemographic factors

**Table (4.21): Differences in workload related to gender, marital status, work shifts, weekly working hours, and training (n= 104)**

Factor	Category	n	Mean	SD	T	P value
Gender	Male	54	3.831	0.513	2.145	0.034*
	Female	50	3.624	0.470		
Marital status	Single	18	3.600	0.489	-1.229	0.222
	Married	86	3.759	0.502		
Work shifts	Straight morning	17	3.829	0.528	0.877	0.383
	Mixed	87	3.712	0.496		
Weekly working hours	35 hours	55	3.767	0.432	0.764	0.447
	36 hours and more	49	3.691	0.570		
Training	No	20	3.790	0.366	0.576	0.566
	Yes	84	3.717	0.529		

Table (4.21) showed that there were statistically significant differences in workload related to gender ( $t= 2.145$ ,  $P= 0.034$ ) in favor of male nurses. It could be due to that physical structure of females is lower and weaker than males, also the male nurses do most work and duties, and may they have another work. In addition of that any inadequate on work schedule, often, the head nurse contacted with male nurses because female nurses may have another responsibility. It is consistent with Jabari and Salah, (2020) who found that the most workload and work pressure done by male nurses.

There were statistically no significant differences in workload related to marital status ( $t= -1.229$ ,  $P= 0.222$ ), work shifts ( $t= 0.877$ ,  $P= 0.383$ ), weekly working hours ( $t= 0.764$ ,  $P= 0.447$ ), and training ( $t= 0.576$ ,  $P= 0.566$ ).

**Table (4.22): Differences in workload related to age, residency, qualification, place of work, income, and experience in NICU (N= 104)**

Factors		n	Mean	SD	F	P value
Age (years)	22-29	35	3.765	0.465	0.469	0.627
	30-39	57	3.691	0.534		
	36-42	12	3.825	0.455		
Residency	North	11	3.645	0.506	1.868	0.122
	Gaza	41	3.719	0.470		
	Middle	20	3.720	0.564		
	Khan Younis	22	3.631	0.499		
	Rafah	10	4.120	0.391		
	Total	104	3.731	0.501		
Qualification	Diploma	16	3.743	0.404	1.477	0.233
	Bachelor	79	3.698	0.529		
	Postgraduate	9	4.000	0.331		
	Total	104	3.731	0.501		
Place of work	Al Shifa	32	3.643	0.487	0.941	0.443
	Al Nassr	32	3.756	0.429		
	EGH	13	3.953	0.386		
	NMC	16	3.718	0.603		
	Aqsa	11	3.672	0.678		
	Total	104	3.731	0.501		
Income	Less than 1500	27	3.703	0.373	0.246	0.782
	1500-2000	66	3.756	0.551		
	More than	11	3.654	0.486		
	Total	104	3.731	0.501		
Experience in NICU	less than 5	51	3.670	0.50291	1.692	0.189
	5-10	29	3.875	0.50189		
	11 and more	24	3.687	0.48303		
	Total	104	3.731	0.50151		

Table (4.22) showed that there were statistically no significant differences in workload related to age ( $F= 0.469$ ,  $P= 0.627$ ), place of residency ( $F= 1.868$ ,  $P= 0.122$ ), qualification ( $F= 1.477$ ,  $P= 0.233$ ), place of work ( $F= 0.941$ ,  $P= 0.443$ ), income ( $F= 0.246$ ,  $P= 0.782$ ), and experience in NICU ( $F= 1.692$ ,  $P= 0.189$ ). It could be due to most of participants have same work condition, same income and most of them place work near of their residency. It is consistent with Wihardja et al., (2019) who found that age, length of work, education, marital status, nutritional status, and career level were not significantly related to the mental workload of nurses.

# **Chapter Five**

## **Conclusion and Recommendations**

## **Chapter Five**

### **Conclusion and Recommendations**

#### **5.1 Conclusion**

Quality of nursing performance or care is a concept of interest of nurse professionals and researchers worldwide. Workload have effect on infants and nurses' outcomes in NICU and decrease workload allow to nurses to have more time to caring and observe the infants in NICU to reach high quality of health status.

This study aims to assess the impact of workload on quality of nursing performance in Neonatal Intensive Care Units at governmental hospitals in Gaza strip. It was descriptive cross-sectional study. Five hospitals were selected " Al Nassr Pediatric Hospital - Al Shifa' Complex - European Gaza hospital – Al-Aqsa hospital and Nasser Medical Complex hospital " The population of the study were all nurses who working in NICU in these five hospitals. The response rate 92%. The study tool was a self-administered questionnaire constructed by the researcher himself.

The percentage of male nurses working in NICUs (51.90%) were more than females and (54.8%) were young age group between (30 – 39) years. The most of the study participants (76 %) had bachelor degree, and (8.7%) had postgraduate degree. Approximately (49%) of study participants had years of experience in NICU less than five years. Also, (80.8%) received training about NICU.

The study shows the major governmental hospitals in Gaza Strip have high quality of nursing care provided for infants in the NICU. The highest score was in hygiene and safety with mean score 4.40 and mean percent 88.10% while, the lowest score was in the documentation with mean score 3.26 and mean percent 65.22%. The overall mean score was 4.20 with mean percent 84.10% which, indicated that the quality of nursing care at NICU was high.

There was statistically significant relationship between workload and work conditions and all the domains of quality of nursing performance; hygiene and safety ( $r= 0.294$ ), missing of some nursing care ( $r= 0.223$ ), documentation of nursing care ( $r= 0.314$ ), interruption of work flow ( $r= 0.409$ ), and the total score of quality of nursing performance ( $r= 0.401$ )

There were statistically significant differences in hygiene and safety ( $F= 3.159$ ,  $P= 0.017$ ). post hoc LSD test indicated that hygiene and safety were higher in Al Nassr hospital compared to Al shifa and Al Aqsa hospital.

The results showed that the highest score was in workload lead to imbalance between work tasks and social time with mean score 4.153 and mean percent 83.06%, The overall mean score was 3.731 with mean percent 74.62%, which indicated that workload was above moderate.

Also, on this study the nurses who are working morning shift reported statistically significant higher scores in hygiene and safety ( $t= 02.740$ ,  $P= 0.007$ ), interruption of work flow ( $t= 2.286$ ,  $P= 0.024$ ), and the total score ( $t= 2.495$ ,  $P= 0.014$ ) and , there were statistically significant differences in workload related to gender ( $t= 2.145$ ,  $P= 0.034$ ) in favor of male nurses.

## **5.2 Recommendations**

Based on results of this study, the researcher could suggest some of advantageous recommendations that may assist to decrease workload and improve nursing performance among nurses in NICU departments.

1. Increase number in nursing staff in NICU to decrease workload on the department and to meet shortage and need.
2. Repeating the postgraduate specialized program on neonatal nursing to qualify nurses work on NICUs.
3. Addition continuous education and training that is based on the needs evaluation for nurses on neonatal units.
4. Support the nursing team with adequate staff , equipment's and supplies .
5. For the management recommendations: focusing on the implementing specific nursing documentation standards.
6. Add special program to motivate and support the nursing staff in NICU.
7. Future studies about problems facing NICU nursing (effect of low salary, burnout or stress on quality of nursing performance).

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# **Annexes**

## Annex (1)

### استبانة

# Impact of Workload on Quality of Nurses Performance in Neonatal Intensive Care Units at Governmental Hospitals in Gaza Strip

تأثير عبء العمل على جودة أداء الممرضين في وحدات العناية المركزة لحديثي الولادة في المستشفيات الحكومية في قطاع غزة

عزيزي / عزيزتي المشارك / ة

أنا الباحثة نور حسن أبو مغصيب طالبة ماجستير في الجامعة الإسلامية تخصص تمريض العناية الحثيثة، أقوم بإجراء هذا البحث كمتطلب رئيس من المتطلبات الحصول على شهادة الماجستير.

ان الهدف الأساسي لهذه الدراسة هو تقييم تأثير عبء العمل على أداء الممرضين في وحدات العناية المركزة لحديثي الولادة في المستشفيات الحكومية في قطاع غزة.

أثمن منحي جزء من وقتكم ومشاركتكم هذه الدراسة، والتي ممكن أن تستغرق 15 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 ولا داعي لكتابة اسمك.

يرجى الإجابة على أسئلة الاستبيان بوضع اشارة على الإجابة التي ترونها مناسبة في المكان المخصص لها من خلال تجاربكم العملية لعبء العمل في أقسام العناية المركزة لحديثي الولادة.

الباحثة:

نور حسن أبو مغصيب

## Annex (2)

### Part I :First sociodemographic Data:

- **Age :** .....year
- **Gender:**       Male                     Female
- **Address:**    North Gaza               Gaza               Middle - zone  
                                    Khan - Younis               Rafah
- **Educational level:**    Diploma degree               Bachelor's degree  
    Post Graduated degree
- **Place of work :**    AL-Shifa hospital       AL Nasser hospital  
 European Gaza hospital    Nasser Medical Complex hospital  
    Al-Aqsa hospital
- **Marital status:**    Single               Married               Divorced / widow
- **Monthly income:** ..... Shekel
- **Experience in NICU :** .....years
- **Work shift :**       Straight morning               Mixed shifts (morning,  
evening, night)
- **Weekly work hours :** .....
- **Did you receive training about NICU?**    Yes     No

**Part 2: Please specify the degree of your conformity with the phrases regarding :**

Item	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
<b>1 : Hygiene &amp; Safety</b>					
1. Perform hand washing before and after contact with infants.					
2. Use sterile technique with invasive procedure					
3. Regular changing of humidifier water, Intravenous Fluids and suction					
4. Regular mouth and eye care for infants					
5. Wear personal protective equipment between each infant					
6. Use the equipment's specific to each infant					
7. Using waterbeds, pillows on prone areas to prevent skin ulcer					
8. workload may affect to performing safety procedure correctly					
<b>2 : Missing of some nursing care</b>					
9. Hourly Intravenous Fluids site assessment					
10. Double check for high – risk medications					
11. Use 7 rights during medications administration					
12. Weight baby daily with same scale at the same time					
13. Check the equipment and alarms					
14. Feeding infant by NGT before age of 34 weeks					

Item	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
15. Burp infant frequently during bottle feeding					
16. Changing the diaper as soon as possible after soiling.					
17. Check vital signs every 1 hour					
18. Place monitor electrode and probe on the infants on correct way.					
19. Teaching mother about breast feeding.					
20. Obtain laboratory samples					
21. Perform ventilator-associated respiratory infection prevention					
22. Workload may lead to missing some of nursing care steps.					
<b>3: Documentation of nursing care</b>					
23. Document vital signs measures every 1 hr.					
24. Document nursing notes clearly at beginning of each shift					
25. Document all information related the infant in his file.					
26. Sign and title any documentation of nursing care					
27. Document baby name & wt. and date of birth in his bracelet					
28. Workload may lead to missing some documentation of nursing care procedure.					
29. Workload may affect the accuracy of documentation.					

Item	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
<b>4 : Interruption of workflow</b>					
30. Workflow interruption increases the time required for nursing activities.					
31. workload interrupted follow up admission and discharge of patient					
32. workload interrupted health education to parents about their infant care.					
33. Workload interrupts may lead to medication preparation & administration error					
34. Workflow interruption increases probability for malpractice.					
<b>5: Workload &amp; Working condition</b>					
35. Workload considered totable to me. (القدرة على تحمل عبء العمل)					
36. Nurse / patient ratio is appropriate					
37. Workload fairly distributed among shift					
38. There are enough breaktime during shifts					
39. Work conditions (noise and loud, ventilation alarms , light) may affect of nursing performance .					
40. Workload leads to delays in carrying out required tasks					
41. Workload lead to imbalance between work tasks and social time					
42. Supporting colleagues and supervisor may decrease workload					
43. Work awards and motivation have a role in reducing the workload					
44. Workload may affects on my performance.					

## Annex (3): The Approval request from Islamic University of Gaza

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ



Faculty of Nursing

هاتف داخلي: 2700

الجامعة الإسلامية - غزة  
The Islamic University - Gaza

كلية التمريض

ج س ع/2021/7

الرقم: Ref. ....

التاريخ: Date ..... 29 مايو 2021

**الأخ الفاضل / د. راهي العبادلة حفظه الله ،**

مدير عام تنمية القوى البشرية بوزارة الصحة

السلام عليكم ورحمة الله وبركاته،،،

### الموضوع/ تسهيل مهمة طالبة

تهديكم عمادة كلية التمريض بالجامعة الإسلامية أطيب التحيات، ونرجو من سيادتكم التكرم بتسهيل مهمة الباحثة/ نور حسن محمد أبو مغصيب تخصص ماجستير (العناية الحثيثة) في الحصول على المعلومات اللازمة لإتمام رسالة الماجستير؛ وذلك لغرض البحث العلمي.

شاكرين لكم حسن تعاونكم،،،

عميد كلية التمريض

أ.د. أشرف يعقوب الجدي

## Annex (4): The Approval letter from Helsinki Committee



### المجلس الفلسطيني للبحوث 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: 2021/06/07

Number: PHRC/HC/913/21

Name: Noor Hassan Abu Meghesieb

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:

#### Impact of Workload on Quality of Nursing Performance in Neonatal Intensive Care Units at Governmental Hospitals in Gaza Strip

The committee has decided to approve the above mentioned research. Approval number PHRC/HC/913/21 in its meeting on 2021/06/07

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

Signature

Member

*Nawaf Amr*

Member

*Dr. Yehia Abu*

For 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](mailto:pal.phrc@gmail.com)

Gaza - Palestine

غزة - فلسطين

شارع النصر - مفترق العيون



## Annex (5): The Approval letter from Ministry of Health

State of Palestine  
Ministry of health



دولة فلسطين  
وزارة الصحة

التاريخ: 27/06/2021

رقم المراسلة 715270

السيد : رامي عيد العبداله المحترم

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

السلام عليكم ...

### الموضوع/ تسهيل مهمة الباحثة// تور أبو مفضيب

التفاصيل //

بخصوص الموضوع أعلاه ، والحاقا لكتابتنا رقم 712666 بتاريخ 22-06-2021 والخاص بتسهيل مهمة الباحثة/

تور حسن محمد أبو مفضيب

الملتقة ببرنامح ماجستير العناية الحثيثة - الجامعة الاسلامية بغزة في إجراء بحث بعنوان:-

**"Impact of Workload on Quality of Nursing Performance in Neonatal Intensive Care Units at  
"Governmental Hospitals in Gaza Strip"**

حيث الباحثة بحاجة لتوسيع مكان جمع البيانات ليشمل مستشفى الأقصى حيث انها بحاجة لتعينة استبانة من عدد من الممرضين العاملين في اقسام العناية المركزة لحديثي الولادة في المستشفيات الحكومية ( مجمع الشفاء الطبي - مجمع ناصر الطبي - مستشفى غزة الأوربي - مستشفى النصر للأطفال) ، بما لا يتعارض مع مصلحة العمل وضمن أخلاقيات البحث العلمي، ودون تحمل الوزارة أي أعباء أو مسئولية.

وتفضلوا بقبول التحية والتقدير...

ملاحظة /

البحث المذكور حاصل على موافقة لجنة أخلاقيات البحث الصحي (لجنة هلنسكي) لتسهيل المهمة الخاص بالدراسة أعلاه صالح لمدة 3 اشهر من تاريخه.

**محمد ابراهيم السرساوي**

مدير دائرة/الإدارة العامة لتنمية القوى البشرية



السيد / توره حسن محمد أبو مفضيب  
تسهيل مهمته

التحويلات

- محمد ابراهيم محمد السرساوي (مدير دائرة/الإدارة العامة لتنمية القوى البشرية) (مدير عام بالوزارة) ← رامي عيد سليمان العبداله (مدير عام بالوزارة) إجراءاتكم بالخصوص (27/06/2021)
- ملاحظات التأشير :: يرجى ارسال الكتاب لتأمين عام المستشفيات ونسخة لمدير عام الرقابة الداخلية ومدير عام التمريض ورئيس لجنة البحث الصحي التمريضي
- رامي عيد سليمان العبداله (مدير عام بالوزارة) ← عبد السلام محمد عبد صباح (مدير عام بالوزارة) إجراءاتكم بالخصوص (27/06/2021)
- ملاحظات التأشير ::
- عبد السلام محمد عبد صباح (مدير عام بالوزارة) ← محمد خليل محمد زقوت (مدير) إجراءاتكم بالخصوص (27/06/2021)
- ملاحظات التأشير ::

Gaza

Tel. (+970) 8-2846949  
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هاتفون. (970+) 8-2846949  
فاكس. (970+) 8-2826295

هزة

**Annex (6): Performance appraisal form for the position of nurse /  
General Personnel Council**

**STATE OF PALESTINE**  
**General Personnel Council**



**دولة فلسطين**  
**ديوان الموظفين العام**

نموذج تقييم وظيفة ممرض

الاسم:	الرقم الوظيفي:	رقم الهوية:
المسمى الوظيفي:	الدرجة:	الفئة:
الوزارة:	الإدارة العامة:	
المستول المباشر:	الرقم الوظيفي:	رقم الهوية:

#	بتود التقييم	التقييم
		الالتزام الوظيفي
1.		الالتزام بمواعيد الحضور والانتصاف الرسمية.
2.		الالتزام بالأنظمة والتعليمات والرى التمريضي والحفاظ على المال العام.
3.		تنسيق الاجازات السنوية وطرق استنفاذها.
4.		حالة الجزاءات التأديبية خلال العام (يحصل الموظف على العلامة الكاملة في حال عدم حصوله على جزاءات، ويشكل نسي عند حصوله على جزاءات مخففة)
		التقييم الأدائي
5.		تطبيق العملية التمريضية بخطواتها الخمس وتطبيق الخطة العلاجية والإجراءات التمريضية حسب التعليمات.
6.		الحرص على تقديم خدمات تمريضية شاملة من الناحية الجسدية والنفسية والاجتماعية.
7.		تطبيق معايير وقواعد السلامة العامة والتحكم بالعدوى لحماية نفسه والمرضى والآخرين.
8.		متابعة تنفيذ خطة الدخول والخروج من المستشفى والاستلام والتسليم عند بدء وانتهاء الوردية.
9.		الالتزام بأخذ وتدوين العلامات الحيوية للمرضى وإخطار الطبيب عن أي تغيرات تحدث للمريض.
10.		الالتزام بتدوين وتوثيق جميع الإجراءات التمريضية في ملف المريض وكتابة التقارير اللازمة
11.		القدرة على تحضير المريض والمعدات اللازمة لعمل الفحص السريري ومساعدة الطبيب في إجراءات الفحص.
12.		القيام والمتابعة والالتزام بالمرور مع الأطباء على حالاته لمرضية المستول عنها وتوثيقها وتعبئة النماذج المخصصة لذلك.
13.		مدى الاهتمام بالمرضى وتحضيرهم قبل إرسالهم للعمليات وعند التحول أو الخروج من المستشفى.
14.		المحافظة على جميع الأدوات والمعدات والأجهزة الموجودة بالقسم والتأكد من صلاحيتها للاستعمال.
15.		الالتزام بأخلاقيات المهنة وأدائها واحترام خصوصية المرضى وأسرهم.
		تقييم الكفايات الشخصية
16.		معاملة متلقي الخدمة بكياسة ولباقة
17.		الاتصال الفعال والعمل بروح الفريق مع زملاء العمل.
18.		تقبل التوجيهات وتحمل المسؤوليات وحسن التصرف في المواقف الطارئة.
19.		القدرة على إدارة الوقت بفاعلية.
20.		الاهتمام بالتجديد والابتكار وتطوير الذات.
21.		تحمل ضغوط العمل والمحافظة على مستويات الإنجاز المطلوب.
22.		الاهتمام بالهندام والمظهر العام.
23.		المهارة في اكتشاف وتحليل المشكلات والمبادرة في اقتراح الحلول.

### Annex (7): The List of experts

<b>Name</b>	<b>Place of work</b>
Dr. Wesam Shaltot	Shohada Al Aqsa hospital
Dr. Alaam Abu Hamdah	Oman country
Dr. Mohammed Elattar	European Gaza hospital
Prof. Yosef Aljeesh	Islamic University of Gaza
Dr. Yosef Fahajan	General Directorate of Nursing
Dr. Khalil Shaqfah	General Directorate of Nursing
Dr. Yosef Awad	Palestine University
Dr. Sharaf al Shurafi	Al-Aqsa University
Dr. Khaled Khadourah	Al Shifa hospital
Dr. Abd Elraheem Shaqurah	General Directorate of Nursing
Mr. Akram Salama	General Directorate of Nursing