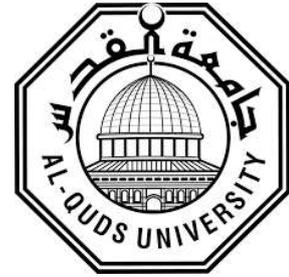


**Deanship of Graduate Studies  
Al-Quds University**



**Knowledge and Practice Regarding Neonatal Jaundice  
among Mothers of Neonates Admitted to Governmental  
Hospitals in Gaza Strip**

**Haneen Abdrahman Ismail Abu Shawareb**

**M. Sc. Thesis**

**Jerusalem- Palestine**

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Hospitals in Gaza Strip**

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A Thesis Submitted in Partial Fulfillment of Requirements  
For the Degree of Master of Mother and Child Health  
Nursing/ Faculty of Health Professions/Al-Quds University

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**Al-Quds University**  
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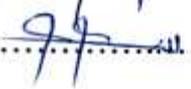
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**Jerusalem- Palestine**

**1444 / 2023**

## **Dedication**

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

To the great mother who gave me the road of my success.

To my father who devoted this life for us.

To my family, and all my relatives who encouraged me to complete this work.

To the Palestinian people especially for martyrs who sacrificed their lives for Palestine and Al- Aqsa.

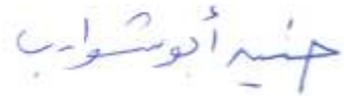
To my friends for their support and encouragement

Today am Thank you for being amazing role models, for always encouraging my dreams, and for all of the sacrifices you made in order for me to live.

## **Declaration**

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

Signed:



Haneen Abdrahman Ismail Abu Shawareb

Date: 10/1/2023

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**Haneen Abdrahman Ismail Abu Shawareb**

## **Abstract**

Jaundice is a yellow-orange discoloration of the skin and sclera result from accumulation of bilirubin in the skin and mucous membrane, and considered a common cause of neonatal admissions to health care facilities around the world; Jaundice is considered significant cause of neonatal mortality, morbidity and life-long disability for the survivors and affects 60% of full-term and 80% of preterm. This study aimed to assess the knowledge and practice regarding neonatal jaundice among mothers admitted to neonatology department in Gaza Strip governmental hospitals.

This study consisted 305 of mothers of children with neonatal jaundice and admitted to neonatology departments in governmental hospitals in Gaza. Quantitative, descriptive cross sectional investigation. The sample chose conveniently where they distributed equally at neonatology departments in Al-Rantisi Al-Nasr pediatric hospital, AL-Aqsa Martyrs Hospital, Nasser Medical Complex hospital and AL-Helal AL-Emaraty Maternity hospital. A questionnaire was constructed and data was collected through face-to-face interviewing questionnaire. The researcher has trained three qualified data collectors who were given explanation and training by the researcher about the study.

Considering mother's knowledge about neonatal jaundice the study found that 79.6% of the participants have low knowledge about neonatal jaundice while 17.1% of them have moderate levels and 3.3% of them had a high level knowledge about neonatal jaundice. In term of mother's practices regarding neonatal jaundice, the results showed that 78.7% of the participants have low practice level, while 19.7% of them have moderate levels and 1.6% of them had high level of practices about neonatal jaundice. Study showed that there was no statistical significant relation between mothers' knowledge and practices about neonatal jaundice ( $\alpha > 0.05$ ).

The majority of mothers have low level knowledge and practice regarding neonatal jaundice as well as there was no statistical significant between mothers' knowledge and practice. Therefore researcher suggested give education to mothers about effectively deal with babies, family and empowered them to detect signs of jaundice in the first week of life. And involvement of electronic media to increase the awareness of mothers regarding neonatal jaundice.

## **Table of contents**

Dedication.....	
Declaration.....	i
Acknowledgment.....	ii
Abstract.....	iii
Table of contents .....	iv
List of Tables .....	viii
List of Figures.....	ix
List of Annexes.....	x
Table of abbreviations .....	xi
<b>Chapter one Introduction .....</b>	<b>1</b>
1.1 Background.....	1
1.2 Problem Statement.....	2
1.3 Justification of the study .....	4
1.4 Aim of the Study.....	4
1.5 Objectives of the Study.....	4
1.6 Research Questions.....	5
1.7 Theoretical Definitions .....	5
1.8 Operational Definitions .....	6
1.9 Context of study.....	6
1.9.1 Sociodemographic context.....	6
1.9.2 Socio-economical context.....	7
1.9.3 Health care system .....	7
1.9.4 Governmental Hospital Services.....	8
<b>Chapter Two Literature Review .....</b>	<b>9</b>
<b>2.1 Conceptual Framework.....</b>	<b>9</b>
2.1.1 Background .....	10
2.1.2 Definition of Neonatal Jaundice .....	10

2.1.3 Bilirubin Formation .....	10
2.1.4 Bilirubin Level .....	11
2.1.5 Types of Bilirubin .....	11
2.1.6 Epidemiology of Neonatal Jaundice .....	12
2.1.7 Etiology of Neonatal Jaundice .....	13
2.1.7.1 Physiologic Jaundice .....	13
2.1.7.2 Pathologic Jaundice .....	13
2.1.7.3 Breastfeeding Jaundice .....	14
2.1.7.4 Hemolytic Jaundice .....	14
2.1.7.5 Rh Factor Hemolytic Disease .....	14
2.1.7.6 ABO Incompatibility .....	15
2.1.8 Diagnosis of Neonatal Jaundice .....	15
2.1.9 Clinical Manifestations of Neonatal Jaundice .....	16
2.1.10 Treatment of Neonatal Jaundice .....	17
2.1.11 Complications of Neonatal Jaundice .....	18
2.2 Knowledge and Practice of Mothers Regarding Neonatal Jaundice.....	18
2.3 Summary .....	27
<b>Chapter Three Method and Materials.....</b>	<b>29</b>
3.1 Study Design.....	29
3.2 Setting of the Study .....	29
3.3 Period of the Study .....	29
3.4 Study Population.....	29
3.5 Sample and Sampling .....	30
3.6 Eligibility Criteria:.....	30
3.6.1 Inclusion Criteria .....	30
3.6.2 Exclusion Criteria .....	30
3.7 Instrument of the Study .....	30
3.8 Validity of the instrument.....	31
3.9 Reliability of the instrument .....	31

3.10 Data Collection .....	31
3.11 Pilot Study.....	31
3.12 Data Entry and Analysis .....	32
3.13 Ethical and Administrative Considerations .....	32
<b>Chapter Four Results .....</b>	<b>33</b>
4.1 Sample distribution according to socio-demographic data.....	33
4.1.1 Distribution of the study population according to their age groups.....	33
4.1.2 Distribution of the study population according to educational level .....	34
4.1.3 Distribution of the study participants based on their socio-demographic data ...	34
4.1.4 Distribution of the study population according to their past obstetric history ....	35
4.1.5 Distribution of the study population according to their maternal pregnancy in the current child information .....	37
4.1.6 Distribution of the study participants according to child information .....	38
4.2 Scores of items measuring mothers' knowledge about neonatal jaundice .....	39
4.2.1 Distribution of the study population according to their measuring mothers' knowledge about neonatal jaundice.....	39
4.2.2 Distribution of the study population according to their responses about mothers' knowledge of neonatal jaundice .....	42
4.3 Scores of items measuring practices of mothers about neonatal jaundice.....	43
4.3.1 Scores of items measuring practices of mothers about neonatal jaundice .....	43
4.3.2 Distribution of the study population based on their answer about the practice ..	45
4.4 Mean difference of studied between research domains related to socio-demographic characteristics .....	45
4.4.1 Mean difference of studied domains linked to the age of the mother.....	45
4.4.2 Mean difference of studied domains related to educational level.....	46
4.4.3 Mean difference of studied domains related to mother occupation .....	47
4.4.4 Mean difference of studied domains related to monthly income.....	47
4.4.5 Mean difference of studied domains related to the number of family members	48
4.5 Mean difference of studied domains related to past obstetric history .....	49
4.5.1 Mean difference of studied domains related to first pregnancy .....	49

4.5.2 Mean difference of studied domains related to of a miscarriage .....	49
4.5.3 Mean difference of studied domains related to previous children being admitted to the NICU.....	50
4.5.4 Mean difference of studied domains related to children who had neonatal jaundice.....	51
4.5.5 Mean difference of studied domains related to awareness lectures about jaundice and its complications in primary care centers.....	52
4.6 Mean difference of studied domains related to information about a child .....	53
4.6.1 Mean difference of studied domains related to child's age in days .....	53
4.6.2 Mean difference of studied domains related to the current baby's uterine age ..	53
4.6.3 Post Hoc test of mean difference of the demographic data domain in the current baby's uterine age .....	54
4.7 Correlation between studied domains among the study participants.....	55
<b>Chapter Five Discussion.....</b>	<b>56</b>
5.1 Discussion.....	56
5.2 Mother's knowledge regarding neonatal jaundice .....	57
5.3 Mother's practice regarding neonatal jaundice .....	58
5.4 Relationship between the socio-demographic characteristics and mothers' knowledge and practice .....	60
5.5 Related between past obstetric history and mothers knowledge and practice.....	63
5.6 Relationships between Mothers' knowledge and practice regarding neonatal jaundice.....	64
<b>Chapter Six Conclusion and Recommendations .....</b>	<b>66</b>
6.1 Conclusion .....	66
6.2 Recommendations.....	66
<b>References.....</b>	<b>67</b>
<b>Annexes.....</b>	<b>77</b>
<b>Abstract in Arabic .....</b>	<b>97</b>

## List of Tables

Table (4.1) Illustrated the distribution of the study participants based on their socio-demographic data.....	34
Table (4.2): Distribution of the study population according to their past obstetric history information .....	36
Table (4.3): Distribution of the study population according to their maternal pregnancy in the current child information .....	37
Table (4.4): Distribution of the study population according to child information .....	38
Table (4.5a): Scores of items measuring mothers' knowledge about newborn jaundice ....	39
Table (4.5b): Scores of items measuring mothers' knowledge about newborn jaundice....	40
Table (4.5c): Scores of items measuring mothers' knowledge about newborn jaundice....	41
Table (4.6): Distribution of the study population according to their level of mothers' knowledge about neonatal jaundice.....	42
Table (4.7a): Scores of items measuring the practices of mothers regarding neonatal jaundice.....	43
Table (4.7b): Scores of items measuring the practices of mothers regarding neonatal jaundice.....	44
Table (4.8): Distribution of the study population based on their level of practice.....	45
Table (4.9): Mean difference of studied domains linked to the age of the mother .....	45
Table (4.10): Mean difference of studied domains related to educational level .....	46
Table (4.11): Mean difference of studied domains related to mother occupation.....	47
Table (4.12): Mean difference of studied domains related to monthly income .....	47
Table (4.13): Mean difference of studied domains related to the number of family members .....	48
Table (4.14): Mean difference of studied domains related to first pregnancy .....	49
Table (4.15): Mean difference of studied domains related to the miscarriage .....	49
Table (4.16): Mean difference of studied domains related to previous children being admitted to the NICU .....	50
Table (4.17): Mean difference of studied domains related to children who had neonatal jaundice.....	51
Table (4.18): Mean difference of studied domains related to awareness lectures about jaundice and its complications in primary care centers.....	52
Table (4.19): Mean difference of studied domains related to child's age in days.....	53
Table (4.20): Mean difference of studied domains related to the current baby's uterine age .....	53
Table (4.21): Post Hoc test of mean difference of the demographic data domain in the current baby's uterine age.....	54
Table (4.22): Correlation between the studied domains among the study participants.....	55

## List of Figures

Figure (2.1): Conceptual Framework .....	9
Figure (4.1): Distribution of the study population according to their age group.....	33
Figure (4.2): Distribution of the study population according to their educational level .....	34

## **List of Annexes**

Annex (1): Control panel.....	77
Annex (2): Palestine map .....	78
Annex (3): Approval from university .....	79
Annex (4): Approval from MOH.....	80
Annex (5): Helsinki .....	81
Annex (6): Questionnaire (English) .....	82
Annex (7): Questionnaire (Arabic).....	89

## **Table of abbreviations**

<b>ABE</b>	Acute Bilirubin Encephalopathy
<b>ABO</b>	Blood Groups
<b>CBC</b>	Complete Blood Cell
<b>ECT</b>	Exchange Transfusion
<b>G.S</b>	Gaza Strip
<b>G6PD</b>	Glucose-6-Phosphate Dehydrogenase Deficiencies
<b>GDP</b>	Gross Domestic Product
<b>IgG</b>	Maternal ImmunoGlobulin
<b>IUGR</b>	Intrauterine Growth Restriction
<b>LBW</b>	Low Birth Weight
<b>MOH</b>	Ministry of Health
<b>NICU</b>	Neonatal Intensive Care Unit
<b>NNJ</b>	Neonatal Jaundice
<b>PPROM</b>	Preterm Prelabour Rupture of Membranes
<b>RH</b>	Rhesus factor
<b>SPSS</b>	Statistical Package for Social Sciences
<b>TM</b>	Traditional Medicine
<b>TSB</b>	Total Serum Bilirubin
<b>UGT</b>	Uridine Diphosphate Glucuronoyl Transferase
<b>WHO</b>	World Health Organization

# Chapter one

## Introduction

### 1.1 Background

Neonatal jaundice (NNJ) is considered as a common event that happens especially in the first week of birth (Boskabadi & Zakerihamidi, 2018). According to Shitran and Abed (2020), jaundice is a yellow-orange discoloration of the skin and sclera result from accumulation of bilirubin in the skin and mucous membrane, and considered a common cause of neonatal admissions to health care facilities around the world. Jaundice is considered an significant reason of neonatal mortality, morbidity and life-long disability for the survivors and affect 80% of preterm neonates and 60% of full-term who constitutes 84–112 million of the 140 million babies born yearly worldwide will develop this condition in the first weeks of life (Olusanya et al., 2018). Globally, the overall occurrence of NNJ is 9.9 per 10,000 live births (Magai et al., 2019). In Palestine, the number of live births for the year 2020 reached 129,896 of whom 53,490 (41,2%) were born in the Gaza Strip (G.S), while the number of admissions to neonatal intensive care unit (NICU) 7424 baby in the G.S for to the year 2020, about 14,34 of admitted with NNJ in G.S (Ministry of Health (MoH, 2020).

NNJ caused by increased indirect bilirubin in the blood which results from imbalance between bilirubin manufacture and metabolism by the immature liver (Brits et al., 2018). Types of jaundice include nonpathological jaundice, pathological jaundice, jaundice due to breastfeeding and hemolytic jaundice including three subtypes due to Rh factor incompatibility, ABO blood group incompatibility and jaundice associated with Glucose-6-phosphate dehydrogenase deficiency (G6PD) (Ullah, Rahman & Hedayati, 2016).

The neonate has a higher risk to NNJ for many reasons like greater red cell mass at birth, shorter red blood cells lifecycle, insufficient intake of calorie as result of poor breastfeeding, albumin level in sufficient and an immature bilirubin conjugating system, ABO blood incompatibility, sepsis, G6PD, prematurity, maternal diabetes, race, low gestational age, male sex, and stimulation of labor with oxytocin may develop neonatal jaundice (Olatunde et al., 2020).

NNJ is a serious illness that may result in fatal problems if not diagnosed early and treated correctly and is still as reason of preventable brain impairment, physical and mental handicap such as cerebral palsy, deafness, talking disorders, learning debilities and mental retardation, and death among infants in many societies (Huq et al., 2017).

Different methods could be used to treat NNJ these methods include frequent feedings which considered the best method in treatment of jaundice at home; feeding the baby frequently (about 8 to 12 times a day) will provide the baby with the fluids needed to get rid of the extra bilirubin (Hameed, Abdul-Hussain & Ahmed, 2019). Phototherapy, exchange transfusion and intravenous immune globulin consider the common therapeutic modalities in the treatment NNJ that can prevent complications (Mostafa et al., 2017).

Mother's knowledge and practice considered significant for early diagnosis of NNJ by the time, mother can identify jaundiced baby have a serious complication and sometimes can be fatal (Amegan-Aho et al., 2019). Neonates may be sent home with their mothers earlier than the time of beginning of jaundice, which would diminish access to treatments. It may be seen as a normal outcome, this may delay management as well. There is no data available on how mothers deal with NNJ and their awareness for this topic. Therefore, determining the level of mother's knowledge and practice regarding NNJ is of importance, to decrease the risk for future baby's to develop NNJ, for early intervention and treatment (Hamad & Khalil., 2019).

Therefore, the purpose of this study is to assess knowledge and practice regarding neonatal jaundice among mothers whose babies admitted to neonatology departments in Gaza Strip.

## **1.2 Problem Statement**

NNJ is a common condition in neonate that primarily happens during the first weeks of life and considered as one reason for admission to NICU worldwide (Boskabadi & Zakerihamidi, 2018). Worldwide, about 481,000 neonates may develop severe NNJ each year, causing 114,000 deaths and leaving more than 63,000 survivors with long-term complications (Iliyasu et al., 2020). Low and middle-income countries represent the highest burden of severe NNJ characterized by high rates of morbidity, mortality and neurodevelopmental disorders compared to high-income countries (Olusanya et al., 2015).

The serious complication of NNJ is kernicterus or even neonatal death in severe cases due to the severe accumulation of unconjugated bilirubin in the brain tissue (Boskabadi et al., 2015). NNJ may also a reason for many serious complications including sensorineural hearing loss, cerebral palsy, and attention deficit hyperactivity disorder consider as a common neurodevelopmental disorder. It is linked with functional impairments such as learning dysfunction, peer and family conflict, poor performance in working, and harmful social behavior (Le Ray et al., 2020).

Mothers require learning about baby care, childhood sicknesses, vaccinations and neonate nourishing; during postnatal period the deficiency of knowledge and in-appropriate practices have possibly harmful childrearing practices which can delay the growth and development of some neonate. Another study that aims to evaluate the maternal knowledge and health-seeking activities for neonatal jaundice in rural Kumbotso, northern Nigeria, show that maternal knowledge about NNJ was low (Iliyasu et al., 2020).

There are multitudes of misconceptions among mothers regarding NNJ. Several studies have been conducted about NNJ. However, few studies have been done on the perception of mothers who went through the experience of their baby having jaundice. The mother is considered the primary care giver for babies in most of the societies, the awareness of mothers in understanding and dealing with NNJ would make a significant difference in the disease outcome (Dharel & Bhattarai, 2017).

Additionally, with increasing tendency of early discharge from hospital, responsibility of mothers to identify jaundice becomes more essential. So, mothers must be able to distinguish jaundice and take babies had jaundice to the hospital for early care and treatment (Aggarwal et al., 2017).

It is essential that parents should have correct knowledge of how to identify jaundice as well as how to respond correctly, because often the delay in seeking medical advice usually due to parent's action and sometimes they do self-medication with herbal medicines and homemade remedies due to inadequate knowledge, also misconceptions include the advantageous role of sunlight in reducing jaundice (Alfouwais et al., 2018).

### **1.3 Justification of the study**

The study will enhance nursing profession in Palestine particular in the following areas: in practice, this study will afford ideas for a policy maker to improve performs and administration about neonates especially in assisting mothers about care for their neonate.

In research, the study will construct frame of knowledge in nursing researches, and will stimulate for further research, also in nursing care, the study will provide parents with accurate information about how to identify NNJ as well as how to respond appropriately and provide a health instruction and this will have an impact in neonatal morbidity and mortality.

In education, this study will be used as the foundation for a review of the pediatrics curriculum for pre-service and in-service training in the fields of medicine and nursing.

The researcher will give recommendations at the administrative level for the Ministry of Health (MOH) and other health sectors policy-makers building up policies for implementing programs connected to health education activities to raise mother awareness of NNJ.

Poor maternal understanding of NNJ has been found by several studies. Finally, there is no research on mothers' understanding of and use of NNJ in the Gaza Strip. In order to fill this knowledge and practice gaps, this study examined mothers who were admitted to the neonatology departments of Gaza Strip government hospitals.

### **1.4 Aim of the Study**

To assess the knowledge and practice regarding neonatal jaundice among mothers of neonates admitted to neonatology department in Gaza Strip governmental hospitals.

### **1.5 Objectives of the Study**

1. To assess knowledge about neonatal jaundice among mother's of neonate admitted to neonatology department in governmental hospitals in Gaza strip.
2. To assess mothers practice about neonatal jaundice before their baby admitted to neonatology department in governmental hospitals in Gaza strip.

3. To determine the relationship between a number of socio-demographic characteristics of mothers and their level of knowledge and practice regarding neonatal jaundice in the Gaza Strip hospitals.
4. To determine the relationship between knowledge and practice among mothers regarding neonatal jaundice in the Gaza Strip.
5. To identify the relationship between mother who have pervious baby with neonatal jaundice and their knowledge and practice regarding neonatal jaundice in the Gaza Strip hospitals.
6. To examine relationship between setting of admission and mother knowledge and practice regarding neonatal jaundice in the Gaza Strip.
7. To make recommendations that might help mothers learn more about neonatal jaundice and how to treat it when admitted with her baby to the neonatology department of government hospitals in the Gaza Strip.

## **1.6 Research Questions**

1. What is the knowledge level of mothers about neonatal jaundice in the Gaza Strip?
2. What is the practice level of mothers about neonatal jaundice in the Gaza Strip?
3. Is there a relationship between some demographic characteristics and mother knowledge and practice about neonatal jaundice in the Gaza Strip?
4. Is there a significant relationship between the level of knowledge and practice of mothers about neonatal jaundice in the Gaza Strip?
5. Is their relationship between mother's who have pervious baby with neonatal jaundice and mother knowledge and practice regarding neonatal jaundice in Gaza Strip?
6. What is the relation between the setting of admission and the mother knowledge and practice regarding neonatal jaundice in Gaza Strip?
7. What suggestions to improve mother's knowledge and practice about neonatal jaundice at governmental hospitals in Gaza Strip?

## **1.7 Theoretical Definitions**

- **Neonate:** (from Latin, neonatus, newborn) refers to a neonate in the first 28 days after birth (Merriam Webster, 2021).

- **Neonatal jaundice:** is characterized by a yellowish coloring of the skin, conjunctiva, and sclera brought on by an increased bilirubin serum during the neonatal period (Ansong-Assoku& Ankola, 2018).
- **Knowledge:** is familiarity with, awareness of, or comprehension of someone or something, including knowledge of facts, abilities, or objects (Cambridge Dictionary, 2020).
- **Practice:** is described as an action that is frequently performed as a habit, tradition, or custom (Cambridge Dictionary, 2020).

## 1.8 Operational Definitions

- **Knowledge:** This refers to the theoretical understanding of newborn jaundice problems that has been obtained through education or experience and is assessed using the questionnaire that the researcher has created.
- **Practice:** Mother's behaviors toward their baby diagnosis with NNJ and what mother will do to manage this condition, the researcher will create a questionnaire to measure this practice.

## 1.9 Context of study

### 1.9.1 Sociodemographic context

Palestine covers 27,000 Km<sup>2</sup>, including the Dead Sea's eastern half and the lakes Tiberias and Houla. The West Bank, including its part of the Dead Sea; it is 5842 Km<sup>2</sup>, while the area of the Gaza Strip is 365 Km<sup>2</sup> (Palestinian Central Bureau of Statistics - PCBS, 2018). Annex (2). The West Bank (WB), which is 5.655 km<sup>2</sup> in size, and East Jerusalem make up the Palestinian Territories. Gaza is a small area of land on the eastern shore of the Mediterranean Sea that is bordered by Egypt to the south, the Mediterranean Sea to the west, and the 1948-occupied territories to the east and north. In GS, refugees make up more over two thirds of the total population. Five provinces make up GS: Khanyounis, Mid-zone, Gaza, and North of Gaza (Palestinian Central Bureau of Statistics - PCBS, 2018).

In the year 2020, the Palestinian population in the State of Palestine, according to estimates by the Central Bureau of Statistics for Palestine, was 5,101,152 people, of whom about 59.2 million were males, compared to 50.2 million females, while the population of the

West Bank was about 05.3 million, with a rate of 9.59% of the total population of Palestine 55.1 million males compared to 49.1 million females in the Gaza Strip. The population of the Gaza Strip for the same year was about 4.2 million, or 1.40% of the total population of Palestine, of whom about 03.1 million males compared to 01.1 million female (MOH, 2020)

The estimated crude birth rate is 29.9 live births per 1,000 people (27.5 in WB and 33.4 in GS), whereas the anticipated crude death rate is 2.8 deaths per 1,000 people (2.8 in WB and 2.5 in GS), and the estimated crude fertility rate is 3.8 babies per woman (3.8 in WB and 3.9 in GS) (PCBS, 2020).

### **1.9.2 Socio-economical context**

Gross Domestic Product (GDP), according to PCBS in 2020, was 15.56 billion USD, million 3,239.73 \$ for GDP Per person (PCBS, 2020). During 2020, the local economy witnessed one of the worst conditions as a result of the concurrent outbreak of the Corona pandemic (Covid-19), the decline in foreign aid, and the renewal of the clearance revenue crisis with the Israeli side, which led to a decline in your economic and economic performance. A slight rise in the unemployment rate, from 3.25 percent in 2019 to 9.25% of the total workforce in the year 2020. A total of 44% of people aged 15 and over participated in the labor force in 2019, with 46% of them living in the West Bank and 41% in the Gaza Strip.

### **1.9.3 Health care system**

The Ministry of Health (MoH), which is responsible for providing the majority of health services in Gaza, UNRWA, non-governmental organizations (NGOs), military medical services, and the private sector make up the system. The MOH runs 743 PHC facilities, including 27 hospitals (14 in WB and 13 in GS) (583 in WB and 160 in GS). 22 PHC facilities are run by UNRWA in the Gaza Strip as another key aspect (MoH, 2018). The provision of care as a whole and meeting the needs of a group of particular diseases constitute the essence of health, which deals with its comprehensive physical, psychological, and social elements (UNOCHA, 2020).

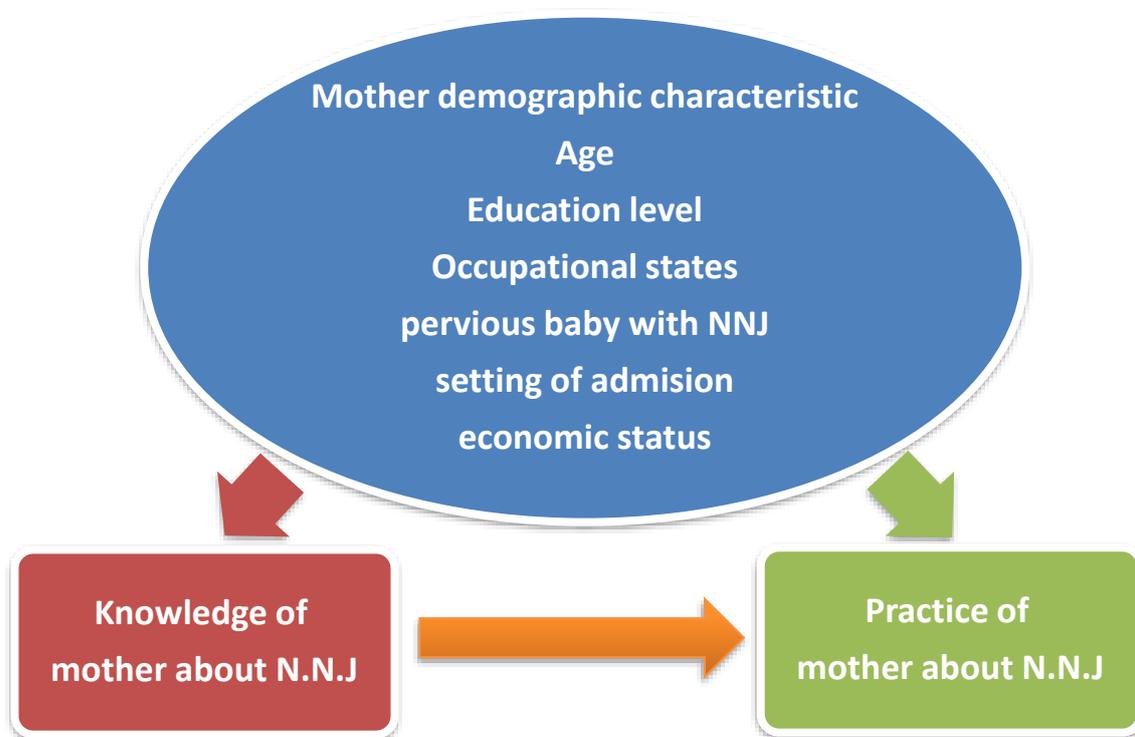
#### **1.9.4 Governmental Hospital Services**

The MOH is the primary provider of secondary care in the GS. It is in charge of 13 hospitals spread across the five governorates, and GS has roughly 1830 hospital beds. The Palestinian Ministry of Health (MOH) is the major employer of human cadres working in the health sector in Palestine, and as of 2020, there were 5,695 employees working in the Gaza Strip, which is a relatively low number compared to the enormous population covered by the GS. The strain on the health care systems in Gaza and the West Bank is made worse by the precarious political situation in Palestine.

## Chapter Two

### Literature Review

#### 2.1 Conceptual Framework



**Figure (2.1): Conceptual Framework**

The researcher builds the conceptual framework after studying numerous related literatures on the subject. The graphic illustrates the relationships between the study's variables. The researcher also identified the main factors that affect mothers' knowledge of and practice toward NNJ.

**Independent variables:** The independent variable includes the demographic factors; these factors will affect mother's knowledge and practice regarding neonatal jaundice. These factors affect the level of the knowledge and practice of mother regarding NNJ several studies indicated that age of mothers, level of education, occupational states, have previous baby with NNJ, setting of admission and the economic status who affect their knowledge about NNJ, and reflected in their practice regarding NNJ.

**Dependent variables:** The dependent variable is the mother's knowledge and practice regarding NNJ. The demographic characteristics play a significant influence in determining the degree of knowledge and practice about NNJ, as shown in the previous diagram.

### **2.1.1 Background**

NNJ has a significant rank in neonatal morbidity and mortality world-wide. Around 10% of breast-fed babies are still suffering from NNJ during the first months of their life. It is also responsible for 70% neonatal morbidity and 10% mortality, about 75% of neonatal mortality because of jaundice complication occurred in South Asia and sub-Saharan Africa (Lake et al., 2019). Jaundice in newborns is a result of enlarged production bilirubin and breakdown of red cells due to high hemoglobin at birth, as well as due to reduced lifecycle of neonate red blood cells (70–80 days) compared to that of adults (90–120 days), and reduced hepatic metabolic rate for bilirubin due to immature hepatocytes (Adoba et al., 2018). Most of neonate with NNJ is a natural transition which resolutions by the first week of life with development of the liver (Shrestha et al., 2019). High bilirubin level has potentially toxic to the central nervous system, can lead to bilirubin encephalopathy and subsequently kernicterus and with devastating, permanent neurodevelopmental handicaps (Ramdan et al., 2019).

### **2.1.2 Definition of Neonatal Jaundice**

The term jaundice is from the French word "Jaune," which means yellow (Jannat et al., 2019). A yellowish discoloration of the skin, sclera, and mucous membranes, caused by excess accumulation of bilirubin in the tissue and plasma (serum bilirubin level should be in excess 7 mg/dl) (Asefa et al., 2020). African, Asian, Mediterranean and Middle-Eastern descents are greatest frequently affected by NNJ and consider a life-threatening disorder in newborn (Kasemy et al., 2020)

### **2.1.3 Bilirubin Formation**

The physiology of humans normally produces bilirubin, which is created when senescent red blood cells' heme is broken down. After being created, bilirubin is combined with glucuronic acid in the liver to create bilirubin glucuronide. Conjugated bilirubin is then transported via the biliary tree, past the canalicular membrane, and into the intestinal

lumen for elimination (Mabogunje, Olaifa & Olusanya, 2016). Bilirubin is the final product of heme catabolism made during a progression that involves oxidation-reduction responses and conserves iron body stores other forms that remainder creates from the turnover of various heme-containing proteins found in other tissues, primarily the liver and muscles, about 4 mg/kg body weight of bilirubin is produced daily (Hansen, Wong, and Stevenson, 2020). Red blood cells have a life cycle that is (70 – 80) days shorter in newborns than it is in adults (Adoba et al., 2018). Hemoglobin is composed of heme and globin, the heme fragmented into free iron which associations with ferritin and the straight remnant chain of four pyrrole nuclei that aids as a substrate for the formation of bile pigments. Biliverdin is made which then gets transformed into bilirubin (Vagholkar, 2020). These limits account for an inequality between bilirubin production and elimination. The disparity between bilirubin production and removal is explained by these constraints. In essence, neonatal jaundice occurs when the rate of bilirubin production exceeds the rate of bilirubin clearance, reflecting the total bilirubin levels in the body after birth, to cause yellow pigment to be seen in the skin (Mabogunje, Olaifa & Olusanya, 2016).

#### **2.1.4 Bilirubin Level**

Total serum bilirubin (TSB) has normal ranges of 0.3 to 1.0 mg/dL. Due to the stress of giving birth, a neonate's indirect bilirubin level should be under 5.2 mg/dL within the first 24 hours of life. However, many newborns experience some kind of jaundice, and their indirect bilirubin level rises above 5 mg/dL within the first few days (Case-Lo, 2018).

#### **2.1.5 Types of Bilirubin**

There are two types of bilirubin: unconjugated (indirect bilirubin) and conjugated (direct bilirubin). Unconjugated bilirubin is expelled by the liver because it is insoluble in water, attached to albumin, and glucuronic acid, which is added by the enzyme glucuronyl transferase, cannot be directly eliminated from the body (Chaudhary, 2020). Because the conjugated bilirubin is water-soluble, it may move through the bloodstream without the aid of transport proteins like albumin and can be eliminated from the body through bile in the duodenum (Vagholkar, 2020).

### **2.1.6 Epidemiology of Neonatal Jaundice**

Jaundice is expected to develop in about 1 in 10 newborns (Olusanya, Kaplan and Hansen, 2018). No matter the gestational age, there were reported to be 37,8 cases of severe jaundice per 10,000 live births, with Africa having the highest frequency (667,8 cases per 10,000) and Europe having the lowest (3,7 cases per 10,000). (Shitran and Abed, 2020). According to the studies, severe jaundice is a major reason for hospitalization in the first week of life and can be the cause of up to 35% of hospital readmissions in the first month. The incidence of chronic bilirubin encephalopathy, also known as kernicterus, varies between 0.2 and 2.7% per 100,000 people (Olusanya, Kaplan and Hansen, 2018).

NNJ is one of the major causes of the high morbidity and mortality rates observed in sub-Saharan Africa. In comparison, in industrialized nations like North America and Europe, there are 0.4 to 2.7 incidences of morbidity and mortality from NNJ problems for per 100,000 live births. 24 million or 18% of 134 million live births fewer than 32 weeks of gestation from 184 (mainly developing) nations were discovered to be at risk for NNJ associated with negative outcomes (Shehu, Shehu & Onuwe, 2019).

Globally, each year about 1.1 million neonates would develop severe NNJ with or without bilirubin encephalopathy, and the majorities exist in sub-Saharan Africa and South Asia. The burden was highest in low and middle income countries of sub-Saharan Africa and South Asia. The global burden of NNJ reported that the African region has the highest incidence of severe NNJ per 1000 live births (667.8 to 738.5) followed by the Southeast Asian (251.3 to 473.2) and Americas and European regions 4.4 and 3.7 respectively (Asefa, et al., 2020).

Jaundice considered 13th leading cause of neonatal mortality in North America and ninth in Western Europe. In the late-neonatal period (7–27 days) jaundice accounted for 187, 1 deaths per 100, 000 and ranked ninth globally (Olusanya, Kaplan & Hansen., 2018). The condition ranked seventh in south Asia and 12th in sub-Saharan Africa, compared with 15th in western Europe and 21st in North America; it was considered 16th leading cause of mortality in children younger than 5 years among over 100 causes of child mortality globally (Olusanya, Kaplan and Hansen, 2018).

According to the available data, low- and middle-income countries, which have higher rates of illness, mortality, and neurodevelopmental abnormalities than high-income ones, bear the brunt of NNJ (Olusanya Osibanjo & Slusher, 2015). The use of herbal preparations during pregnancy and the high prevalence of G6PD in low- and middle-income countries are the main causes of hemolytic jaundice (Iliyasu et al., 2020).

### **2.1.7 Etiology of Neonatal Jaundice**

Increased enterohepatic circulation, decreased bilirubin clearance due to a lack of the uridine diphosphate glucuronoyltransferase (UGT) enzyme, which in the neonate has the activity of about 1% of the adult liver, and increased bilirubin production are the causes of the increased bilirubin load in the neonate (Ansong-Assoku & Ankola, 2018). Several forms of bilirubinemia have been reported in neonates including physiological jaundice, pathological jaundice, jaundice due to breastfeeding or breast milk and hemolytic jaundice including three subtypes due to Rh factor incompatibility, ABO blood group incompatibility and Jaundice connected with Glucose-6-phosphate dehydrogenase (G6PD) deficiency (Ullah, Rahman, & Hedayati, 2016).

#### **2.1.7.1 Physiologic Jaundice**

The condition is known as non-pathologic jaundice with occurs due to the high concentration of red blood cells and the immaturity of liver function, (Pan & Yolanda, 2017). It is the most prevalent kind of neonatal hyperbilirubinemia and has no negative effects. High toxic levels of bilirubin can cause neurodevelopmental problems such as athetosis, hearing loss, and in rare cases, intellectual deficiencies. When it first manifests, jaundice caused by physiological immaturity typically occurs between 24 and 72 hours; in term newborns, it peaks between the fourth and fifth day; in preterm newborns, it peaks at the seventh day; and in both cases, it dissipates between 10 and 14 days after birth. The predominant form of bilirubin is unconjugated, and its serum level is typically less than 15 mg/dl (Ullah, Rahman & Hedayati, 2016).

#### **2.1.7.2 Pathologic Jaundice**

It appears within 24 hours of birth and the bilirubin level increases above 5 mg/dL per day and remains of clinical jaundice more than 2 weeks. The level of bilirubin is higher than 17 mg / dL in neonate, and it is result of a specific disease such as: Sickle cell anemia,

erythroblastosis fetalis which is a mismatch of the blood type between the mother and the infant, that results in significant red blood cell breakdown in the infant and a lack of some crucial proteins because of genetic abnormalities, bruising as a result of labor pains, infections, small red blood cells' high concentrations, and premature birth; Changes in bilirubin metabolism during the newborn period create an elevated bilirubin load, which causes jaundice (Ansong-Assoku & Ankola, 2018).

### **2.1.7.3 Breastfeeding Jaundice**

It happens 5-7 days after birth and peaks after 14 days and can continue for several months, it is arise due to an increase in the concentration of the enzyme ( $\beta$ -glucuronidase) About 10% of breast-fed babies are still suffering from neonatal jaundice during the first months of their life(Lake et al., 2019). And bilirubin levels are among 12-20 mg / dL, and then levels begin to fall after two weeks (Bratton et al., 2020). If the newborn is healthy, active, eating well and gaining weight appropriately and the serum bilirubin is primarily unconjugated, alternative causes of chronic jaundice have been eliminated, a diagnosis of breast milk jaundice should be considered. Mothers should be advised to nurse more frequently going forward, and bilirubin levels typically decrease gradually. It is not advised to stop nursing unless levels are higher than 20 mg/dl (Ullah, Rahman & Hedayati, 2016).

### **2.1.7.4 Hemolytic Jaundice**

the most frequent causes of hemolytic jaundice (a) Rh hemolytic disease, (b) ABO incompatibility and (c) Glucose-6 phosphate dehydrogenase (G6PD) deficiency and minor blood group incompatibility (Ullah, Rahman & Hedayati, 2016).

### **2.1.7.5 Rh Factor Hemolytic Disease**

Neonatal Rhesus hemolytic illness results from maternal immunoglobulin (IgG) antibodies may cross the placenta into the fetal circulation and cause a wide variety of signs and symptoms in the fetus, ranging from slight to severe hemolytic anemia and fetal hydrops. Maternal antibodies are made against the fetal red blood cells when fetal red blood cells are positive for a certain antigen, typically at the time a baby having Rh positive born to an Rh-negative mother. blood group and Rh type, as well as serum bilirubin on cord blood, should be used to help early care in newborns who are questionably Rh-positive (Ullah, Rahman, & Hedayati, 2016).

### **2.1.7.6 ABO Incompatibility**

ABO blood group incompatibility occurs when the mother has blood group O and the baby has blood types A or B. ABO incompatibility-related jaundice typically manifests 24 hours after delivery. The workup for pathological jaundice should be ready if jaundice manifests within 24 hours. Depending on the baby's postnatal age, phototherapy is indicated at TSB 12–17 mg/dl. According to the TSB, ECT is recommended. For preterm neonates, phototherapy and ECT may be used as a standard based on weight at birth. (Ullah, Rahman, & Hedayati, 2016)

### **2.1.7.7 Jaundice Associated With G6PD Deficiency**

Absence of an enzyme in RBCs is the most frequent enzymopathy associated with G6PD. The hexose monophosphate pathway's most important disease is this one. Infants with severe jaundice who have a family history of G6PD deficiency or whose geographic origin is related to the condition should be tested for it. The course of hyperbilirubinemia in infants with G6PD deficiency is significantly influenced by decreased bilirubin conjugation induced by differences in the UGT1A1 and OATP2 genes. This condition should be treated similarly to ABO incompatibility (Ullah, Rahman, & Hedayati., 2016).

### **2.1.8 Diagnosis of Neonatal Jaundice**

The outpatient assessment of jaundice in neonates is generally through by a visual examination of a neonate skin to evaluate the gradation of yellowness (Taylor et al., 2017). The judgment of NNJ was based on clinical laboratory measurement of TSB through biochemical method and medical history and physical examination, blood can be drawn to determine the total serum or plasma level of bilirubin, or a transcutaneous measuring device can be used. Transcutaneous measurement is noninvasive and is based on the multiwavelength spectrum reflectance from the skin's bilirubin discolorations (Ullah, Rahman, & Hedayati., 2016). The frequency of bilirubin blood tests is decreased; however this is constrained by dark skin tones and whether the newborn has had phototherapy. In addition, the total serum bilirubin level should be measured to classify any other hemolytic diseases, such as blood group, Coombs test, complete blood count (CBC), reticulocyte count, blood smear, and G6PD, if the transcutaneous bilirubin level exceeds the 95th percentile on the transcutaneous nomogram or 75% of the total serum bilirubin nomogram for phototherapy (Ankola and Ansong-Assoku 2018). Identification of breast milk jaundice

can only be made after elimination of other probable causes and parents requirement a clarification of the nature of the problem. Beta-glucuronidase is existing in breast milk and can cause increased levels of unconjugated bilirubin that pass in the enterohepatic circulation from the gut (Mitra & Rennie, 2017). Hepatosplenomegaly, hemolysis on a peripheral blood smear, an elevated reticulocyte count (>8%), a rapid rise in bilirubin (>5 mg/dl in 24 h or >0.5 mg/dl/hr), or a family history can all indicate hemolytic jaundice that occurs within 24 hours (Ullah, Rahman, & Hedayati., 2016).

### **2.1.9 Clinical Manifestations of Neonatal Jaundice**

The main symptom of NNJ is a yellowing of the skin and other parts of the body. As the conditions develop, the whites of the eyes may take on a yellow tinge. Symptoms will naturally begin in the region of the face and progressively progress down the body to the legs. This development may be unidentifiable in some cases, with the discoloration appearing to occur across the whole body all at once. If there is any doubt about skin discoloration, probable in babies with dark skin, this can be checked by pressing a finger down on the skin. In cases of jaundice, the skin should appear yellow when the finger is released (Ada's Medical Knowledge Team, 2019).

Numerous neonatal morbidities' clinical presentations lack specificity, which makes it challenging to make a diagnosis, causes patients to put off seeking treatment, and has a high mortality rate as a result. The warning indications of a serious illness include a history of eating difficulties, sluggish movement without stimulation, a body temperature below 35.5°C or above 37.5°C, a respiratory rate of more than 60 breaths per minute, a severe chest in drawings, and a history of convulsions. A high overall sensitivity and specificity will be achieved by evaluating these signs and symptoms to determine whether a newborn should be hospitalized during the first week of life (Thakur et al., 2017).

The following symptoms are also indicative of NNJ:

- Yellow skin below the knee
- Yellow skin becoming more intense in color
- Difficulty feeding the baby
- Difficulty waking the baby
- Irritability (Ada's Medical Knowledge Team, 2019).

### **2.1.10 Treatment of Neonatal Jaundice**

When severe hyperbilirubinemia develops, it is treated with phototherapy, IV immunoglobulin, or exchange transfusions to stop the development of acute bilirubin encephalopathy (ABE) and kernicterus. To identify the bilirubin levels at which phototherapy and exchange transfusion are recommended, nomograms are available (Ansong-Assoku & Ankola, 2018).

Phototherapy is a simple and effective way to reduce the bilirubin level. That enhances the conversion of bilirubin into less toxic water-soluble photo-isomers; most babies have rapid responses to phototherapy (Mitra & Rennie, 2017). Treated using blue light phototherapies, exploiting the strong optical absorbance of bilirubin at 460 nm to photo decompose bilirubin to a form that can be excreted (Keahey et al., 2017).

Exchange transfusion (ECT), however, is considered to be the most effective and fastest method to lower the bilirubin level in newborns at high risk of kernicterus. That indicated when hyperbilirubinemia resides at dangerous levels (Ballot, & Rugamba, 2016). With or without phototherapy, ECT decreases the risk of neurologic impairment. It is used to remove bilirubin from the bloodstream, and in iso-immune hemolysis, it also gets rid of circulating antibodies and sensitized red blood cells. Exchange transfusions can result in a variety of complications, including blood-borne infections, cardiac arrhythmias, thrombocytopenia, and electrolyte disorders like hypocalcaemia and hyperkalemia (Ansong-Assoku & Ankola, 2018).

When iso-immune hemolysis persists despite phototherapy, IV immunoglobulin is advised to decrease bilirubin levels. IV immunoglobulin infusion in immune-mediated hemolysis if TSB remains within 2 to 3 mg/dl of exchange level despite intensive phototherapy, however, the evidence that the use of IV immunoglobulin reduces the need for ECT is not very clear. (Ansong-Assoku & Ankola, 2018). A baby who needs an exchange transfusion and has a serum bilirubin level of about 20 mg/dl must be monitored closely in a high-risk clinic for potential neurodevelopmental effects. Assessment of hearing (Brainstem Evoked Response Audiometry required at 3 months of age) (Ullah, Rahman, & Hedayati., 2016).

### **2.1.11 Complications of Neonatal Jaundice**

Severe NNJ leads to ABE with a significant danger of neonatal mortality and long-term neurologic damage such as cerebral palsy, sensory neural hearing loss, intellectual difficulties, or gross developmental delays. It is assessed for 75% hospitalization which requirements medical concern and hospital readmission in neonate. It results in brain encephalopathy which wants close attention, diagnosis and treatment. It also rises the economic and social load on the families and community (Asefa,et al.,2020).So, the timely diagnosis and treatment of neonatal jaundice are very significant in avoiding complications (Mojtahedi et al., 2018).

When bilirubin breaches the blood-brain barrier, neonates who develop severe hyperbilirubinemia are at risk for bilirubin-induced neurologic impairment. Acutely, this expresses as ABE characterized by lethargy, hypotonia, and decreased suck and is reversible. Kernicterus, which is permanent, may develop if ABE developments. It manifests as cerebral palsy, seizures, arching, posturing, and sensorineural hearing loss (Ansong-Assoku & Ankola., 2018).

The blood-brain barrier can be broken by the elevated blood indirect bilirubin, which then deposits in the cells of the auditory ventricular nucleus. Numerous researches have looked into the link between hearing loss and hyperbilirubinemia. The most frequent cause of acquired deafness has been identified as kernicterus, and research has indicated that extended exposure to hyperbilirubinemia increases the chance of hearing loss. High blood levels of indirect bilirubin (>20 mg/dl) have been linked to hearing loss in infants, according to the status of the auditory brainstem response in neonates (Boskabadi et al.,2018).

## **2.2 Knowledge and Practice of Mothers Regarding Neonatal Jaundice**

Adoba et al. (2018) report on a study done to determine the potential causes of newborn jaundice and gauge the level of maternal awareness of this disease in Ghana. Blood samples were taken to determine the blood group, G6PD status, and serum bilirubin levels (ABO and Rhesus). The findings showed that 10% of newborns had jaundice at birth, and that it usually appeared one to three days after delivery. Only 17.3% of mothers were aware of neonatal jaundice, which was particularly common in newborns with low birth weights. The majority of information regarding newborn jaundice came from the

classroom (34.6%). 90% of participants (mothers) said they were unaware that NNJ can harm other organs in the body.

Amegan-Aho et al. (2019) conducted a study to evaluate pregnant mothers attending the antenatal clinics of Korle-Bu Teaching Hospital and Mamprobi Polyclinic in Accra's knowledge, attitudes, and practices surrounding neonatal jaundice. The Outcomes Regardless of their level of education or parity, the majority of mothers who frequent antenatal clinics at a Teaching Hospital and a Polyclinic in Accra, Ghana, are aware of NNJ but have limited information about the causes, risk signals, and treatment of NNJ. Their degree of schooling has no real relationship to the outcome.

A study was conducted in Nigeria at the Lagos University Teaching Hospital. To evaluate pregnant women's knowledge of newborn jaundice's causes, treatments, and warning signs. The observation that 25.6% of participants correctly defined newborn jaundice. People from lower socioeconomic groups made up the largest percentage of individuals who provided an incorrect definition. Participants who picked inadequate treatment alternatives (82.2%) did not know the causes (79.2%). Furthermore, incorrect problems were correctly identified by 74.9% of respondents, particularly those with low levels of education (Ekure, et al., 2016).

Another study sought to identify the traditional beliefs of antenatal mothers regarding the management and prevention of neonatal jaundice in rural areas of Ekiti State, Southwestern Nigeria. the finding from the women selected, 56% had at least one child before.36% of all the respondents would use pawpaw extract to treat neonatal jaundice, 30% would use sunlight, 26% would use antibiotics, 16% would use over the counter drugs, and 5% would use phototherapy. With regards of preventive measures, 48% indicated that neonatal jaundice can be prevented by breast feeding, 11% by drinking herbal concoctions by both mother and baby, 26% by giving glucose water to the baby and 12% of respondents by avoidance of cold water when pregnant (Esan, et al.,2021).

A study for Olatunde, et al. (2020) have an investigation was made into the knowledge of pregnant mothers receiving antenatal treatment at a tertiary medical facility in Ekiti State, Southwest Nigeria, about neonatal jaundice. According to the findings, (77%) of the respondents were aware of NNJ before the survey. The majority of respondents (69.5%) have little understanding of what causes NNJ. 98.4% of respondents had a positive

impression toward how NNJs were treated. The majority of respondents (72.1%) showed poor understanding of the appropriate care for NNJ. One-fourth of the respondents were unaware of any NNJ danger signs.

A study was done on moms who visited a tertiary medical center in northwest Nigeria to receive immunizations. The goal of the study was to evaluate the impact of mothers' education and training, taken together with other forms of intervention, on their awareness of and capacity for spotting NNJ. They discovered that getting NNJ educational instruction and social class significantly linked positively with the level of knowledge about NNJ (Abdulkadir, et al., 2018).

According to Igboanusi, et al. (2020), a study carried out to assess the knowledge and attitude related to NNJ among women of reproductive age group in Basawa community, Zaria, Nigeria. the result showing that (92%) of them were aware of NNJ and predominant sources of information from relatives (35%) and hospital (33.1%).and 91% had poor knowledge of NNJ. (46%) identified infection and (21%) breast milk as causes of NNJ. Complications of NNJ included serious illness (56.4%) and disability (21.5%). Majority of respondents (62%) had poor attitude to NNJ. About (77%) believed that NNJ had an effect on neonates .the finding a statistically significant association was found between income and level of knowledge of respondents about NNJ.

Alao et al. (2022). An research on the prevalence and causes of newborn hyperbilirubinemia in infants who appeared healthy was conducted in Southwestern Nigeria. The researchers showed that a statistically significant jaundice was more common with maternal-baby concordant paired blood group of A- A, O-O compared with discordant materno-baby group pairs. Of the known causes of significant neonatal jaundice, G6PD deficiency graded topmost. Half of the causes of significant jaundice were unidentified.

A research survey was carried out to evaluate maternal knowledge and awareness of neonatal jaundice in term neonates and to identify risk factors for severe jaundice. At a Neonatal Intensive Care Unit (NICU) of a tertiary hospital in the Northern area of Ghana, The findings indicated that maternal knowledge of jaundice (17.1%) and capacity to recognize the disease (11.8%) were both low. The most frequent risk factor (68.4%) was neonatal sepsis, which was followed by G6PD deficiency (14.5%) and ABO blood group

incompatibility (10.5%). At presentation, total serum bilirubin in more than 70% of infants was greater than 25 mg/dl (Abdul-Mumin, et al., 2021).

In a study conducted in rural Kumbotso, northern Nigeria, Iliyasu et al. (2020) sought to identify the factors that predict maternal knowledge of infant jaundice and behavior related to seeking medical attention for the condition. The findings showed that 12,0% of mothers with a newborn who was jaundiced turned to home treatments, while 67,5% of these moms sought care from traditional healers and health facilities, respectively. According to the study's findings, mothers had insufficient awareness of newborn jaundice.

A study conducted in Nigeria, to estimate whether teaching mothers about NNJ will decrease the occurrence of ABE among infants admitted for jaundice. The investigators showed that delayed care-seeking was the strongest single predictor of ABE. Instruction decreased delay from 49% to 17%. Other main risk factors were home births and hemolytic disease. The greater rate of ABE with home vs. hospital birth disappeared if mothers received jaundice teaching. The investigator concluded that providing information about jaundice to mothers was accompanying with a reduction in the frequency of bilirubin encephalopathy per hospital admission (Wennberg, et al., 2020).

Another study conducted in Nepal that aimed to assess the knowledge among mothers about NNJ. A descriptive cross-sectional study that findings indicated around 50% of mothers had a low level of knowledge, 28.6% had a moderate level of knowledge and 22% had an adequate level of knowledge regarding NNJ. And few mothers (12%) were aware of the cause of NNJ, around 74% of mothers believed that exposing the baby to sunlight at home to management of NNJ but only 2% had heard about phototherapy. Whilst knowledge about NNJ had a statistically significant relationship with maternal education, there was no statistically significant relationship with age, occupation and parity (Shrestha et al., 2019).

According to the findings of a survey conducted at tertiary care institutions to evaluate the knowledge, attitudes, and practices of postnatal mothers concerning NNJ, 73% of the mothers are aware of the state's place of recognition. However, responders' awareness of causes, serious warning indicators, consequences, and treatments was lacking. Only 15% of mothers indicated that phototherapy and exchange transfusion were their preferred forms of treatment. Their knowledge score, but not age, was substantially correlated with

parity, education level, place of residence, religion, and the presence of prior affected babies (Aggarwal et al., 2017).

A study was undertaken to find out any obstetric characteristics which may contribute to the development of Neonatal Hyperbilirubinemia and which is modifiable. In Kozhikode, Kerala, Indian. The researcher showed that was statistically significant relationship between hyperbilirubinemia and LBW, preterm delivery, Preterm Prelabour Rupture of Membranes (PPROM), breast feeding, neonatal infection, instrumental delivery and presence of gestational diabetes mellitus and Intrauterine Growth Restriction (IUGR). They pointed out that identifying these obstetric characteristics, we may be able to modify them and reduce the need for NICU admissions for Neonatal Hyperbilirubinemia (Devi, & Vijaykumar., 2017).

Another study was aimed to assess the attitude and practice of mothers to recognize neonatal danger signs and various household practices followed by mother to identify and to treat danger signs. Study shows that 61% of mothers had moderate attitude, 39% of mothers had favorable attitude. Whereas, practice level was high among majority (90.56%) of the post natal mothers regarding neonatal danger signs. There was a statistically significant correlation between attitude score and practice score. Finally, it was determined that antenatal visits or postpartum practices of postpartum mothers on newborn danger signs needed to be improved, post natal period or at community level. Community based educational program should be launched to enhance knowledge, attitude and practice of post natal mothers regarding neonatal danger signs (Thakur, et al., 2017).

Another study looked at prospective mothers' knowledge and practices about newborn jaundice as well as the percentage of them who use hemolytic agents. Conducted at the border between Thailand and Myanmar's Shoklo Malaria Research Unit. The findings showed that 41.4% of mothers reported using mothballs in their homes, while 46.7% claimed to have used menthol-containing treatments on their newborns' skin (Prins, et al., 2017).

A study conducted in Chang Gung Memorial Hospital at Taipei that aimed of to determine correlations of breastfeeding with NNJ by examining infant's manifestations in the first week after birth and to understand parents' perceptions toward NJ in relation to breastfeeding. The results showed that was no significant correlation of exclusive

breastfeeding with hyperbilirubinemia, most parents were aware of phototherapy as management of NNJ. However, their knowledge of risk factors, complications, and assessments of NNJ was relatively deficient. And 24% of parents indicated that cessation of breastfeeding was a management option for NNJ (Chiu, et al., 2021).

In a study conducted in northern Taiwan to investigate the impact of NNJ on breastfeeding duration and exclusivity during the first four months postpartum. According to the findings, participants' infants with NNJ on average breastfed for longer than participants' newborns without NNJ. Although the difference was significant only at 1 month postpartum and not during hospitalization or at 4 months postpartum, the level of breastfeeding was higher in the group with NNJ. The findings demonstrated that the group lacking NNJ was more likely to stop nursing (Kuei-Hui, et al., 2021).

In Sepang, Selangor, a study was carried out to determine the level of knowledge and attitudes among the Orang Asli regarding newborn jaundice. The findings showed that 67% of people were generally aware of newborn jaundice. Among the 68% who have good knowledge, 70% recognized jaundice by the yellow pigmentation on the body; among the symptoms they were aware of were high-pitched crying (12.7%) and not feeding (10.8%). Nearly 50% of those surveyed thought prenatal jaundice may lead to mental impairment. Regarding the treatment of neonatal jaundice at home, the majority (47%) will expose the infant to sunlight, 7.8% will use herbal remedies, and 2% will continue breastfeeding. Nearly 80% of the respondents said they would take their jaundiced child right away to the hospital (Adeeb, et al., 2016).

Cavallin et al. (2020), demonstrated to evaluate the role of pathway to admission for jaundice between the risk factors for ECT in out born infants in a low resource setting. The researchers showed one hundred thirty-four cases and 134 controls were involved in the study. Among cases, home was the most common place of birth while public hospital was the most frequent source of referral. Among controls, private/public hospitals were the commonest places of birth and referral. At multivariable analysis, homebirth was associated with increased likelihood of receiving exchange transfusion at admission. The researchers concluded that homebirth was an independent risk factor for exchange transfusion at admission for jaundice in a low-resource setting. They recommended for appropriate health education of pregnant women and traditional/home birth attendants may contribute to decrease the want for exchange transfusion in low-resource settings.

In Qom, Iran, a study was conducted to support the use of traditional medicine in treating infant jaundice. According to the findings, (78%) of participants said they used Traditional Methods(TM) for their newborns. Among these conventional therapies, the use of herbal remedies was the most common. These patients' use of TM is related to their prior TM use experience and perception of its possible harm (Heydari, et al., 2016).

A interventional study with interventional and control group to Mahdiah and Mofid hospitals in Tehran- Iran, aimed to investigate the role of educational intervention on the knowledge and practice of the mothers with icteric newborns .The finding mean score for practice of mothers to neonatal jaundice was significantly higher in trained mothers than in untrained ones , Also, high score for practice in trained and untrained women was 84% and 67%, respectively that was significantly higher in former group (Kashaki, et al.,2016).

Another study to evaluate mothers' practices and knowledge of neonatal jaundice in Saravan, Iran. The results showed that (73%) of the women said their newborn had jaundice, and (85.4%) of the mothers said they had treated the jaundice in their newborn with "antibiotics," "herbs," or other "remedies." Furthermore the discovered connections between receiving prenatal care, being aware of jaundice, and finding out whether the newborn would survive if jaundice occurred (Vaez, et al., 2018).

Another study by Hamad and Khalil (2019) in Soran city sought to determine the mothers' knowledge of neonatal jaundice; the findings revealed that the majority of the mothers (88%) had little to no understanding of neonatal jaundice. Additionally, there was a strong correlation between mothers' work, educational level, and understanding of newborn jaundice. The study found that there was a severe lack of awareness among mothers regarding the causes and warning symptoms of newborn jaundice. Mother's knowledge was significantly impacted by her educational background and employment status.

A study conducted in Pediatric Teaching Hospital in holy Karbala city, Aimed To assess mothers' knowledge and beliefs toward care of neonatal jaundice, The finding that there is a significant relationship between mothers' knowledge and their demographic characteristics( age ,level of education and socioeconomic status, neonate's age, neonate's ordinal position family and baby affected in one family).There is a significant relationship between mothers beliefs and their demographic characteristics (age ,level of education, socioeconomic status, residential area , baby affected in one family and duration of the

disease). There is a high significant relationship between mother's knowledge and their beliefs (Hussein & Aziz., 2016).

A study carried out at Babel maternity and pediatric hospital in Hilla, Iraq. Aim of the study to identify the effect of successful breastfeeding on neonatal hyperbilirubinemia. the study result reveal that no statistical significant relationship between mother's chronic disease and jaundice , which congruent with (14) who found that found that there is no significant relationship found in the familiar history of diabetes, anemia ,thalassemia ) among neonates with different levels of bilirubin (Al Doori, Ameen, & Talib., 2020).

In Baghdad, a comparison research was carried out at the Welfare Teaching Hospital and the Ibn Al-Baladi Maternal and Child Center. The goals of this study are to examine how well mothers understand neonatal jaundice and how they manage it at home. The study discovered a strong correlation between mothers' knowledge and their age, education, and residence area as well as between their practice and their occupation and resident area and between their beliefs and those same variables (Hameed, Abdul-Hussain & Ahmed, 2019).

Study conducted in Saudi Arabia, to assess parent's knowledge, attitude and practice towards NNJ in different regions in Saudi Arabia. The result found that 4413 participants, females were (79.4%) while (20.6%) were males. And the relatives and friends were the main sources of knowledge for (52.6%) of the participants followed by treating doctor in (29.8%). In (34%) of the participants knowledge was gained after their child had NNJ, while in (42.1%) while their child was free of NNJ, and result found that hospital treatment was done only by (23.4%), believing that it wasn't a serious disease in (18.1%) of participants, while (5%) believed that it needed no treatment at all (Alfouwais et al., 2018).

Another study aim to assess mother's perception toward neonatal jaundice in Jazan region in Saudi Arabia. The result finding 60.4% of mothers had poor knowledge, whereas 39.6% had good knowledge, the most common source of knowledge was physicians (83.8%). Several factors affected the level of mother's knowledge, including (age, education level, parity, or history of their infants developed neonatal jaundice) (Magfour,et al.,2019).

Another study was carried out in Egypt to determine the level of awareness and attitudes of expectant mothers toward NNJ and to assess the impact of a neonatal jaundice education program among the target group. The findings showed that there was a statistically significant difference in knowledge and attitude levels between the study group and the control group in pre- vs. post-tests, and that there was statistical evidence of neonatal outcomes for improving women's breastfeeding and reducing the number of jaundice days. The study found that pregnant women lacked adequate understanding about NNJ and had a negative attitude, but that these factors had significantly improved as a result of the implementation of an educational program, as seen by the changes in the study group's knowledge and attitudes, which had a favorable effect on the newborn (Mohamed et al., 2019).

Another study in Egypt examined Egyptian mothers' attitudes, practices, and traditional beliefs concerning NNJ that might be responsible for hyperbilirubinemia's delayed manifestation and improper therapy. According to surveys, the majority of Egyptian mothers have acceptable levels of knowledge and attitudes towards NNJ. Nevertheless, regardless of their degree of education, societal beliefs and conventional baby care methods still have an impact on moms (Moawad, Abdallah & Ali., 2016).

An Egyptian cross-sectional study was undertaken on mothers who visited Kafr El-Batanoon primary health care for prenatal care or to have their children immunized. Aimed to assess the mothers' knowledge, attitudes, and actions around neonatal jaundice (NNJ). Only 18.9% of mothers had strong awareness of NNJ, according to the findings. The mother's education, age, parity, and prior experiences all had a big impact on her understanding. A favorable opinion toward NNJ and its administration was expressed by about 48.0% of participants. Only 25.3% of mothers had a good practice and stated that they would seek medical attention within the first 24 hours of jaundice, which was significantly influenced by their age, parity, occupation, and history. However, 95.8% of mothers expressed their willingness to seek medical advice if their babies develop NNJ (Allahony, Hegazy, Kasemy & Bahgat., 2016).

Kasemy et al. (2020). A study conducted in Egyptian governorates to estimate the prevalence of G6PD deficiency among neonates with jaundice and to assess mothers' perception towards G6PD and NNJ. The results finding that the Neonates with G6PD deficiency showed higher levels of serum bilirubin, Mothers' perceptions of NNJ and

G6PD were low, with only 30% having good knowledge on NNJ and 17.10% on G6PD deficiency, 46.8% with positive attitude towards NNJ and 45.0% towards G6PD deficiency, and 29.9% with good practice towards NNJ and 19.9% towards G6PD deficiency.

A study conducted to assess perception of mothers regarding their neonatal hyperbilirubinemia, at Benha University Hospitals in Egypt. They demonstrated that fewer than seventy-five percent of the women in the study had inadequate understanding about NNJ, majority of mothers had unacceptable self-report practices and minority of them had satisfactory self-report practices. About two-thirds the studied women had undesirable attitude regarding NNJ (Mohamed, et al., 2022).

A study evaluated the knowledge and attitudes of mothers toward neonatal NNJ, the results showed the more than half of mothers with past history of children with NNJ have a satisfactory knowledge and there was no statistically a significance difference between mothers who have previous experience with NNJ and their attitudes to NNJ. Finally the finding that more than half of mothers have inadequate knowledge concerning NNJ and the greatest of mothers have an agree attitude regarding NNJ. They recommendation for further health instruction program should be directed to increase awareness of mother to how to deal and treatment their newborn with NNJ (Omar, et al., 2018).

A systematic review and meta-analysis study was performed to estimate the level of societal awareness of neonatal hyperbilirubinemia. They found that the pooled estimate of societal awareness of neonatal hyperbilirubinemia was 67%. Therefore that there is a significant need to improve societal awareness of neonatal hyperbilirubinemia (Farouk, et al., 2021).

### **2.3 Summary**

In neonatal intensive care units, NNJ, a preventable cause of brain injury, is the most frequent reason for hospitalization within the first week of life. Most newborns with NNJ experience a moderate and brief episode, which affects 60% of full-term and 80% of preterm neonates, respectively (Aggarwal et al., 2017). Commonly caused by physiologic jaundice, this condition also manifests on the second or third day, peaks on the third to fourth day, and reduces on the fifth to seventh day (Refat et al., 2020). Therefore, the

parents' inadequate and incorrect knowledge, the mothers' years of experience, their views of the situation, and their attitude toward it may explain why they didn't seek medical help right away, which could cause long-term complications (Aggarwal et al., 2017). The main objective of this study was to identify the gaps in knowledge and practice regarding NNJ among of mothers of neonate admitted to neonatology department in governmental hospitals in G.S.

## **Chapter Three**

### **Method and Materials**

This chapter explains the study's methodology. Different topics were covered in this chapter, including study design, location, population, sample size, sampling method, study time, inclusion and exclusion criteria, ethical and administrative considerations, study tools, reliability, validity, pilot study, data collecting, and data management.

#### **3.1 Study Design**

The study employed a quantitative, descriptive cross sectional design to assess the knowledge and practice regarding neonatal jaundice among mothers admitted to neonatology department in G.S governmental hospitals. This design is appropriate for measuring the effect and outcome at the same time at a single point of measurement and is appropriate given the variables used in the study. On the other hand, this design is generally manageable and practical, saves time, and is economical in terms of money. The reason it was chosen is that it helps the researcher to quickly complete the study's objectives.

#### **3.2 Setting of the Study**

This research was done in neonatology departments in Al-Rantisi Al-Nasr pediatric hospital in Gaza city, AL-Aqsa Martyrs Hospital in Dayr Al Balah, Nasser Medical Complex hospital in Khanyounis and AL-Helal AL-Emaraty Maternity hospital in Rafah.

#### **3.3 Period of the Study**

The study was started as soon as the proposal was approved. In June 2022, a pilot study was carried out. Data gathering began in July 2022. Up August 2022, data entry, analysis, and final report writing (Annex 4).

#### **3.4 Study Population**

Study population consisted of all mothers of children with NNJ and admitted to neonatology departments in governmental hospitals in Gaza Strip during the period of the study.

### **3.5 Sample and Sampling**

By using the sample size calculation application with a 95% confidence level and a 5% margin of error, the sample size was determined to be 305 participants, with 1434 cases of NNJ in 2020 as the total number of diagnoses from the population. Convenient sample method used by the researcher in this study, which suitable related to population size.

### **3.6 Eligibility Criteria:**

#### **3.6.1 Inclusion Criteria**

- Mothers of neonates diagnosed with NNJ admitted to governmental hospital included in the study.
- Agrees to participate in the research.

#### **3.6.2 Exclusion Criteria**

- Any caregivers rather than the mothers of admitted neonates.

### **3.7 Instrument of the Study**

After evaluating the relevant prior studies, the researcher created a structured interviewing questionnaire (Annex 6).

The first part of the questionnaire covered the respondent's socio-demographic information; which included: address, hospital, mother age, education level, mother occupation, income and number of family members. Also information about past obstetric history, maternal pregnancy in the current information about child.

The second part of the questionnaire developed by the researcher to assess knowledge of the participants towards neonatal jaundice. It was composed of 27-item multiple-choice questions, each item in the knowledge section of the questionnaire had three possible responses, namely yes, no, and Don't know. One mark will be awarded for every correct response, zero otherwise. The total score ranged from 0-27 and it was then converted into percentage. The higher scores indicated the higher level of knowledge.

The third part of the questionnaire developed by the researchers to assess practices of the participants towards neonatal jaundice. Each item in the practice section of the

questionnaire had five possible responses, namely No Never = zero, rarely= one, Sometimes = two, mostly= three and Always = four. These scores were then converted into a percentage. The higher scores indicated the higher level of practice.

### **3.8 Validity of the instrument**

To validate the questions and determine whether the included items appropriately and clearly cover the domains of the subject covered, the created questionnaire was delivered to ten experts (Annex 1). Experts' suggestions were taken into account, and changes were made as a result.

### **3.9 Reliability of the instrument**

Before the study began, the questionnaire underwent pretesting on 10 % samples of the population to ensure its reliability. Internal consistent reliability was statistically calculated, and values of Cronbach's alpha over 0.7 was regarded as appropriate for the tool's reliability. This study tool was altered accordingly. To enable each participant to respond in their mother language, the questionnaire was translated into Arabic (Annex 7).

### **3.10 Data Collection**

Data were gathered via a questionnaire. Three qualified data collectors who were trained by the researcher were informed about the study's goal, objectives, procedures, and best practices for distributing and gathering questionnaires while maintaining anonymity. Each questionnaire has a consent form (Annex 6) attached to it, and the researcher asked the moms if they would voluntarily participate in the study. The questionnaire took 20 to 30 minutes to complete.

### **3.11 Pilot Study**

Before beginning the data collection, a pilot research was done with 30 (10%) of the study sample. This study was undertaken to evaluate the questionnaire's clarity, identify areas of ambiguity, highlight wording flaws, forecast response rates, assess the actual time required to complete the questionnaire, and assess the questionnaire's applicability and dependability. All study participants who were recruited met the sample selection criteria, and their participation was excluded if significant adjustments are required. The 30 participants were chosen from the first eight neonatal moms admitted to public hospitals

with NNJ throughout the study's time period and who met the inclusion requirements. The 10% participants in the pilot study were included in the study sample because no changes towards the data collection questionnaire were required.

### **3.12 Data Entry and Analysis**

The researcher coded the questions before cleaning the data that had been submitted and entering it into the "Statistical Package for Social Sciences" SPSS program. The version (20) of the SPSS program was used to examine the data. All of the data were double-checked for inconsistencies and reviewed for coding and entry errors. The mean, median, and standard deviation were used to express numerical data. Frequency and percentage were used to express quantitative data. The processes of data analysis were as follows: coding the questionnaire, data entry, data cleaning, frequency table's construction for all study variables, reliability testing for each categorized question, and cross tabulation. The level of relevance was examined using the Chi square (0.05).

### **3.13 Ethical and Administrative Considerations**

- The Helsinki committee has provided an official letter of consent for the study to be conducted (Annex 5).
- To perform the study in the government hospitals, Al-Nasser pediatric, Nasser complex hospitals, Al-Aqsa Martyrs hospital, and AL-Helal AL-Emaraty maternity hospital, an official letter of request received from the Ministry of Health (Annex 3).
- A covering letter (consent form) attached in front of the questionnaire to ensure that participants' rights are protected. This letter was state that participation was voluntary, guarantee the confidentiality of the data, and state that participants have the right to decline participation or withdraw at any time, guarantee the results' confidentiality (Annex 6).

# Chapter Four

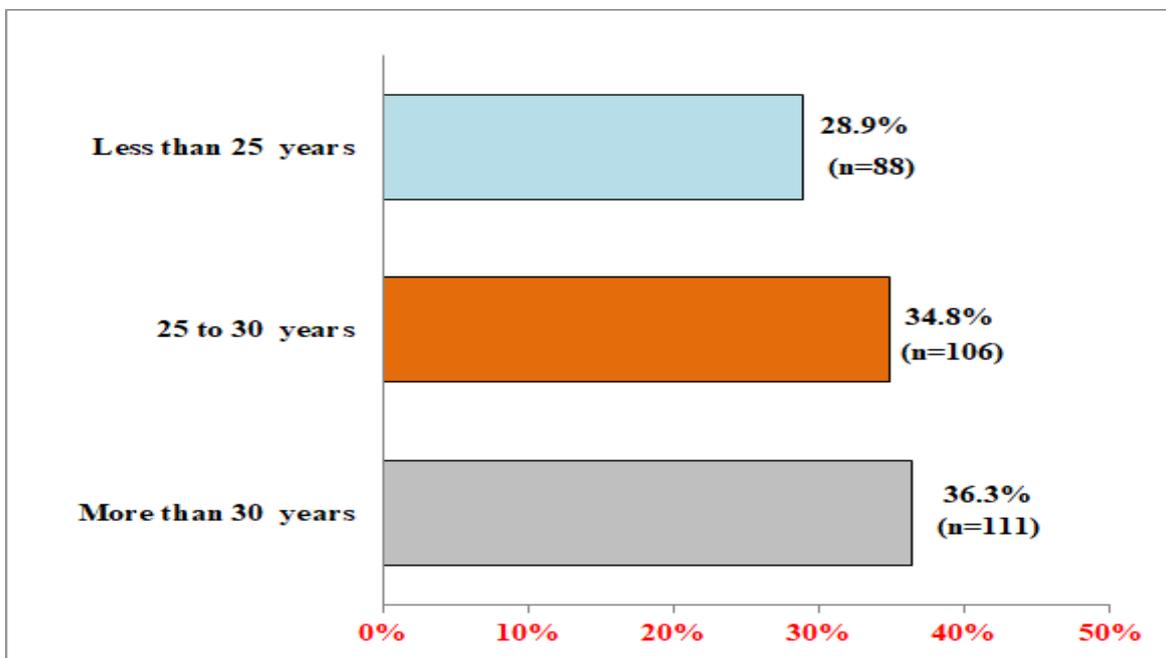
## Results

This chapter provides examples of the findings from statistical analyses of data, including descriptive analyses that show the sociodemographic characteristics of the study sample, the characteristics of the neonates, the mean scores of the mothers' knowledge and practice levels regarding neonatal jaundice, and the relationships that result from these levels. The researcher used simple statistics including frequencies, means and percentages, also independent sample t test, and One-way ANOVA.

### 4.1 Sample distribution according to socio-demographic data

The present study is a cross-sectional study that included 305 subjects. the socio-demographic characteristics that were studied included age, qualification, address, the hospital, the mother's occupation, monthly income and the number of family members.

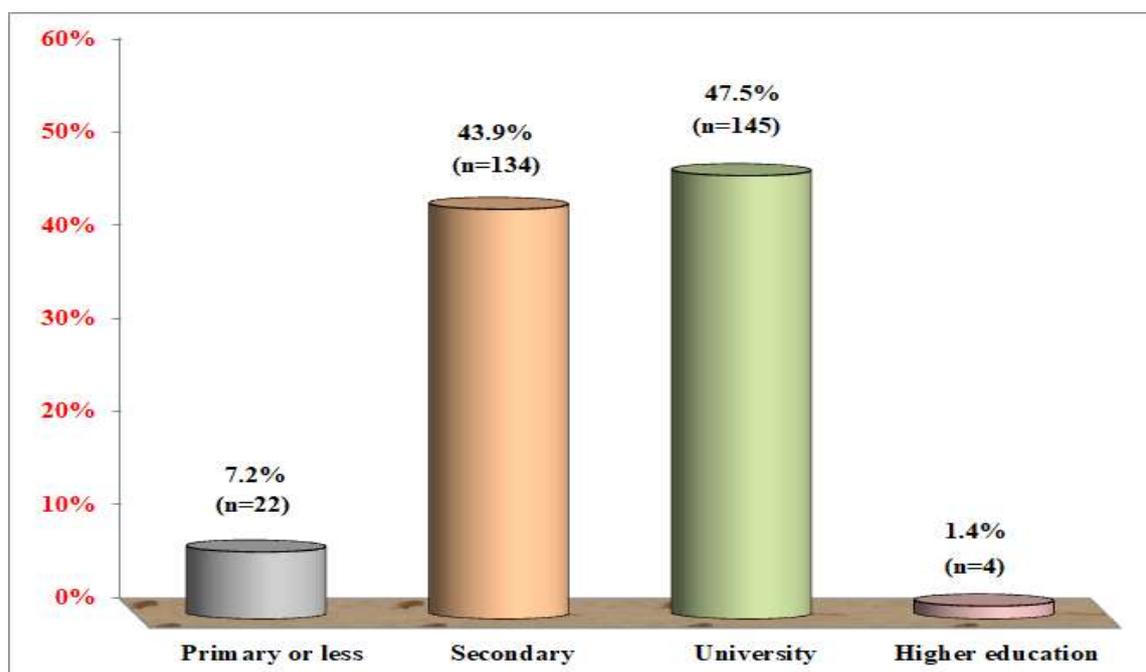
#### 4.1.1 Distribution of the study population according to their age groups



**Figure (4.1): Distribution of the study population according to their age group**

Figure (4.1) illustrated that the highest age groups of the participants were aged (more than 30) (36.3%) followed by 34.8% of them being aged between 25 to 30 years. The results showed that the lowest age groups of the study were age less than 25 years (28.9%).

#### 4.1.2 Distribution of the study population according to educational level



**Figure (4.2): Distribution of the study population according to their educational level**

The distribution of the study population according to academic education level showed that the highest group of the study population have finished university (47.5%) while 43.9% of them have finished secondary education level and 7.2% finished primary education or less. However, the outcomes showed that 1.4% of participants finished their higher education degree (Figure 4.2).

#### 4.1.3 Distribution of the study participants based on their socio-demographic data

Table (4.1) illustrated the distribution of the study participants based on their socio-demographic data.

Socio-demographic characteristics		N	%
Address	Gaza	84	27.5
	Middle Gaza	82	26.9
	Khan Younes	57	18.7
	Rafah	82	26.9
The hospital	AL-Rantisy/Al-Naser Hospital	80	26.2
	Al-Aqsa Hospital	75	24.6
	Nasser Hospital	75	24.6
	Emarat Hospital	75	24.6

**Table (4.1): Continued ...**

<b>Socio-demographic characteristics</b>		<b>N</b>	<b>%</b>
Mother Occupation	Employed	25	8.2
	Worker	35	11.5
	Housewife	245	80.3
Monthly income (shekels)	1000 or less	235	77.0
	More than 1000	70	23.0
A number of family members:	Less than 4 members	126	41.3
	4 to 6 members	130	42.6
	More than 6 members	49	16.1

The findings indicated that the majority of participants was living in Gaza 27.5%, followed by 26.9% of them being living in Rafah and 26.9% of living in from Middle Gaza. The results showed that the lowest address of study was living in Khan Younes 18.7%. The results detected that 26.2%, 24.6%, 24.6%, and 24.6% of AL-Rantisy/Al-Naser Hospital, Al-Aqsa Hospital, Al-Aqsa Hospital and Al-Aqsa Hospital, respectively. The table pointed out that the majority of the study populations have a mother occupation as a housewife (80.3%) while 11.5% of them are workers and 8.2% are employed. The results detected that 77% of them have income 1000 shekels of less while 23% have more than 1000 shekels. The table pointed out that the majority of the study populations have a number of family members less than 4 members (42.6%) while 41.3% of them from 4 to 6 members and 16.1% have number of family more than 6 members.

#### **4.1.4 Distribution of the study population according to their past obstetric history**

The past obstetric history characteristics included first pregnancy, number of previous pregnancies, had a miscarriage, specify the number of times, previous children been admitted to the NICU, specify the reason for admission, children had neonatal jaundice, received any awareness lectures about jaundice and its complications in primary care centers.

**Table (4.2): Distribution of the study population according to their past obstetric history information**

<b>Past Obstetric History</b>		<b>N</b>	<b>%</b>
First pregnancy	Yes	93	30.5
	No	212	69.5
Number of previous pregnancies	1 to 3 times	213	69.8
	4 to 5 times	50	16.4
	More than 5	42	13.8
Had a miscarriage	Yes	92	30.2
	No	213	69.8
Specify the number of times	Less than 2 times	66	71.7
	2 times	21	22.8
	More than 2 times	5	5.4
Previous children have been admitted to the NICU	Yes	88	28.9
	No	217	71.1
Specify the reason for admission	Jaundice	69	78.4
	Congenital disease	13	14.8
	Other	6	6.8
Children had neonatal jaundice	Yes	120	39.3
	No	185	60.7
Received any awareness lectures about jaundice and its complications in primary care centers	Yes	91	29.8
	No	214	70.2

Table (4.2) illustrated that about one-third of participants had their first pregnancy (30.5%) and 69.5% of participants were had more than one pregnancy. The table pointed out that most of the study population have a number of previous pregnancies from 1 to 3 times (69.8%) while 16.4% of them 4 to 5 times and 13.8% more than 5 times. The table also showed little more than 30.2% had a history of miscarriage and the majority of them had miscarriage has once before. The study's findings demonstrated that 28.9% had previous children admitted to the NICU and 71.1% of participants were haven't. The table pointed out that half of the study populations have specified the reason for admission in jaundice (78.4%). The distribution of the study population according to children who had neonatal

jaundice showed that the lowest percentage of participants were yes which represents 39.3% and 60.7% of participants haven't.

#### 4.1.5 Distribution of the study population according to their maternal pregnancy in the current child information

The maternal pregnancy in the current child characteristics studied included the nature of the birth of this child, suffering from health problems during pregnancy with your current child, health problems during pregnancy with your current child, health problems during childbirth, health problems during childbirth, health problems after giving birth (Table 4.3).

**Table (4.3): Distribution of the study population according to their maternal pregnancy in the current child information**

<b>Maternal pregnancy in the current child</b>		<b>N</b>	<b>%</b>
The nature of the birth of this child	Cesarean delivery	168	55.1
	Vaginal delivery	104	34.1
	Assisted birth	33	10.8
Suffer from health problems during pregnancy with your current child	Yes	126	41.3
	No	179	58.7
Cause of suffering from health problems during pregnancy with your current child	Gestational diabetes	26	20.6
	Hypertension during pregnancy	29	23.0
	Anemia	32	25.4
	Urinary infections	30	23.8
	Others	9	7.1
Were there any health problems during childbirth	Yes	80	26.2
	No	225	73.8
Have any health problems during childbirth	Heavy bleeding	39	48.8
	Lacerations	34	42.5
	Other	7	8.8

The table pointed out that most of the study participants have the nature of the birth of this child in cesarean delivery (55.1%) while 34.1% of them gave birth by vaginal delivery and 10.8% by assisted birth. The table showed that 41.3% suffer from health problems during pregnancy with their current child. The results detected that 25.4%, 23.8%, 23.0%, 20.6%, and 7.1% of the study participants suffered from anemia, urinary infections, and hypertension of pregnancy, gestational diabetes, and others, respectively. The table also showed that 26.2% have health problems during childbirth while 73.8% haven't. The table pointed out that some of the study participants have a health problems during childbirth are heavy bleeding (48.8%) while 42.5% of them are lacerations and 8.8% have complained from other problems.

#### 4.1.6 Distribution of the study participants according to child information

**Table (4.4): Distribution of the study population according to child information**

<b>Information about a child</b>		<b>N</b>	<b>%</b>
Gender child	Male	178	58.4
	Female	127	41.6
Child's age in days	10days or less	140	45.9
	More than 10 days	165	54.1
Your current baby's uterine age	Less than 36 weeks	56	18.4
	36 to 42 week	235	77.0
	More than 42 week	14	4.6
Birth weight	Less than 2.5 kg	51	16.7
	2.5 to 4 kg	243	79.7
	More than 4 kg	11	3.6
Does the child have any diseases	Yes	24	7.9
	No	281	92.1
What is the method of feeding your baby	Breastfeeding	100	32.9
	Formula feeding	22	7.2
	Both	182	59.9
The time when the yellow color appears for the first time in a child	First day	98	32.1
	Third - five days	150	49.2
	After a week	57	18.7
Tests were carried out to ascertain the condition of the yellow color before the child was discharged from the hospital after birth	Yes	217	71.1
	No	88	28.9

According to the table more than half of children were male (58.4%) and 41.6% were female, Additionally, the table indicated slightly less than half of the study attendees have a child's age in days was 10 days or less (45.9%) and 54.1% more than 10days. The table showed that the vast majority of the study's participants have a current baby's uterine age from 36 to 42 weeks (77%) while 18.4% of them were less than 36 weeks and 4.6% more than 42 weeks.

Additionally, the table noted that the most majority of the research populations have a birth weight of 2.5 to 4 kg (79.7%) while 16.7% of them have a birth weight of less than 2.5 kg and 3.6% in more than 4 kg. The results showed that 7.9% of children have diseases while 92.1% of them haven't had any disease.

The chart also demonstrated that the more than half of participants have feed their babies through both breastfeeding and formula feeding (59.9%) while 32.9% of them are breastfeeding and 7.2% in formula feeding. The table illustrated that the largest proportion of research participants have third - five days when the yellow color appears for the first time in a child (49.2%) while 32.1% of them are on the first day and 18.7% after a week. The distribution of the study population showed that 71.1% of participants' tests carried out to ascertain the condition of the yellow color before the child was discharged from the hospital after birth showed that the highest percentage of participants was yes representing.

## 4.2 Scores of items measuring mothers' knowledge about neonatal jaundice

### 4.2.1 Distribution of the study population according to their measuring mothers' knowledge about neonatal jaundice

**Table (4.5a): Scores of items measuring mothers' knowledge about newborn jaundice**

SN	Items	Key answer	Correct	Incorrect	Rank
1	The jaundice is caused by an increase in bile (bilirubin) in the blood	True	223 (73.1)	82 (26.9)	2
2	Jaundice is the yellowing of the skin and eyes of newborns	True	244 (80)	61 (20)	1
3	The jaundice occurs as a result of the presence of liver diseases in the child	False	67 (22.0)	238 (78)	27

**Table (4.5b): Scores of items measuring mothers' knowledge about newborn jaundice**

SN	Items	Key answer	Correct	Incorrect	Rank
4	Jaundice occurs due to the incomplete development and maturity of the liver	True	137 (44.9)	168 (55.1)	14
5	Jaundice is a common condition in premature babies	True	190 (62.3)	115 (37.7)	7
6	Pathological jaundice occurs less than 24 hours after the birth of the child	True	168 (55.1)	137 (44.9)	10
7	The jaundice is a normal thing that happens to newborns within 2-4 days	True	191 (62.6)	114 (37.4)	6
8	Jaundice is caused by genetic factors	False	118 (38.7)	187 (61.3)	17
9	The mismatch of the blood of a child with the mother is a reason for the occurrence of jaundice in the child	True	88 (28.9)	217 (71.1)	22
10	Infection in a child may cause jaundice	False	106 (34.8)	199 (65.2)	20
11	Do you have information about the causes of jaundice other than lack of breastfeeding?	True	146 (47.9)	159 (52.1)	13
12	The presence of bruising or internal bleeding may cause jaundice	True	80 (26.2)	225 (73.8)	23
13	One of the symptoms of jaundice in a child is the color of stool that is dark yellow.	True	161 (52.8)	144 (47.2)	11
14	One of the symptoms of jaundice is that the urine is yellow in color	True	189 (62.0)	116 (38)	8
15	One of the symptoms of jaundice is difficulty in waking the child	True	156 (51.1)	149 (48.9)	12

**Table (4.5c): Scores of items measuring mothers' knowledge about newborn jaundice**

SN	Items	Key answer	Correct	Incorrect	Rank
16	One of the symptoms of jaundice in a child is not gaining weight	True	122 (40)	183 (60)	16
17	One of the symptoms of jaundice in a child is severe abdominal pain	False	111 (36.4)	194 (63.6)	19
18	Crying loudly about a child is a symptom of jaundice	True	100 (32.8)	205 (67.2)	21
19	Non-pathological jaundice often disappears within two weeks without any treatment and only needs follow-up	True	169 (55.4)	136 (44.6)	9
20	Continuous breastfeeding helps the baby to expel bile (bilirubin) from the body	True	218 (71.5)	87 (28.5)	3
21	Jaundice in a child can be treated with intravenous medicines	False	77 (25.2)	228 (74.8)	24
22	Jaundice can be treated by phototherapy in a hospital	True	196 (64.3)	109 (35.7)	5
23	In very severe cases, the treatment of jaundice is a blood change process (reduce the level of jaundice in the blood)	True	130 (42.6)	175 (57.4)	15
24	Starting your baby's breast milk early is a way to prevent jaundice	True	217 (71.1)	88 (28.9)	4
25	The child may develop brain problems when the jaundice treatment is neglected	True	116 (38)	189 (62)	18
26	The persistence of pathological jaundice for more than three weeks exposes the child to deafness	True	69 (22.6)	236 (77.4)	26
27	Baby with jaundice can have convulsion	True	74 (24.3)	231 (75.7)	25
<b>Total</b>			<b>46.9%</b>	<b>53.1%</b>	

The distribution of the participants according to their responses to their mothers' knowledge about newborn jaundice is ranked and pointed out in table 4.5. According to the results, the mothers' knowledge about neonatal jaundice is 46.9%. The table showed that the highest correct answer item according to their responses to greeting was the number (2) "Jaundice is the yellowing of the skin and eyes of newborns "with 80.0% correct answers, followed by the item number (1) "The jaundice is caused by an increase in bile (bilirubin) in the blood "with score equal 73.1%. While items (20) Continuous breastfeeding helps the baby to expel bile (bilirubin) from the body (71.0%), items (24) Starting your baby's breast milk early is a way to prevent jaundice (71.1%) & items (22) Jaundice can be treated by phototherapy in a hospital (64.3%). While the lowest item was number (3) "The jaundice occurs as a result of the presence of liver diseases in the child "with score equal 22.0%, followed by item number (26) "The persistence of pathological jaundice for more than three weeks, it exposes the child to deafness "with score equal 22.6%.

#### 4.2.2 Distribution of the study population according to their responses about mothers' knowledge of neonatal jaundice

**Table (4.6): Distribution of the study population according to their level of mothers' knowledge about neonatal jaundice**

Variable and level	n (%)	Mean <sup>£</sup>	(SD)	Min	Max
<b>Mothers' knowledge about neonatal jaundice</b>		46.90	16.53	0.00	81.48
High	10 (3.3)				
Moderate	52 (17.1)				
Low	243 (79.6)				

**n:** number of subjects; **SD:** standard deviation; **Min:** minimum; **Max:** maximum; <sup>£</sup>Maximum score of mean = **100 points**; **High**= equal 80% or more; **Moderate** = 60-79.9%; **Low** = less than 60%.

Table (4.6) showing the distribution of research participants based on their answers about the mothers' knowledge of newborn jaundice. According to this table, 3.3% of the participants have high level of knowledge about neonatal jaundice while 17.1% of them have moderate levels of knowledge about neonatal jaundice and 79.6% of them had a low

level of knowledge about neonatal jaundice. Finally, the average (SD) of knowledge levels was 46.9 (16.53) out of 100 points.

### 4.3 Scores of items measuring practices of mothers about neonatal jaundice

#### 4.3.1 Scores of items measuring practices of mothers about neonatal jaundice

**Table (4.7a): Scores of items measuring the practices of mothers regarding neonatal jaundice**

No	Items	Mean	SD	% Mean	t-test	P-vale	Rank
1	I breastfeed my baby every 2-3 hours	3.53	0.87	88.20	30.54	0.000	1
2	I breastfeed my baby until I feel that he has taken all the milk he needs	3.30	0.99	82.38	22.87	0.000	2
3	I stop breastfeeding if I feel that my baby has jaundice	1.56	1.54	38.93	-5.01	0.000	7
4	I give my baby formula milk if I feel that he is not getting enough breastfeeding	2.60	1.35	65.00	7.78	0.000	4
5	I give my baby water instead of breastfeeding	1.12	1.25	27.95	-12.36	0.000	12
6	Use sugar as a treatment for jaundice	1.17	1.27	29.18	-11.50	0.000	11
7	I use honey to treat my baby from jaundice	1.05	1.30	26.15	-12.80	0.000	13
8	Use the date soak or date water to treat the jaundice	1.18	1.25	29.59	-11.42	0.000	9
9	I use natural herbs to treat my child from jaundice	1.33	1.33	33.28	-8.75	0.000	8
10	I expose my child to the sun for treatment of jaundice	2.04	1.53	50.98	0.45	0.653	5

**Table (4.7b): Scores of items measuring the practices of mothers regarding neonatal jaundice**

No	Items	Mean	SD	% Mean	t-test	P-vale	Rank
11	I shine a house light (neon) over the head or face of the child to treat the jaundice	1.96	1.47	49.10	-0.43	0.669	6
12	Put the child in a dark place if he has jaundice	0.84	1.23	20.98	-16.53	0.000	14
13	I stop eating yellow foods and liquids (such as corn fenugreek) if my child develops jaundice	1.17	1.28	29.34	-11.23	0.000	10
14	Put a garlic collar around the baby's neck to treat jaundice	0.64	1.11	16.07	-21.31	0.000	15
15	I contact the doctor if I feel a change in my child's condition	2.84	1.48	70.90	9.88	0.000	3
<b>Total</b>		<b>1.75</b>	<b>0.68</b>	<b>43.87</b>	<b>-6.28</b>	<b>0.000</b>	

Table (4.7) summarized the distribution of the study participants according to their answers about the practices of mothers with neonatal jaundice, by using a one-sample t-test this table demonstration that the weighted mean for the overall perceptions about practices of mothers about neonatal jaundice was 35.1%. According to the finding, the highest item was number (1) "I breastfeed my baby every 2-3 hours" with a score equal to 88.2%, followed by item number (2) " I breastfeed my baby until I feel that he has taken all the milk he needs" with a score equal 82.5%. items (15) I contact the doctor if I feel a change in my child's condition (70.90%), items (4) I give my baby formula milk if I feel that he is not getting enough breastfeeding (65.0%), items (10) I expose my child to the sun for treatment of jaundice (50.95%), items (11) I shine a house light (neon) over the head or face of the child to treat the jaundice (49.10%). While the lowest item (14) " Put a garlic collar around the baby's neck to treat jaundice" with a score equal to 16.0%, followed by item was the number (12) " Put the child in a dark place if he has jaundice" with a score equal 21.0%.

### 4.3.2 Distribution of the study population based on their answer about the practice

**Table (4.8): Distribution of the study population based on their level of practice**

Variable and level	n (%)	Mean <sup>£</sup>	(SD)	Min	Max
Practices of mothers about neonatal jaundice		43.90	17.04	0.00	100.00
High	5 (1.6)				
Moderate	60 (19.7)				
Low	240 (78.7)				

**n:** number of subjects; **SD:** standard deviation; **Min:** minimum; **Max:** maximum; <sup>£</sup>Maximum score of mean = **100 points**; **High**= equal 80% or more; **Moderate** = 60-79.9%; **Low** = less than 60%.

Table (4.8) shown how the study group was distributed based on their responses about the practices of mothers regarding neonatal jaundice. These tables showed that 1.6% of the participants have a high practice about neonatal jaundice, while 19.7% of them have moderate levels of practices about neonatal jaundice, and 78.7% of them had a low level of practices about neonatal jaundice. Finally, the average (SD) of practice levels was 43.9 (17.04) out of 100 points.

## 4.4 Mean difference of studied between research domains related to socio-demographic characteristics

### 4.4.1 Mean difference of studied domains linked to the age of the mother

**Table (4.9): Mean difference of studied domains linked to the age of the mother**

Domains	Age of mother	N	Mean	SD	F	P-value
Mothers' knowledge about neonatal jaundice	Less than 25 years	88	45.2	15.74	0.820	0.442
	25 to 30 years	106	48.25	16.75		
	More than 30 years	111	46.98	16.96		
	Total	305	46.91	16.53		
Practices of mothers about neonatal jaundice	Less than 25 years	88	45.76	15.16	0.876	0.418
	25 to 30 years	106	42.53	13.94		
	More than 30 years	111	43.65	20.75		
	Total	305	43.87	17.04		
Total	Less than 25 years	88	45.48	11.45	0.005	0.995
	25 to 30 years	106	45.39	9.35		
	More than 30 years	111	45.31	14.21		
	Total	305	45.39	11.86		

\*Significant at  $P \leq 0.05$ ;  $P > 0.05$ : Not significant; **n:** number of subjects; **SD:** standard deviation; & **F:** One-way ANOVA.

Table (4.9): According to the mother's age was a factor in the mean difference of the analyzed domains. The results of the one-way ANOVA test indicated that there was no statistically significant difference between the mother's age and the mean of the studied domain, including the mother's knowledge of neonatal jaundice, practices of mothers regarding neonatal jaundice, and the domain as a whole ( $P>0.05$ ).

#### 4.4.2 Mean difference of studied domains related to educational level

**Table (4.10): Mean difference of studied domains related to educational level**

<b>Domains</b>	<b>Educational level</b>	<b>N</b>	<b>Mean</b>	<b>SD</b>	<b>F</b>	<b>P-value</b>
<b>Mothers' knowledge about newborn jaundice</b>	Primary or less	22	43.77	13.26	2.389	0.069
	Secondary	134	44.69	17.00		
	University	145	49.20	16.25		
	Higher education	4	55.56	18.14		
	Total	305	46.91	16.53		
<b>Practices of mothers about neonatal jaundice</b>	Primary or less	22	50.38	19.02	2.571	0.054
	Secondary	134	44.30	17.61		
	University	145	42.09	15.67		
	Higher education	4	57.92	24.70		
	Total	305	43.87	17.04		
<b>Total</b>	Primary or less	22	47.07	12.04	1.653	0.177
	Secondary	134	44.50	12.49		
	University	145	45.64	11.09		
	Higher education	4	56.74	14.35		
	Total	305	45.39	11.86		

\*Significant at  $P\leq 0.05$ ;  $P>0.05$ : Not significant; **n**: number of subjects; **SD**: standard deviation; & **F**: One-way ANOVA.

Table (4.10) demonstrated how the mean discrepancy between the researched domains and educational level. The one-way ANOVA test revealed there was no statistically significant difference between educational level in the mean of the analyzed domain as mothers' knowledge of newborn jaundice practices of mothers about neonatal jaundice and domain as a whole ( $P>0.05$ ).

#### 4.4.3 Mean difference of studied domains related to mother occupation

**Table (4.11): Mean difference of studied domains related to mother occupation**

Domains	Mother Occupation	N	Mean	SD	F	P-value
<b>Mothers' knowledge about newborn jaundice</b>	Employed	25	45.48	13.96	0.444	0.642
	Worker	35	44.87	21.57		
	Housewife	245	47.35	15.98		
	Total	305	46.91	16.53		
<b>Practices of mothers about neonatal jaundice</b>	Employed	25	48.33	18.64	2.370	0.095
	Worker	35	48	19.74		
	Housewife	245	42.82	16.36		
	Total	305	43.87	17.04		
<b>Total</b>	Employed	25	46.91	10.52	0.419	0.658
	Worker	35	46.43	16.85		
	Housewife	245	45.09	11.15		
	Total	305	45.39	11.86		

\*Significant at  $P \leq 0.05$ ;  $P > 0.05$ : Not significant; **n**: number of subjects; **SD**: standard deviation; & **F**: One-way ANOVA.

Table (4.11) displayed the average difference between the researched domains and the mother occupation. The one-way ANOVA test revealed that there was no statistically significant difference in the mean of the studied domain, mothers' awareness of newborn jaundice, among mother occupation groups. Mother's practices regarding newborn jaundice

#### 4.4.4 Mean difference of studied domains related to monthly income

**Table (4.12): Mean difference of studied domains related to monthly income**

Domains	Monthly income	N	Mean	SD	t	P-value
<b>Mothers' knowledge about neonatal jaundice</b>	1000 or less	235	48.2	9.54	1.675	0.804
	More than 1000	70	47.1	10.50		
<b>Practices of mothers about neonatal jaundice</b>	1000 or less	235	44.15	16.68	1.521	0.489
	More than 1000	70	45.87	18.03		
<b>Total</b>	1000 or less	235	445.82	9.25	1.728	0.165
	More than 1000	70	47.19	13.86		

\*Significant at  $P \leq 0.05$ ;  $P > 0.05$ : Not significant; **n**: number of subjects; **SD**: standard deviation;

Table (4.12) indicated how the average difference between the investigated domains and monthly income. The t- test revealed that there was no statistically significant difference between monthly income and the domain as a whole or the examined domain as mothers' knowledge of and practices with newborn jaundice ( $P>0.05$ ).

#### 4.4.5 Mean difference of studied domains related to the number of family members

**Table (4.13): Mean difference of studied domains related to the number of family members**

<b>Domains</b>	<b>Number of family members</b>	<b>N</b>	<b>Mean</b>	<b>SD</b>	<b>F</b>	<b>P-value</b>
<b>Mothers' knowledge about neonatal jaundice</b>	Less than 4	126	44.36	16.74	2.867	0.058
	4 to 6	130	48.15	16.93		
	More than 6	49	50.19	14.1		
	Total	305	46.91	16.53		
<b>Practices of mothers about neonatal jaundice</b>	Less than 4	126	45.48	16.96	1.107	0.332
	4 to 6	130	42.31	17.6		
	More than 6	49	43.88	15.62		
	Total	305	43.87	17.04		
<b>Total</b>	Less than 4	126	44.92	12.62	0.581	0.560
	4 to 6	130	45.23	11.59		
	More than 6	49	47.03	10.58		
	Total	305	45.39	11.86		

\*Significant at  $P\leq 0.05$ ;  $P>0.05$ : Not significant; **n**: number of subjects; **SD**: standard deviation; & **F**: One-way ANOVA.

According to Table (4.13), the average difference between the analyzed domains was related to the size of the family. The results of the one-way ANOVA test indicated that there was no statistically significant difference between the number of family members and the domain as a whole in terms of the mean of the researched domain as well as mothers' knowledge of neonatal jaundice and practices.

## 4.5 Mean difference of studied domains related to past obstetric history

### 4.5.1 Mean difference of studied domains related to first pregnancy

**Table (4.14): Mean difference of studied domains related to first pregnancy**

Domains	First pregnancy	N	Mean	SD	t	P-value
Mothers' knowledge about neonatal jaundice	Yes	93	45.5	15.4	-0.972	0.332
	No	212	47.5	17.0		
Practices of mothers about neonatal jaundice	Yes	93	48.8	15.5	3.405	<b>0.001*</b>
	No	212	41.7	17.2		
Total	Yes	93	47.2	9.8	1.732	0.084
	No	212	44.6	12.6		

\*Significant at  $P \leq 0.05$ ;  $P > 0.05$ : Not significant; **n**: number of subjects; **SD**: standard deviation; & **t**: independent t-test.

Table (4.14) displayed the mean variation in studied domains during the first pregnancy. The student t-test (independent t-test) showed that higher statistical significance in the average of the mean practices of mothers about neonatal jaundice among those who had first pregnancy compared to those who haven't ( $P < 0.05$ ).

### 4.5.2 Mean difference of studied domains related to of a miscarriage

**Table (4.15): Mean difference of studied domains related to the miscarriage**

Domains	Miscarriage	N	Mean	SD	T	P-value
Mothers' knowledge about neonatal jaundice	Yes	92	48.43	17.04	1.056	0.292
	No	213	46.25	16.30		
Practices of mothers about neonatal jaundice	Yes	92	46.96	17.02	2.092	<b>0.037*</b>
	No	213	42.54	16.91		
Total	Yes	92	47.69	11.37	2.244	<b>0.026*</b>
	No	213	44.39	11.96		

\*Significant at  $P \leq 0.05$ ;  $P > 0.05$ : Not significant; **n**: number of subjects; **SD**: standard deviation; & **t**: independent t test.

Table (4.15) shown the average difference between those who have miscarried in the researched domains. The student t-test (independent t-test) showed the greater statistical

significance in the mean average of mothers practice about neonatal jaundice and domain as total among those who have a miscarriage compared to those who haven't ( $P < 0.05$ ). While the findings indicated that there is no statistically significant difference between mothers who have miscarriages and those who do not ( $P > 0.05$ ), in terms of their average knowledge about neonatal jaundice.

#### 4.5.3 Mean difference of studied domains related to previous children being admitted to the NICU

**Table (4.16): Mean difference of studied domains related to previous children being admitted to the NICU**

Domains	Previous children been admitted to the NICU	N	Mean	SD	t	P-value
Mothers' knowledge about neonatal jaundice	Yes	88	50.4	16.6	2.380	<b>0.018*</b>
	No	217	45.5	16.3		
Practices of mothers about neonatal jaundice	Yes	88	46.3	16.6	1.583	0.114
	No	217	42.9	17.1		
Total	Yes	88	48.4	10.5	2.811	<b>0.005*</b>
	No	217	44.2	12.2		

\*Significant at  $P \leq 0.05$ ;  $P > 0.05$ : Not significant; **n**: number of subjects; **SD**: standard deviation; & **t**: independent t test.

Table (4.16) displayed the mean difference of studied domains between those previous children being admitted to the NICU. The student t-test (independent t-test) pointed out that there is higher statistical significance in the average of the mean mothers' knowledge about neonatal jaundice and practices of mothers about neonatal jaundice among those who have previous children been admitted to the NICU compared to those who haven't ( $P < 0.05$ ). Although the findings indicated that there is not a statistically significant in general of domain as total among those who have previous children been admitted to the NICU against to those who haven't ( $P > 0.05$ ).

#### 4.5.4 Mean difference of studied domains related to children who had neonatal jaundice

**Table (4.17): Mean difference of studied domains related to children who had neonatal jaundice**

Domains	Children had neonatal jaundice	N	Mean	SD	t	P-value
<b>Mothers' knowledge about neonatal jaundice</b>	Yes	120	49.3	15.7	2.009	<b>0.045*</b>
	No	185	45.4	16.9		
<b>Practices of mothers about neonatal jaundice</b>	Yes	120	42.9	18.6	-0.786	0.433
	No	185	44.5	16.0		
<b>Total</b>	Yes	120	46.1	12.2	0.828	0.408
	No	185	44.9	11.6		

\*Significant at  $P \leq 0.05$ ;  $P > 0.05$ : Not significant; **n**: number of subjects; **SD**: standard deviation; & **t**: independent t test.

Table (4.17) demonstration the mean difference in studied domains among those previous children being admitted to the NICU. The student t-test (independent t-test) showed the greater statistical significance in the average of the mean mothers' knowledge about neonatal jaundice among those who have children had neonatal jaundice compared to those who haven't ( $P < 0.05$ ). While the results displayed that there is no statistically significant in the average of Practices of mothers about neonatal jaundice and domain as total among those who have children had neonatal jaundice compared to those who haven't ( $P > 0.05$ ).

#### 4.5.5 Mean difference of studied domains related to awareness lectures about jaundice and its complications in primary care centers

**Table (4.18): Mean difference of studied domains related to awareness lectures about jaundice and its complications in primary care centers**

<b>Domains</b>	<b>Awareness lectures about jaundice and its complications in primary care centers</b>	<b>N</b>	<b>Mean</b>	<b>SD</b>	<b>t</b>	<b>P-value</b>
<b>Mothers' knowledge about neonatal jaundice</b>	Yes	91	50.8	17.5	2.704	<b>0.007*</b>
	No	214	45.3	15.8		
<b>Practices of mothers about neonatal jaundice</b>	Yes	91	44.5	18.8	0.425	0.671
	No	214	43.6	16.3		
<b>Total</b>	Yes	91	47.6	14.1	2.183	<b>0.030*</b>
	No	214	44.4	10.7		

\*Significant at  $P \leq 0.05$ ;  $P > 0.05$ : Not significant; **n**: number of subjects; **SD**: standard deviation; & **t**: independent t test.

Table (4.18) displayed the mean difference between the research domains among those awareness lectures about jaundice and its complications in primary care centers. The researcher t-test showed the higher statistical significance in the average of the mean of mothers' knowledge about neonatal jaundice and domain as total among those who have awareness lectures about jaundice and its complications in primary care centers versus to those who haven't ( $P < 0.05$ ).

#### 4.6 Mean difference of studied domains related to information about a child

##### 4.6.1 Mean difference of studied domains related to child's age in days

**Table (4.19): Mean difference of studied domains related to child's age in days**

Domains	Child's age in days	N	Mean	SD	t	P-value
<b>Mothers' knowledge about neonatal jaundice</b>	10 or less	140	46.15	14.75	0.040	0.951
	More than 10 days	165	45.50	17.77		
<b>Practices of mothers about neonatal jaundice</b>	10 or less	140	42.21	14.87	0.492	0.603
	More than 10 days	165	42.67	15.40		
<b>Total</b>	10 or less	140	44.18	9.55	0.279	0.746
	More than 10 days	165	44.09	11.26		

\*Significant at  $P \leq 0.05$ ;  $P > 0.05$ : Not significant; **n**: number of subjects; **SD**: standard deviation; & **F**: One-way ANOVA.

Table (4.19) display the mean difference between the researched domains in relation to the child's age in days. The one-way t-test revealed that there was no statistically significant difference between age groups in the domain as a whole and the mean of the examined domain as mothers' knowledge and practices with newborn jaundice ( $P > 0.05$ ).

##### 4.6.2 Mean difference of studied domains related to the current baby's uterine age

**Table (4.20): Mean difference of studied domains related to the current baby's uterine age**

Domains	Current baby's uterine age	N	Mean	SD	F	P-value
<b>Mothers' knowledge about neonatal jaundice</b>	Less than 36 weeks	56	40.21	16.81	6.894	<b>0.001*</b>
	36 to 42 week	235	48.78	16.3		
	More than 42 week	14	42.33	11.5		
	Total	305	46.91	16.53		
<b>Practices of mothers about neonatal jaundice</b>	Less than 36 weeks	56	44.52	17.43	0.910	0.403
	36 to 42 week	235	43.38	16.87		
	More than 42 week	14	49.52	18.36		
	Total	305	43.87	17.04		
<b>Total</b>	Less than 36 weeks	56	42.37	12.48	2.244	0.108
	36 to 42 week	235	46.08	11.81		
	More than 42 week	14	45.93	8.51		
	Total	305	45.39	11.86		

\*Significant at  $P \leq 0.05$ ;  $P > 0.05$ : Not significant; **n**: number of subjects; **SD**: standard deviation; & **F**: One-way ANOVA.

Table (4.20) revealed a relationship between the mean difference across the research domains and the fetus' uterine age at birth. The one-way ANOVA test revealed that there is a statistically significant variation in knowledge of newborn jaundice among mothers by age group in the study domain's mean. While the mean of the investigated domain as D2: Mothers' practices towards newborn jaundice and domain as a whole did not significantly differ across age groups ( $P>0.05$ ),

#### 4.6.3 Post Hoc test of mean difference of the demographic data domain in the current baby's uterine age

**Table (4.21): Post Hoc test of mean difference of the demographic data domain in the current baby's uterine age**

Dependent Variable	(I) Current baby's uterine age		Mean Difference (I-J)	SE	P-value	95% CI	
						Lower	Upper
Mothers' knowledge about neonatal jaundice	Less than 36 weeks	36 to 42 week	-8.57	2.41	<b>0.000*</b>	-13.31	-3.82
		More than 42 week	-2.12	4.85	0.663	-11.65	7.42
	36 to 42 week	More than 42 week	6.45	4.46	0.149	-2.33	15.23

\* $P\leq 0.05$ : Significant,  $P>0.05$ : Not significant **SE**: standard error and **CI**: confidence interval

Table (4.21) highlights the mean difference of researched domains in relation to the current baby's uterine age. The Post Hoc (LSD) test revealed that the average level of mothers' knowledge about regarding infant jaundice was less statistically significant among those whose current baby's uterine age was less than 36 weeks compared to current baby's uterine age from 36 to 42 weeks ( $P 0.05$ ). However, the findings revealed that there was no statistically significant difference in the average uterine age of other study groups when it came to current newborns ( $P>0.05$ ).

#### 4.7 Correlation between studied domains among the study participants

Table (4.22): Correlation between the studied domains among the study participants

		Mothers' knowledge about neonatal jaundice	Practices of mothers about neonatal jaundice	Total
Mothers' knowledge about neonatal jaundice	R	-	-0.001	0.696
	P-value	-	0.986	<b>0.000*</b>
Practices of mothers about neonatal jaundice	R	-0.001	-	0.717
	P-value	0.986	-	<b>0.000*</b>
Total	R	0.696	0.717	-
	P-value	<b>0.000*</b>	<b>0.000*</b>	-

r: Pearson correlation & \* indicates a statistically significant difference at  $P < 0.05$ .

Table (4.22) indicated there is a positive correlation between domain as total with mothers' knowledge about neonatal jaundice and practices of mothers about neonatal jaundice ( $P < 0.05$ ). However, the researcher findings indicated that there was no relationship between mothers' practices and their knowledge of newborn jaundice ( $P > 0.05$ ).

## **Chapter Five**

### **Discussion**

This chapter exemplifies the discussion of the study's findings in all areas, including mothers' knowledge and practices related to neonatal jaundice, the association between mothers' sociodemographic characteristics and their knowledge and practices of neonatal jaundice, and the relationship between knowledge and practice. The findings of the current study are contrasted with those of earlier studies, and the researcher's personal judgment is presented based on her expertise in the area. Due to the dearth of research on the topic, it was challenging the researcher to compare the findings of the current study with those of a prior one.

#### **5.1 Discussion**

The purpose of this study was to assess knowledge and practice regarding neonatal jaundice among mothers admitted to neonatology departments in Gaza Strip governmental hospitals. Neonatal jaundice is considered a significant cause of death and disability that is generally preventable (Farouk et al., 2021). Therefore, it is essential to examine knowledge and practices of caregivers, especially mothers, and educate them so they can change their own beliefs, habits, and procedures to better care for newborns. The successful treatment of neonatal jaundice has implications for lowering neonatal mortality (Ezeaka et al., 2014), and these improvements in mother understanding and early care-seeking behavior serve as important components of this therapy. Furthermore, the current research study aimed to examine how much caregivers know, how they feel about neonatal jaundice, and what they really do in practice. It is crucial and essential to reduce infant mortality through meeting the health component of the sustainable development goals, and one way to do this is by raising awareness and enhancing caregivers' understanding, motivation, and behavior. Successful treatment of neonatal jaundice has implications for lowering neonatal mortality (Ezeaka et al., 2014), and these improvements in maternal understanding and early care-seeking behavior are essential components.

## **5.2 Mother's knowledge regarding neonatal jaundice**

Most mothers in this study demonstrated a low level of knowledge (79.6%) about newborn jaundice, according to the present study. About one third of mothers in this research study correctly identify jaundice and recognized preterm and infection as the primary causes of neonatal jaundice that indicating high understanding of the situation. Study participants had good knowledge about jaundice definition, but they were not knowledgeable regarding the underlying cause of jaundice as well as the consequences of neonatal jaundice.

These findings were consistent with these of a study conducted by Aggarwal et al. (2017) who discovered that 73% of mothers were familiar with the location of recognition in NNJ. Respondents lacked sufficient awareness about the origins, problems, danger indicators, and treatments. Other findings were consistent with a study by Magfour et al. (2019) that examined mothers' perceptions of newborn jaundice in the Jazan region of Saudi Arabia and discovered that 60.4% of mothers had limited knowledge about the NNJ. In addition, results were in the same track with a research study conducted by Shrestha et al. (2019) who demonstrates that almost 50% of mothers had little knowledge. That outcome consistent with the research done by Amegan-Aho et al. (2019) who discovered that 92.6% either did not know the causes of jaundice nor had the incorrect information, while 72.6% were aware of at least one NNJ sign. An Egyptian study inconsistent with findings that mothers had moderate knowledge 89.8% and 10% of positive attitude scores regarding neonatal jaundice, furthermore, participants showed adequate knowledge with regard to risk factors, management and complications (Moawad, Abdallah, and Ali, 2016).

In the other hand, the percentage of well-informed mothers for neonatal jaundice was just 3.3% when compared to prior findings in other lower middle-income countries; we found that our 3.3% excellent knowledge score was lower. These findings was inconsistent with these of a study conducted by Magfour et al. (2019) who shows that there were 39.6% of mothers had good knowledge. Another cross-sectional study was inconsistent with a study conducted by Shrestha et al. (2019) around 22% of mother had adequate level of knowledge (score >75%) regarding NNJ. These findings were inconsistent with a study conducted Yaqub et al. (2016) 47.5% mothers had adequate knowledge score.

Despite the present study's finding of widespread ignorance of neonatal jaundice, the majority of mothers showed excellent knowledge of the terminology and areas for testing for jaundice. These findings are consistent with those made in lower middle-income countries by Goodman et al. (2015) who showed that the majority of mothers accurately identified the areas where neonatal jaundice was present. If mothers are well versed in spotting jaundice, they will notice it soon after the baby is born and act swiftly to get the baby to the hospital for treatment. Another cross-sectional study was consistent with our study which conducted by Adeb et al. (2016) and showed that 70% mother recognized jaundice by yellow discoloration on the body. High pitched crying (12.7%) and not feeding (10.8%) were among symptoms they knew. Almost eighty percent of the respondents will send their jaundiced baby to the hospital immediately.

Another study of the caregivers surveyed, less than half had adequate knowledge (45.5%), attitude (47.5%), and behaviors (58.9%) when it came to neonatal jaundice. Three times as many caregivers with prior education and awareness of neonatal jaundice had strong knowledge of jaundice as those without ( $p = 0.001$ ). Public sector caregivers are twice as likely as private sector caregivers to have a positive outlook on jaundice ( $p = 0.042$ ) (Salia et al., 2021).

These results and according to the researcher point of view could be related to the lack of teaching sessions in this topic during the antenatal care in the primary health center, Some mothers are not interested in studying topics related to how to take care of a child, despite the importance of this matter.

### **5.3 Mother's practice regarding neonatal jaundice**

According to the current study, most mothers (78.7%) were unfamiliar with care of newborn diagnosed with jaundice. In this study, slightly less than 90% of participants have reported that they would breastfed their newborns every two to three hours. The level of mothers' practice about newborn jaundice was statistically significant and the findings indicated that the majority of mothers in this study had an unfavorable opinion of neonatal jaundice. However, some of the mothers' responses were accurate, such as their refusal to expose their newborns to sunlight or treat jaundice with herbal remedies. In this point exposing newborns with jaundice to sunlight is a widespread practice in Africa and other underdeveloped regions and the researcher could reveal this result to the level of education

of mothers as well as the changed nature of living in modern apartments rather than the open spaces used in the past in refugee camps in particular. These findings were consistent a study conducted by Goodman et al. (2015) who aimed to determine the knowledge of, attitudes to, preventive and treatment practices towards NNJ, the study showed that 58% of mothers believed that exposing babies to sunlight could prevent the condition. Findings were also consistent with a study conducted by Onyearugha et al. (2016) to evaluate the knowledge and practice of expectant mothers towards neonatal jaundice NNJ, the study shows that only 10% of participants have known the appropriate treatment modality of NNJ. The findings were also not consistent with a study conducted by Ogunlesi et al. (2015) who shows mothers had a good care-seeking behavior for newborn jaundice (P = 0.027) and their infants did not develop kernicterus (P = 0.0001).

It is encouraging to see that most of mothers in our research study (70%) would directly contact a doctor to treat jaundice and that the common take their neonates with jaundice to the hospital for treatment. These findings were consistent with a study conducted by Goodman et al. (2015) who found that up to 64% of the mothers believed that attending antenatal care could prevent the condition. Other findings were consistent also with a study conducted by Bello et al. (2014) who found that sixty seven percent of mothers in Gwoza community admit to taking their jaundiced babies to hospitals. Also, these findings were not consistent with a study conducted by Dash (2013) who showed that 30% mothers had a positive attitude towards the management pattern of the baby with jaundice that is taking the baby to hospital for prevent , and continuing breast feeding etc.

It is hopeful that by maintaining an optimistic outlook, neonatal mortality may be reduced by early discovery and accurate diagnosis, followed by timely treatment with phototherapy or exchange blood transfusion. As these harmful practices might delay mothers from obtaining medical attention for their neonates early on, increasing the risk of problems and even death, they must be avoided by adequate teaching during antenatal care visits Dey et al. (2021). In my research, i found that the vast majority (88%) of mothers had good practices regarding breastfeeding which is a good choice to prevent neonatal jaundice. It is important to note that mothers did not properly recognized management options for jaundice. Instead, mothers in the current study would contact the doctor if they felt any changes in baby's general condition. Many additional studies in low- and middle-income countries found that a small percentage of people know about management options for

neonatal jaundice. These findings were not consistent with a study conducted by Moawad et al. (2016) who found that 10% of mothers have positive attitudes toward NNJ. Another finding was not consistent with a study conducted by Allahony et al. (2016) who found that only 25.3% of mothers had a good practice about NNJ. A study conducted by Amegan-Aho et al. (2019) found Only (5.2%) knew one or more correct forms of treatment of NNJ; that the number of mothers who in the case of NNJ, would choose to sunbathe rather than seek medical assistance was relatively low but still rather substantial the conventional medication might have been a factor in the length of time that patients had to wait for treatment in situations of acute jaundice.

Based on researcher's point of view, when comparing finding from this study with previously published studies conclude there is significant problem of poor practice held by mother caring for neonates experiencing NNJ because of culture and grandparents effect.

#### **5.4 Relationship between the socio-demographic characteristics and mothers' knowledge and practice**

The findings demonstrated that there was no statistically significant difference between mother's knowledge and practice and socio-demographic variables (mother age, level of education, occupation, and monthly mothers' income). The researcher could reveal this result to that all mothers from the different age groups as well as from the different social sectors completely comply with antenatal care provided to pregnant women including the health education sessions provided in this care. These findings were incongruent with these of a previous research study, which found that mothers with different age groups had varying degrees of knowledge at level of significance less than 0.001 (Bhutani et al., 2013). This finding was consistent with a study conducted by Shrestha et al. (2019) to assess the knowledge among mothers about NNJ. The study showed that the mean age of the sample was 26- 30 years and showed a not statistically significant relationship between mothers; age and their level of knowledge. Also the results of another study conducted by Adoba et al. (2018) were consistent with our findings, who showed that the sample included 150 mothers with the mean age of  $28.32 \pm 5.81$  participated and there were not statistically significant differences between mothers age and their level of knowledge and practice.

The study demonstrated that participants' level of knowledge was not statistically significant when compared with their educational level ( $P= 0.069$ ). This is consistent to the results of Moawad, Abdallah, and Ali (2016) study in which knowledge was higher among participants having university degree ( $P<0.001$ ), had no significant correlation between educational level and the mothers knowledge regarding NNJ.

The study showed that the highest group of the study population have finished university (47.5%) while 43.9% of them have finished secondary education level and 7.2% finished primary education or less. A study conducted by Amolo et al. (2017), who discovered that poor knowledge was also associated with those who had lower than tertiary level of education, the percentage of women who have completed some form of basic education is relatively high, with secondary education making up 48.2%, tertiary education accounting for 45.5%, primary education making up 3.9%, and no education making up only 2.4%. Authors discovered that only 76.0% of participants were familiar with NNJ, this can be due to the fact that a very small percentage of respondents have finished their post-secondary education; authors discovered that just 5.1% of respondents had finished post-secondary education, there was statistically significant between the level of education of the respondents and their level of knowledge with NNJ (Amegan-Aho et al., 2019).

Another study conducted by Ogunlesi and Abdul.(2015) showed that poor levels of mothers' education were substantially connected to delays in seeking medical care and the adoption of alternate therapies for NNJ. Instead, the cumulative amount of information a woman was exposed to about NNJ increased with both age and the number of children she had. In addition, the findings that friends and family were the most common source of information, followed by the media, hospitals came in third place (Amegan-Aho et al., 2019).

Our study also revealed that 80.3% of the mothers are homemakers and from the researcher point of view has enough time to care for their children. According to the researcher, mothers in the G.S are primarily concerned with caring for their children, paying attention to at-home education, and dealing with rising unemployment and a lack of jobs. The results of our study are also agreement with a study conducted by Adib-Hajbaghery and Khosrojerdi (2017) who found that 88% of the mothers were housewives and assessed their knowledge of post-discharge infant,  $P$  value = 0.314 and there was no significant difference between mothers knowledge according to Mother's Job. Another

finding consistent with a study conducted by Mohamed et al. (2022) aimed to assess perception of mothers regarding their neonatal hyperbilirubinemia who showed that personal characteristics data of the studied women, regarding occupation, and the study showed that there was no statistically significant relationship between mother knowledge and mother occupation regarding NNJ.

In Egypt, it was found that working mothers has had a higher level of knowledge ( $P=0.023$ ) and urban living mothers were more knowledgeable ( $P=0.021$ ) (Moawad, Abdallah, and Ali, 2016). These results were inconsistent with the findings of our study, which found that residency place and working status were not statistically significant with levels of knowledge or practice among mothers with children diagnosed with NNJ. The researcher could reveal this result to the quality of the antenatal care provided to pregnant women and cover all social sectors of women living in GS.

According to the researcher, many families in the GS has a monthly income less than 1000 NIS as a result of the challenging living conditions as well as the rising rates of poverty and unemployment among different population sectors living in GS. It was clear that there was a not statistically significant relationship between monthly income of mothers and their level of knowledge and practices regarding care of children diagnosed with NNJ. This finding not consistent with study conducted by Mohini and Shetty (2017), in India the household income, there was a statistically significant relation between income and mothers' level of knowledge and practices about NNJ. This finding was consistent with a case-control study conducted by El-Kurdy et al. (2021) who found that more most of (57.4 %) of the study group reported a low monthly income, while half (50.8 %) of the control group reported a good income and showed that there were no statistically significant relationship between most of sociodemographic characteristics including income and mothers level of knowledge and practices.

In term of family number, the researcher found that the common of mothers live in families consisted of 6 members and less (83.9%). Although most families in the Gaza Strip wish to have children, the researcher expects that recently and because of poverty, tended to turn to have little number in family. This finding conflicts with another study by Priyadarshanie and Pethiyagoda (2017), which discovered that 30% of mothers had two children. Some people had more kids than two; there is no significant association between family number and mother knowledge regarding NNJ.

## **5.5 Related between past obstetric history and mothers knowledge and practice**

Study findings indicated that there was a statistical significant relationship between number of pregnancies and level of practice and showed a higher level among mothers get babies for the first time. The researcher could reveal this result to that new mothers provide most of their time to their new baby ( $P=0.001$ ). This result was in line with a study conducted by Mohamed et al. (2022), which discovered that more than half of the samples of mothers (54.7%) were primigravida. Additionally, only 60.0% of mothers were primiparous, and parity was not significantly correlated with the mothers' knowledge regarding NNJ. A cross-sectional study conducted by Demis et al. (2021) aimed to assess mother's knowledge on neonatal jaundice (NNJ) and its associated factors that finding 320 (84.2%) multigravida and 297 (78.2%) primiparous and found that the knowledge of women about NNJ regarding parity, 40.4% of primiparous and 34.9% of multiparous mothers had good knowledge, were showing significant association mothers knowledge about NNJ between multigravida and primiparous. Another finding conflict with a research by Amolo et al. (2017), which found majority of the mothers were multiparous 61.1% while 38.9% were primiparous, that showed that primiparous had significant poorer knowledge compared to multiparous.

The study results revealed that there is a statistically significant relationship between the average of the mean mothers' knowledge about newborn jaundice and practices of mothers about neonatal jaundice and a history of previous neonates being admitted to the NICU compared to those who have not ( $P=0.018$ ). These results were similar to that of the study of (Olusanya et al., 2016) which found that mothers with history of neonatal jaundice were more knowledgeable than mothers with first time dealing with neonatal jaundice ( $P<0.001$ ). The researcher also found a statistically significant relationship between mothers' knowledge about neonatal jaundice and having children diagnosed in the past with neonatal jaundice compared to those who haven't ( $P<0.05$ ). This finding was consistent with these of a study conducted by Demis et al. (2021) which found that knowledge about NNJ among mothers who had a history of NNJ in previous children were 7.5 times higher compared with their counterparts ( $p<0.001$ ). The findings of this study showed that mothers who had a history of NNJ in the current child were almost two times more likely knowledgeable as compared with their counterparts ( $p=0.008$ ). Also this findings were consistent with a study conducted by Ogunlesi, and Abdul (2015), who found that mothers

have significantly higher proportions of the mothers with good knowledge were had a previous child with jaundice ( $P = 0.001$ ).

The study results showed a statistically significant relationship between attending an education session about NNJ and level of knowledge about NNJ and its complications in primary care centers compared to those who haven't ( $P < 0.05$ ). These findings were consistent with a study conducted by Abdulkadir et al. (2018) which found that most of mothers (74.1%) received instruction and education on NNJ during pregnancy and all of them attended antenatal care in the tertiary facility. The degree of knowledge on NNJ was significantly correlated positively with receiving NNJ educational instruction ( $P = < 0.001$ ).

In addition, research has shown that mothers' understanding of NNJ increases considerably with the birth of each new child; nonetheless, despite this trend, mothers wait longer before seeking medical assistance. There was not a single piece of statistical data to support this (Amegan-Aho et al., 2019).

### **5.6 Relationships between Mothers' knowledge and practice regarding neonatal jaundice**

Our research revealed a favorable link between domain as total with mothers' knowledge about newborn jaundice and practices of mothers about newborn jaundice of documentation nursing ( $P < 0.05$ ). This correlation was found also statistically significant in most other literature (Afaya et al., 2020).

Other research substantially proved that a lack of understanding about the causes of newborn jaundice is a recipe for making bad decisions about the choice of therapy and for missing the possibility of avoiding preventable variables that may contribute to jaundice. The primary treatment for newborn jaundice is phototherapy, and parents should be encouraged to bring their babies to the hospital right once if they see any signs of the condition (Salia et al., 2021). In addition, when asked about the consequences of jaundice on neonates, the common (77.7%) of mothers had low knowledge regarding the consequences of persistent neonatal jaundice. By contrast, the present percentage is lower than the 57.8% recorded in Nigeria (Ogunlesi, and Abdul, 2015).

Participants in the research had a limited awareness of the history of NNJ as well as the appropriate treatment for it (Amegan-Aho et al., 2019). To put this into perspective, Farouk et al. (2021) discovered that 56 % of mothers did not know what causes NNJ. According to Amegan-Aho et al.(2019) many of the expectant mothers authors talked with had the false belief that NNJ may be brought on by ingesting an excessive amount of oil or being bitten by a mosquito, it is essential to take into consideration the fact that the overwhelming majority of the women authors questioned had, at some point in time previous to our interview, attended a prenatal clinic.

## **Chapter Six**

### **Conclusion and Recommendations**

The primary conclusion and suggestions for enhancing mother's knowledge and practices about newborns' jaundice in government hospitals are presented in this chapter.

#### **6.1 Conclusion**

The main conclusions of this research were mother's level of knowledge (3.3%) of the mothers have high knowledge while (79.6%) of them had a low level of knowledge about neonatal jaundice. The degree of mothers' knowledge about newborn jaundice was statistically significant. There was (1.6%) of the mothers have a high practice level, and (78.7%) of them had a low level of mothers practices about neonatal jaundice. In terms of mothers' practices regarding neonatal jaundice, there was statistical significance. Results showed that there was statistical significant between mothers' knowledge and practices of mothers about neonatal jaundice ( $P>0.05$ ). The remaining variables of income, educational attainment, mother's age, location, family composition, and employment status did not statistically different from one another in terms of knowledge and practice.

#### **6.2 Recommendations**

The researcher would highlight a number of helpful suggestions that may aid in increasing and improving mothers' knowledge and practice about newborn jaundice based on the findings of the current study.

1. More research quantitative and qualitative is required to determine the elements that influence mothers' knowledge and practice of NNJ.
2. MOH should take initiative to improve mothers knowledge and practice by dealing seriously with provide them educational programs in primary health care.
3. Engagement media special educational initiatives to raise mothers' knowledge of NNJ.
4. Study results to be into consideration while planning national maternal and child health education program.

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## **Annexes**

### **Annex (1): Control panel**

Dr. Abed Elmajeed Thabet	Palestine College of Nursing
Dr. Ahmed Najem	Al-Azhar University- Gaza
Dr. Ayman Abu Mustafa	Palestine College of Nursing
Dr. Hamza Abdeljawad	Al- Quds University
Dr. Heba Agha	Al Rantisi Naser Pediatric Hospital - Gaza
Dr. Ismail Al-Rafei	Al Rantisi Naser Pediatric Hospital - Gaza
Dr. Mahammed Algergawee	psychiatric hospital-Gaza
Dr. Osama Ellayan	Gaza University- Gaza
Dr. Reda Abu Assi	Al Rantisi Naser Pediatric Hospital - Gaza
Dr. Sherif Matar	Al Rantisi Naser Pediatric Hospital - Gaza
Dr. Shireen Abed	Al Rantisi Naser Pediatric Hospital - Gaza
Dr. Wesal Abu Laban	Al Rantisi Naser Pediatric Hospital - Gaza



### Annex (3): Approval from university

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

جامعة القدس  
كلية المهن الصحية  
مديرية التمريض - غزة

التاريخ: 2022/7/26

حضرة الأخ/ أ. هاني سلطان الوحيدي حفظه الله  
مدير عام وحدة المعلومات الصحية بوزارة الصحة  
السلام عليكم ورحمة الله وبركاته

الموضوع: تسهيل مهمة الطالبة الباحثة حنين أبو شوارب  
تهديكم كلية المهن الصحية بجامعة القدس أطيب التحيات، ونرجو من حضرتكم مساعدة الطالبة المذكورة  
بخصوص جمع معلومات خاصة بموضوع دراستها البحثية للحصول على درجة الماجستير في تمريض  
صحة الأم والطفل بعنوان:

**Knowledge and Practice Regarding Neonatal Jaundice among Mothers of  
Neonates Admitted to Governmental Hospitals in Gaza Strip**

حيث ستكون عينة الدراسة من أمهات الأطفال حديثي الولادة المتواجدين في حضانات ال baby friendly:  
حضانة م. النصر  
حضانة م. التحرير بجمع ناصر  
حضانة م. الهلال الإماراتي  
حضانة م. شهداء الأقصى  
وستجمع البيانات بواسطة استبانة من أمهات الأطفال.

وتفضلوا بقبول وافر الاحترام والتقدير

د. حمز تاحمد عبد الجواد  
أستاذ مساعد في التمريض  
مستشار برامج ماجستير التمريض بغزة  
كلية المهن الصحية - جامعة القدس  
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تلفاكس: 08 2644220 X 8  
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المديرية التمريض  
Nursing Department

Tel: 08 2644210 + 08 2644220  
Tel. Fax: 08 2644220

تلفون: 08 2644210 + 08 2644220  
تلفاكس: 082644220

## Annex (4): Approval from MOH

State of Palestine  
Ministry of health

دولة فلسطين  
وزارة الصحة

التاريخ: 01/08/2022  
رقم المراسلة: 1021990

السيد : جهاد عبدالقادر عكاشه المحترم

مدير دائرة الإدارة العامة للوحدات الإدارية المساعدة لوزارة الصحة

السلام عليكم ...

الموضوع / تسهيل مهمة الباحثة حنين عبد الرحمن ابو شوارب

التفاصيل // السلام عليكم نهدىكم أطيب التحيات ونود منكم تسهيل مهمة الباحثة/ حنين عبد الرحمن اسماعيل ابو شوارب  
الملتققة ببرنامح ماجستير صحة الأم والطفل - جامعة القدس أبو ديس في اجراء بحث بعنوان: Knowledge and Practice  
Regarding Neonatal Jaundice among Mothers of Neonates Admitted to Governmental Hospitals in Gaza Strip  
الصحة (العسشفيات) دون اجراء أي تدخل طبي أو سحب عينات دم ، نأمل توجيهاتكم لذوى الاختصاص بضرورة الحصول على الموافقة  
المستتيرة من المشاركين . بما لا يتعارض مع مصلحة العمل وضمن أخلاقيات البحث العلمي، وبدون تحمل الوزارة أي أعباء أو مسئولية  
وتفضلوا بقبول التحية والتقدير ملاحظات / تسهيل المهمة الخاص بالدراسة أعلاه صالح لمدة 3 أشهر من تاريخه. يرجى التأكد من  
توافق الاستبانة المرفقة والتي يتم تعبئتها ميدانيا على ان لا يتم أي إضافة أو تعديل على الاستبانة المرفقة

علي حسن البليسي  
حكيم جامعي

المرفقات  
■ استبانة حنين عبد الرحمن ابو شوارب.pdf



Annex (5): Helsinki

**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: 2022/08/01 Number: PHRC/HC/1160/22  
Name: Haneen Abu Shawareb الاسم:

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

**Knowledge and Practice Regarding Neonatal Jaundice among Mothers of Neonates Admitted to Governmental Hospital in Gaza Strip**

The committee has decided to approve the above mentioned research. Approval number PHRC/HC/1160/22 in its meeting on 2022/08/01 وقد قررت الموافقة على البحث المذكور عاليه بالرقم والتاريخ المذكوران عاليه

**Signature**

Member  Member   
Chairman 

**Genral Conditions:-**

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

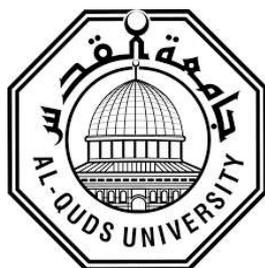
**Specific Conditions:-**



E-Mail: pal.phrc@gmail.com

Gaza - Palestine فلسطين  
شارع النصر - مقبرة العيون

## **Annex (6): Questionnaire (English)**



**Dear Mother:**

I am Haneen Abu Shawareb. I will be thankful if you agree to participate actively in the research study entitled "knowledge and practice regarding neonatal jaundice among mothers of neonates admitted to governmental hospitals in Gaza Strip." This study submitted for a master's degree in Maternal and Child Health Nursing, at Al Quds University. This study aims to determine the knowledge and practice regarding neonatal jaundice among mothers admitted to neonatology department in Governmental Hospitals of the Ministry of Health in the Governorates of Gaza Strip. It may take up to 15 minutes to complete the questionnaire. All data will be treated in strict confidence and will be used for scientific research purposes only. Please answer all questions as you see fit. There is no correct and wrong answer.

With high respect and appreciation

**The Researcher**  
**Haneen Abdrahman Ismail Abu Shawareb**

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## Questionnaire

---

**"Knowledge and Practice Regarding Neonatal Jaundice among Mothers of Neonates  
Admitted to Governmental Hospitals in Gaza Strip"**

Serial number .....

**Direction: Mark the response that best describes you in the bellows**

<input checked="" type="checkbox"/> <b>Sociodemographic characteristics</b>				
1. Address	<input type="checkbox"/> Gaza	<input type="checkbox"/> Middle zone	<input type="checkbox"/> Khanyounis	<input type="checkbox"/> Rafah
2. Hospital	<input type="checkbox"/> Al-Rantisi Al-Nasr pediatric hospital	<input type="checkbox"/> AL-Aqsa Martyrs hospital		
	<input type="checkbox"/> Naseer Medical Complex	<input type="checkbox"/> AL-Helal AL-Emaraty maternatity hospital		
3. Age of mother	.....years			
4. Educational level	<input type="checkbox"/> Primary	<input type="checkbox"/> Secondary	<input type="checkbox"/> University	<input type="checkbox"/> Postgraduate
5. Mother occupation	<input type="checkbox"/> Employee		<input type="checkbox"/> Worker	<input type="checkbox"/> Housewife
6. Monthly income	.....NIS			
7. Number of family members:	.....			

<input checked="" type="checkbox"/> <b>Past Obstetric History</b>			
1. Is it your first pregnancy?	<input type="checkbox"/> Yes		<input type="checkbox"/> No
	<b>If the answer is no, answer question No. (2, 3, 4)</b>		
2. How many previous pregnancies?	<input type="checkbox"/> 1-3	<input type="checkbox"/> 4-5	<input type="checkbox"/> more than 5
3. Have you ever had a miscarriage?	<input type="checkbox"/> Yes		<input type="checkbox"/> No
	<b>If the answer is yes, specify the number of times.....</b>		
4. Have any of your previous children been admitted to the NICU?	<input type="checkbox"/> Yes		<input type="checkbox"/> No
	<b>If the answer is yes, specify the reason for admission.....</b>		
5. Have any of your children had neonatal jaundice?	<input type="checkbox"/> Yes		<input type="checkbox"/> No
6. Have you ever received any awareness lectures about jaundice and its complications in primary care centers?	<input type="checkbox"/> Yes		<input type="checkbox"/> No
<input checked="" type="checkbox"/> <b>Maternal pregnancy in the current child</b>			
1. The nature of the birth of this child?	<input type="checkbox"/> natural birth	<input type="checkbox"/> Caesarean section	<input type="checkbox"/> Assisted childbirth (artificial divorce - aspiration)
2. Did you suffer from health problems during pregnancy with your current child?	<input type="checkbox"/> Yes		<input type="checkbox"/> No
	<b>If the answer is yes, select</b> <input type="checkbox"/> gestational diabetes <input type="checkbox"/> hypertension during pregnancy <input type="checkbox"/> anemia <input type="checkbox"/> Bleeding during pregnancy <input type="checkbox"/> Urinary infections <input type="checkbox"/> Others select.....		

3. Was there any health problems during childbirth	<input type="checkbox"/> Yes		<input type="checkbox"/> No	
	<b>If the answer is yes, select</b> <input type="checkbox"/> Heavy bleeding <input type="checkbox"/> lacerations <input type="checkbox"/> other specify.....			
<input checked="" type="checkbox"/> <b>Information about a child</b>				
1. Gender	<input type="checkbox"/> male		<input type="checkbox"/> female	
2. Child's age in days	.....			
3. Your current baby's gestational age	<input type="checkbox"/> less than 35 weeks	<input type="checkbox"/> 36-42 weeks	<input type="checkbox"/> more than 42 weeks	
4. Birth weight	<input type="checkbox"/> less than 2.5 kg	<input type="checkbox"/> 2.5-4 kg	<input type="checkbox"/> more than 4 kg	
5. Does the child have any diseases?	<input type="checkbox"/> Yes		<input type="checkbox"/> No	
	<b>If there is, Specify -----</b>			
6. What is the method of feeding your baby?	<input type="checkbox"/> Breastfeeding	<input type="checkbox"/> Formula feeding	<input type="checkbox"/> Both	
7. What is the time when the yellow color appears for the first time in a child?	<input type="checkbox"/> first day	<input type="checkbox"/> third - five days	<input type="checkbox"/> after a week	
8. Were tests carried out to ascertain the condition of the yellow color before the child was discharged from the hospital after birth?	<input type="checkbox"/> Yes		<input type="checkbox"/> No	

<input checked="" type="checkbox"/> <b>Mothers' knowledge about newborn jaundice</b>			
<b>Phrase</b>	<b>Yes</b>	<b>No</b>	<b>I don't know</b>
1. The jaundice is caused by an increase in bile (bilirubin) in the blood			
2. Jaundice is the yellowing of the skin and eyes of newborns			
3. The jaundice occurs as a result of the presence of liver diseases in the child			
4. Jaundice occurs due to the incomplete development and maturity of the liver			
5. Jaundice is a common condition in premature babies			
6. Pathological jaundice occurs less than 24 hours after the birth of the child			
7. Jaundice is a normal thing that happens to newborns within 2-4 days			
8. Jaundice is caused by genetic factors			
9. The mismatch of the blood of a child with the mother is a reason for the occurrence of jaundice in the child			
10. Infection in a child may cause jaundice			
11. Do you have information about the causes of jaundice other than lack of breastfeeding?			
12. The presence of bruising or internal bleeding may cause jaundice			
13. One of the symptoms of jaundice in a child is the color of stool that is dark yellow.			
14. One of the symptoms of jaundice is that the urine is yellow in color			
15. One of the symptoms of jaundice is the difficulty of waking the child			
16. One of the symptoms of jaundice in a child is not gaining weight			

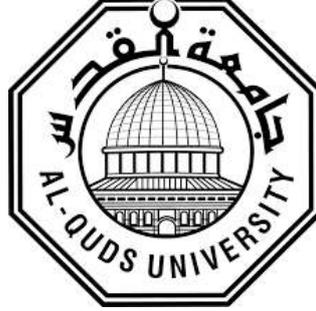
17. One of the symptoms of jaundice in a child is severe abdominal pain			
18. Crying loudly about a child is a symptom of jaundice			
19. Non-pathological jaundice often disappears within two weeks without any treatment and only needs follow-up			
20. Continuous breastfeeding helps the baby to expel bile (bilirubin) from the body			
21. Jaundice in a child can be treated with intravenous medicines			
22. Jaundice can be treated by phototherapy in hospital			
23. In very severe cases, the treatment of jaundice is a blood change process (reduce the level of jaundice in the blood)			
24. Starting your baby's breast milk early is a way to prevent jaundice			
25. The child may develop brain problems when the jaundice treatment is neglected			
26. The persistence of pathological jaundice for more than three weeks, it exposes the child to deafness			
27. Baby with jaundice can have convulsion			

<input checked="" type="checkbox"/> Practices of mothers about newborn yolks					
Phrase	Always	Mostly	Sometimes	Rarely	Never
1. I breastfeed my baby every 2-3 hours					
2. I breastfeed my baby until I feel that he has taken all the milk he needs					
3. I stop breastfeeding if I feel that my baby has jaundice					
4. I give my baby formula milk if I feel that he is not getting enough					

breastfeeding					
5. I give my baby water instead of breastfeeding					
6. I use sugar as a treatment for jaundice					
7. I use honey to treat my baby from jaundice					
8. I use the date soak or date water to treat the jaundice					
9. I use natural herbs to treat my child from jaundice					
10. I expose my child to the sun for treatment of jaundice					
11. I shine a house light (neon) over the head or face of the child to treat the jaundice					
12. I put the child in a dark place if he has jaundice					
13. I stop eating yellow foods and liquids (such as corn - fenugreek) if my child develops jaundice					
14. I put a garlic collar around the baby's neck to treat jaundice					
15. I contact the doctor if I feel a change in my child's condition					

## Annex (7): Questionnaire (Arabic)

استبانة



عزيزتي الأم المشاركة :

أنا الباحثة / حنين عبد الرحمن أبو شوارب، يسعدني مشاركتك الفاعلة في بحث بعنوان "معرفة وممارسات الأمهات بخصوص اليرقان لدى أمهات الأطفال المدخلين لأقسام الحضانة في المستشفيات الحكومية في قطاع غزة". هذه الدراسة مقدمة لنيل درجة الماجستير في تمريض صحة الأم والطفل في جامعة القدس. تهدف هذه الدراسة إلى تحديد معرفة والممارسات لدى أمهات بخصوص اليرقان الأطفال المدخلين لأقسام الحضانة في المستشفيات الحكومية التابعة لوزارة الصحة في محافظات غزة. قد تستغرق ما يصل إلى 15 دقيقة لإكمال الاستبيان. سيتم التعامل مع جميع البيانات بسرية تامة وسيتم استخدامها لأغراض البحث العلمي فقط. الرجاء الإجابة على جميع الأسئلة كما تراه مناسباً. لا توجد إجابة صحيحة وإجابة خاطئة.

مع فائق الاحترام والتقدير

الباحثة

حنين عبد الرحمن إسماعيل أبو شوارب

استبانة لدراسة

"معرفة وممارسات الأمهات بخصوص اليرقان لدى أمهات الأطفال المدخلين لأقسام الحضانه في المستشفيات الحكومية في قطاع غزة"

رقم الملف -----

توجيه: يرجى التفضل بالأجابة حسب المطلوب				
<b>☒ المعلومات الشخصية</b>				
1. العنوان				
<input type="checkbox"/> غزة	<input type="checkbox"/> الوسطى	<input type="checkbox"/> خان	<input type="checkbox"/> رفح	يونس
2. المستشفى				
<input type="checkbox"/> مستشفى الرنتيسي النصر للأطفال		<input type="checkbox"/> مستشفى شهداء الأقصى		
<input type="checkbox"/> مجمع ناصر الطبي		<input type="checkbox"/> مستشفى الهلال الإماراتي		
3. عمر الأم بالسنوات				
.....				
4. المستوى التعليمي				
<input type="checkbox"/> ابتدائي	<input type="checkbox"/> ثانوي	<input type="checkbox"/> جامعي	<input type="checkbox"/> دراسات عليا	
5. مهنة الام				
<input type="checkbox"/> موظف	<input type="checkbox"/> عاملة	<input type="checkbox"/> ربة منزل		
6. الدخل الشهري				
..... بالشيكل				
7. عدد افراد الاسرة				
.....				

<b>☒ تاريخ الحمل للأم</b>			
<input type="checkbox"/> نعم		<input type="checkbox"/> لا	
1. هل حملك بهذا المولود هو الأول؟ إذا كانت اجابة بلا اجيبي على السؤال رقم (2 . 3 . 4 )			
<input type="checkbox"/> 1-3 مرات		<input type="checkbox"/> 4-5 مرات	
2. كم عدد مرات الحمل السابقة <input type="checkbox"/> اكثر من 5 مرات			
<input type="checkbox"/> نعم		<input type="checkbox"/> لا	
3. هل سبق وان حدث لديك اجهاض إذا كانت الاجابة نعم حددي عدد المرات .....			
<input type="checkbox"/> نعم		<input type="checkbox"/> لا	
4. هل تم دخول أي من أطفالك السابقين الى قسم الحضانه إذا كانت الاجابة نعم حددي سبب الدخول ----- -----			
<input type="checkbox"/> نعم		<input type="checkbox"/> لا	
5. هل اصيب احد أطفالك بصفار المواليد			
<input type="checkbox"/> نعم		<input type="checkbox"/> لا	
6. هل سبق وان تلقيت أي محاضرات توعية عن الصفار و مضاعفاته داخل مراكز الرعاية الاولية			
<b>☒ الحمل الأم في الطفل الحالي</b>			
<input type="checkbox"/> ولادة طبيعية		<input type="checkbox"/> ولادة قيصرية	
1. طبيعة الولادة لهذا الطفل <input type="checkbox"/> ولادة مساعدة (طلق صناعي - شفت)			
<input type="checkbox"/> نعم		<input type="checkbox"/> لا	
2. هل كنت تعانين من مشاكل صحية خلال فترة الحمل في طفلك الحالي؟ ان كانت الاجابة بنعم حددي <input type="checkbox"/> سكري حمل <input type="checkbox"/> ضغط حمل <input type="checkbox"/> فقر دم			

<input type="checkbox"/> نزيف خلال الحمل <input type="checkbox"/> التهابات بولية <input type="checkbox"/> اخرى حديدي.....	
<input type="checkbox"/> نعم	<input type="checkbox"/> لا
<b>إذا كانت الاجابة بنعم حديدي</b> <input type="checkbox"/> نزف شديد <input type="checkbox"/> تمزقات <input type="checkbox"/> اخرى حديدي.....	

<b>☒ معلومات عن طفل</b>			
1. الجنس		<input type="checkbox"/> ذكر	<input type="checkbox"/> انثى
2. العمر الطفل بالأيام		.....	
3. العمر الرحمي لطفلك الحالي	<input type="checkbox"/> اقل من 35 اسبوع	<input type="checkbox"/> 36-42 اسبوع	<input type="checkbox"/> اكثر من 42 اسبوع
4. الوزن عند الولادة	<input type="checkbox"/> اقل من 2.5 كجم	<input type="checkbox"/> 2.5-4 كجم	<input type="checkbox"/> اكثر من 4 كجم
5. هل يعانى الطفل من أي أمراض؟		<input type="checkbox"/> نعم	<input type="checkbox"/> لا
<b>إذا كان يوجد حديدي -----</b>			
6. ما هي طريقة الرضاعة لطفلك	<input type="checkbox"/> رضاعة طبيعية	<input type="checkbox"/> رضاعة صناعية	<input type="checkbox"/> كلاهما
7. ما هو وقت ظهور الصفار للأول مرة عند الطفل	<input type="checkbox"/> اول يوم	<input type="checkbox"/> ثالث - خمس ايام	<input type="checkbox"/> بعد اسبوع
8. هل تم إجراء فحوصات للتأكد من حالة الصفار قبل إخراج الطفل من المستشفى بعد الولادة؟		<input type="checkbox"/> نعم	<input type="checkbox"/> لا

☒ معرفة الامهات عن صفار ( يرقان) المواليد			
لا اعرف	لا	نعم	العبارة
			1. الصفار ينتج عن ارتفاع المادة الصفراء (البيليروبين) في الدم
			2. الصفار هو اصفرار الجلد والعينين عند الأطفال حديثي الولادة
			3. يحدث الصفار نتيجة وجود أمراض في الكبد عند الطفل
			4. يحدث الصفار بسبب عدم اكتمال نمو الكبد ونضجه
			5. الصفار هو حالة شائعة في الأطفال الذين يولدون خداج
			6. الصفار المرضي يحدث خلال أقل من 24 ساعة من ولادة الطفل
			7. الصفار يعتبر امر طبيعي يحدث لمواليد خلال 2-4 أيام
			8. يحدث الصفار بسبب عوامل وراثية
			9. عدم تطابق دم طفل مع الأم يعتبر سبب لحدوث الصفار عند الطفل
			10. حدوث العدوى لدى الطفل قد يسبب الصفار
			11. هل لديك معلومات عن أسباب الصفار غير قلة الرضاعة
			12. وجود الكدمات أو حدوث نزيف داخلي قد يسبب الصفار
			13. من أعراض الصفار عند الطفل لون براز يكون أصفر داكن.
			14. من أعراض الصفار أن يكون لون البول اصفر

			15. من أعراض الصفار صعوبة إيقاظ الطفل
			16. من أعراض الصفار عند الطفل عدم زيادة الوزن
			17. من أعراض الصفار عند الطفل ألم شديد في البطن
			18. يعتبر البكاء بصوت عالٍ عن الطفل من أعراض الصفار
			19. يختفي الصفار غير المرضي غالبًا في غضون أسبوعين دون أي علاج فقط يحتاج إلى متابعة
			20. تساعد الرضاعة الطبيعية المستمرة للطفل على إخراج المادة الصفراء (البيليروبين) من الجسم
			21. يمكن معالجة الصفار عند الطفل إلى العلاج بالأدوية الوريدية
			22. يمكن أن يعالج الصفار بواسطة العلاج الضوئي في المستشفى
			23. الحالات الشديدة جداً يكون علاج الصفار هو عملية تغيير للدم (تخفيف نسبة الصفار في الدم)
			24. يعتبر البدء بحليب الثدي لطفلك في وقت مبكر طريقة لمنع الصفار
			25. قد يصاب الطفل بمشاكل في الدماغ عند إهمال العلاج الصفار
			26. استمرار الصفار المرضي أكثر من ثلاثة أسابيع فإنه يعرض الطفل للصلصم
			27. يمكن أن يحدث تشنجات للطفل المصاب بالصفار

☒ ممارسات الامهات عن الصفار المواليد

العبارة	دائما	غالبا	احيانا	نادرا	ابدا
1. اقوم بإرضاع طفلي كل 2-3 ساعات					
2. اقوم بإرضاع طفلي حتى اشعر انه اخذ حاجته من الحليب					
3. اقوم بإيقاف الرضاعة اذا شعرت ان طفلي مصاب بالصفار					
4. اقوم بإعطاء طفلي حليب صناعي اذا شعرت انه لم يأخذ كفايته من الرضاعة الطبيعية					
5. اقوم بإعطاء طفلي الماء بدلا من الرضاعة					
6. استخدم السكر كعلاج للصفار					
7. استخدم العسل لعلاج طفلي من الصفار					
8. استخدم منقوع التمر أو ماء التمر لعلاج الصفار					
9. استخدم الاعشاب الطبيعية لعلاج طفلي من الصفار					
10. اقوم بتعريض طفلي للشمس لعلاج من الصفار					
11. اقوم بتسليط ضوء المنزل ( النيون ) فوق رأس أو وجه الطفل لعلاج الصفار					
12. اقوم بوضع الطفل في مكان مظلم اذا اصيب بالصفار					

					13. اتوقف عن تناول الاطعمة والسوائل الصفراء (كالذرة – الحلبة) اذا اصاب طفلي بالصفار
					14. اضع طوق من الثوم حول رقبة الطفل لعلاج الصفار
					15. اقوم بالتواصل مع الطبيب اذا شعرت بتغير في حالة طفلي

نشكركم لحسن تعاونكم

## Abstract in Arabic

عنوان الدراسة: معرفة وممارسات الأمهات بخصوص اليرقان لدى أمهات الأطفال المدخلين لأقسام الحضانات في المستشفيات الحكومية في قطاع غزة.

الباحثة/ حنين عبد الرحمن إسماعيل أبو شوارب

المشرف/ د. علي الخطيب

**المقدمة:** اليرقان المواليد: هو تغير لون الجلد إلى الأصفر والبرتقالي والصلبة ناتجة عن تراكم البيليروبين في الجلد والأغشية المخاطية ، ويعتبر سبباً شائعاً لدخول حديثي الولادة إلى مرافق الرعاية الصحية حول العالم ، ويعتبر اليرقان سبباً مهماً لحديثي الولادة معدل الوفيات والمرضاة والعجز مدى الحياة للناجين ويؤثر على 60% من الخدج و 80%. تعتبر معرفة الأم وممارساتها مهمة للتشخيص المبكر ليرقان المواليد بحلول ذلك الوقت، يمكن للأُم تحديد أن الطفل المصاب باليرقان يعاني من مضاعفات خطيرة وأحياناً يمكن أن يكون قاتلاً. الهدف من الدراسة هو تقييم المعرفة والممارسة فيما يتعلق باليرقان الوليدي بين الأمهات اللاتي تم قبولهن في قسم طب الولدان في المستشفيات الحكومية في قطاع غزة.

**منهجية الدراسة:** هي دراسة مقطعية وصفية وكمية. تكونت العينة من 305 أمهات تم اختيارهن بشكل مناسب وتوزيعهن بالتساوي على أقسام حديثي الولادة بمستشفى الرنتيسي للأطفال ومستشفى شهداء الأقصى ومستشفى مجمع ناصر الطبي ومستشفى الهلال الإماراتي للولادة. تم إنشاء استبيان وجمع البيانات من خلال استبيان المقابلات وجهاً لوجه. قامت الباحثة بتدريب أربعة جامعي بيانات مؤهلين لقيام الباحث بتوضيح وتدريبهم على الدراسة.

**النتائج:** أظهرت معرفة الأم حول اليرقان الوليدي أن 3.3% من المشاركات لديهن معرفة عالية باليرقان الوليدي بينما 17.1% لديهن مستويات معتدلة و 79.6% منهم لديهم مستوى منخفض من معرفة الأم حول اليرقان الوليدي ، ممارسات الأمهات فيما يتعلق باليرقان الوليدي أظهرت النتائج أن 1.6% من المشاركات لديهن ممارسة عالية للأمهات حول اليرقان الوليدي ، في حين أن 19.7% منهن لديهن مستويات معتدلة و 78.7% منهن لديهن مستوى منخفض من ممارسات الأمهات حول اليرقان الوليدي ، وأظهرت الدراسة عدم وجود العلاقة المتبادلة بين معرفة الأمهات حول اليرقان الوليدي وممارسات الأمهات حول اليرقان الوليدي ( $P > 0.05$ ).

**الاستنتاج والتوصيات:** غالبية الأمهات لديهن مستوى منخفض من المعرفة والممارسة فيما يتعلق باليرقان الوليدي بالإضافة إلى عدم وجود دلالة إحصائية بين معرفة وممارسة الأمهات. اقترح الباحث تقديم تعليم للأمهات حول التعامل الفعال مع الأطفال والأسرة وتمكينهم من اكتشاف علامات اليرقان في الأسبوع الأول من الحياة. وإشراك وسائل الإعلام الإلكترونية في زيادة وعي الأمهات باليرقان الوليدي.