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Determinants of Preterm Birth among Women at Al Makassed Hospital in Jerusalem: A Retrospective case-control study between 2013-2016

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Dedication

This thesis is dedicated to those who have been a source of inspiration and support throughout my academic journey.

To my beloved husband,

To my little munchkins, my endless source of giggles and inspiration, who may not understand this thesis yet, but know that just like building a giant LEGO castle, big things take time and perseverance!

To my parents, brothers and sisters, their support throughout my academic journey has been a source of immense strength.

To my mentors, friends and colleagues who offered encouragement and motivation.

Declaration

I clarify that this thesis submitted for the degree of master, is the result of my research, except where otherwise acknowledged, and that this study (or any part of the same) has not been submitted for a higher degree to any other university or institution.

Signed

Suha Abu Asal

Suha Abd Alftah Mohammad Abu Asal

Date: 18/8/2024

Acknowledgment

الشكر لله رب العالمين الذي منحني التوفيق والعون لإتمام هذا العمل

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List of Abbreviation

LMP: last Menstrual Period

PTB: Preterm Birth

IPTB: Indicated Preterm Birth

PET: Preeclampsia toxaemia

SPTB: Spontaneous Preterm Birth

PPROM: Preterm Premature Rupture of Membrane

IUGR: Intra Uterine Growth Restriction

MCMA: Monochorionic Monoamniotic

MCDA: Monochorionic Diamniotic

DCDA: Dichorionic Diamniotic

TCTA: Trichorionic Triamniotic

ART: Assisted reproductive technology

IVF: In veto Fertilization

IUI: Intrauterine insemination

IOO: Induction of ovulation.

CS: Caesarean Section

RDS: Respiratory Distress Syndrome

HTN: Hypertension

APH: antepartum hemorrhage

DM: Diabetes mellitus

GDM: Gestational Diabetes mellitus

CKD: Chronic kidney disease

APS: Antiphospholipid syndrom

IVH: intraventricular hemorrhage.

ROP: Retinopathy of prematurity

GA: gestational age

GW: gestational weight

BW: birth weight

SPSS: Statistical Package of Social Sciences

Abstract

Background: Preterm birth, defined as delivery before 37 weeks of gestation, poses significant health risks for newborns. Globally, an estimated 1 in 10 babies are born preterm), impacting roughly 13.4 million newborns annually. These premature births can lead to a variety of developmental issues. Studies suggest that around 20% of children born preterm worldwide experience long-term health problems, including learning disabilities, vision or hearing impairments, and chronic health conditions. The situation in Palestine, according to Palestinian Central Bureau of Statistics (PCBS) estimated at around 8.8 in west bank and 23% of their deliveries result in preterm births. (*UNICEF State of Palestine,2015)*.

These preterm infants also face similar developmental outcomes, with about 55% experiencing some form of long-term disability, highlighting the urgent need for enhanced prenatal and postnatal care to improve outcomes for these vulnerable populations.

Study problem and justification: Existing researchers discussed various risk factors, including maternal age, obstetric history, complications, and medical conditions. However, nuanced examinations are needed to understand the complex interplay of maternal, fetal and socio-demographic factors, with disparities observed globally and within specific regions.

In the Palestinian context, particularly in Jerusalem, introduces unique challenges influenced by socioeconomic and political factors, impacting maternal health and access to quality healthcare. Specific risk factors for preterm birth in different Palestinian regions include multiple pregnancies, previous preterm births, and inadequate antenatal care, emphasizing the need for targeted interventions

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Aim & Hypothesis: The purpose of this study is to investigate the determinants of preterm birth and possible risk factors among Palestinian women at Almakassed hospital in Jerusalem aged 18-40 years old in 2013-2016. The objectives are to identify the main characteristics of mothers who gave premature babies, to investigate the risk factors of Preterm birth, maternal, fetal factors, impact of sociodemographic status, to identify the prevalent long-term developmental outcomes in preterm infants.

Study methodology: Retrospective Case-control design: In a case-control design, (in this case, preterm birth) of (case) and a control group of (controls) without the outcome:(Have full term), matched for residence and age.

Statistical Analysis: Data analyses were performed by using version 28 of the Statistical Package for Social Sciences (SPSS). Descriptive and inferential techniques were used to answer research questions.

Ethical Considerations: this study was submitted to Al Quds University-SPH graduate studies committee. Approval was obtained from Al- Quds University. Approval from Al-Makassed hospital was obtained. Approval from each participant was obtained to be involved in the study, and Al- Makassed hospital approval was obtained. Ethical codes compatible with requirements of Helsinki committee were respected including (confidentiality, anonymity, right to reject participation, the right to be informed about results, and that the data was used for scientific purposes only and that names were not used neither in analysis or reporting). Each participant was asked with phone call a verbal consent form declaring their wailings to participate in this study.

Results: This study involved 978 women, socio-demographic characteristics, maternal, fetal factors and health care were examined to determine their impact on gestational age at delivery. The study found statistically significant differences in gestational age at delivery based on several factors, firstly the maternal factors There was a significant positive relationship between gestational age and the number of parties. There was no significant difference in gestational age between women with and without a history of abortion. Significant differences in gestational age were observed based on pregnancy methods. Medical comorbidities and a history of preterm delivery were associated with significantly lower gestational ages, while cervical incompetence showed no significant difference. For fetal factors, chronicity type significantly affected gestational age. Among sociodemographic factors, significant differences were noted between tobacco exposed and whom not and education levels but not across different age categories, regarding healthcare factors, more frequent prenatal care is positively correlated with longer pregnancies.

Also This study examined developmental outcomes among preterm infants, revealing a notable prevalence of complications. Developmental complications were present in 55.0% of preterm infants, reflecting the significant impact of premature birth on developmental

outcomes. Intracranial hemorrhage affected 28.2% of infants. Respiratory complications were observed in 49.7% of the infants, Nephrological complications were less common, affecting 12.1%. Retinopathy was seen in 36.8% of the infants.

Conclusion: This study investigated the determinants of preterm birth and associated risk factors among Palestinian women aged 18-40 years and its impact on child development at Al Makassed Hospital in Jerusalem from 2013 to 2016. Key findings indicate significant relationships between various socio-demographic, medical, and healthcare factors and gestational age at delivery. These findings emphasize the multifaceted nature of preterm birth determinants, suggesting that improving prenatal care access and addressing socio-demographic and medical risk factors could mitigate the incidence of preterm births and enhance child development outcomes in this population. These findings underscore the substantial risks faced by preterm infants, including neurological, respiratory, renal, and visual complications.

Chapter One

Introduction

1.1 Background:

Preterm birth remains a significant public health challenge worldwide, with infants born preterm facing higher risks of mortality, morbidity, and long-term developmental disabilities. While the determinants of preterm birth are complex and multifactorial, understanding the factors that contribute to preterm birth outcomes is critical for developing effective interventions to improve outcomes for preterm infants. Approximately 13.4 million infants are born prematurely each year, constituting a significant contributor to infant mortality, responsible for 40% of deaths among children under the age of five years specially within the initial four weeks of life. Paradoxically, the prevalence of preterm births remains high, yet there is a notable lack of documented information regarding the underlying risk factors associated with this global issue (Etil et al., 2023)

Some of the reasons why studying preterm birth is important include: Understanding the risk factors: Preterm birth is a complex and multifactorial phenomenon that can be influenced by a range of biological, environmental, and social factors that contribute to the incidence of preterm birth, which can inform the development of effective prevention and intervention strategies. Preterm birth not only poses a substantial health challenge but also represents a significant economic burden on healthcare systems and families alike. The financial implications of providing specialized care for preterm infants, coupled with potential long-term healthcare needs, underscore the urgency of understanding and addressing the factors

contributing to preterm births. “it is necessary to make better clinical decisions with accurate assessment of risk factors, complications, and realistic predictions related to PTB and ETB, which should ultimately provide a way forward for precision health and to help reduce the burden and the consequences associated with PTB and ETB. (Mohamed et al., 2022)

1.2 Study justification:

Preterm birth is a global public health concern, contributing significantly to neonatal mortality and morbidity, Research has identified several risk factors for preterm birth. However, there is a need for more detailed studies to explore how these maternal, fetal, and socio-demographic factors interact, as there are notable disparities in preterm birth rates both globally and within specific regions. n the Palestinian context, particularly in Jerusalem, the situation is further complicated by socioeconomic and political challenges that affect maternal health and access to quality healthcare. Factors specific to preterm birth in Palestinian regions include multiple pregnancies, previous preterm births, and insufficient antenatal care, highlighting the need for tailored interventions to address these issues.

1.3 Problem statement:

Preterm birth, “defined as delivery before 37 weeks of gestation” (WHO,2023) is a major public health concern globally. It is a leading cause of neonatal mortality and morbidity, with preterm infants facing a higher risk of adverse outcomes, including respiratory distress syndrome, developmental delays, and long-term neurological issues. While certain risk factors such as maternal age and medical history are well-established, there is a need for a comprehensive exploration of the multifaceted determinants contributing to preterm births. Identifying the determinants of preterm birth is crucial for developing effective interventions to improve outcomes for preterm infants.

Existing research has provided insights into some factors influencing preterm birth, such as maternal age (parity, abortions, presence of infertility, Obstetric history, Obstetric complications, and medical conditions. However, a more nuanced examination is required to uncover the complex interplay of biological, environmental, and socio-demographic factors. Additionally, variations in preterm birth rates across different populations necessitate a focused investigation into the unique determinants within specific contexts. By gaining a deeper understanding of these determinants, the study aims to contribute to the long-term developmental outcomes in preterm infants, including cognitive, motor, and behavioral

development and respiratory complications, effects on mothers and develop targeted interventions and policies to reduce the incidence of preterm births and improve maternal and neonatal outcomes.

While global research has identified maternal, fetal, and environmental factors associated with preterm birth, existing data may not fully capture the nuances of the Palestinian context in Jerusalem.

There have been numerous studies conducted around the world on the determinants of preterm outcome. In 2020, the global prevalence of preterm births was estimated to be 9.9%, resulting in approximately 13.4 million live births occurring before full term. The highest rate of preterm births was observed in southern Asia at 13.2%, almost double the rate in the Sustainable Development Goal region of eastern Asia, south-east Asia, and Oceania (excluding Australia and New Zealand), which stood at 6.8%. Despite regional trends, significant national variations persisted. In southern Asia, Bangladesh had the highest preterm birth rate at 16.2%, followed by Pakistan at 14.4%, and India at 13.0% in 2020. In Latin America, preterm birth rates ranged from 5.8% in Nicaragua to 12.8% in Suriname. These findings highlight the considerable disparities in preterm birth rates both globally and within specific regions and countries. (Houma et al., 2023a)

Preterm birth continues to be a notable public health issue in Palestine. Jerusalem, in particular, encounters distinctive socioeconomic and political challenges that influence maternal health. The Palestinian community as a whole grapple with a generally low socioeconomic status, and a considerable portion of the population lives below the poverty line. Compounding these challenges is the overarching reality of living under occupation.

In the north of west bank, the analysis identified several significant risk factors associated with preterm birth. The following five factors were found to have statistical significance: Multiple Pregnancy, Previous History of Preterm Birth, Preterm Premature Rupture of Membrane, Medical Indications of Preterm Birth, Disorder Associated with Pregnancy. Following the analysis of socio-demographic data, the results indicate that there is no discernible relationship between maternal age and the occurrence of preterm birth. Additionally, monthly income was not identified as a significant risk factor for preterm birth based on the analysis (Sarhan, A. L., & Anini, H. E. 2015).

In Gaza, Annually, 14,000 women are identified as being at high risk, and 23% of their deliveries result in preterm births. This substantial proportion of preterm births necessitates the transfer of approximately 10,000 neonates to neonatal intensive care units for immediate health care and early interventions. (UNICEF, n.d.). The identified risk factors for preterm birth in the Gaza Strip include older maternal age, refugee status, inadequate antenatal care, insufficient weight gain during pregnancy, and a history of previous preterm births. These findings suggest that factors such as poor economic status, high fertility, and a lack of awareness among women regarding proper nutrition during pregnancy may also contribute to an increased predisposition to preterm birth in this region. Addressing these risk factors and improving awareness and access to proper prenatal care and nutrition may be essential in reducing the incidence of preterm births in the Gaza Strip. (Abu Hamad et al., 2007)

Regards its complications in Palestine the primary contributors to neonatal mortality were identified as prematurity, respiratory infections, and congenital malformations, collectively accounting for 61% of neonatal deaths. This highlights the significance of addressing these specific factors to make substantial progress in reducing neonatal mortality rates. (UNICEF, n.d..)**.**

1.4 Aims of the study:

The purpose of this study is to investigate the determinants of preterm birth and possible risk factors among Palestinian women in Jerusalem aged 18-40 years old in 2013-2016. It is objectives are to identify the main characteristics of mothers who gave premature babies, to investigate the risk factors of Preterm birth, maternal, fetal factors, sociodemographic factors and health care factors.

1.5 Study Hypothesis and sub hypothesis:

- **“There is a significant relationship between gestational age at delivery in weeks and the number of maternal factors”.**

  Six sub-hypotheses related to the hypothesis were tested which state:

  1. “There is a significant relationship between gestational age at delivery in weeks and the number of parties”

2. “There is a significant difference in gestational age at delivery in weeks due to the status of abortions”
3. “There is a significant difference in gestational age at delivery in weeks due to the pregnancy methods”
4. “There is a significant difference in gestational age at delivery in weeks due to the suffering from medical comorbidities”
5. “There is a significant difference in gestational age at delivery in weeks due to history of preterm delivery”
6. “There is a significant difference in gestational age at delivery in weeks due to the presence of cervical incompetence”

- **“There is a significant difference in gestational age at delivery in weeks due to fetal factors”.**

  Two sub-hypotheses related to the hypothesis were tested which state:

  1. “There is a significant difference in gestational age at delivery in weeks due to chorionicity type”
  2. “There is a significant difference in gestational age at delivery in weeks due to fetal medical comorbidities”

- **“There is a significant relationship between gestational age at delivery in weeks and sociodemographic factors”.**

  Three sub-hypotheses related to the hypothesis were tested which state:

1. “There is a significant difference of gestational age at delivery in weeks due to the exposure to tobacco”
2. “There is a significant difference in gestational age at delivery in weeks due to the age category of women”

3. “There is a significant difference in gestational age at delivery in weeks due to the education level”

- **“There is a significant relationship between gestational age at delivery in weeks and the number of visits to the clinical center”.**

1.6 Thesis structure:

This thesis will be presented in 6 chapters as follows:

- **Chapter one:** contains the background of the study, study justification, problem statement, study aims, objectives, and expected outcomes.
- **Chapter two** includes a literature review of international, regional, and national studies and research conducted.
- **Chapter three**: includes the study conceptual framework.
- **Chapter four**: includes the study area, study methods, population, sampling method, sample size, ethical consideration, data collection, processing, and analysis.
- **Chapter five**: presents the results of the study.
- **Chapter six:** includes a discussion, study limitations, conclusions, and multi-level recommendations.

Chapter two

Literature Review

2.1 Introduction

Preterm birth, according to the World Health Organization (WHO), defined as “delivery before 37 completed weeks of gestation or fewer than 259 days from the first date of a woman's last menstrual period (LMP)” (*Preterm Birth*, n.d.), is a major public health concern due to its association with increased morbidity and mortality rates for both the mother and the infant. The determinants of preterm birth are multifactorial, and several studies have investigated the various factors that contribute to its occurrence. In this literature review, we will examine the current state of knowledge on the determinants of preterm birth, with a focus on recent studies.

An estimated 15 million infants are born preterm each year, accounting for approximately 11% of all live births. The incidence of preterm birth varies widely across countries, 13.4 million babies were born preterm in 2020, (Ohuma et al., 2023a).

With rates ranging from 5% in some European countries to 18% in some African countries. In terms of global trends, preterm birth rates have been increasing over the past few decades. a study by (S. Chawanpaiboon, 2019) found that the global preterm birth rate increased from 9.8% in 2000 to 10.6% in 2014. (Houma et al., 2023b). In 2019, there were 5·30 million deaths (95% uncertainty range 4·92–5·68) among children younger than 5 years, primarily due to preterm birth complications. (Perin et al., 2022) The March of Dimes' goal is to reduce the incidence of preterm birth to 5.5% by the year 2030.

2.2 The potential risk factors associated with preterm birth includes

Maternal age has been identified as a determinant of preterm birth, with both very young and older mothers being at increased risk. A study conducted by (Hu et al., 2020) in China found that women younger than 20 years of age had a higher risk of preterm birth than women aged 20-29 years. Similarly, a study conducted by (Esposito et al., 2022) in Italy found that women aged 35 years or older had a higher risk of preterm birth than women aged 25-29 years. The reason for the increased risk in very young and older mothers is thought to be due to their increased likelihood of having pre-existing medical conditions or complications during pregnancy. The prematurity rate was 4.7% among women with a low educational level, 3.7% among those with a medium level and 3.0% among women with higher education. (Granges et al., 2023). study findings individuals with lower socio-economic status appear to experience a disproportionately higher prevalence of preterm births, highlighting a potential association between socio-economic factors and adverse pregnancy outcomes. (Johnson et al., 2020)

Infections have also been identified as a determinant of preterm birth, with maternal infections such as urinary tract infections and sexually transmitted infections increasing the risk, a study conducted by Werter DE, (2021) Mothers with UTI faced an elevated risk of preterm birth overall (12% versus 5.1%, adjusted odds ratio 2.5; 95% confidence interval 1.7-3.5), including the specific risk of spontaneous preterm birth before 37 weeks. (Werter et al., 2021)

The occurrence of preterm birth (PTB), both before 34 weeks and before 37 weeks of gestation, was notably higher in the group testing positive for Group B Streptococcus (GBS) compared to the group testing negative for GBS. Specifically, the rates were 6.6% versus 0.5% ($p = 0.001$) for PTB before 34 weeks and 9.8% versus 4.3% ($p = 0.047$) for PTB before 37 weeks. This suggests a statistically significant association between GBS positivity and an increased risk of preterm births at both examined gestational periods.

Similarly, a study conducted by Gao R. (2021) In the general population, mothers who contracted chlamydia, gonorrhea, or syphilis exhibited an elevated risk of preterm birth when compared to mothers without these infections. The adjusted odds ratios for preterm birth were as follows: 1.03 (95% confidence interval, 1.02-1.04) for chlamydia, 1.11 (95% CI, 1.08-1.15) for gonorrhea, 1.17 (95% CI, 1.11-1.22) for syphilis, and 1.06 (95% CI, 1.05-1.07) for any

sexually transmitted infection. The reason for the increased risk in infections is thought to be due to the inflammatory response that occurs. (Gao et al., 2021) in the mother's body, leading to preterm labor. Medical health conditions also show an interplay, such as hypertension, diabetes, and autoimmune diseases, have also been identified as determinants of preterm birth. A preterm birth was linked to about a 1.2-fold increased risk of type 1 maternal diabetes and a 1.3-fold increased risk of type 2 diabetes.) Crump et al., 2020(An increase in systolic blood pressure (SBP) by one standard deviation (SD = 12.2 mmHg) and diastolic blood pressure (DBP) by one standard deviation (SD = 9.3 mmHg) was linked to a 14% higher risk of preterm delivery (95% confidence interval [CI]: 2 to 27) for SBP and a 20% higher risk (95% CI: 4 to 37) for (DBP. Delker et al., 2022). Similarly, that women with lupus had a higher risk of preterm birth than women without lupus, (RR: 2.90; 95% CI: 2.42, 3.48), as did women with Crohn's (cesarean delivery RR:1.31, 95% CI: 1.08, 1.60; preterm delivery RR: 1.84, 95% CI (1.37, 2.49) (Williams et al., 2019), The reason for the increased risk in chronic health conditions is thought to be due to the increased likelihood of complications during pregnancy. Having anemia seems to be contributed significantly increased a mother's risk of having a premature baby (PTB). Mothers with anemia were nearly 3 times more likely to have an early delivery compared to mothers without anemia (Abaraya et al., 2018). It is important to note that Premature membrane rupture (AOR = 9.30; 95% CI = 3.18–27.16) (Rutayisire et al., 2023) also play a significant role. Mothers who had previously given PTB were much more likely (6 times more likely) to have another premature baby compared to mothers who hadn't had a premature baby before (Muhumed et al., 2021).

Other factor influences the outcome as a study found a strong link between short cervical length (<25 mm) and an increased risk of preterm birth ($p < 0.05$). (yıldız, 2023). Uterine abnormalities affect the time of delivery 2.5 times more common in the cases group compared to the control group. (27.4 vs. 9.8%, $P < 0.001$). (Wang et al., 2023).

The importance of considering health care of the mothers in a prenatal care factors (such as the timing and frequency of prenatal care visits), Women who had 1 or fewer prenatal care visits (ANC) were more than twice as likely to have a premature baby (PTB) compared to women who had 3 or more visits (OR 2.37, 95% CI 2.07 to 2.70). (Pervin et al., 2020).

According to mother life style habits also contribute to the likelihood of preterm birth. A study showed that smoking any time before or during the first half of pregnancy raised the chances of a baby being born premature (Liu et al., 2020). Mothers who use stimulant or

depressant drugs during pregnancy are more likely to deliver their babies prematurely (Garrison-Desany et al., 2020). Furthermore, Diet and poor nutrition in a research indicates that women who did not receive dietary supplementation during pregnancy faced 2.43 times higher odds of experiencing preterm birth compared to their counterparts who received such supplementation (Adjusted Odds Ratio = 2.43, 95% Confidence Interval: 1.51 to 3.91). This suggests a significant association between the lack of dietary supplementation and an increased likelihood of preterm birth. (Abadiga et al., 2021). Beyond the obvious culprits, additional fetal factors emerge. Multiple gestation is another determinant of preterm birth, as women carrying twins, triplets, or more are at increased risk. the likelihood of preterm birth is 2.4 times greater in multiple pregnancies compared to single pregnancies, with women carrying triplets having the highest risk. The reason for the increased risk in multiple gestations is due to the increased strain on the mother's body and the increased likelihood of complications during pregnancy. (Mulualem et al., 2019). A cumulative effect emerges from the presence of multiple risk factors. The odds ratios and 95% confidence intervals (CI) for (PTB) revealed distinct patterns for births conceived using ovulation drugs, the odds ratio was 2.17 (CI 0.99, 4.75), while neonates conceived through intrauterine insemination (IUI) had an odds ratio of 3.17 (CI 1.4, 7.19), and those conceived by in vitro fertilization (IVF) showed an odds ratio of 4.24 (CI 2.05, 8.77). These values are in comparison to women with subfertility who did not undergo any treatment during the conception month. (Sanders et al., 2022). Notably, all assisted reproductive technologies (IVF, IUI, and Induction of ovulation (IOO)) were associated with an increased likelihood of preterm birth and low birth weight. This association was primarily attributed to a higher incidence of multiple gestation births in these groups. Genetic abnormalities of fetus include IUGR plays a role in the time of birth. The relationship between growth restriction and preterm delivery is strongest for preterm births before 34 weeks of gestation for spontaneous or premature rupture of membranes related preterm births, the association is significant (OR 1.51))Zeitlin et al., 2000)

2.3 Types of preterm birth

There are several different types of preterm birth, which are classified based on the timing of delivery and the underlying cause. The main types of preterm birth are Spontaneous preterm births occurs when labor begins naturally either because of preterm labor or premature rupture of membrane the most common type of preterm birth, accounting for approximately 75% of all preterm births. Secondly Medically indicated preterm birth: This type of preterm birth occurs when delivery is medically necessary to protect the health of the mother or the baby. Common reasons for medically indicated preterm birth include preeclampsia, fetal distress, and placental abruption. According to the weeks of delivery it divides to Early preterm birth before 34 weeks of gestation and Late preterm birth between 34 and 36 weeks of gestation (World Health Organization: WHO, 2023).

2.4 Diagnosis

The diagnosis of preterm birth is typically made based on gestational age and the presence of signs and symptoms of labor.

The most accurate method of determining gestational age is through ultrasound, which can measure the size of the fetus and estimate gestational age with high accuracy. Other methods, such as measuring fundal height or using menstrual dates, are less accurate. Cervical length measurement: A short cervical length has been identified as a risk factor for preterm birth. Transvaginal ultrasound can measure cervical length and identify women at increased risk of preterm birth. Fetal fibronectin (fFN) testing is a protein that is present in cervical and vaginal secretions during pregnancy. The presence of fFN in vaginal secretions between 22 and 35 weeks of gestation is a strong predictor of preterm birth. Signs and symptoms of labor include regular contractions, lower back pain, abdominal cramping, vaginal bleeding, and fluid leaking from the vagina. Biophysical profile (BPP) is a test that combines ultrasound and fetal heart rate monitoring to assess fetal well-being. A low BPP score may indicate the need for early delivery to prevent fetal distress. It is important to note that not all cases of preterm birth can be predicted or prevented, and some cases may occur without warning signs. However, early identification of women at increased risk of preterm birth can allow for close monitoring and timely intervention to improve outcomes for both mother and baby (*Preterm Labor Diagnosis*, n.d.).

2.5 Complications of preterm birth

Preterm birth can lead to a wide range of complications, which can affect both the infant and the mother, on the neonatal side the focus turns to the immediate struggles of premature lungs.

Claire E, (2016) sheds light on the long-term impact on brain development, revealing higher risks found brain volumetric, morphologic and microstructural alterations in adults born VP/VLBW, suggesting very preterm birth leads to long-lasting brain structural impact in adulthood. (Kelly et al., 2023). And intraventricular hemorrhage. The study of Deger et al. (2021), found that babies born preterm have a nearly doubled risk of developing CKD later in life, while babies born extremely preterm have a tripled risk (adjusted hazard ratio 1.94, 95% confidence interval 1.74 to 2.16; P<0.001; 3.01, 1.67 to 5.45; P<0.0) (Crump et al., 2019). Also Sepsis is a life-threatening condition that can occur in preterm infants due to their immature immune systems and increased susceptibility to infections**.** Common risk factors for sepsis in preterm infants include umbilical catheters, respiratory complications, and skin barrier immaturity. Symptoms of sepsis can include fever, rapid breathing, lethargy, poor feeding, and jaundice

On the mother side the emotional and psychological toll on mothers navigating the neonatal intensive care unit and its uncertainties becomes a crucial piece of the puzzle. (Dien et al., 2022).

Also preterm birth is associated with an elevated risk of postpartum hemorrhage, necessitating proactive measures to manage and prevent excessive bleeding during and after delivery. (Reddy et al., 2015).

2.6 Mortality and Morbidity of Preterm Birth

Mortality:

Leading cause of death under 5: Preterm birth complications are the leading cause of death among children under 5 years old, responsible for approximately 900,000 deaths globally each year.

Increased risk with lower gestational age: The risk of death for a preterm infant increases dramatically the earlier they are born. Babies born extremely preterm (before 28 weeks) have the highest mortality rate.

Improvements over time: Despite these challenges, advancements in neonatal care have significantly reduced mortality rates for preterm infants over the past few decades (Manuck et al., 2016).

Morbidity:

Lifelong health complications: Preterm infants are more likely to experience a range of short and long-term health problems compared to full-term babies.

Spectrum of complications: These complications can include respiratory issues, developmental delays, vision and hearing problems, cerebral palsy, and chronic health conditions.

Severity varies: The severity of these complications depends on the gestational age and birth weight of the infant (Zhu et al., 2021).

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2.7 Management of preterm birth:

The management of preterm birth depends on the gestational age of the fetus, the severity of symptoms, and the presence of complications. The following are some common management strategies for preterm birth:

Antenatal corticosteroids typically given to women who are at risk of preterm birth between 24 and 34 weeks of gestation. Tocolytic therapy used in women who are experiencing preterm labor between 20 and 34 weeks of gestation. Magnesium sulfate help prevent cerebral palsy in premature infants and is commonly used in women at risk of preterm birth between 24 and 32 weeks of gestation. Antibiotics in women who have a positive culture for Group B Streptococcus or other infections that can cause preterm birth. The timing and method of delivery will depend on the gestational age of the fetus, the presence of complications, and the health of the mother. Premature infants often require specialized care in a neonatal intensive care unit (NICU). Treatment may include respiratory support, feeding support, and monitoring for complications (Preterm Labor - Diagnosis and Treatment - Mayo Clinic, 2022).

2.8 Prevention

Prevention of preterm birth is a critical goal in maternal and child health, requiring a multifaceted approach. Effective strategies include providing comprehensive prenatal care to monitor and manage health conditions in pregnant women, promoting a healthy lifestyle through proper nutrition, and reducing stress levels. Education on the risks associated with preterm birth and the importance of antenatal care can empower expectant mothers to take proactive steps. Additionally, addressing socio-economic factors, such as ensuring access to quality healthcare and support services, can mitigate some of the risks associated with preterm births. Medical interventions, such as progesterone supplements and cervical cerclage, can be utilized for women identified as high-risk. By integrating these measures, the incidence of preterm birth can be significantly reduced, improving outcomes for both mothers and infants (Treatments to Prevent Premature Birth (for Parents), n.d.).

Chapter three

Conceptual Framework

3.1 Introduction

This visual conceptual framework depicts the relationships between factors influencing preterm birth rates and child development among Palestinian women delivering at Al Makassed Hospital in Jerusalem between (2013-2016).

3.2 Conceptual framework:

The conceptual component translates the theoretical concepts into specific variables and relationships to be studied. It consists of two primary sections: Preterm Birth Factors and Child Development Outcomes**.**

3.2.1 Preterm Birth Factors

This section identifies the conditions and factors associated with preterm births, focusing on the context of Al Makassed Hospital in Jerusalem from 2013 to 2016. Key factors include:

Conceptual Definitions:

Dependent variable: This is the variable that is measured or observed by the researcher. It is the presumed effect of changes in the independent variable. In our study preterm birth was:

- Preterm Birth: Delivery of a baby before 37 weeks of gestation (a normal pregnancy lasts about 40 weeks). (World Health Organization: WHO, 2023b).

Independent variable: This is the variable that is manipulated or controlled by the researcher. It is the presumed cause of changes in the dependent variable. In our study the independent variables were:

- Maternal Factors: Encompass a range of characteristics and conditions associated with the pregnant woman can influence outcomes in the context of pregnancy, childbirth, and maternal health, such as the mother's age, health status, lifestyle choices, and medical history (Omar et al., 2022).

- Fetal Factors: Represent attributes and conditions related to the developing fetus during pregnancy include multiple gestation in which pregnancy where more than one fetus the stage begins at the end of the embryonic period, which is around the 9th week after fertilization, and continues until birth (twins, triplets, or more) develops simultaneously in the uterus, gestational age the length of time a pregnancy has progressed, measured from the first day of the woman's (LMP) to the current date, and the presence of any abnormalities or complications (Premature Birth - Symptoms and Causes - Mayo Clinic, 2024).

- Sociodemographic Factors: Social and demographic characteristics of individuals or populations. These variables, such as age, education, income, ethnicity, marital status, and residence, are considered influential elements that can affect various outcomes in health or social studies (Hidalgo-Lopezosa et al., 2019).

- Prenatal care visits: A series of regular appointments a pregnant woman has with her healthcare provider throughout her pregnancy (Pervin et al., 2020).

3.2.2 Child Development Outcomes:

This section focuses on the developmental milestones and health outcomes of children born preterm at Al Makassed Hospital. Key areas of development include:

- Neurodevelopmental Impairments**:** refers to the potential challenges baby can face, including cognitive delays, learning disabilities, and behavioral problems. Preterm birth can increase the risk of delays in cognitive development, learning, and motor skills (Chung et al., 2020).

- Organ developmental impairment: Incomplete development of organs and tissues that normally occurs during the later stages of pregnancy (Van Hood et al., 2019)
- Respiratory System**:** Underdeveloped lungs, leading to breathing difficulties like respiratory distress syndrome (RDS) (Zivaljevic et al., 2024).

- Renal System**:** Kidney function may be impaired in preterm infants, leading to difficulties in regulating fluids and electrolytes (Akalay et al., 2024).

- Visual Systems: Eye disorder that primarily affects premature infants, like retinopathy of prematurity (ROP), which can cause vision impairment or blindness (Zivaljevic et al., 2024).

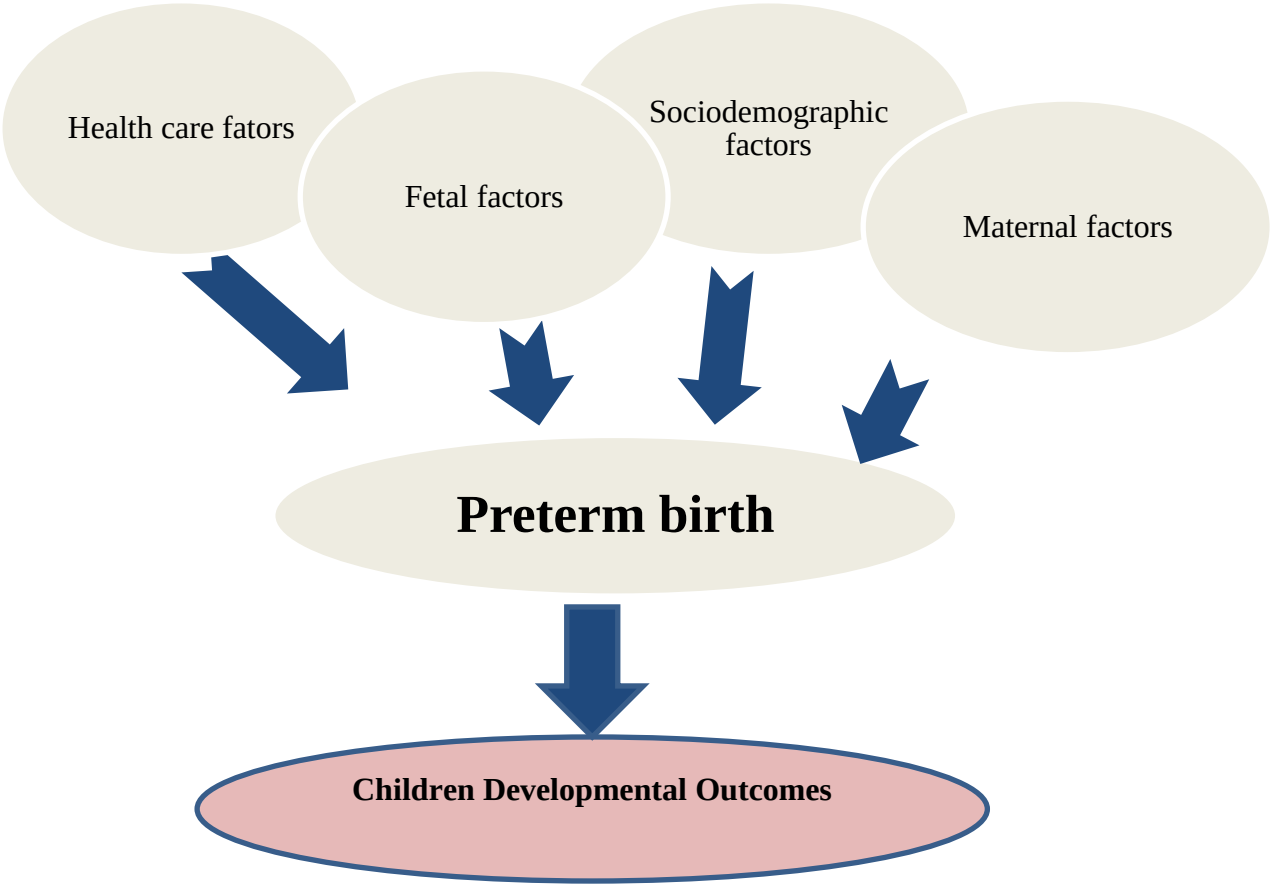

Figure3. 1: Study Conceptual Framework, preterm birth is the dependent variable and all other groups of variables in the figure are the independent variables in our study.

Chapter four

Methodology

This chapter, how the research methodology was conducted, The study design, study population, study settings, tools and data collection method, reliability and validity, statistical analysis, ethical considerations.

1.1 Design:

Retrospective Case-control design was used: In a case-control design, we selected participants with the outcome of interest (in this case, preterm birth) of (case) and a control group of (controls) without the outcome (Have full term), matched for residence and age, examined differences between the groups. The cases and control were taken from computerized perinatal database from Al Makassed hospital in Jerusalem. Case-control studies offer several advantages in epidemiological research. They are notably efficient, as they can be conducted relatively quickly and inexpensively compared to other study designs. This efficiency is particularly beneficial when investigating outcomes that are rare, as case-control studies are well-suited to focus on uncommon conditions by selecting individuals who already have the outcome of interest. Additionally, these studies can examine multiple exposures or risk factors simultaneously, enabling researchers to identify potential interactions between different

variables and providing a comprehensive understanding of the factors contributing to the outcome.

1.2 Study Settings:

The study was conducted at Al Makassed hospital in Jerusalem.

1.3 Study population:

The participants of this study were all the women who delivered a premature baby between January 2013-december 2016 as long as they fit in the inclusion criteria.

1.4 Study sample:

The **whole population** in the registries in 2013- 2016 in al Makassed hospital were taken.

Number of women who delivered a premature baby at this period was 489 women. For whom that took a matched (age and residence) 489 control of women with normal delivery.

Inclusion criteria: The criteria for cases in this study focused on live preterm births between 2013 and 2016. The gestational age for these cases was defined as less than 37 weeks. In contrast, the control group consisted of full-term deliveries, with a gestational age range from 37 to 40 weeks. This distinction allowed for a clear comparison between preterm and full-term births, facilitating the investigation of factors associated with preterm deliveries.

Exclusion criteria: Mothers with iatrogenic preterm birth.

1.5 Study tool:

Computerized medical records that includes demographics, diagnoses, medical history, medications, procedures, laboratory results, and delivery details were used for both cases and controls.

1.6 Data collection:

A- Data capturing sheet from the medical file:

Primary data was collected through analyzing medical records of patients and highly structured questionnaires were filled directly by phone call contact with enrolled patients.

B- Follow up data capturing sheets:

Follow up data was captured through a special section in the capturing sheets that asked about the following variables based on mother's knowledge (through phone calls) If the child has been medically diagnosed as:

- Cognitively impaired.
- RDS.
- Retinopathy.
- Nephropathy.

4.7 Data analysis:

Data analyses were performed by using version 28 of the Statistical Package for Social Sciences (SPSS). Descriptive and inferential techniques will be used to answer research questions with the following tools: Frequencies and percentages to describe the sample's characteristics. Mann-Whitney U test was used to examine the differences between the mean score of the dependent variable with non-normal distributions or non-equal variance in two groups. Kruskal Wallis test was used to examine the differences between the mean score of the dependent variable with non-normal distributions or non-equal variance in more than two groups. Simple linear regression was used to examine the relationship between a quantitative dependent variable and a quantitative independent variable.

4.8 Ethical consideration:

This proposal was submitted to Al Quds University /School of Public Health's Ethical Review Board committee for discussion and approval. The permission to conduct the study was obtained from Al- Quds University was obtained. Approval from Al- Makassed hospital was obtained. Approval from each participant was obtained to be involved in the study Al-

Makassed hospital was obtained. Information sheet explaining the purposes, aims and objectives of the study was sent to each participants. Ethical codes compatible with requirements of Helsinki committee was respected including (confidentiality, anonymity, right to reject participation, the right to be informed about results, and that the data was used for scientific purposes only and that names wouldn't be used neither in analysis or reporting. Each participant was requested verbally a consent form declaring their wailings to participate in this study.

Chapter Five

Results

5.1 Introduction

This chapter includes the presentation of data analysis and testing the study hypotheses by answering the research questions and reviewing the study's main results by analyzing the various variables. The SPSS program was used to obtain the study results that will be presented and analyzed in this chapter. After collecting the required data, we present the study results to answer the questions that appeared and represent the study's problem.

5.2 Descriptive analysis

5.2.1 Gestational age at delivery in weeks of the study sample

Our study sample consisted of 978 women, 50% had a preterm birth, and 50% did not. As shown in Table 5.1 the mean and standard deviation values of women who had a preterm were 33.72±2.981 weeks, while the mean and standard deviation values of women who had not were 38.32±1.085 weeks.

Table 5. 1: descriptive analysis of preterm birth

Preterm birth	N	Minimum	Maximum	Mean	Std. Deviation
Had a preterm birth	489	22	36	33.72	2.981
Had not	489	34	40	38.32	1.085

5.2.2 Demographic characteristics of the study sample

Through the study, we looked at certain characteristics including three socio-demographic characteristics: age category, education level, smoking exposure.

According to the result in Table 5.2, 978 women participated in this study, 42.3% of them were less than 25 years old, 24.3% were between 26 and 30 years old, 21.4% were between 31 and 35 years old, and 12.1% were above 35 years old. The education level of 66% of women is medium, 17.8% and 16.2% of the sample had a low and high education level respectively. In addition, 13.3% of women have an exposure to smoking.

Table 5. 2: Descriptive analysis of the demographic characteristics of the study sample

Variables	**Frequency**	**Valid Percentage (%)**
Exposure to smoking		
Yes	129	13.3
No	839	86.7
Educational level		
Low	173	17.8
Medium	640	66.0
High	157	16.2
Age		
Less than 25 years	413	42.3
26-30 years	237	24.2
31-35 years	209	21.4
More than 35 years	118	12.1

5.2.3 Maternal factors of the study sample

Through the study, we also examined certain maternal factors including six factors: number of parties, status of abortions, pregnancy methods, suffering from medical comorbidities (MDs) and type of (MDs) containing the frequency and percentage for each variable listed according to the variable categories, history of preterm delivery, and presence of cervical incompetence.

According to Table 5.3, 66.6% of the sample previously had an abortion and the pregnancy method of 94.2% is spontaneous while about 5.8 has an assisted reproductive technology (ART). Only 11.7% of the study sample had a history of preterm delivery and 3.5% had a presence of cervical incompetence. Regarding medical comorbidities, 71.8% of women have no medical comorbidities. In comparison, 28.2% suffer from medical comorbidities, 21% (n=58) of women suffer from Antepartum hemorrhage (APH), 8.7% (n=24) of them suffer from Gestational Diabetes mellitus (GDM), 6.5% (n=18) suffer from Preeclampsia (PET), 4% (n=11), and 2.9% (n=8) suffer from Preterm premature rupture of membrane (PPROM), while 47.8% (n=132) suffer from other comorbidities. The mean number of parties is 2.33 children with a standard deviation of 1.99 children.

Table 5. 3: Descriptive analysis of the maternal factors of the study sample

Variables	**Frequency**	**Valid Percentage (%)**
Status of abortions		
Previously had an abortion	649	66.6
Has not previously had an abortion	325	33.4
Method of Pregnancy		
Spontaneous	916	94.2
IVF	43	4.4
IUI	7	0.7
IOO	7	0.7
History of preterm delivery		
Yes	113	11.7
No	850	88.3
Presence of cervical incompetence		
Yes	34	3.5
No	931	96.5
Medical comorbidities		
Have no medical comorbidities	702	71.8
Have medical comorbidities	276	28.2
Medical comorbidities type		
APH	58	21
GDM	24	8.7
PET	18	6.5
PPROM	11	4.0
Others	132	47.8

	Mean ± Std. Deviation	**Minimum**	**Maximum**
Number of parties	2.33 ± 1.99	0	9

5.2.4 Fetal factor of the study sample

According to Table 5.4, the chorionicity type of 88.5% of women is singleton, 6.8% is Dichorionic diamniotic (DCDA). In terms of fetal medical comorbidities, Intrauterine growth restriction (IUGR) is present in 9.1% of the cases, Oligohydramnios, a condition characterized by low amniotic fluid, is observed in 2.9% of the cases.

Table 5. 4: Descriptive analysis of the maternal factors of the study sample

Chorionicity type	**Frequency**	**Valid Percentage (%)**
Singleton	853	88.5
MCDA	21	2.2
DCDA	66	6.8
TCTA	19	2.0
Fetal medical comorbidities type		
IUGR	25	9.1
Oligohydramnios	8	2.9

5.3 Bivariate analysis

This section displays the result of the study hypotheses and sub-hypotheses.

5.3.1 Relationship between gestational age at delivery in weeks and maternal factors

The result indicates there is a statistically significant difference in gestational age at delivery in weeks due to the method of pregnancy, medical comorbidities, and history of preterm delivery (sig. value is less than 0.05 for all factors), which indicates to accept $H_{1.3}$, $H_{1.4}$, and $H_{1.5}$. Other maternal factors (status of abortions, medical comorbidities types, presence of cervical incompetence) did not show any significant differences in gestational age at delivery in weeks, which indicates reject $H_{1.2}$, and $H_{1.6}$ (Table 5.5).

The mean gestational age at delivery in weeks of pregnancy with the spontaneous method with spontaneous pregnancies resulting in the highest mean value (36.17 weeks) compared to the mean gestational age at delivery in weeks of different methods is less than 36 weeks as shown IVF (34.21 weeks), IUI (33.86 weeks), and IOO (33.14 weeks). In addition, the mean gestational age at delivery in weeks of the women who suffer from medical comorbidities

(mean=34.65 weeks) is less than the mean gestational age at delivery in weeks of the other women who do not suffer (mean=36.56 weeks) Overall, these comorbidities show varying degrees of impact on gestational age. The mean gestational age at delivery in weeks of the women who have a history of preterm delivery (mean=35.16 weeks) is less than the mean gestational age at delivery in weeks of the other women (mean=36.15 weeks).

Table 5. 5: Difference of gestational age at delivery in weeks due to qualitative maternal factors

Maternal factors	**Factors categories**	**Mean**	**Std.**	**Sig.**
Status of abortions	Previously had an abortion	36.01	3.061	0.475†
	Has not previously had an abortion	36.03	3.293	
Method of pregnancy	Spontaneous	36.17	3.15	0.000**‡
	IVF	34.21	3.11	
	IUI	33.86	3.53	
	IOO	33.14	3.08	
Medical comorbidities	Suffer	34.65	3.31	0.000**†
	Not suffer	36.56	3.01	
Medical comorbidities types	OTHERS	34.69	3.33	0.243‡
	PET	34.11	2.81	
	APH	33.72	4.27	
	GDM	35.5	2.06	
	PPROM	35.18	1.66	
History of preterm delivery	Yes	35.16	3.31	0.000**†
	No	36.15	3.18	
Presence of cervical incompetence	Yes	36.30	2.34	0.905†
	No	36.03	3.24	

Note: * and ** indicate the difference is significant at the significant level of 10% and 5%; †: The result obtained by the Mann–Whitney U test; ∗∗‡: The result was obtained by the Kruskal–Wallis test.

Also, the result indicates there is a positive statistically significant relationship between gestational age at delivery in weeks and the number of parties (Sig.=0.000<0.05), so the first sub-hypothesis was accepted. According to the linear regression equation result in Figure 5.1, if the number of parties increased by one, then the gestational age at delivery in weeks

increased by 0.265 weeks but this is very weak, and 2.7% of the variation in the gestational age at delivery in weeks is explained by variation in their number of parties, that's mean there is another factor that affected to gestational age at delivery in weeks.

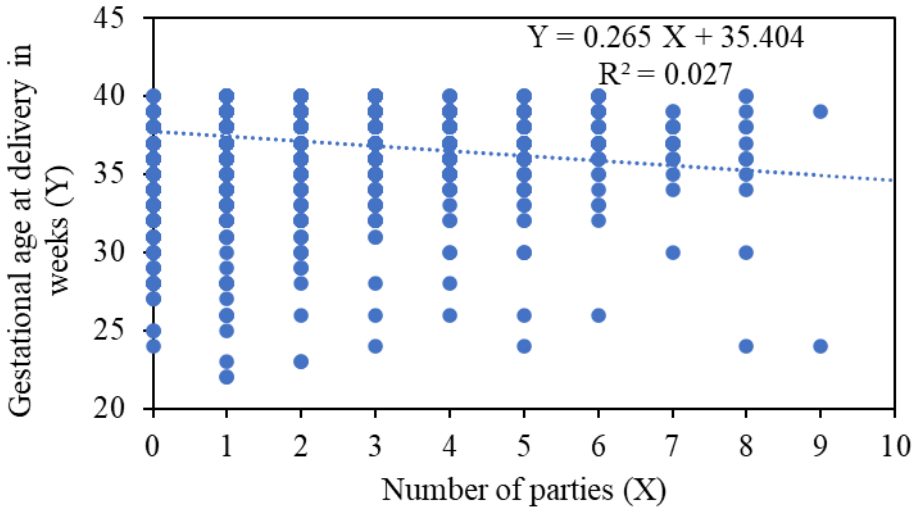

Figure5. 1: The relationship between gestational age at delivery in weeks and the number of parties.

5.3.2 Relationship between gestational age at delivery in weeks and fetal factor

The result in Table 5.6 indicates that there is a statistically significant difference in gestational age at delivery in weeks due to the chorionicity type (Sig.=0.00<0.05), so $H_{2.1}$ was accepted. According to the mean value of gestational age at delivery in weeks of DCDA, and TCTA is less than 36 weeks. Regarding fetal medical comorbidities $H_{2.2}$ was rejected because it's not significantly associated (Sig.= 0.243>0.05). However, Intrauterine Growth Restriction (IUGR) has a mean gestational age at delivery of (35.68 weeks), and Oligohydramnios about (35.63 weeks).

Table 5. 6: Difference of gestational age at delivery in weeks due to fetal factors

Chorionicity type	**Mean**	**Std.**	**Sig.**
Singleton	36.17	3.17	0.000**
MCDA	35.71	3.51	
DCDA	35.11	3.08	
TCTA	32.53	3.47	
Fetal medical comorbidities type			
IUGR	35.68	1.97	0.243‡
Oligohydramnios	35.63	2.72	

Note: *, **: Result significant at 10% and 5% respectively; ‡: The result was obtained by the Kruskal–Wallis test, %; †: The result obtained by the Mann–Whitney U test.

5.3.3 Relationship between gestational age at delivery in weeks and sociodemographic factors

The result indicates there is a statistically significant difference in gestational age at delivery in weeks due to the exposure to smoking, and education level (sig. value is less than 0.05 for all factors), which indicates to accept $H_{3.1}$ and $H_{3.3}$. Age category did not show any significant differences in gestational age at delivery in weeks, which indicates to reject $H_{3.2}$ (Table 5.7).

The mean gestational age at delivery in weeks of the women who have an exposure to smoking (mean=34.42 weeks) is less than the mean gestational age at delivery in weeks of the other women who have not (mean=36.26 weeks). the mean gestational age at delivery in weeks of women with high education (mean=37.68 weeks) is more than the mean of gestational age at delivery in weeks with low and medium levels (mean=34.15 and 36.12 weeks respectively).

Table 5. 7: Difference of gestational age at delivery in weeks due to qualitative sociodemographic factors

Maternal factors	Factors categories	Mean	Std.	Sig.
Exposure to smoking	Yes	34.42	2.601	0.000**†
	No	36.26	3.236	
Age category	Less than 25 years	35.87	3.39	0.688‡
	26-30 years	36.21	3.04	
	31-35 years	35.97	3.33	
	More than 35 years	36.28	2.65	
Education level	Low	34.15	2.85	0.000**‡
	Medium	36.12	3.23	
	High	37.68	2.46	

Note: * and ** indicate the difference is significant at the significant level of 10% and 5%; †: The result obtained by the Mann–Whitney U test; ‡: The result was obtained by the Kruskal–Wallis test.

5.3.4 Relationship between gestational age at delivery in weeks and health care factors

The result in Figure 5.2 shows that there is a positive statistically significant relationship between gestational age at delivery in weeks and the number of visits to the clinical center (Sig.=0.000<0.05), so H_4 was accepted. According to the linear regression equation result, if the number of visits to the clinical center increased by one visit, then the gestational age at delivery in weeks increased by 0.368 weeks, and also 8.9% of the variation in the gestational age at delivery in weeks is explained by variation in the number of visits to the clinical center, that's mean there is another factor that affected to gestational age at delivery in weeks.

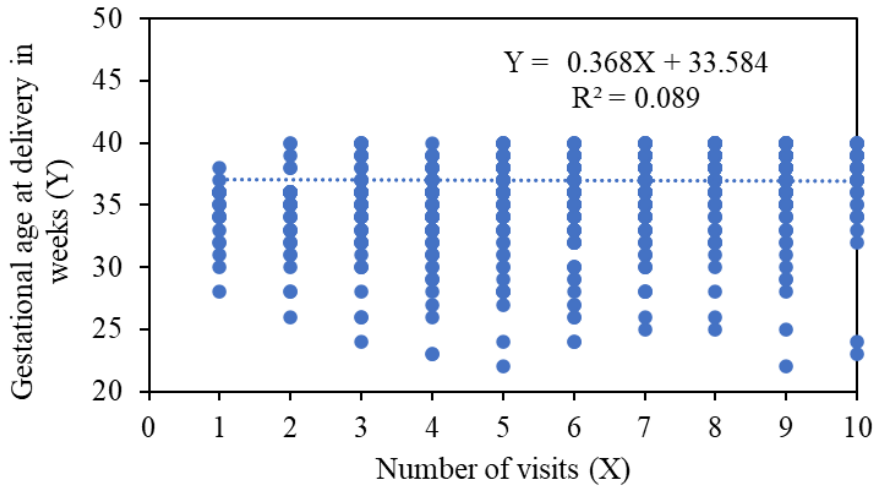

Figure5. 2: The relationship between gestational age at delivery in weeks and the number of visits to the clinical center

5.4 Multivariate analysis

In this section of the analysis, one model was developed, in which all risk factors revealed in statistical test results and had (p <0.05) were included. Multiple linear regression included the method of pregnancy, medical comorbidities, history of preterm delivery, number of parties, chorionicity type, exposure to smoking, and education level and number of visits to the clinical centre as independent variables in the model.

The R squared of the regression equation is equal to 0.243, which means that 24.3% of the variation in the gestational age at delivery in weeks is explained by variation in the

independent variables, that's mean there is another factor that affects to gestational age at delivery in weeks.

According to the result in Table 5.8, Among the factors, the number of parties attended shows a statistically significant but weak positive relationship with gestational age. Specifically, each additional parity attended increases gestational age by 0.202 weeks ($p < 0.05$). Similarly, the number of visits to the clinical center significantly affects gestational age, with each additional visit increasing it by 0.262 weeks ($p < 0.05$).

Medical comorbidities have a significant negative effect, reducing gestational age by 1.272 weeks ($p < 0.05$). This indicates that health complications during pregnancy can lead to earlier deliveries, and exposure to smoking affects negatively on the gestational age at delivery in weeks.

The type of chorionicity also affects gestational age. Compared to singleton pregnancies, DCDA pregnancies reduce gestational age by 0.740 weeks ($p = 0.054$), and TCTA pregnancies reduce it by 2.957 weeks ($p < 0.05$). These findings emphasize the complexity of multiple pregnancies and their tendency toward earlier deliveries.

Education level shows a significant positive relationship with gestational age. Compared to women with a low education level, those with medium and high education levels experience increases in gestational age by 1.892 weeks and 2.990 weeks, respectively (both $p < 0.05$). This highlights the role of socioeconomic factors and access to resources in achieving longer pregnancies.

Finally, the method of pregnancy (IVF, IUI, IOO) does not show a statistically significant impact on gestational age compared to spontaneous pregnancies. This suggests that, in this sample, assisted reproductive technologies do not significantly alter the length of pregnancy.

Table 5. 8: Multivariate model for gestational age at delivery in weeks

Factors categories	Unstandardized Coefficients	Std. Error	t	Sig.
(Constant)	32.604	0.505	64.538	0.000**
Number of parities	0.202	0.047	4.320	0.000**
Number of visits to the clinical center	0.262	0.036	7.184	0.000**
medical comorbidities (yes)	-1.272	0.211	-6.041	0.000**
smoking status (yes)	0.846	0.505	1.676	0.094*
Chorionicity type (Singleton)	Reference category			
(MCDA)	-0.766	0.644	-1.190	0.234
(DCDA)	-0.740	0.383	-1.932	0.054**
(TCTA)	-2.957	0.847	-3.492	0.001**
Education level (low)	Reference category			
(Medium)	1.892	0.455	4.160	0.000**
(High)	2.990	0.505	5.919	0.000**
Method of pregnancy (Spontaneous)	Reference category			
(IVF)	-0.214	0.562	-0.381	0.703
(IUI)	-1.228	1.169	-1.051	0.293
(IOO)	-0.768	1.179	-0.651	0.515

Note: * and ** indicate the difference is significant at the significant level of 10% and 5%.

5.5 Prevalence rate of developmental outcomes among preterm infants

In this study, five types of developmental outcomes were included to have a knowledge about the complications infants may face later in their lives which are: developmental complications, intracranial hemorrhage, respiratory complications, nephrological complications, and retinopathy complications. The result indicates that the prevalence rate of developmental complications is the highest (55%), followed by Respiratory complications (49.7%), retinopathy complications (36.8%), intracranial hemorrhage (28.2%), and nephrological complications (12.1%) respectively.

Table 5. 9: The prevalence rate of developmental outcomes among preterm infants

Developmental outcomes	Frequency	Valid Percentage (%)
Developmental complications		
Yes	268	55.0
No	219	45.0
Intracranial hemorrhage		
Yes	138	28.2
No	351	71.8
Respiratory complications		
Yes	243	49.7
No	246	50.3
Nephrological complications		
Yes	59	12.1
No	430	87.9
Retionopathy complications		
Yes	180	36.8
No	309	63.2

Chapter six

Discussion, conclusion, and recommendations

6.1 Introduction:

This study aimed to investigate the determinants of preterm birth and associated risk factors among Palestinian women aged 18-40 years at Al Makassed Hospital in Jerusalem between 2013 and 2016. The findings highlight several key maternal, fetal, and socio-demographic factors contributing to the high incidence of preterm births in this population. In this chapter, our study results were summarized and compared with other research projects conducted globally. Additionally, the findings are also analyzed and discussed. In the final section, we present the study's conclusions and recommendations.

6.2 Discussion:

In context of Palestine:

A case-control study conducted in northern Palestine at 2013 identified several primary risk factors for preterm birth among Palestinian women. These factors included multiple pregnancies, medical conditions necessitating preterm birth (p=0.000), placenta Previa, placental abruption(p=0.000), a history of Caesarean section (0.018), pregnancy-associated disorders (mainly hypertensive disorders), preterm premature rupture of membranes(p=0.006), and a previous history of preterm birth(p=0.007). Interestingly, the study found no significant relationship between socio-demographic variables such as maternal age(p=0.437), age at marriage, age at first delivery, and monthly income with preterm birth (p=0.232). Maternal smoking was also not identified as a significant risk factor (p=0.113), Level of education also showed no significance with p value of 0.334 (Adnan Sarhan,2015).

According to our study, the risk factors associated with preterm birth were investigated and in a group of 978 women and their infants. The results offered valuable into the factors influencing gestational age and the developmental challenges faced by preterm infants. Maternal factors, such as the number of previous pregnancies, history of preterm delivery, and methods of conception, were found to significantly affect gestational age, also multiple pregnancies showed a relationship with preterm birth. Methods of conception also showed significant differences, with spontaneous pregnancies resulting in longer gestational periods compared to intrauterine insemination (IUI) and in vitro fertilization (IVF). Additionally, medical comorbidities and a history of preterm delivery were associated with shorter gestational ages, although cervical incompetence did not have a notable impact.

Fetal factors, particularly the type of chronicity, emerged as significant determinants of gestational age, highlighting their importance in preterm birth outcomes. Sociodemographic factors like smoking exposure and education levels were also linked to significant differences in gestational age, while age categories did not show a substantial effect. More frequent prenatal care was positively correlated with longer gestational age, emphasizing the importance of regular medical monitoring in improving pregnancy outcomes.

In terms of developmental outcomes, the study found a high prevalence of complications among preterm infants. Developmental issues were observed in 55% of these infants, with significant complications including intracranial hemorrhage (28.2%), respiratory problems (49.7%), kidney complications (12.1%), and retinopathy (36.8%). These findings highlight the significant impact of preterm birth on infant health and development, underscoring the need for targeted interventions and comprehensive care strategies.

6.2.1 Maternal Factors:

The results indicate that there is no statistically significant difference in gestational age at delivery in weeks between women who previously had an abortion and those who did not (test statistic = -0.714; Sig. = 0.475 > 0.05), However, it is noted that the mean gestational age at delivery for women who previously had an abortion is slightly lower (36.01 weeks) compared to women without a history of abortion (36.03 weeks). Despite this difference, it is not statistically significant, suggesting that previous abortion does not have a significant impact on the gestational age at delivery. Which is similar to other prospective cohort study in India that found the odds ratio of 1.05 with a 95% confidence interval of 0.49–2.26 suggests

that women with a history of abortion are slightly more likely to experience the outcome compared to women with no history of abortion. However, since the confidence interval includes 1 (0.49–2.26), this result is not statistically significant. (Rao et al., 2018).

Our study identified a prior preterm birth as a strong predictor of having another preterm delivery(Sig.=0.000<0.05). Additionally, a history of previous preterm births was strongly associated with recurrent preterm deliveries, corroborating the findings of (Agarwal & Agrawal, 2024) on the importance of obstetric history as a predictive factor. This increased risk can be attributed to Unknown reasons , also some factors play a role in this phenomena lasting physiological changes, genetic predispositions can make a woman more susceptible to conditions that increase the risk of preterm labor, such as infections or inflammatory responses, underlying health conditions that persist across pregnancies, and persistent behavioral and socioeconomic factors, also the use of certain medications or surgical procedures in the management of previous preterm pregnancies can have lasting effects on reproductive health

Our data showed a higher incidence of preterm birth among multiparous women the F-statistic is 27.22 with a significance value (p-value) of 0. 000, However, the effect size is relatively small, as indicated by the R-squared value of 0.027 and other factors likely play a more substantial role in determining gestational age at delivery, but further research is needed to establish a causal relationship as correlation does not equal causation. Other studies observed a statistically significant association between multiparty and increased risk of preterm birth compared to prim gravida women. (Agarwal & Agrawal, 2024). The reason for this risk factors may be related to uterine over distension, cervical insufficiency, or complications from previous pregnancies can influence the current pregnancy for multiparous women like preeclampsia, greater likelihood of placental complications, and the time interval between pregnancies might affect the health of the mother and baby in subsequent deliveries.

Our research suggests that assisted reproductive procedures are linked to a higher risk of preterm birth(Sig.=0.00<0.05). In other researches data Women who conceived through IVF or IUI were more likely to have a preterm birth, including both early and late preterm deliveries. (Li et al., 2022). A Population-based Study in Qatar the rate of assisted conception use was markedly higher among women with preterm births (18%) compared to those with full-term births (3%) (Elias et al., 2021). The use of such ART as IVF, IUI, IOO often results

in multiple pregnancies, which are inherently at higher risk for preterm birth due to increased uterine stretching, higher nutritional and oxygen demands, placental issues, and a higher risk of preeclampsia. Additionally, there is an increased likelihood of premature rupture of membranes, infections, and preexisting health conditions in mothers carrying multiples, all of which can lead to early labor. Other study was carried out at Khon Kaen University showed that women carrying twins, triplets, or other multiples were considerably more likely to experience preterm delivery compared to singleton pregnancies (Seetho et al., 2023). Additionally, the underlying infertility issues that necessitate the use of ART may themselves be associated with factors that predispose women to preterm delivery.

Cervical incompetence, also known as cervical insufficiency, is a condition where the cervix weakens and begins to dilate prematurely during pregnancy, leading to an increased risk of preterm birth and miscarriage. It's a significant risk factor for women who have experienced previous pregnancy complications. The finding that there is no statistically significant difference in gestational age at delivery between women with cervical incompetence and those without, Sig.=0.905>0.05 .Also in other studies, it was being identified that women with a shorter cervical length (< 2.5 cm) appear to have a higher likelihood of experiencing the outcome compared to those with a longer cervical length (≥ 2.5 cm), but this difference is not statistically significant based on the given confidence interval(0.90–5.99) (Rao et al., 2018) . This could be due to advances in medical management, such as the use of cervical cerclage, progesterone therapy, or other interventions, might mitigate the risk associated with cervical incompetence, leading to similar gestational ages at delivery between the groups.

Our findings showed that medical comorbidities had a significant relationship with preterm birth Sig.=0.000. But the study found no significant difference in GA based on the specific type of medical condition they had according to Kruskal–Wallis test (Chi-Square value =7.929; Sig.=0.243>0.05). But an interesting finding that patients with PET, GDM seemed to deliver earlier than those without these comorbidities with a mean of (34.11 weeks,35.5 weeks.). while other studies observed a positive association between chronic diseases (diabetes, hypertension) and preterm birth (Wu et al., 2024). This discrepancy might be due to differences in sample size, genetic or environmental factors specific to our study population, or variations in healthcare access and management strategies. Additionally, it is possible that our study had different diagnostic criteria or levels of disease severity, which could affect the outcomes. Further investigation is needed to clarify these differences.

In deliveries related to the preterm premature rupture of membranes, according to the data, preterm premature rupture of membranes (PPROM) typically happens around 35.18 weeks' gestation. Prospective cohort in Canada showed the median gestational age at delivery was significantly lower in the PPROM group, at 35.6 weeks ($p < 0.0001$) (Bouvier et al., 2019).

In our study we found that on average, APH occurs at 33.72 weeks of gestation. In other studies, women who reported experiencing antepartum hemorrhage during their current pregnancy had significantly higher odds of having preterm births (OR 7.1, 95% CI 2.26–22.09, $P < 0.001$) compared to those who did not have antepartum hemorrhage (Njunwa MR,2023).

6.2.2 Fetal Factors:

Chorionicity, the number of placentas in a multiple pregnancy, influences preterm birth risk. In monochorionic pregnancies (one shared placenta), complications like unequal blood flow or twin-to-twin transfusion syndrome are more likely. These put stress on the fetuses and can trigger premature labor to protect their health. Even though several previous studies have shown that monochorionicity was linked to a threefold increase in both iatrogenic and spontaneous preterm births. This suggests that having a single shared placenta in twin pregnancies might independently predict a higher risk of preterm birth ((Li et al., 2021).

For women with fetuses suffering from medical comorbidities there was no statistically significant difference with gestational age at delivery, however It was found that deliveries for pregnancies complicated by intrauterine growth restriction (IUGR) occur at 35.68 weeks of gestation and pregnancies affected by oligohydramnios tend to deliver at an average of 35.63 weeks of gestation. despite other studies that shows a significate association with it with p value of 0.001 (Rao et al., 2018). This could have happened due to variations in how medical comorbidities, IUGR, or oligohydramnios were classified or measured could influence results. Differences in diagnostic criteria or reporting practices might affect the observed associations further investigations needed.

6.2.3 Impact of sociodemographic factors:

Maternal age emerged as a significant determinant, with women younger than 20 and older than 35 experiencing higher rates of preterm births in previous research indicating increased obstetric risks at both ends of the reproductive age spectrum less than 20 years and more than 40 years (Esposito et al., 2022). Other study confirms that women aged 35 and older were twice as likely (adjusted odds ratio [AOR] = 2.00) to experience preterm birth compared to younger women, (Rutayisire et al., 2023). Also lower age was statistically significant according to (Kinjyo et al., 2022) in Japan as (P = 0.026). In contrast to this study, our research conducted in Jerusalem did not identify maternal age as a significant determinant of preterm birth (Sig.=0.688>0.05), despite numerous other studies suggesting that maternal age is a critical factor. This discrepancy highlights the variability of preterm birth risk factors across different populations and emphasizes the need for region-specific research and interventions. Jerusalem might have specific environmental or cultural factors that somehow mitigate the risk of preterm birth associated with maternal age. This could be related to access to healthcare, dietary habits, or social support systems for expectant mothers.

Our findings suggest that women with lower education levels were more likely to have a preterm birth(Sig.=0.000<0.05). Other researches shows an inverse association was observed between educational level and the risk of preterm birth, indicating that lower education levels were associated with a higher risk of preterm delivery (Okui, 2023). In India women in the preterm group had a higher prevalence of illiteracy and elementary education compared to the term group (65.52% vs. 43.29%, p = 0.036). This suggests that lower educational levels may be a risk factor for PTB (Devi & Singh, 2023). One reason for this association could be that women with lower educational levels often have reduced access to healthcare services, lack knowledge about proper prenatal care, Additionally, lower educational attainment is frequently correlated with higher levels of stress and poorer living conditions, which can contribute to adverse pregnancy outcomes.

Tobacco exposure during pregnancy has been consistently associated with several adverse outcomes, including preterm birth and this was an aberrant finding that there is a statistically significant difference in gestational age at delivery(Sig.=0.000<0.05). A 2000 systematic review and meta-analysis, encompassing 20 prospective cohort studies, provided strong evidence for a dose-dependent association between maternal active smoking and the risk of preterm birth (PTD). The analysis highlighted a significant 27% increase in PTD risk with

each level of smoking intensity. (Shah & Bracken, 2000). A statistically significant association was identified between a partner's smoking status and an increased risk of preterm birth (Rutayisire et al., 2023). Other study showed the risk was three times higher for mothers who used tobacco (OR = 3.03). This finding was statistically significant (p = 0.01), with a 95% confidence interval ranging from 1.28 to 7.15 (Devi & Singh, 2023). The unique socio-political context of Palestine, including economic hardship and occupation-related stress, further complicates these dynamics, emphasizing the necessity for socio-economic support and targeted interventions for at-risk populations.

6.2.4 Health System Factors:

The quality of antenatal care appeared to be a critical determinant as the results showed (Sig.=0.000<0.05). Women with inadequate antenatal visits or delayed first prenatal visit were more likely to experience preterm birth (p<0.001) in a population-based cohort study was conducted in Matlab. This underscores the importance of timely and comprehensive prenatal care in mitigating preterm birth risks, as suggested by (Pervin et al., 2020). In the context of Jerusalem, political instability and restricted access to healthcare facilities likely exacerbate these issues, highlighting the need for improved healthcare access and infrastructure.

6.3 Developmental outcomes among children born preterm to date:

6.3.1 Developmental Complications:

55.0% of infants experienced developmental complications. This high prevalence suggests that preterm infants are at significant risk for developmental issues, likely due to their premature birth which can affect brain development and other growth processes. Children born moderately or late preterm have a significantly higher likelihood of experiencing impairments compared to those born at full term. Moderately preterm children have a hazard ratio of 1.73 (95% confidence interval 1.60 to 1.87) and a risk difference of 4.75% (95% confidence interval 3.88% to 5.60%). For late preterm children, the hazard ratio is 1.30 (95% confidence interval 1.26 to 1.35) with a risk difference of 2.03% (95% confidence interval

1.75% to 2.35%). These impairments may include motor, cognitive, epileptic, visual, and hearing issues (Mitha et al., 2024).

6.3.2 Intracranial Hemorrhage:

This condition is commonly associated with preterm birth because the blood vessels in the brains of preterm infants are more fragile and prone to bleeding about 28.2% of infants had this type of complications. The rate of IVH increasing as gestational age (GW) and birth weight (BW) decrease. This means the earlier a baby is born and the smaller they are, the higher the risk of ICH. (Sancak, 2019).

6.3.3 Nephrological Complications:

Although less common only 12.1% of infants had nephrological symptoms, these issues may arise due to systemic complications from premature birth or related medical treatments. Being born preterm was associated with almost twice the risk of developing CKD from birth to mid-adulthood. The adjusted hazard ratio for this risk is 1.94, with a 95% confidence interval of 1.74 to 2.16, and the association is highly significant ($P<0.001$) (Crump et al., 2019).

6.3.4 Retinopathy of Prematurity:

This condition, specifically Retinopathy of Prematurity (ROP), is linked to preterm birth due to the rapid growth of retinal blood vessels in preterm infants, which can lead to abnormal development and potential vision problems about 36.8% of infants had retinopathy in our findings. A multivariate analysis of significant risk factors for retinopathy of prematurity (ROP) development revealed that gestational age (GA) has the greatest impact. The risk of developing ROP increases as gestational age decreases with p value of < 0.0001 (De Las Rivas Ramírez et al., 2022).

6.3.5 Respiratory Complications:

49.7% of infants had respiratory issues. Respiratory complications are frequent among preterm infants due to their underdeveloped lungs and insufficient surfactant production, which can lead to conditions such as Respiratory Distress Syndrome (RDS). Between 2010 and 2020, the incidence of this condition increased from 13% to 17% ($p<0.0001$), more preterm infants are surviving, but they are experiencing poorer respiratory outcomes, especially severe bronchopulmonary dysplasia that requires respiratory support even after discharge (Kwok et al., 2023).

6.4 Limitations:

While this study provides valuable insights, it is not without limitations. The retrospective design may introduce recall bias, and the specific context of Al Makassed Hospital may limit the generalizability of the findings. Future research should consider longitudinal designs and explore interventions that could mitigate the identified risk factors and improve outcomes for preterm infants.

6.5 Conclusion:

This study explored the risk factors associated with preterm birth and the prevalence of developmental outcomes in a cohort of 978 women and their infants. The findings revealed several significant insights into factors affecting gestational age and developmental complications in preterm infants.

Maternal factors such as the number of parties, history of preterm delivery, and pregnancy methods were found to significantly influence gestational age. Specifically, a higher number of parties was positively related to longer gestational age, while preterm births were associated with a lower mean number of parties. Pregnancy methods also showed significant differences, with spontaneous pregnancies resulting in longer gestational periods compared to IIO and IVF methods. Notably, medical comorbidities and a history of preterm delivery were linked to shorter gestational ages, although cervical incompetence did not show a significant impact.

Among fetal factors, chronicity type was a significant determinant of gestational age, highlighting its importance in preterm birth outcomes. Sociodemographic factors such as

smoking exposure and education levels were associated with significant differences in gestational age, while age categories did not show a notable effect. Increased frequency of prenatal care was positively correlated with longer gestational age, emphasizing the role of consistent medical monitoring in improving pregnancy outcomes.

Regarding developmental outcomes, the study identified a high prevalence of complications among preterm infants. Developmental complications were observed in 55.0% of infants, with notable issues including intracranial hemorrhage (28.2%), respiratory complications (49.7%), nephrological complications (12.1%), and retinopathy (36.8%). These findings underscore the profound impact of preterm birth on the health and development of infants, emphasizing the need for targeted interventions and comprehensive care strategies.

Overall, the study highlights the complex interplay of maternal, fetal, and sociodemographic factors in influencing preterm birth and its outcomes. Addressing these risk factors through preventive measures, enhanced prenatal care, and targeted treatment can improve gestational age and developmental outcomes for preterm infants.

6.6 Recommendations:

The findings of this study have several important implications for policy and practice. There is a clear need for:

- Enhanced prenatal care programs, particularly for high-risk groups such as young mothers and those with a history of preterm births.
- Address Socio-Economic Disparities and support measures to alleviate the impact of poverty and education deficits on pregnancy outcomes, access to healthcare.
- Improved healthcare access and infrastructure, especially in politically unstable regions, to ensure timely and adequate prenatal and postnatal care.
- Public health campaigns to raise awareness about the risk factors for preterm birth Support programs that promote preconception health, healthy lifestyles.
- Fund research on preterm birth and its developmental outcomes and encourage data collection and sharing to facilitate evidence-based policy making.
- Long-term monitoring and support for preterm infants to address developmental delays and chronic health issues early.

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كلية الصحة العامة- جامعة القدس

نموذج الموافقة للمشاركة في دراسة حول محددات الولادة المبكرة وعوامل الخطر لدى النساء الفلسطينيات بأعمار 18-40 سنة وأثرها على نمو الطفل في مستشفى المقاصد بالقدس للعام 2013-2016.

انا الطالبة سها أبو عسل أقوم بإجراء بحث حيث يهدف هذا البحث إلى دراسة مهمة حول محددات الولادة المبكرة وعوامل الخطر لدى النساء الفلسطينيات بأعمار 18-40 سنة وأثرها على نمو الطفل في مستشفى المقاصد بالقدس للعام 2013-2016 .تهدف هذه الدراسة إلى دراسة الأسباب التي أدت إلى حدوث الولادة المبكرة و فهم أفضل التحديات التي يواجها الأطفال الخدج وكيفية دعم نموهم بشكل أفضل كمتطلب لرسالة الماجستير في الصحة العامة في جامعة القدس كلية الصحة العامة تحت اشراف الدكتور سعادة جابر.

يُطلب منك بموجب هذا النموذج المشاركة في دراسة بحثية و تتضمن هذه الدراسة تعبئة استبيان في مرحلة معينة من الدراسة ، . وسيتم استخدام المعلومات عن الوضع الصحي للأطفال الخدج فيما يتعلق بأهداف الدراسة.

يجوز لك عدم المشاركة في الدراسة، كما يجوز لك الانسحاب من الدراسة في أي وقت كان .لن يؤدي قرارك عدم المشاركة في الدراسة، أو قرارك الانسحاب منها في وقت لاحق، إلى أي تدبير جزائي ، ولن يكون لقرارك هذا أي تأثير على علاقتك بالباحثين أو بمن يستخدمهم .سيتم الاحتفاظ بمعلوماتك بشكل

سري ولن يتم الكشف عن هويتك في أي تقرير ناتج عن هذا البحث. سيتم استخدام المعلومات فقط لأغراض البحث.

بموقعي على هذا النموذج، أؤكد موافقتي على ما يلي:

1) تم شرح هدف الدراسة لي من قبل الباحث

- **نعم**
- **لا**

2) تم إبلاغي بأن جميع المعلومات الشخصية والبيانات التي سيتم جمعها خلال الدراسة ستبقى سرية ولن تُستخدم إلا لأغراض البحث العلمي

- **نعم**
- **لا**

3) أدرك أن لدي الحق في الانسحاب من الدراسة في أي وقت دون أي عواقب

- **نعم**
- **لا**

4) أملك الحق في عدم الإجابة عن أي سؤال لا أرغب في الإجابة عليه

- **نعم**
- **لا**

التوقيع :أنا أقر بأنني قرأت وفهمت المعلومات الواردة أعلاه. أوافق على المشاركة في هذا البحث وأتطلع إلى تقديم مساهمتي.

اسم المشاركة ---------- التوقيع ----------التاريخ---

-

اسم الباحثة ---------- التوقيع----------التاريخ----

-

Al-Quds University

Jerusalem

Graduate Studies

جـامـعـة الـقـدس

القدس

الدراسات العليا

College of Public Health

Public health and Epidemiology Master's Program

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This questionnaire is designed as a yes/no survey. Participants are asked to respond with "Yes" or "No" to each question. It focuses on the mother's knowledge regarding the developmental outcomes of her premature baby. Premature birth, occurring before 37 weeks of gestation, is associated with various challenges and potential health complications for infants.

We appreciate your participation in this important survey focused on the awareness and knowledge of parents regarding complications that premature babies may face.

Section 1: Participant Information
Participant ID: _____
Date of Birth (Participant): _____ (MM/DD/YYYY)
Age of Participant at the Time of Delivery: _____ years

Section 2: Premature Birth Details
Date of Premature Birth: _____ (MM/DD/YYYY)
Gestational Age at Birth?

- ☐ Extremely preterm (less than 28 weeks)
- ☐ Very preterm (28 to 32 weeks)
- ☐ Moderately preterm (32 to 34 weeks)
- ☐ Late preterm (34 to 37 weeks)

Section 3: Knowledge of Developmental Outcomes

Are you aware that premature babies may experience developmental outcomes compared to full-term babies?

- ☐ Yes
- ☐ No

Do you know that developmental outcomes can vary based on the degree of prematurity?

- ☐ Yes
- ☐ No

Have you received information or counseling regarding the potential developmental outcomes of premature babies from healthcare professionals?

- ☐ Yes
- ☐ No

Are you familiar with common developmental challenges faced by premature babies? (e.g., motor skills, cognitive development, language development)

- ☐ Yes
- ☐ No

Did your baby develop intraventricular hemorrhage (IVH) when born?

- ☐ Yes
- ☐ No

Did your baby have respiratory complications, such as respiratory distress syndrome (RDS)?

- ☐ Yes
- ☐ No

Does your baby have nephropathy or manifestations of impaired kidney function or renal issues?

- ☐ Yes
- ☐ No

Do you Know if your baby had retinopathy of prematurity (ROP), an eye condition that premature babies may experience?

- ☐ Yes
- ☐ No

العوامل المحددة للولادة المبكرة بين النساء في مستشفى المقاصد في القدس: دراسة الحالات والضوابط بين عامي 2013-2016.

إعداد: سها عبد الفتاح محمد أبو عسل.

إشراف: د. سعادة جابر.

الملخص

الخلفية: الولادة المبكرة، والتي تعرف بأنها الولادة قبل 37 أسبوعًا من الحمل، تشكل مخاطر صحية كبيرة على الأطفال حديثي الولادة. وعلى مستوى العالم، يُقدر أن 1 من كل 10 أطفال يولدون قبل الأوان، مما يؤثر على ما يقرب من 13.4 مليون طفل حديث الولادة سنويًا. يمكن أن تؤدي هذه الولادات المبكرة إلى مجموعة متنوعة من مشاكل النمو. تشير الدراسات إلى أن حوالي 20٪ من الأطفال المولودين قبل الأوان في جميع أنحاء العالم يعانون من مشاكل صحية طويلة الأمد، بما في ذلك صعوبات التعلم، وضعف البصر أو السمع، والحالات الصحية المزمنة. يقدر الوضع في فلسطين، وفقًا للجهاز المركزي للإحصاء الفلسطيني، بنحو 8.8٪ في الضفة الغربية و23٪ من ولاداتهم تؤدي إلى ولادات مبكرة. (اليونيسف دولة فلسطين، 2015). يواجه هؤلاء الأطفال الخدج أيضًا نتائج نمو مماثلة، حيث يعاني حوالي 55٪ منهم من شكل من أشكال الإعاقة طويلة الأمد، مما يسلط الضوء على الحاجة الملحة إلى رعاية ما قبل الولادة وما بعدها لتحسين النتائج لهذه الفئات السكانية الضعيفة.

مشكلة الدراسة ومبرراتها: ناقش الباحثون الحاليون عوامل الخطر المختلفة، بما في ذلك عمر الأم، والتاريخ التوليدي، والمضاعفات، والحالات الطبية. ومع ذلك، هناك حاجة إلى فحوصات دقيقة لفهم التفاعل المعقد بين العوامل الأمومية والجنينية والاجتماعية والديموغرافية، مع وجود تفاوتات ملحوظة على مستوى العالم وفي مناطق محددة. في السياق الفلسطيني، وخاصة في القدس، يطرح تحديات فريدة تتأثر بالعوامل الاجتماعية والاقتصادية والسياسية، مما يؤثر على صحة الأم والوصول إلى الرعاية الصحية الجيدة. تشمل عوامل الخطر المحددة للولادة المبكرة في المناطق الفلسطينية المختلفة حالات الحمل المتعددة، والولادات المبكرة السابقة، والرعاية السابقة للولادة غير الكافية، مما يؤكد على الحاجة إلى تدخلات مستهدفة الهدف والفرضية: الغرض من هذه الدراسة هو التحقيق في محددات الولادة المبكرة وعوامل الخطر المحتملة بين النساء الفلسطينيات في مستشفى المقاصد في القدس الذين تتراوح أعمارهم بين 18 و 40 عامًا في الفترة 2013-2016.

الأهداف :هي تحديد الخصائص الرئيسية للأمهات اللاتي أنجبن أطفالًا خدجًا، والتحقيق في عوامل الخطر للولادة المبكرة، والعوامل الأمومية والجنينية، وتأثير الوضع الاجتماعي والديموغرافي، وتحديد النتائج التنموية طويلة الأجل السائدة عند الأطفال الخدج. منهجية الدراسة: تصميم الحالة والشاهد

الرجعي: في تصميم الحالة والشاهد، (في هذه الحالة، الولادة المبكرة) من (حالة) ومجموعة ضابطة من (ضوابط) بدون النتيجة: (ولادة كاملة المدة)، مطابقة للإقامة والعمر.

التحليل الإحصائي: تم إجراء تحليلات البيانات باستخدام الإصدار 28 من الحزمة الإحصائية للعلوم الاجتماعية (.(SPSS تم استخدام التقنيات الوصفية والاستدلالية للإجابة على أسئلة البحث.

الاعتبارات الأخلاقية: تم تقديم هذه الدراسة إلى لجنة الدراسات العليا بجامعة القدس–.SPH تم الحصول على موافقة جامعة القدس. تم الحصول على موافقة مستشفى المقاصد. تم الحصول على موافقة كل مشارك للمشاركة في الدراسة، وتم الحصول على موافقة مستشفى المقاصد. تم احترام القواعد الأخلاقية المتوافقة مع متطلبات لجنة هلسنكي بما في ذلك (السرية، وعدم الكشف عن الهوية، والحق في رفض المشاركة، والحق في الحصول على معلومات حول النتائج، وأن البيانات استخدمت لأغراض علمية فقط وأنه لم يتم استخدام الأسماء سواء في التحليل أو الإبلاغ). طُلب من كل مشاركة عبر الهاتف نموذج موافقة شفهية يعلن عن رغبتها في المشاركة في هذه الدراسة.

النتائج: شملت هذه الدراسة 978 امرأة، وتم فحص الخصائص الاجتماعية والديموغرافية والعوامل الأمومية والجنينية والرعاية الصحية لتحديد تأثيرها على العمر الحملي عند الولادة. وجدت الدراسة فروقًا ذات دلالة إحصائية في العمر الحملي عند الولادة بناءً على عدة عوامل، أولها العوامل الأمومية. كانت هناك علاقة إيجابية كبيرة بين العمر الحملي وعدد الأطراف. لم يكن هناك فرق كبير في العمر الحملي بين النساء اللاتي لديهن تاريخ من الإجهاض ومن لا يوجد لديهن. لوحظت فروق كبيرة في العمر الحملي بناءً على طرق الحمل. ارتبطت الأمراض المصاحبة الطبية وتاريخ الولادة المبكرة بأعمار حملية أقل بشكل ملحوظ، في حين لم يُظهر عدم كفاءة عنق الرحم أي فرق كبير. بالنسبة لعوامل الجنين، أثر نوع المزمن بشكل كبير على عمر الحمل. من بين العوامل الاجتماعية والديموغرافية، لوحظت فروق كبيرة بين المعرضين للتبغ ومن لا يتعرضون له ومستويات التعليم ولكن ليس عبر الفئات العمرية المختلفة، فيما يتعلق بعوامل الرعاية الصحية، فإن الرعاية قبل الولادة المتكررة ترتبط بشكل إيجابي بحمل أطول. كما فحصت هذه الدراسة نمو الأطفال الخدج، وكشفت عن انتشار ملحوظ للمضاعفات. كانت المضاعفات التنموية موجودة في 55.0٪ من الأطفال الخدج، مما يعكس التأثير الكبير للولادة المبكرة على النتائج. أثر النزيف داخل الجمجمة على 28.2٪ من الأطفال. لوحظت المضاعفات التنفسية في 49.7٪ من الأطفال، وكانت المضاعفات في الجهاز الكلوي أقل شيوعًا، حيث أثرت على 12٪ من الأطفال الخدج. وظهر اعتلال الشبكية لدى 36.8٪ من الأطفال.

الخلاصة: بحثت هذه الدراسة في محددات الولادة المبكرة وعوامل الخطر المرتبطة بها بين النساء الفلسطينيات في سن 18–40 عامًا وتأثيرها على نمو الطفل في مستشفى المقاصد في القدس من عام

2013 إلى عام 2016. تشير النتائج الرئيسية إلى وجود علاقات مهمة بين العوامل الاجتماعية والديموغرافية والطبية والرعاية الصحية المختلفة وعمر الحمل عند الولادة. وتؤكد هذه النتائج على الطبيعة المتعددة الجوانب لمحددات الولادة المبكرة، مما يشير إلى أن تحسين الوصول إلى الرعاية قبل الولادة ومعالجة عوامل الخطر الاجتماعية والديموغرافية والطبية يمكن أن يخفف من حدوث الولادة المبكرة ويعزز نتائج نمو الطفل في هذه الفئة. وتؤكد هذه النتائج على المخاطر الكبيرة التي يواجهها الأطفال الخدج، بما في ذلك المضاعفات العصبية والتنفسية والكلوية والبصرية.