

Risk Factors Associated with Premature Deliveries among Newly Born Babies at Maternity Teaching Hospital in Mosul City, Iraq

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ABSTRACT

Objective: The aim of this study was to determine the risk factors associated with premature deliveries among newly born babies at maternity teaching hospital in Mosul city, Iraq.

Study Design: A case-control study

Place and Duration of Study: This study was conducted at maternity teaching hospitals in Mosul city. The study conducted from October 2025 to April 2026.

Methods: Purposive sampling method was used in collection the study sample at maternity teaching hospitals in Mosul city.

Results: The finding of the study mothers with gravida of ≥ 4 times and the spacing between pregnancy of < 2 years are more likely to have preterm deliveries in comparison with mothers who are primigravida or gravida < 4 times and who have spacing of > 2 years between pregnancy and the other.

Conclusion: The present study conclude that premature delivery was more common among mothers with urinary tract infection, premature rupture of membrane, bleeding and anemia compared to control groups there was significant difference between case and control groups.

Key Words: Pregnancy, premature, Risk factors, Mother, Infant.

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INTRODUCTION

Preterm birth (PTB), as defined by the World Health Organization (WHO), refers to "a live birth taking place prior to the completion of 37 weeks of gestation¹. Preterm birth is the largest risk factor for infant morbidity and mortality, not only in the immediate neonatal period but also in infancy, childhood, and even adulthood². Compared to children born at term, preterm babies are more likely to die and experience long-term neurological and developmental problems. Every year, 15 million preterm births occur worldwide, with preterm birth rates ranging from 5 to 13% among nations. It is one of the biggest obstacles to contemporary public health since it can impact behavioral, cognitive, and physical aspects of health^{3,4}.

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Additionally, respiratory distress, interventricular hemorrhage, sepsis, thrombocytopenia, blindness, and gastrointestinal problems have all been linked to multi-organ immaturity^{5,6}. Premature birth has been associated with several factors, such as history of preterm birth, anemia, high catecholamine levels in the maternal urine, tobacco consumption, premature rupture of membranes (PROM), high blood pressure (HBP), vaginal bleeding, inter gestational intervals ≤ 1 year, urinary tract infection (UTI), lack of prenatal care, inadequate prenatal care, maternal age less than 20 years, maternal age over 35 years, oligohydramnios, history of induced abortion, preeclampsia, twin pregnancy, advanced maternal age⁷. The prematurity rates can be significantly reduced and neonatal outcomes can be improved with public health interventions to improve access to prenatal care, increase maternal education, and provide social support^{8,9}. Strategies aimed at preventing or delaying premature birth and reducing morbidity and death associated with prematurity fall into two categories. Due to the fact that there are very few and almost nonexistent studies on preterm labor in general in our nation, particularly when it comes to the high prevalence of preterm labor among women and the causes of this high prevalence at the republic-wide and Mosul governorate-specific levels^{10,11}. Premature

delivery is a major public health issue due to its high contribution to neonatal morbidity and mortality. Babies born prematurely are at increased risk of complications such as respiratory distress syndrome, infections, neurological impairment, and long-term developmental disabilities. Identifying the risk factors associated with premature births at maternity teaching hospital in Mosul city will help healthcare providers and policymakers in planning targeted interventions, improving prenatal care services, and reducing adverse neonatal outcomes.

METHODS

A case control research aimed at evaluating the risk variables linked to premature births in infants; the study conducted from (1st Oct 2025 until 5th Apr 2026). The tool used for collection the data of this study was a questionnaire which had been established by the researcher based on the literature review and previous studies, this questionnaire consists of three parts: Part One: Biographical Data / Obstetric History, Part two: Estimated risk factors related to maternal obstetric history, Part three: Estimated risk factors related to maternal health condition during pregnancy. The study sample was gathered using the purposeful sampling approach between December 5, 2025, and February 5, 2026. The study sample included 169 deliveries condition at maternity teaching hospitals in Mosul city. Inclusion and exclusion criteria was used to determine the study sample. Preterm < 37 weeks and Term infant by a gestational age > 37 wks. and free from congenital malformation were included in the study. Neonates with congenital anomalies were excluded from the study. This study was conducted in delivery and NICU departments at three maternity teaching hospitals in Mosul city "Al Batoul, Ibn al-Atheer, Al-khansa and Al-Salam teaching hospitals", these hospitals located in the left side of Mosul city and provided different medical services to the patients who attend from inside and outside of Mosul city for management by specialists in these hospitals. Visits were conducted to the hospital, specifically to the neonatal intensive care unit (NICU), pediatric ward, and obstetrics and gynecology ward, in order to collect data from mothers regarding risk factors associated with preterm birth. Data were gathered through direct interviews with the mothers after giving their verbal consent, who were cooperative and willingly responded to all questions beginning by Biographical Data and Obstetric History then estimated risk factors related to maternal obstetric history. We verified the information by reviewing their medical records and examinations. Neonates with congenital anomalies were excluded from the study. The validity of the study tool for data collection (questionnaire) is confirmed by a group of the specialists in different fields regarding the subjects of the proposed study, they are asked to explore their

viewpoint whether the questionnaire is clear and adequate enough to achieve the purpose of the study. Reliability was done to measure consistency of tool and to detect any mistake or weak point in it, each item in the study tool was assessed through statistical analysis by alpha Cronbach test (alpha coefficient of reliability), the reliability and consistency of the study tool was high at alpha value (0.75). After the study tool had been established, pilot study is applied on 20 subjects to test the reliability of this tool, the time assigned to carry out the pilot study was 10 days before initiating in collecting of the study sample, the used sample in pilot study was excluded from the original sample. The data of the study were analyzed statistically by the (SPSS) version 26, descriptive statistics was used to demonstrate the variables of the study sample and to explore the mother's and neonatal characteristics. The differences regarding risk factors among preterm and term infant were assessed by the statistical test (Chi- X^2).

RESULTS

Table 1: During the study period 169 deliveries were performed at maternity teaching hospitals in Mosul city, 69(40.828%) of them were born preterm babies and the rest 100(59.171%) of them were term babies. "The number of live births prior to 37 weeks of gestation was divided by the total number of live births to determine the preterm birth rate" table 1 show the maternal and neonatal characteristics of the studied population, according to this table the maturity of preterm deliveries were recoded among male babies compared with female and from mothers with age group <18 year (50.7%), (49.1%), although there was no significant difference between groups (p-value = 0.212 and .111). also preterm deliveries were occurred more frequently among mothers from low educational level (elementary and below =67.5%). There were significant differences between groups (p-value=0.000). At it is demonstrated in table 2. the obstetric characteristics that are associated with preterm delivery are multigravida and interpregnancy interval of <2 years, according to this table mothers with gravida of ≥ 4 times and the spacing between pregnancy of <2 years are more likely to have preterm deliveries in comparison with mothers who are primigravida or gravida < 4 times and who have spacing of >2 years between pregnancy and the other, there are significant difference between two groups (p-value = 0.010, 0.043), in addition the odd of delivering preterm births in mothers with gravida of >4 times and the interval between the pregnancy and the other is < 2 years was 2.250 and 1.922 times higher than in those with gravida of < 4 times and the interpregnancy spacing of > 2 years. Also the odds of delivering a preterm birth was significantly high among mothers who were deliver twin babies and who have inadequate antenatal care visits (OR= 10.15, 2.89) in comparison with control group. Although mothers who were experience a previous abortion were more likely to have a preterm delivery in comparison with those

how do not have previous abortion there was no significant difference between case and control groups. (P-value= 0.198). According to the table (3) premature delivery was more common among mothers with urinary tract infection, premature rupture of membrane, bleeding and anemia compared to control groups there was significant difference between case and control groups (P-value= 0.005, 0.000, 0.024 and 0.001).

(OR=2.457, 3.210, 2.64 and 2.765). Amniotic fluid abnormalities (oligohydramnios and polyhydramnios) and placental abnormalities (placenta previa and abruptio placenta) shown to be risk factors associated with premature delivery (OR= 3.574, 3.959). Mothers with hypertension or gestational DM have odds of delivering a preterm babies (5.009,2.428) times higher than those mothers without these medical conditions.

Table No. 1: Socio-demographic Characteristics of the Study Sample

The study variables	Preterm n.=69(40.828%)		term n.=100(59.171%)		Mode	SD	Chi-square	p-value
maternal age					1,2	.969	4.391	.111
<18	26	49.1%	27	50.9%				
19-35	26	32.5%	54	67.5%				
>35	17	47.2%	19	52.8%				
Educational level					2	.710	21.141	0.000
elementary and below	27	67.5%	13	32.5%				
Secondary	31	41.3%	44	58.7%				
University and above	11	20.4%	43	79.6%				
Gender					1	.504	1.560	0.212
Male	35	50.7%	41	41%				
Female	34	49.3%	59	59%				

Sd: standard deviation, the difference between preterm and term babies regarding demographic characteristics is significant at p-value (p-value < 0.05).

Table No. 2: Risk Factors of Preterm Deliveries Related to the Obstetric Characteristics:

Risk factors	Preterm n.=169 (40.828%)		term n.=100 (59.171%)		Chi-square	p-value	Odd-ratio	CI(lower limit-upper limit)	
Gravidity					6.525	.010	2.250	1.204	4.208
>4 times	40	51.3%	38	48.7%					
<4 times	29	31.9%	62	68.1%					
Pregnancy type					42.64	0.000	10.159	4.819	21.416
Single	26	23.2%	86	76.8%					
Multiple	43	75.4%	14	24.6%					
Pregnancy interval					4.098	.043	1.922	1.017	3.629
<2 years interval	46	47.4%	51	52.6%					
>2 years interval	23	31.9%	49	68.1%					
Previous apportion	38	45.8%	45	54.2%	1.657	.198			
Adequate Antenatal care visits	30	30.3%	69	69.7%	10.960	.001	2.894	1.530	5.473

The risk factors are considered significant at p-value <0.05, CL: confidence intervals.

Table No. 3: Risk factors of preterm delivers related to medical illness and heath condition during pregnancy

Risk factors	Preterm		Term		Chi-square	p-value	OR	CI	
UTI	37	53.6%	32	46.4%	7.902	0.005	2.457	1.305	4.626
PMR	43	55.8%	34	44.2%	13.201	0.000	3.210	1.695	6.082
Bleeding	34	51.5%	32	48.5%	5.119	0.024	2.064	1.097	3.338
Amniotic fluid abnormalities	40	58.8%	28	41.2%	15.251	0.000	3.547	1.857	6.776
DM	36	53.7%	31	46.3%	7.650	0.006	2.428	1.287	4.580
Hypertension	44	62.9%	26	37.1%	24.002	0.000	5.009	2.579	9.729
Placental	42	60.3	27	39.7	17.846	0.000	3.959	2.062	7.603
Anemia	42	53.8%	36	46.2%	10,161	0.001	2.765	1.469	5.207

The risk factors are considered significant at p-value <0.05, CL: confidence intervals.

DISCUSSION

One of the leading causes of child death worldwide, particularly in poorer nations, is preterm birth. In order to identify the risk factors associated with premature deliveries among newly born babies, the current investigation was carried out¹². The study finding show the maternal and neonatal characteristics of the studied population, according to this table the maturity of preterm deliveries were recoded among male babies compared with female and from mothers with age group <18 year (50.7%), (49.1%), concur that the study shows the maternal age of term controls and preterm cases. The risk of preterm birth was 6.63 times higher for women under 20 than for those between (25-29)^{13,14}. The odds of delivering a preterm birth was significantly high among mothers who were deliver twin babies and who have inadequate antenatal care visits in comparison with control group. This conclusion is consistent with a study that found monochromic twins had a significantly greater rate of spontaneous preterm births compared to dichromic twins¹⁵. The study found that premature delivery was more common among mothers with urinary tract infection, premature rupture of membrane, bleeding and anemia compared to control groups there was significant difference between case and control groups and this result comparable with^{16,17}. They found that there was a statistically significant positive correlation between the incidence of PTB and UTIs during pregnancy. A substantial positive correlation between UTIs and the development of PTB was further verified by additional REM analysis on adjusted ORs. Mothers with hypertension or gestational DM have odds of delivering a preterm babies (5.009,2.428) times higher than those mothers without these medical conditions, agree with 18,19 they came to the conclusion that GDM is linked to an increased risk of unfavorable neonatal outcomes in premature babies and a higher risk of unfavorable perinatal outcomes in pregnant mothers.

CONCLUSION

The study conclude that mothers with gravida of ≥ 4 times and the spacing between pregnancy of <2 years are more likely to have preterm deliveries in comparison with mothers who are primigravida or gravida < 4 times and who have spacing of >2 years between pregnancy and the other.

RECOMMENDATION

The present study Recommend Nineveh health directorate to the necessity of opening special centers for family health education to raise the mother's awareness about causes and consequences of preterm delivery, obstetrician need to focus on health education during their discussion and guide the pregnant women in making their decision.

Author's Contribution:

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