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Prevalence and Probable Risk Factors for Preterm Birth: A HospitalBased Study

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Abstract

Background and objectives: The preterm birth rates are still high commonly in poor communities which contributedto high infantile co-morbidities and mortalities. The aim of this study was to measure prevalence of preterm birth in a single tertiary center and to identify associated factors related to preterm birth.

Methods: A hospital-based cross-sectional study was carried out to evaluate the preterm rate and a case-control study was conducted to examine risk factors for preterm birth in Labor ward Maternity Teaching Hospital in Erbil city-Kurdistan Region/Iraq through the period of one year from 1st of May,2022 to 30th of April, 2023 on 13841 pregnant women with live birth; 1512 women with preterm birthand 12329 women with term birth.

Results: Preterm labor prevalence in the hospital was (10.9%). Main detected risk factors of pretermbirth were increased age (2.8%, p<0.001), shorter interpregnancy interval (22,5%, p<0.001), history of preterm labor (29.7%, p<0.001), history of miscarriage(21.6%, p<0.001), history of stillbirth (7.5%, p<0.001), history of previous caesarean section (36%, p<0.001), preeclampsia (11.2%, P<0,001), bleeding (p<0.001), premature rupture of membranes (34.7%, p<0.001) andoligohydramnios (26.4% , p<0.001) The cesarean section was related to high incidence of preterm birth (41.6%, p<0.001).

Conclusions: The prevalence of preterm birth in Maternity Teaching hospital located in Erbil, Kurdistan Region of Iraq is within acceptable range.

Keywords: Cesarean section, Preeclampsia, Preterm birth, Term birth.

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Introduction

Preterm birth (PTB) is a global health issue that affects worldwide annually millions of newborns.[1] Ithas a short and long-term financial and medical impact on the healthcare system, affected newborns, and their families.[2] After pneumonia, it is the second most common cause of death in children under five and the largest direct cause of neonatal mortality.[3] The World Health Organization (WHO) estimates the prevalence of premature birth to be between 5 and 18% in 184 different countries.[4] Prematurity affects about 12 million people (81.1%) in Asia and sub-Saharan Africa.[5] Compared to developed countries (9%), developing countries have a higher estimated prevalence of PTB (12%).[6] In general, different research show different country-to-country variations in PTB prevalence. For instance, PTB prevalence is 5.1% in Iran and in Sweden 5%.The prevalence of PTB in Nigeria is 12%, in Algeria 9.6% and Kenya 18.3%.[7,8,9,10,11] The percentage of PTB in Ethiopia ranges from 4.4% to25.9%.[12] Preterm neonates still die because of a lack of adequate new-born care in many underdeveloped countries.[7] Preterm birth has a complex and multiple etiology that is influenced by biological, psychological, social, and genetic variables. However, earlier research from several locations showed that a number of risk factors for preterm, in a study conducted in Dominican Mother's educational level was not found to be a risk factor for preterm delivery, while maternal age ≥35 years,a family history of preterm births, and prelabour rupture of membranes were significant risk factors for preterm birth.[13] while study conducted in Italy found maternal educational level as a strong risk factor for preterm birth.[14] A Ghanaian study discovered maternal obesity has been linked to a number of adverse pregnancy outcomes, including as IUGR, preeclampsia, and HELP syndrome.[15] Research from Finland, Italy, Brazil, and Taiwan also revealed significant associations with risk factors like anemia, smoking, low socioeconomic status, congenital abnormalities, hypertension, fetal growth restriction, infection, and spontaneous rupture of membranes, antepartum hemorrhage, previous abortion, previous cesarean section were strongly associated with the preterm birth.[15,16] The purpose of this study was to determine the prevalence of preterm birth at a single tertiary facility and to find risk factors for preterm delivery. The results could be applied to enhance the health of newborns in ourcommunity.

Patients and methods

A cross-sectional study implemented in the Labor ward of maternity teaching hospital in Erbil city- Kurdistan region/Iraq in one year duration from 1st of May, 2022 to 30th of April, 2023. All pregnant women admitted to the Labor ward for delivery during study duration were examined. Singleton gestation with live birth was included; the women with preterm birth were defined with gestational age at less than 37 weeks, while controls with term birth were defined with 37 weeks of gestation or completing gestation.[17] Exclusion criteria were terminated pregnancy before 22 weeks of gestation, stillbirth, multiple pregnancy, uterine anomalies, cervical cerclage, and missing or in complete data. The data was filled in a prepared questionnaire designed by the researchers. The questionnaire contained general characteristics of study participants (age, parity and educational level), obstetric factors (previous birth category, inter-pregnancy interval, history of preterm birth, previous prematurity, history of previous abortion, number of previous miscarriages, history of stillbirth, number of previous stillbirths, history of cesarean section, number of previous cesarean sections, antenatal care, number of previous antenatal care and number of antenatal care visits), clinical history of study participants (hypertension, diabetes mellitus, medical illness and infection) and birth characteristics of study participants (bleeding, premature ruptures of membranes (PROM), amniotic fluids volume, history of infertilities and management and mode of delivery). Prematurity was detectedas a livebirth prior to 37 weeks of pregnancy.[17] The hypertension, diabetes mellitus, medical illness, PROM and stillbirth were defined in regard NICE guidelines.[17] The research ethics was approved by Research Protocol Ethics Committee of Kurdistan Higher Council of Medical Specialties. No.1563, 08.09.2022. A written informed consent was signed by eachparticipant proving their willingness for participation. The collected data were gathered and analyzed by

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statistical package of social sciences which used different statistical tests like chi square, fishers' exact and independent sample t-tests for analysis. Significancy level was ≤ 0.05.

Results

The number of women with preterm birth in hospital during one year duration was (1512) and number of live births in hospital through the same duration was (13841). The prevalence rate of preterm birth in the hospital was (10.9%), Figure (1).

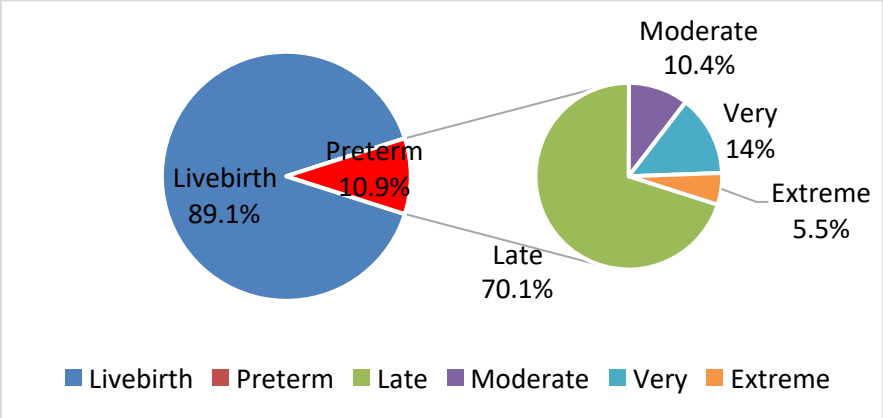

Figure (1): Prevalence rate of preterm birth.

There was a highly significant association between increased maternal age and preterm birth (p<0.001). Mean parity was higher among pregnant women with preterm birth (p<0.001). A highly significant association was observed between increased maternal educational level and preterm birth (p<0.001). Rural resident women were significantly associated with preterm birth (p<0.001). No significant differences were observed between pregnant women with preterm birth and pregnant women with term birth regarding occupation (p=0.26), Table (1).

Table (1): Distribution of general characteristics according to gestational age at birth

Variable	Study group					P
	Preterm			Term		
	No.		%	No.		%	
Age							
<20 years	123		8.1	310		10.1	<0.001 S
20-29 years	722		47.8	1695		55.3	
30-39 years	624		41.3	993		32.4	
≥40 years	43		2.8	68		2.2	
Parity							<0.001 S
Mean±SD		1.9±1.8			1.7±1.6		
ResidenceUrban	515		34.1	1226		40.0	<0.001 S
Rural	997		65.9	1840		60.0	
Educational levelIlliterate	161		10.6	378		12.3	<0.001 S
Read & write and primary level	870		57.5	2484		81.0	
Intermediate level	318		21.0	132		4.3	
Secondary level	163		10.8	72		2.3	
Occupation							0.26 NS
Employed	164		10.8	300		9.8	
Unemployed	1348		89.2	2766		90.2	

S=Significant, NS=Not significant

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A highly significant association was observed between previous induced labor and women with preterm birth (p<0.001). There was a highly significant association between shorter interpregnancy interval and preterm labor (p<0.001). A highly significant association was observed between positive history of preterm labor and preterm birth (p<0.001) and significant association with increased number of previous preterm labors (p=0.008). There was a highly significant association between positive history of miscarriage and preterm birth (p<0.001) and significant association with increasednumber of previous miscarriages (p=0.007). A highly significant association was observed between positive history of stillbirths and preterm birth (p<0.001) and significant association with increased number of previous stillbirths (p=0.001). There was a highly significant association between positive history of cesarean section and preterm birth (p<0.001) and significant association with increased number of CSs (p<0.001). No significant differences were observed between pregnant women with preterm birth and pregnant women with term birth regarding antenatal care (p=0.7), however, mean number of ANC visits was significantly lower among pregnant women with preterm birth (p<0.001). Table (2)

Table (2): Distribution of obstetrical history according to gestational age at birth

Variable Preterm	Study	groups	Term	P
No.	%	No.	%	
Type of previous birth Spontaneous 1212	80.2	2726	88.9	<0.001 S
Induced 300	19.8	340	11.1	
Interpregnancy interval				<0.001 S
≤18 months 248	22.5	214	9.5	
>18 months 852	77.5	2050	90.5	
History of preterm birth				<0.001 S
Yes 449	29.7	46	1.5	
No 1063	70.3	3020	98.5	
Number of previous preterm birth				0.008 S
Mean±SD 1.6±0.8		1.2±0.4		
History of miscarriage				<0.001 S
Yes 327	21.6	312	10.2	
No 1185	78.4	2754	89.8	
Number of previous miscarriages				0.007 S
Mean±SD 1.6±0.8		1.9±1.6		
History of stillbirth				<0.001 S
Yes 113	7.5	116	3.8	
No 1399 Number of previous stillbirths	92.5	2950	96.2	0.001 S
Mean±SD 1.3±0.9 History of cesarean sectionYes 545	36.0	506	1±0.2 16.5	<0.001 S
No 967	64.0	2560	83.5	
Number of previous cesarean sections				<0.001 S
Mean±SD Antenatal care 2.1±1.1		1.6±0.8		0.7 NS
Yes 1490	98.5	3018	98.4	
No 22 Number of ANC visits	1.5	48	1.6	<0.001 S
Mean±SD 3.1±1.7		3.6±1.8		

S=Significant, NS=Not significant

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There was a highly significant association between preeclampsia and preterm birth (p<0.001). A highly significant association was observed between newly diagnosed DM and preterm birth (p<0.001). Pregnant women medical illness was significantly associated with preterm birth (p<0.001). No significant differences were observed between pregnant women with preterm birth and pregnant women with term birth regarding infection (p=0.75), Table (3).

Table (3): Distribution of clinical history according to gestational age at birth

Variable	Preterm	Study	groups	Term	P
	No.	%	No.	%	
Hypertension in pregnancy No	1281	84.7	2962	96.6	<0.001 S
Chronic hypertension	7	0.5	14	0.5	
Preeclampsia	169	11.2	40	1.3	
Pregnancy induced hypertension	52	3.4	46	1.5	
Chronic HTN supper imposed by	3	0.2	4	0.1	
Diabetes in pregnancy					<0.001 S
No	1433	95.0	3010	98.2	
Type1 DM	0	-	24	0.8	
Type2 DM	16	1.1	8	0.3	
Newly diagnosed DM	59	3.9	24	0.8	
Medical illness					<0.001 S
No	1467	97.0	2990	97.5	
Heart diseases	8	0.5	4	0.1	
Renal diseases	4	0.3	0	-	
Thyroid diseases	23	1.5	20	0.7	
Anemia	10	0.7	40	1.3	
Others Infection	0	-	12	0.4	0.75 NS
No	1486	98.3	3014	98.3	
Chorioamnionitis	12	0.8	20	0.7	
UTI	12	0.8	30	1.0	
Sepsis	2	0.1	2	0.1	

S=Significant, NS=Not significant

There was a highly significant association between birth antepartum hemorrhage and preterm birth (p<0.001). A highly significant association was observed between PROM and preterm birth (p<0.001). Pregnant women oligohydramnios was significantly associated with preterm birth (p<0.001). No significant differences were observed between pregnant women with preterm birth and pregnant women with term birth regarding history of infertility and treatment method (p=0.64). There was a highly significant association between cesarean section and pregnant women with preterm birth (p<0.001), Table (4).

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Table (4): Distribution of birth characteristics according to gestational age at birth

Preterm	Study groups Term				P
	No.	%	No.	%	
Antepartum haemorrhage No	1437	95.0	3057	99.8	<0.001 S
Placenta previa	31	2.1	0	-	
Abruptio placentae	33	2.2	2	0.1	
Unknown causes	11	0.7	4	0.1	
PROM					<0.001 S
Yes	523	34.7	268	8.7	
No	984	65.3	2798	91.3	
Amniotic fluid volume					<0.001 S
Adequate	1102	72.9	3012	98.2	
Oligohydraminous	399	26.4	52	1.7	
Polyhydraminous	11	0.7	2	0.1	
History of Infertility and treatment method					0.64 NS
ART	8	0.5	20	0.7	
Ovular stimulator drugs	75	5.0	136	4.4	
No	1429	94.5	2910	94.9	
Mode of delivery					
Spontaneous vaginal delivery	812	53.7	2544	83.0	<0.001 S
Induced vaginal delivery	71	4.7	86	2.8	
Cesarean section	629	41.6	436	14.2	

S=Significant, NS=Not significant

Discussion

In present study, preterm birth prevalence in our hospital was (10.9%). This prevalence of (10.9%) is higher than prevalence of (2.48%) reported by Hassan prospective study in Iraq. However, our study prevalence of preterm labor is lower than preterm birth prevalence in Western Iraq (31%), Eastern Iraq (51.8%) and in Center of Iraq (31%).[18] Our study prevalence is close to findings of Reddy et al.'sstudy, which found that prevalence of preterm birth in rural tertiary teaching hospital was (10.86%). [19] However, it is higher than results of Abdel Razeq et al cross-sectional study in which reported prevalence of prematurity as (5.8%). Vakilian et al. found that the overall estimated prevalence of preterm birth was (9.2%). [20,21] These differences in preterm birth prevalence between different, hospitals or between different countries, might be attributed to differences in health infrastructure, socioeconomic status, cultural factors, antenatal care services in addition to discrepancies in study methodology, and sample size between different literatures. The preterm birth in the current study was classified into extreme PTB (5.5%), very PTB (14%), moderate PTB (10.4%), and late PTB (70.1%).Close to our findings, Kluwgant et al-study documented that majority of preterm births were late. [22] This study found that both advanced maternal age and higher parity were associated with pretermbirth. This is similar to findings of different literatures.[23] Additionally, higher maternal educational level was related to preterm birth. Consistently, Assadi et al literatures which reported higher proportion of women with preterm labor at primary and secondary educational level.[24] This study showed a positive relationship between each of shorter interpregnancy interval, positive history and number of preterm births, positive history and number of miscarriages, positive history and number of stillbirths, positive history and number of cesarean sections, and number of ANC visitswith preterm birth ($p<0.05$). These findings coincide with results of many international studies.[25-27] This study also reported a positive relationship between each of preeclampsia, newly diagnosed DM and medical illness with preterm birth. Similarly, Shapiro-Mendoza et al study found the same relationships. In the current study, antepartum hemorrhage, PROM and oligohydramnios were relatedto preterm birth. These results agreed to findings of different literatures.[28,29-31] Present literature detected a positive relationship

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between cesarean section and preterm birth. This finding is consistent with results of Shabila study in which found an increase in cesarean section rates especially for preterm birth. [32]

Conclusion

The prevalence of preterm birth in Erbil Maternity Teaching hospital is within acceptable range. Preterm labor risk factors are increased with age, multiparity, increased educationallevel, previous induced labor, shorter interpregnancy interval, history of preterm labor with high number, history of miscarriage with high number, history of stillbirth with high number, history of previous caesarean section with high number, number of antenatal care visits, preeclampsia, newly diagnosed diabetes mellitus, medical illness, bleeding, premature rupture of membranes and oligohydramnios. The caesarean section rate was higher with preterm labor. This study recommendedmore efforts in increasing public health education regarding antenatal care visits and women with riskfactors should be receiving additional care and monitoring during pregnancy to prevent preterm birth.

Conflicts of interest

None

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