Assessment of Maternal Contributing Factors of Preterm Birth in Soran Maternity Hospital

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ABSTRACT
Background: Preterm birth has become a global issue owing to its high morbidity and mortality rate. It accounts for significant medical expenses and places a considerable economic strain on children, families, and healthcare systems.
Objective: This study aimed at determining the maternal risk factors related to preterm birth.
Patients and methods: This cross-sectional study was conducted in Soran Maternity Hospital from 15th November 2019 to 25th October 2020; the time of data collection was from 20th December 2019 until 30th September 2020. A total of 130 pregnant women with 24-37 gestational weeks and painful uterine contractions admitted to the labor room during the time of data collection were included in the present research. A self-structured questionnaire was utilized to collect information from participants. The data were analyzed utilizing SPSS version 20.
Results: The highest percentage, 66.2%, was multiparous, and the commonest maternal contributing factors for preterm birth were urinary tract infection, vaginal infection, anemia, and hypertension during pregnancy. There was a significant association between parity, urinary tract infection, pregnant women's age, and risk for preterm birth by gestational age. Urinary tract infection, vaginal infection, anemia, and hypertension during pregnancy were the most prevalent risk factors for preterm birth. **Conclusions:** Early recognition of preterm risk factors can benefit healthcare workers and medical staff to identify high-risk pregnant women to adopt preventive measures against preterm birth.
Keywords: Preterm birth, Risk factors, Parity, Cross sectional study, Erbil Polytechnic University.

INTRODUCTION

Preterm birth (PTB) is among the main complications in pregnant women, affecting 10% of all pregnancies. One million neonatal deaths happen annually due to preterm birth. It accounts for significant medical expenses and places a considerable economic strain on children, families, and healthcare systems [1]. PTB, the birth of an infant before 37 post-menstrual weeks (and after 20 weeks gestation), is a dreadful pregnancy complication with long-term medical and financial burdens on children, families, and healthcare systems [2].

In developed countries, preterm labor is the main cause of perinatal morbidity and mortality, with most deaths occurring in neonates with a gestational age <32 weeks [3]. Recently, the care offered in Neonate Intensive Care Units (NICU) has increased the survival of premature neonates while increasing the hospitalization stay and cost. Accordingly, the care of premature infants now accounts for a large share of the total in-hospital costs globally [4]. Overall, 15 million premature births are reported globally per year, [5] about 90% of which happen in developing countries in Asia and Africa, even though preterm labor frequency differs significantly between them [6].

Preterm birth has become a global issue owing to its high morbidity and mortality rate. According to World Health Organization (WHO), in 2018, the preterm birth rate in Africa and South Asia was more than 60% [7].

Across 184 countries, its prevalence varies from 5 % to 18%. The highest preterm birth percentages are in Sub-Saharan Africa and Asia, accounting globally for half of the births, over 60% of preterm babies, and over 80% of neonatal deaths annually [8].

Al-Diwan (2006) reported the preterm birth frequency as 31% in the west (Al-Anbar), 51.8% in the east (Diyala), and 50% in the center (Baghdad) of Iraq [9].

Preterm birth causes are not known in more than 50% of spontaneous preterm labor, while preterm labor mechanisms remain poorly understood. [9] Potentially, recognizing and understanding the preterm birth risk factors helps address this issue. Similar to most developing countries, Iraq lacks reliable data on the preterm delivery burden. Despite this, few studies have been published locally on the preterm birth burden and its associated factors. This research aims to determine the maternal factors associated with preterm birth.

PATIENTS AND METHODS

This cross-sectional study was conducted in Soran Maternity Hospital from 15th November 2019 to 25th October 2020; data collection time was from 20th December 2019 to 30th September 2020. A total 130 pregnant women with a gestational age of 24-37 weeks and painful uterine contractions admitted to the labor room during data collection time were included in the research. The gestational age was obtained on the basis of LMP (first day of the last menstrual period) or/and early

pregnancy ultrasound. In this study, according to the WHO, on the basis of gestational age, preterm birth samples were grouped into three, extremely preterm (<28 weeks), very preterm (28-32 weeks), and moderate to late preterm (32-37 weeks) [1]. Before data collection, official permission was obtained from Soran Technical Institute, Soran General Directorate of Health, and Soran Maternity Hospital to perform the study in Soran City.

Initially, a pilot study was performed on 20 pregnant women to assess the reliability of the questionnaire and the time required to be applied. The Cronbach's alpha was 0.75. These pregnant women were included in the research. A self-structured questionnaire was utilized to collect information from participants and data from medical records (files) of pregnant women. The research objectives were explained to the subjects who agreed to participate in this study, and verbal consent was obtained from them. All subjects were interviewed individually, and the time required to fill out the questionnaire was 10-15 minutes. The questionnaire included socio-demographic data (age, educational level, and occupation), obstetric characteristics (gravid para, miscarriage, etc.), and maternal factors associated with preterm birth (anemia, gestational diabetes, urinary tract infection during pregnancy, etc.).

Ethical approval

The ethical approval of the present research was obtained from the Ethics Committee of Erbil Polytechnic University/Soran Technical College. The verbal consent was taken from the all-pregnant women prior to research recruitment after explaining its objectives and procedures; it was mentioned in the special form requested by Ethics Committee. Anonymity and confidentiality of all participants were ensured throughout the research in line with the instructions of the Ethics Committee. This study was executed according to the code of ethics of the World Medical Association (Declaration of Helsinki) for studies on humans.

Statistical analysis

The collected data were introduced and statistically analyzed by utilizing the Statistical Package for Social Sciences (SPSS) version 20 for windows. Qualitative data were defined as numbers and percentages. Chi-Square test and Fisher's exact test were used for comparison between categorical variables as appropriate. Quantitative data

were tested for normality by Kolmogorov-Smirnov test. Normal distribution of variables was described as means and SD, and independent sample t-test was used for comparison between groups. P value ≤0.05 was considered to be statistically significant.

RESULTS

According to the descriptive analysis of the collected data, 33.8% of the samples were in the age group of 21-25 years old, the same percentage as 33.8% of the samples in the age group of 26-30 years old, with most (35.4%) having education level of primary school. Further, the highest percentage (76.9%) of the study samples was housewives (Table 1).

Table 1. Socio-demographic characteristics of the studied women (N= 130).

Variables	No.	%
Age groups		
Less than 20	14	10.8
21-25	44	33.8
26-30	44	33.8
31-35	21	16.2
36 and above	7	5.4
Education level		
Illiterate	38	29.2
Primary school	46	35.4
High school	23	17.7
Higher education	23	17.7
Occupation		
Employed	14	10.8
Housewife	100	76.9
Self-employed	16	12.3

Most (59.2%) of the study samples were multigravida, and the highest percentage (66.2%) of them were multiparous, while 71.5% did not have a history of miscarriage. According to the table, only 25.4 of the study samples had a history of stillbirth, and the majority (60.8%) was in the gestational age of 32-37 weeks. In addition, most (56.9%) of pregnant women did not have a history of cesarean section, and just 19.2 % had a history of preterm birth in the previous pregnancy. Meanwhile, the highest percentage (86.2%) had a pregnancy interval of more than six months between the current and previous pregnancy (**Table 2**).

Table 2. Obstetrical characteristics of the studied women (N= 130).

Variables	No.	%
Gravida		
Primigravida	15	11.5
Multigravida	77	59.2
Grand multigravida	38	29.2
Parity		
Nulliparous	9	6.9
Primiparous	17	13.1
Multiparous	86	66.2
Grand multipara	18	13.8
Miscarriage		
0	93	71.5
1-3	31	23.8
4 and more	6	4.6
Gestational age		
Less than 28 W	11	8.5
28-31 W	40	30.8
32-37 W	79	60.8
History of cesarean birth		
Yes	56	43.1
No	74	56.9

During pregnancy, most (79.2%) of the study samples had a vaginal infection, and 70 % had a urinary tract infection. In addition, 38.5% of the participants were anemic, while 32.3% had hypertension during pregnancy. Meanwhile, 25.4% and 19.2% of the subjects had a history of stillbirth and previous preterm delivery, respectively, and only 13.8% had pregnancy intervals <6 months between the current and previous pregnancy (**Table 3**).

Table 3. Maternal contributing factor related to preterm birth (N= 130)

Variables		No.	%
	Less than 18	16	12.3
Age	**18-35**	104	80
	More than 35	10	7.7
Anemia	**Yes**	50	38.5
	No	80	61.5
Thyroid problem	**Yes**	8	6.2
	No	122	93.8
Gestational diabetes	**Yes**	13	10
	No	117	90
UTI during pregnancy	**Yes**	91	70
	No	39	30
Vaginal infection during pregnancy	**Yes**	103	79.2
	No	27	20.8
Hypertension during pregnancy	**Yes**	42	32.3
	No	88	67.7
History of stillbirth	**Yes**	33	25.4
	No	97	74.6
Previous preterm delivery	**Yes**	25	19.2
	No	105	80.8
The period between the current and previous pregnancy (short pregnancy interval of fewer than six months)	**Yes**	18	13.8
	No	112	86.2
Multiple gestations	**yes**	6	4.6
	no	124	95.4

There was a significant association between parity, urinary tract infection, pregnant women's age, and preterm birth risk by gestational age with a p-value=0.001, p-value=0.002, and p-value=0.003, respectively (Table 4).

Table 4. Association between the contributing factor of preterm birth and gestational age among women (N= 130).
(a) Fisher's exact test.

Variables		Gestational age groups			Chi-square (P-value)
		Extreme preterm %	Very preterm %	Moderate preterm %	
Para					
Nulliparous	%	12.5	25.0	62.5	0.001 a
Primiparous	%	14.3	28.6	57.1	
Multiparous	%	9.4	46.9	43.8	
Grand multipara	%	27.3	0.0	72.7	
Anemia					
Yes	%	8.7	34.8	56.5	0.731
No	%	15.0	31.8	53.3	
Thyroid problems					
Yes	%	0.0	33.3	66.7	0.771 a
No	%	14.2	32.3	53.5	
Abortion groups					
0	%	13.9	29.7	56.4	0.414
1-3	%	8.7	43.5	47.8	
4 and more	%	33.3	33.3	33.3	
Gestational diabetes					
Yes	%	0.0	50.0	50.0	0.473 a
No	%	14.5	31.5	54.0	
Vaginal infection before delivery					
Yes	%	16.2	29.7	54.1	0.098 a
No	%	0.0	47.4	52.6	
UTI before delivery					
Yes	%	21.7	27.7	50.6	0.002 a
No	%	0.0	40.4	59.6	
Hypertension during pregnancy					
Yes	%	19.5	24.4	56.1	0.272
No	%	11.2	36.0	52.8	
Age groups					
less than 20	%	25.0	12.5	62.5	0.003 a
21-25	%	20.0	12.5	67.5	
26-30	%	9.8	48.8	41.5	
31-35	%	0.0	44.0	56.0	
36 and above	%	25.0	50.0	25.0	

DISCUSSION

According to the present research, most of the samples were multiparous, in line with **Wagura et al. (2018)**, who reported that 93.2% of pregnant women with preterm birth were multiparous [8]. Further, the majority of the participants did not have a history of abortion (zero abortion), in line with **Butali et al. (2016)**, who that reported more than half (55.7%) of women with preterm birth did not have a history of abortion [2]. Regarding maternal risk factors, the current study was consistent with **Wagura et al. (2018)**, according to whose report, maternal age, parity, multiple gestations, previous preterm birth, antepartum hemorrhage, pregnancy-induced hypertension, and urinary tract infections were significantly related to preterm birth [8]. **Van den Broek et al. (2014)** reported previous preterm birth and anemia as maternal factors related to preterm birth [10]. The present study revealed that the majority of participants had urinary tract and vaginal infections during pregnancy, in agreement with **Qobadi & Dehghanifirozabad (2015)**, who reported that women with UTI during pregnancy were about two times more likely to have a preterm birth [11].

Balachandran et al. showed women with UTI during pregnancy to be more likely to have preterm delivery [12]. According to a meta-analysis conducted by **Palupi et al. (2022)**, in pregnant women with UTI, the occurrence of preterm labor increased by 2.19 times as compared with those without [13]. **Butali et al.** reported that, in older maternal age (≥35 years), hypertension during pregnancy was significantly related to an increased risk of preterm birth [2].

Bin Dahman showed a significant relationship between preterm birth with pre-eclampsia, parity, and premature rupture of membranes [14].

Kamram et al. showed preterm birth to be highest for multiple pregnancies and preterm delivery in women with a history of obstetric complications such as preterm delivery, stillbirth, low birth weight, and abortion is observed more compaired to other mothers [15].

Rugumisa et al. revealed previous preterm delivery, previous spontaneous abortion, uterine scar, parity, premature rupture of membranes (PROM), bleeding during second trimester, pre-eclampsia, placenta previa, and maternal anemia to be related to preterm delivery risk. The major risk factors related to preterm delivery are previous preterm delivery, placenta previa, and PROM [16].

Another support for the present research results was a study conducted by **Al-Assadi et al.**. They reported multiparty (73.6%), prior miscarriage (41.3%), inter pregnancy interval of <1 year (39.1%), urinary tract infection (28.4%), prior preterm birth (12.1%), multiple pregnancies (11.6%), and poor socio-economic state as the most frequent risk factor related to preterm birth [17]. The result of the present study showed an important relationship between parity and preterm birth, in line with **Koullalil et al.** who reported an increased risk for spontaneous preterm birth <37 weeks in nulliparous women (OR 1.95, 95%CI: 1.89-2) and those in their fifth pregnancy (OR 1.26, 95%CI: 1.13-1.41) as compared with those in their second pregnancy. Comparable results were observed for spontaneous preterm birth <32 and <28 weeks [18].

The commonest maternal contributing factors to preterm birth are urinary tract infection, vaginal infection, anemia, and hypertension during pregnancy. These results can be helpful to medical staff and public health workers in attempting to identify and manage related factors and unfavorable social environments, as well as providing early intervention to decrease preterm delivery risk.

In conclusion, early recognition of preterm risk factors can benefit healthcare workers and medical staff to identify high-risk pregnant women to adopt preventive measures against preterm birth.

DECLARATION

ABBREVIATION

- UTI: Urinary Tract Infection
- NICU: Neonate Intensive Care Units
- PTB: Pre-Term Birth
- WHO: World Health Organization

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