HSPI The Open Access Publisher

JCMHS ISSN 2833-5333 JOURNAL OF COMMUNITY MEDICINE AND HEALTH SOLUTIONS

Research Article

Prevalence and Risk Factors to Preterm Labor through a Study in Jiblah University Hospital, Ibb, Governorate, Yemen

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Abstract

Background: Preterm Birth (PTB) is the largest direct cause of neonatal mortality and the second leading cause of under-five mortality following pneumonia. Although there are studies conducted before, the magnitude of PTB remains a major issue in most developing countries including Yemen. Therefore, this study aims to assess the prevalence and associated factors of premature birth among newborns delivered in Jiblah University Hospital in Ibb governorate, Yemen.

Objectives: No studies have previously been conducted about preterm labour in Jiblah University Hospital in Ibb governorate, Yemen.

Methods: This retrospective observational study was conducted in the Department of Obstetrics & Gynecology, Jiblah University Hospital in Ibb Governorate, from 1 December 2023 to 29 February 2024.

Results: A total of 1350 pregnancies, 252 (18.67%) were preterm deliveries and 1089 (80.66%) were full-term deliveries at Jiblah University Hospital, Ibb. Our study shows the distribution of participants based on socio-demographic factors. The data that out of the total 252 female participants, with ages mean ± *std* = 27.43 ± 6.34 roughly 18.67% experienced preterm deliveries. Our study demonstrates that several factors are significantly linked to preterm birth, including the number of siblings, blood pressure, gravida, and abortion number, where the Chi-square p - value was < 0.05. On the other hand, the results from the logistic regression analysis indicated the predictive potential of certain socio-demographic factors in relation to preterm birth.

Conclusion: In this study, the number of siblings, blood pressure, gravida, and abortion number are the risk factors for premature delivery. Recognizing the most common risk factors for PTB will help to increase awareness about high-risk pregnancy, improve the preventive measures of preterm risk factors, and modify preterm care protocol in nurseries.

More Information

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Submitted: February 07, 2025
Approved: February 17, 2025
Published: February 18, 2025

How to cite this article: Alsharif A, Said Z, Mokabes F, Ameen L, Alqadri A, Musaed T, et al. Prevalence and Risk Factors to Preterm Labor through a Study in Jiblah University Hospital, Ibb, Governorate, Yemen. J Community Med Health Solut. 2025; 6(1): 020-026. Available from: https://dx.doi.org/10.29328/journal.jcmhs.1001053

Keywords: Preterm birth; Risk factors

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Introduction

Preterm birth is defined by the World Health Organization (WHO) as the birth of an infant < 37 weeks (259 days) completed gestation [1]. The most important outcome of preterm labor is a premature neonate. Previous studies have estimated that 11.1% of all live births are preterm worldwide, ranging from about 5% in several European countries to 18% in some African countries [2] Prematurity is the most prevalent cause of mortality in infants [3]. Based on global reports, 60% - 80% of neonatal mortalities (not accompanied by congenital abnormalities) occur in premature infants, resulting in asphyxia in the first week and septicemia in the fourth week [4].

Studies have revealed that mothers' education, age over 36, history of having a premature infant, multiparity, mother hypertension, infant diabetes, oligohydramnios polyhydramnios, placenta previa, anatomic abnormality of uterus, history of organic disorder (cardiac, renal, thyroid), and blood group type A have significant correlation with recurrence of premature labor [5,6].

In addition to problems and expenses related to the prematurity of infants, preterm labor may cause cerebral palsy, infection, fetal or neonatal death, and serious problems in the personal skills development of children at school age [7].

Every year, 3.6 million neonatal mortality cases are observed around the globe, of which 99 percent take place in developing countries [8]. In Iran, the most important cause of newborn death was prematurity (63.24%), constituting nearly two-thirds of neonatal mortalities [9].

In a number of studies, the most prevalent risk factors leading to premature birth consist of insufficient pregnancy care (52%), mothers' age being under 20 (34.7%), third-trimester hemorrhage (23.4%), and eclampsia and preeclampsia (13.1%). The most prevalent complications of preterm labor reported in infants include septicemia (66.7%), hyperbilirubinemia (58.8%), asphyxia (26.8%), and complications regarding the hyaline membrane (23.3%) [10,11].

Despite limited data due to ongoing conflict, estimates suggest that Yemen has a high prevalence of preterm birth, potentially exceeding 15%. This is translated to thousands of premature infants annually, facing increased vulnerability to respiratory distress, infections, and neurodevelopmental delays. This study was to determine the most common risk factors contributing to preterm deliveries at Jiblah University Hospital, Ibb, Yemen.

Materials and methods

Design of the study

This study was conducted retrospective observational study was conducted in the department of Obstetrics & Gynecology, Jiblah University Hospital in Ibb city, from 1 December 2023 to February 2024. The study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki and received approval from the Jiblah University Ethics Research Committee (approval number: 5). Consent from the patients was waived off by the ethical committee of the institute because of the retrospective design of the study.

Study population

The study involved all women pregnancy who were admitted to gynecological wards. One thousand three hundred and fifty participants, among the 1350 participants, 252 (18.66%); participants were preterm birth and 1098 (81.33%); participants were term birth, during the period of the study and were selected as study population.

Data collection

For data collection, the maternity records available in the hospital archive were used. The sampling method in this study was based on complete enumeration and all the records in the hospital archive were evaluated.

Cases were excluded from analysis for women lost to follow-up or with missing data. The hospital database including the hospital information system (archive medical records), and registries was used to collect the following data: The dependent variable in this study was preterm birth, dichotomized as birth occurring before 37 weeks (preterm birth) and at 37 weeks or later (term birth). Accordingly, a mother who gave birth before 37 weeks was classified as having experienced preterm birth and assigned a code of 1, while a mother who delivered at 37 weeks or beyond was categorized as having undergone term birth and assigned a code of 0. On the other hand, the independent variables included various aspects of family socio-demographics. Age was measured in completed years and subsequently grouped into four categories during the analysis: 15-25 years, 26-36, 37-47 years, and 47 years or older, workers. Education level was divided into two categories: literate, and illiterate. Employment status was dichotomized as employed or not employed. The location was classified as rural or urban. Parity was stratified as having fewer than 2 children or having 2 or more children. Gravidity was stratified as having fewer than 4 children or having 4 or more children. Other independent variables included: Detailed obstetric profile of the women such as gestational age, abortions, parity, six of baby, trauma, cervix incomitance, uterine anomaly, chronic steroids, uterine overdistension, presence of baby, the prevalence of preeclampsia, eclampsia, congenital anomalies for baby, Premature Rupture of Membranes (PROM), and medical history, urinary tract infection, blood pressure, smoking, chewing the khat, in the study population was noted.

Data analysis

The data analysis was conducted using SSPSS version 26.0 software. In the initial univariate analysis, means, standard deviation, frequencies, and percentages were computed to describe the variables considered in the study. In bivariate analysis, associations were examined using the Pearson Chi-square test with a significance level set at $p < 0.05$. Factors that demonstrated significance in this analysis were selected for inclusion in the subsequent multivariate analysis. The purpose of the multivariate analysis was to estimate the individual net effects of each independent factor on the dependent variable.

Study setting

Jiblah University Hospital is the main referral governmental hospital located in Jiblah, Ibb region, Yemen. It was built in 1965 and serves the Ibb region with a population of 772,000 according to the Central Statistics Agency [12]. Recently, this hospital has become an academic hospital for Jiblah University for Medical & Health Sciences. The maternity ward had sex beds in the delivery room and was staffed by a midwife or a nurse who attended deliveries and provided newborn resuscitation as needed. Additionally, a specific staff assigned to newborn care was also available. The Obstetrics & Gynecology unit was also located next to the maternity ward and received newborns who needed critical care.

Importance of the study

The studies in our country on preterm labour, in general,

are very minor and almost negligible, especially with regard to the high incidence of preterm labour among women Yemenis and at the same time the reasons behind this high prevalence at the level of the republic in general and the level of Ibb governorate in particular.

So, in the absence of previous studies here in Ibb City, Yemen, on factors contributing to preterm labor, we were interested in doing such an important area of research.

Objective

This study aims to:

1. Identify the prevalence of preterm birth (PTB) in Jiblah University Hospital, Ibb, Yemen.
2. Identify and understand the factors contributing to PTB in Yemen.
3. To do the prevention for PTB

Results

Table 1 shows the distribution of participants based on socio-demographics. The tabulated data indicates that out of the total 252 female participants, with ages Mean ± SD = 27 ± 6.34, Mean ± SD = 4.03 ± 2.18 for family number, Mean ± SD = 3.18 ± 2.38 for gravidity number, Mean ± SD = 0.39 ± 0.82 for abortion number, Mean ± SD = 108 ± 2 for parity number to return percentage 18.67% experienced preterm deliveries. The largest segment (20%) of the respondents fell within the age range of 26 to 36, with approximately 22.90% in the family the number greater than 6. Among the sample, 18.90% of women had preterm births in the residence area (rural), and 17.70% of women had preterm births in the residence area (urban). Regarding the education level, the literate percentage was 19.30% while the illiterate percentage was 14%, also, 18.90% were worker female participants, and 15.10% were non-workers. Among the women who were smokers and non-smokers were recorded (21.1%) and (18%), respectively.

On the other hand, risk factors among the study participants were as follows: 29.80% of patients have high blood pressure, and 17.70 % have normal blood pressure. However, the women who had gravidity ≥ 3 were (23%) while women who had gravidity ≤ 3 were (16.40%). Moreover, the percentage of 26.40% of patients have an abortion number ≥ 2 and the percentage of 17.90% of patients have an abortion number ≤ 1. In the parity percentage, 20.90% of patients have parity ≥2 and 16.90% of patients have parity ≤ 1 (Table 1).

Table 1 also provides an overview of variations in preterm birth across different socio-demographic, maternal, and characteristics. The table demonstrates that several factors are significantly linked to preterm birth, including; family number, blood pressure, gravidity, and abortion number, where the Chi-square p - value was < 0.05.

Multivariate analysis

The factors that were found to be statistically and significantly associated with preterm birth during the bivariate analysis were further examined in multivariate logistic regression. These factors were the number of siblings, blood pressure, gravidity, and abortion number.

In Table 1, it is evident that the factors indicating a significant association with preterm birth were: Family number. The results from the logistic regression analysis indicated the predictive potential of certain socio-demographic factors in relation to preterm birth. Specifically, the analysis indicated that the number of siblings played a role in predicting preterm birth. Accordingly, mothers who have a number of family members less than 4 reduced odds of giving birth to a preterm baby when compared to those who have more than 6 (OR = 0.632, p = 0.036, 95% CI: 0.401 - 0.969). The results revealed significant associations between preterm birth.

Discussion

In preterm labor through a study in Jiblah University Hospital, Ibb, Yemen. The findings, based on a cohort of 252 preterm deliveries and 1089 full-term deliveries, shed light on several key aspects of preterm delivery, offering insights for both clinical practice and future research.

In our study, a total of 1350 study participants were included, and the prevalence of preterm delivery (28-37 weeks) was found to be 18.67% (252 out of 1350). A study by Hassen, et al. [13], in a tertiary hospital in Ethiopia showed a higher prevalence of preterm delivery (28 weeks - 37 weeks) (25.0%) compared to our study, whereas a study by Pusdekar, et al. [14] in tertiary hospitals of six countries (low and low middle income) including India, showed a near similar prevalence rate of preterm delivery (28 weeks - 37 weeks) (12.6%). Also, the rate is similar to the study of Sehati-Shaghaie, et al. [15] in Ardabil (13.4%), but higher than estimates of 7%, 7.2%, and 5.6% in Zanjan [16], Tehran [17] and Qom [18] cities of Iran, however, the range of reported prevalence of premature births in Iran is vast between 5.6% and 34.9% [11]. Also, the identified rate of premature births in this study is in the reported global range of premature birth prevalence between 5 and 25% [3]. The preterm birth rate in the United States was reported to be 11.39% in 2013 [19], which is nearly close to the finding in this study. Another study showed that 52.6% of preterm neonates were admitted to Neonatal Intensive Care (NICU), this result is similar to the finding of another study in Iran on perinatal complications associated with preterm deliveries, which reported 52.6% admission of premature neonates to NICU [20].

This study looked at some of the potential risk factors for preterm births. The risk of preterm births was among mothers age. Several other studies have also reported according to [21,22] linking both younger and older maternal age with preterm births. However, a study conducted in Bangladesh found women aged < 20 years to be protective for preterm, contrary to our findings [23]. Our study did not find any significant association with the mother's age.

Table 1: The association between the socio-demographic, reproductive characteristics, and pre-term labour.

		Preterm labor				
			Yes (252)	No (1098)	Statistically	
Variables		Total	N (%)	N(%)	chi-square	*p* - value
Age	15-25	636	112 (17.60%)	524 (82.40%)	7.556	0.056
	26-36	586	122 (20.80%)	464(79.20%)		
	37-47	124	16 (12.90%)	108(87.10%)		
	>47	4	2 (50.00%)	2(50.00%)		
Mean ± *std* = 27.43 ± 6.34						
Number of siblings	1to 3	707	112 (15.80%)	595(84.20%)	7.988	0.018*
	4to 6	477	102 (21.40%)	375(78.60%)		
	>6	166	38 (22.90%)	128(77.10%)		
Residence	Rural	1062	201(18.90%)	861(81.10%)	0.221	0.638
	Urban	288	51(17.70%)	237(82.30%)		
Education	literate	1193	230 (19.30%)	963(80.70%)	2.535	0.111
	literate	157	22 (14.00%)	135(86.00%)		
Work	Yes	1264	239 (18.90%)	1025(81.10%)	0.763	0.383
	No	86	13 (15.10%)	73(84.90%)		
Smoking	Yes	303	64 (21.10%)	239(78.90%)	1.552	0.213
	No	1047	188(18.00%)	859(82.00%)		
Chewing Khat	Yes	911	170 (18.70%)	741(81.30%)	0.000063	0.994
	No	439	82 (18.70%)	357(81.30%)		
PET	Normal	1232	218(17.70%)	1014(82.30%)	11.033	0.004*
	Increase	114	34(29.80%)	80(70.20%)		
	decrease	4	0(0.00%)	4(100.00%)		
Gravidity	≤3	884	145(16.40%)	739(83.60%)	8.646	0.003*
	>3	466	107(23.00%)	359(77.00%)		
Abortion number	≤1	1225	219(17.90%)	1006(82.10%)	5.426	0.02*
	≥2	125	33(26.40%)	92(73.60%)		
Parity	≤1	767	130(16.90%)	637(83.10%)	3.451	0.063
	≥2	583	122(20.90%)	461(79.10%)		
Cervix incompetent	Emergency	4	0(0.00%)	4(100.00%)	0.921	0.337
	Elective	1346	252 (18.70%)	1094(81.30%)		
Urinary Tract Infection	Yes	1029	193(18.80%)	836(81.20%)	0.023	0.88
	No	321	59(18.40%)	262(81.60%)		
Uterine anomaly	Yes	31	9(29.00%)	22(71.00%)	2.245	0.134
	No	1319	243(18.40%)	1076(81.60%)		
Trauma	Yes	241	39(16.20%)	202(83.80%)	1.192	0.275
	No	1109	213(19.20%)	896(80.80%)		
Medical history	Yes	79	13(16.50%)	66(83.50%)	0.27	0.603
	No	1271	239(18.80%)	1032(81.20%)		
Sex of baby	Female	646	118(18.30%)	528(81.70%)	0.061	0.804
	Male	704	134(19.03%)	570(81.10%)		
Congenital anomalies for baby	Yes	11	4(36.40%)	7(63.60%)	2.288	0.13
	No	1339	248(18.50%)	1091(81.50%)		
Uterine over-distention	Yes	50	11(22.00%)	39(78.00%)	0.38	0.538
	No	1300	241(18.50%)	1059(81.50%)		
There are watery leaking	Yes	115	21(18.30%)	94(81.70%)	0.014	0.907
	No	1235	231(18.70%)	1004(81.30%)		
Presentation of baby	cephalic	1176	234(19.00%)	1000(81.00%)	1.9	0.387
	Transe	39	4(10.30%)	35(89.70%)		
	breech	73	14(18.20%)	63(81.80%)		

* Significance at 5%; X2 = Chi-square

The risk of preterm births was also higher among mothers with a family number, blood pressure, gravidity, and abortion number where the Chi-square p-value was <0.05.

The risk of preterm births was also higher among mothers with greater than six family members. This study was in line with the study in Ethiopia [24], which shows family members had a significant positive effect on preterm birth.

This study revealed a significant association between Pregnancy-Induced Hypertension (PIH) and preterm birth, This finding is in line with the study [25,26] conducted in East Africa, Ethiopia, Nigeria, Iran, Ghana, and Kenya, which shows PIH had a significant effect on preterm birth. This might be due to the vascular damage of the placenta caused by PIH, which results in preterm labor and delivery.

Results of the current study were also in agreement with previous studies that found that abortion numbers according to a recent systematic review published by Gabrielle Saccone

and colleagues join the long list of over 150 studies over the past four decades which extensively document that having an induced abortion increases a woman's risk of preterm birth in subsequent pregnancies. Saccone, et al. [27] clearly document again what other authors have repeatedly published; a fact also acknowledged by the Institute of Medicine (IOM) in their report on preterm birth in 2005. However, unlike the IOM, who hid the association on page 625, Saccone places the facts in the open: "Prior surgical uterine evacuation for either I-TOP [induced termination of pregnancy] or SAB [spontaneous abortion] is an independent risk factor for PTB [preterm birth]." Translated, that means any time the womb of a pregnant woman is forced open, there is a risk of damaging the opening of the womb.

Another finding of this study was a significant correlation between the number of pregnancies and the incidence of premature labor. Although the etiology in many cases is unknown and idiopathic, the findings of the present study are contrary to the results of studies performed by Shah [28] and Babinszki, et al. [29] as those studies did not recognize multiparity and grand parity as a cause of increased risk of premature labor, but are consistent with the results of Guo, et al. [30], who also mentioned this point and stated that number of pregnancies is a risk factor for premature labor and found that prevalence of premature labor in women is 6% regarding the first pregnancy, 4.3% with the second pregnancy, 4% with the third, and 5.7% with fourth pregnancies. Also, Reime, et al. [31], concluded that the risk of premature labor is increased by the second pregnancy in comparison to the first.

Eclampsia and pregnancy hypertension are a status that is present in 5% - 7% of all deliveries and is correlated with main fetal disease and premature labor according to Lazdam M, [32]. Based on the findings of the present study, a significant correlation was observed between the incidence of premature labor and a history of diabetes mellitus/thyroid dysfunction/ cardiac disease in mothers. This finding was consistent with the findings of a study conducted by Shingairai, et al. [33], in which a significant correlation was found between eclampsia during pregnancy and premature labor. Also in conformity with the findings of the present study, Covarrubias, et al. [34], recognized the correlation between mothers' diseases such as eclampsia and preeclampsia and diabetes during pregnancy with premature labor.

Although maternal smoking is a well-accepted risk factor and the use of alcohol can cause preterm birth, in this study there was no evidence for these effects on preterm labor, because smoking and alcohol drinking are very rare in the study population due to culture and religion.

Conditions such as polyhydramnios, PROM, and Urinary Tract Infection (UTI) have not demonstrated significant associations with preterm delivery. Understanding these risk factors offers opportunities for early identification and intervention to reduce the risk of preterm birth. In our study, the incidence of polyhydramnios, PROM, and UTI was not relatively higher among preterm deliveries. In contrast to this, it is worth noting that studies, by Sureshbabu, et al. [35] reported a much higher prevalence of PROM at 31.8%, and Chauhan, et al. [36] found a prevalence of 22.0%.

Interestingly, nulliparity was in contrast to the study by Prakash, et al. [37], where 72.92% of preterm deliveries occurred in multiparous women, while only 27.08% were in primigravida women. This variable, while not negligible, may have a less pronounced impact, possibly influenced by other factors not considered in this study.

Conclusion

In this research, the number of siblings, blood pressure, gravidity, and abortion number, are the risk factors for premature delivery. Recognizing the most common risk factors for PTB will help to increase awareness about high-risk pregnancy, improve the preventive measures of preterm risk factors, and modify preterm care protocol in nurseries.

Recommendations

In the light of the results reached of our study represented in the factors contributing to preterm labor through a study at Jiblah University Hospital, we were able to make a set of the following recommendations:

1. We recommend that the hospital record patient's date should be in an integrated manner.
2. We recommend that the hospital should perform laboratory tests and diagnosis of histological features and outcomes in women with preterm labor.
3. We recommend that the hospital perform laboratory tests and diagnosis of histological features and outcomes in women with Preterm labor.
4. We recommend that women should undergo health care before pregnancy.
5. Continued research is needed to better understand the causes of preterm labor and develop more effective prevention and treatment strategies. By implementing these recommendations, we can work towards reducing the incidence of preterm labor and improving the health outcomes for mothers and babies alike.

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