IJN
Iranian Journal of Neonatology
http://ijn.mums.ac.ir

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Original Article

Prevalence and Associated Factors of Premature Birth at Ramadi Teaching Hospital for Maternity and Children: A Cross-sectional Study

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ABSTRACT

Background: Prematurity poses a significant health concern, and it is crucial to identify the factors associated with it in order to reduce the burden on neonatal care units and prevent associated mortality. To determine the prevalence of premature delivery and identify the associated risk factors at Alramadi Teaching Hospital for Maternity and Children.
Methods: A prospective cross-sectional study was conducted at Ramadi Teaching Hospital for Maternity and Children. The study included all live births that were at least 20 weeks into gestation, while excluding stillbirths and cases where information on gestation length was missing. Checklist was used to collect the necessary information. Logistic regression was employed to analyze the risk factors.
Results: This study involved 1327 neonates, of which 204 were preterm, resulting in a prevalence of preterm delivery of 15.4%. By using logistic regression to analyze the associated variables, the study found that mothers under the age of 25 had a significant impact with an odds ratio of 4.2. Additionally, a history of prematurity was found to be significant with an odds ratio of 5.71, multiple pregnancies were also significantly associated with an odds ratio of 7.22, and complications during pregnancy showed significance with an odds ratio of 6.41.
Conclusion: The prevalence of prematurity at Ramadi Teaching Hospital for Maternity and Children in Anbar, Iraq, is 15.4%. The most associated risk factors were identified as younger maternal age, maternal history of prematurity, multiple pregnancy, and complications during pregnancy.

Keywords: Neonate, Ramadi city, Risk factors, Prematurity, Prevalence

Introduction

Neonates who are born before completing 37 weeks of pregnancy are considered preterm. Preterm births are further classified based on gestational age: extreme prematurity (<28 weeks), very preterm (28 to <32 weeks), and moderately to late preterm (32 to 37 weeks) (1-3). Globally, the leading cause of mortality in children under the age of 5 is prematurity. Prematurity can occur either due to spontaneous preterm labor or as a result of medical intervention, such as labor induction or early caesarean birth (1, 2, 4).

Approximately 15 million births worldwide, accounting for 11% of all births, are classified as preterm each year. Out of these, around 12 million, which is over 81%, occur in South Asia (SA) and Sub-Saharan Africa (SSA) (5). In 2020 about 13.4 million of neonates were born prematurely. That is >1 in 10 Neonates. In 2019 death in children was about 900 000 children because of preterm birth morbidities (6). Prematurity is correlated with increased costs of

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Please cite this paper as:
Shitran RF, Ali SM. Prevalence and Associated Factors of Premature Birth at Ramadi Teaching Hospital for Maternity and Children: A Cross-sectional Study. Iranian Journal of Neonatology. 2026 Apr: 17(2). DOI: 10.22038/ijn.2026.78358.2522

health care. Global proof has shown that health of the mother and preterm birth risk are closely correlated (7).

While no clear risk factors have been identified for the majority of preterm births, it is crucial to define the factors that are associated with an increased risk of prematurity in order to prevent and mitigate complications. Multiple studies conducted in various settings have documented several factors that are significantly linked to prematurity. These factors include a history of previous preterm births, maternal age of less than 20, pregnancy-induced hypertension, lack of antenatal care, previous abortions, and low birth weight(8-10).

Various factors associated with preterm birth have been identified by studies aiming to determine the prevalence and risk factors of premature delivery. These factors include a history of preterm birth, hypertension during pregnancy, preeclampsia, premature rupture of membranes, chronic medical illness, maternal age younger than 20 years, history of stillbirth, and multiple pregnancies (11, 12).

Prevalence: The occurrence of preterm birth varies across different regions. In Iran, the rates range from 5.6% to 39.4%, while in the Amhara Region of Ethiopia, it is 11.41% (12). Preterm birth risk factors encompass medical conditions such as hypertension and diabetes, a history of preterm birth or stillbirth, maternal age younger than 20 years, chronic illnesses, and multiple pregnancies (11, 12).

Efforts to minimize the risk of premature delivery include various interventions. These interventions involve counseling individuals on healthy lifestyle choices, scheduling regular antenatal care visits, closely monitoring for complications, and administering appropriate medical treatments when needed. By identifying these risk factors early in pregnancy, healthcare providers can offer targeted interventions to reduce the chances of preterm birth. Given the significance of preterm delivery and its consequences, it is crucial to determine the associated factors in order to predict those at risk and improve outcomes for individuals in that category. Additionally, it is important to define the prevalence of preterm birth and explore methods to decrease its occurrence (13-15). Limited data is available at Ramadi Teaching Hospital regarding preterm birth in maternity and children. Therefore, it is crucial to study this subject in order to improve outcomes and reduce the burden on the neonatal care unit.

Methods

A prospective cross-sectional study was conducted at the Ramadi Teaching Hospital for Maternity and Children in Anbar, Iraq. This hospital, located in Ramadi City, is a tertiary care center providing comprehensive care for neonates, particularly those born prematurely. The study was conducted in the inborn and outborn neonatal care units of the hospital. All live births with a gestational age of 20 weeks or more who were admitted to the neonatal care unit in Ramadi were included in the study. Neonates born alive before completing 37 weeks of pregnancy were classified as preterm. Stillbirths, cases with missing gestational length information, and families who declined to participate were excluded.

Data was collected from January 1, 2022, to July 1, 2022, covering a span of six months. The data included all live births that took place at Ramadi Teaching Hospital during this time period. Specifically, the collected data encompassed information about the newborns such as gestational age, birth weight, mode of delivery, and the need for resuscitation. Additionally, maternal information was also gathered, which included the age of the mothers, their parity and history of abortions, any complications experienced during pregnancy, as well as the number of antenatal visits made.

Ethical approval

The Ethics Committee of the College of Medicine at the University of Anbar in Iraq approved this study before it was conducted (ethical code 66-18/april/2023). Verbal consent was obtained from each participant before they were enrolled. The collected information was kept confidential and coded for identification purposes instead of using names. The data will only be used for research purposes. Those who declined to participate were excluded from the study.

Statistical analysis

Version 26 of the Statistical Package for Social Sciences (SPSS) was used to analyze the data. The data was displayed using ranges, means, and standard deviations for continuous variables, and frequency and percentage displays for categorical variables. The association between prematurity and certain variables was tested using the Chi-square test. If the anticipated frequency was less than five, the Fisher Exact Test was used instead. Bivariate logistic regression analysis was conducted, with the presence of prematurity as

the dependent variable and the significant variables from the binary analysis as the independent variables. A significance level of <0.05 was used for the P-value.

Results

The total number of neonates was 1327, with 729 (54.9%) being male and 598 (45.1%) being female, as shown in Table 1. Approximately 135 (10.2%) had a birth weight below 1500 grams, 363 (27.4%) had a birth weight between 1500 and 2499 grams, and 741 (55.8%) had a birth weight between 2500 and 4000 grams. Only 88 (6.6%) had a birth weight above 4000 grams.

In terms of gestational age, 1123 (84.6%) were term, while 204 (15.4%) were preterm. Of these, 346 (26.1%) required resuscitation, while 981 (73.9%) did not.

Table 1. Distribution of study patients by general and clinical characteristics of baby

Variable	No. (n= 1327)	Percentage (%)
Gender		
Male	729	54.9
Female	598	45.1
Birthweight (gram)		
< 1500	135	10.2
1500 - 2499	363	27.4
2500 - 4000	741	55.8
> 4000	88	6.6
Gestational age at delivery		
Term	1123	84.6
Preterm	204	15.4
Need resuscitation		
Yes	346	26.1
No	981	73.9

Regarding maternal information, Table 2 presents the age distribution of mothers, ranging from <25 years to >35 years. It shows that 81.1% of mothers were housewives, while only 4.9% were employed and 14% were still students. In terms of previous history, only 9.7% of mothers had a history of prematurity, while the majority (90.3%) did not. In terms of delivery method, 58.6% delivered vaginally and 41.4% via caesarean section. Only 8.5% did not have any antenatal visits, while 18.8% had less than 6 visits and the majority (72.7%) had more than 6 visits. In terms of pregnancy outcomes, 83.3% were single pregnancies, while twin and triplet pregnancies accounted for 14.4% and 2.3%, respectively. During pregnancy, 65.4% of women did not experience any complications, while 20% had hypertension, 4.1% had diabetes, and 5.4% had premature rupture of membranes. In terms of the use of tonics, 76.4% of women reported using them, while 23.6% did not.

Table 3 demonstrates a significant association between prematurity and various factors including birth weight, maternal age, maternal occupation, history of prematurity, number of health care visits, pregnancy outcome, complications during pregnancy, and use of tonics. The association is considered significant based on a P-value level of <0.05.

Logistic regression analysis was performed to examine the risk factors associated with prematurity. The results revealed that there were significant associations between prematurity and several factors. Specifically, mothers who were under the age of 25 (odds ratio = 4.2), had a history of prematurity (odds ratio = 5.71),

Table 2. Distribution of study patients by information of their mothers

Variable	Number (n=1327)	Percentage (%)
Mothers' age (Year)		
< 25	297	22.4
25 - 34	767	57.8
≥ 35	263	19.8
Mother occupation		
Housewife	1076	81.1
Employee	65	4.9
Student	186	14.0
History of prematurity		
Yes	129	9.7
No	1198	90.3
Mode of delivery		
Vaginal delivery	2142	58.6
Cesarean section	1512	41.4
Number of healthcare visits		
No	113	8.5
< 6	249	18.8
≥ 6	965	72.7
Pregnancy outcome		
Single	1105	83.3
Twin	191	14.4
Triple	31	2.3
Complication during pregnancy		
No	868	65.4
Hypertension	266	20.0
Diabetes Mellitus	54	4.1
Premature rupture of membrane	72	5.4
Others	67	5.1
Use tonics		
Yes	1014	76.4
No	313	23.6

Table 3. Association between prematurity and certain characteristics of baby and mothers

Variable	GA at delivery		Total (%) n= 1327	P - Value
	Preterm (%) n= 204	Full term (%) n= 1123		
Gender of baby				
Male	113 (15.5)	616 (84.5)	729 (54.9)	0.886
Female	91 (15.2)	507 (84.8)	598 (45.1)	
Birthweight (gm)				
< 1500	47 (34.8)	88 (65.2)	135 (10.2)	0.001
1500 - 2499	104 (28.7)	259 (71.3)	363 (27.4)	
2500 - 4000	53 (7.2)	688 (92.8)	741 (55.8)	
> 4000	0 (0)	88 (100)	88 (6.6)	
Mothers' age (Year)				
< 25	79 (26.6)	218 (73.4)	297 (22.4)	0.001
25 - 34	84 (11.0)	683 (89.0)	767 (57.8)	
≥ 35	41 (15.6)	222 (84.4)	263 (19.8)	
Mother occupation				
Housewife	186 (17.3)	890 (82.7)	1076 (81.1)	0.001
Employee	13 (20.0)	52 (80.0)	65 (4.9)	
Student	5 (2.7)	181 (97.3)	186 (14.0)	
History of prematurity				
Yes	40 (31.0)	89 (69.0)	129 (9.7)	0.001
No	164 (13.7)	1034 (86.3)	1198 (90.3)	
Mode of delivery				
VD	96 (13.8)	600 (86.2)	696 (52.4)	0.093
C/S	108 (17.1)	523 (82.9)	631 (47.6)	
Number of healthcare visits				
No	5 (4.4)	108 (95.6)	113 (8.5)	0.001
< 6	76 (30.5)	173 (69.5)	249 (18.8)	
≥ 6	123 (12.7)	842 (87.3)	965 (72.7)	
Pregnancy outcome				
Single	140 (12.7)	965 (87.3)	1105 (83.3)	0.001
Twin	53 (27.7)	138 (72.3)	191 (14.4)	
Triple	11 (35.5)	20 (64.5)	31 (2.3)	
Complication during pregnancy				
Yes	167 (36.4)	292 (63.6)	459 (34.6)	0.001
No	37 (4.3)	831 (95.7)	868 (65.4)	
Using tonics				
Yes	176 (38.3)	838 (182.6)	459 (34.6)	0.001
No	28 (3.2)	285 (32.8)	868 (65.4)	

experienced a triplet pregnancy (odds ratio = 7.22), or had complications during pregnancy (odds ratio = 6.41) showed significant associations with prematurity (Table 4).

Discussion

The main goals of this study are to determine the prevalence of preterm birth (15.4%) and assess the main factors associated with preterm birth in Ramadi City, Anbar province, Iraq. This will be done using Multivariable Logistic regression. The factors to be examined include Mother's age [95% C.I (1.78 – 7.17)], History of prematurity [95% C.I (2.16 – 9.18)], Triple pregnancy [95% C.I (2.14 – 12.12)], and Complication during pregnancy [95% C.I (1.71 – 11.62)].

The prevalence of prematurity in current study was (15.4%) is much lower in comparison to the previous prevalence reported in Baghdad (54.2%) (18), and lower than in Uganda (35.8%) (16), in Tanzania (24.4%) (17) and Rwanda (17.5%) (18), Current study prevalence similar to prevalence in Ethiopia (15.5%) (19) Much higher than Abu Dhabi (6.3%) (20), slightly higher than in Brazil (11.1%) (21) And in Ethiopia (14.6%) (22). The

Table 4. Logistic regression analysis for association of various risk factors with incidence of premature delivery

Variables	Crude analysis		Adjusted analysis	
	the crude and adjusted odds ratio (COR (95%CI))	95% C.I for odd's ratio	Adjusted OR (AOR)(95%CI)	95% C.I for odd's ratio
Gender of baby				
Male	1.02	(0.76 - 1.38)		
Female	1			
Birthweight (gm)				
< 1500	6.93	(4.42 - 10.88)	3.17	(0.99 - 4.67)
1500 - 2499	5.21	(3.64 - 7.76)	2.97	(0.93 - 4.01)
2500 - 4000	1			
> 4000	-			
Mothers' age (Year)				
< 25	2.95	(2.09 - 4.15)	4.2	(1.78 - 7.17) †
25 - 34	1			
≥ 35	1.5	(1 - 2.25)	1.12	(0.78 - 3.12)
Mother occupation				
Housewife	7.57	(3.07 - 18.65)	1.97	(0.56 - 3.09)
Employee	9.05	(3.08 - 26.56)	2.56	(0.81 - 5.31)
Student	1			
History of prematurity				
Yes	2.83	(1.88 - 4.26)	5.71	(2.16 – 9.18) ‡
No	1			
Mode of delivery				
VD	1.29	(0.96 - 1.74)		
C/S	1			
Number of healthcare visits				
No	1			
< 6	9.49	(3.72 - 24.2)	5.22	(0.97 - 11.39)
≥ 6	3.16	(1.26 - 7.89)	1.51	(0.78 - 3.34)
Pregnancy outcome				
Single	1			
Twin	2.65	(1.84 - 3.81)		
Triple	3.79	(1.78 - 8.08)	7.22	(2.14 – 12.12) †
Complication during pregnancy				
Yes	12.84	(8.06 - 18.79)	6.41	(1.71 – 11.62) ‡
No	1			
Using tonics				
Yes	2.14	(1.4 - 3.26)	1.19	(0.66 - 1.92)
No	1			

COR: Crude Odds Ratio, AOD: Adjusted Odds ratio, CI: confidence interval
† P<0.001
‡ P<0.05

difference in prevalence between current and other studies can be attributed to various factors, such as cultural differences, diverse settings, and different types of medical services available. Despite significant improvements in healthcare management, the rate of complicated pregnancies and their outcomes remains high.

In a study conducted in Iran, it was found that mother's age has a significant association with preterm delivery when using logistic regression to analyze the variables associated with it (23). While in DUHOK, an association was found between maternal age and statistically significant findings for those ≥ 35 years. This is similar to the findings in the Dominican Republic, where advanced maternal age (over 35 years) was also statistically significant (p<0.001, OR: 2.21; 95% CI 1.57 to 3.09). However, in Abu Dhabi, there was no association found between mother age and the variables being studied (24, 25).

The current study reveals a significant association between the maternal history of prematurity and preterm delivery. This finding is

consistent with previous studies conducted in Iran (OR: 5.3, P < 0.001), Northern Ethiopia, and Southern Ethiopia. Additionally, a similar association was found in Tanzania, where previous preterm delivery was also significant (P = 0.002) (26). Regarding multiple pregnancy and prematurity was significant association. This agree with study in Northern Ethiopia, and In Tigray (27), & In Norway (28).

There was an association between maternal complications during pregnancy and preterm delivery. This finding is consistent with a study conducted in Nepal, which also demonstrated an association between complications during pregnancy and preterm delivery. In southern Ethiopia(29, 30). In other study in Ethiopia (30), Several risk factors associated with premature delivery have been identified in studies. These include younger maternal age, a maternal history of prematurity, multiple pregnancies, and complications during pregnancy (11, 31).

Young Maternal AgeStudies have shown that young maternal age, particularly in adolescents, is linked to an increased risk of preterm delivery (32). Maternal History of Prematurity; A previous premature birth increases the risk of experiencing preterm delivery in subsequent pregnancies (33). Multiple Pregnancy; Women pregnant with twins, triplets, or more are at a higher risk of preterm birth (34). Complications during pregnancy, such as hypertension, preeclampsia, premature rupture of membranes, infections, and chronic medical conditions, can increase the chances of premature delivery (11).

Efforts to decrease the likelihood of premature delivery include various interventions. These interventions involve counseling expectant mothers on making healthy lifestyle choices, ensuring regular antenatal care visits, monitoring for any complications that may arise, and providing appropriate medical treatments as needed. By identifying these risk factors early on in pregnancy, healthcare providers can offer targeted interventions to reduce the risk of preterm birth.

Conclusion

The prevalence of prematurity at Ramadi Teaching Hospital for Maternity and Children in Anbar, Iraq is 15.4%. The most associated risk factors include younger maternal age, maternal history of prematurity, multiple pregnancy, and complications during pregnancy. It is recommended that all pregnant mothers receive regular antenatal visits, with special attention given to those with complications, multiple pregnancies, or a previous history of preterm delivery.

Acknowledgments

None.

Conflicts of interest

The authors have no conflicts of interest to report.

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