http://www.ijwhr.net
doi 10.15296/ijwhr.2016.38
Open Access Original Article
IJWHR
International Journal of Women's Health and Reproduction Sciences
Vol. 4, No. 4, October 2016, 171–175
ISSN 2330-4456

The Relation Between Vaginal Bleeding During Pregnancy and Preterm Birth in Patients Admitted to Martyrs Hospital in Persian Gulf

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Abstract

Objectives: Bleeding during pregnancy, especially in the first trimester, is among the most stressful cases for both patients and physicians. Sometimes bleeding during the first trimester is a predictor of adverse outcomes of pregnancy .The purpose of this study is to document the relationship between vaginal bleeding and preterm birth in patients admitted to the University Hospital in Bushehr.

Materials and Methods: The study was conducted on 1045 pregnant women. All relevant information (including age, parity, gestational age, education level, occupation, history of abortion, preterm delivery, smoking, drugs related to the mother's disease, bleeding, rupture of membrane, mother's blood pressure and vital signs, and gestational age at delivery) was fully recorded in the questionnaire. Then data was analysed by *t* test, chi-square, and logistic regression in SPSS version 16 software.

Results: There was significant difference between two groups of women with and without pregnancy bleeding ($P<0.05$) in terms of risk of preterm birth. The vaginal bleeding of first trimester had no significant relation with second trimester in terms of occurrence of preterm birth ($P=0.115$). The vaginal bleeding had no relation with preterm rupture of membranes ($P=0.0001$).

Conclusion: The emergence of preterm birth increases in patients with bleeding during the first and second trimesters.

Keywords: Vaginal bleeding, Preterm birth, Preterm premature rupture of the membranes

Introduction

The normal human gestation period is 37 to 42 weeks of pregnancy. Preterm birth refers to birth before 37 weeks of pregnancy. Its prevalence has been calculated to be 15% at present (1,2) and thus it continues to be a major health problem. This can be attributed to a wide range of causes including maternal, foetal, and placental. About one-third of preterm births occur due to complications in mother or foetus and health risks such as high blood pressure, bleeding or intrauterine growth restriction, cervical failure, and uterine problems. Two-thirds of preterm births occur spontaneously (1,3-4). The most common cause of mortality in developed countries is preterm birth. More importantly, permanent disabilities are seen in infants surviving death. Although care before and after delivery has been effective in improving infant survival, preterm birth still counts for 70% of infant mortality and 75% of infant disabilities (1,2,5). It is the major cause of disability for infants regardless of forms of congenital abnormalities (1,6). The problem of preterm birth is the most important reason for admission to the hospital during pregnancy (1,7). It also creates abundant economic problems for families (1,8), and, in spite of all efforts for prevention, its infection rate continues to be on the rise (1). Successful pregnancy depends on the integration of complicated genetic, hormonal, immunological and cellular factors. All these factors should fully cooperate with each other during pregnancy so that fertilization, implantation, and development of the embryo eventually reach fulfilment (1,9). Bleeding during pregnancy, especially in the first trimester, is among the most stressful cases for both patients and physicians. Spotting or bleeding during pregnancy is prevalent especially in the first trimester, often with no reason at all.

It can be due to the implantation of embryos, abortion, ectopic pregnancy, hydatid mole form, changes in the cervix, infection, focal lesions such as polyps and fibroids, and bleeding. Severe bleeding can endanger pregnancy and so this topic needs further consideration. In half of the cases, vaginal bleeding in the first trimester of pregnancy results in spontaneous abortion (10), while women who remain pregnant experience the risk of consequent complications during pregnancy. In general, bleeding during the first trimester is a predictor of adverse outcomes of pregnancy (11) and increases the risk of foetal or neonatal death at least four times (12). Such bleeding caused by

Received 18 April 2016, **Accepted** 15 August 2016, **Available online** 15 September 2016

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emerging disorders accompanies complications such as bleeding during the second and third trimesters, placenta abruption, and foetal growth problems in the womb, preterm rupture of membranes, preterm birth, and low birth weight (13-15). Any bleeding during pregnancy is abnormal, which could be categorized on the basis of the severity of bleeding into spotting, less than menstruation bleeding, as much as menstrual bleeding, and more than menstrual bleeding (1). In case of vaginal bleeding in early pregnancy, the rate of adverse outcomes in later stages of pregnancy increases. According to several studies, bleeding during six to 12 weeks (minor and sever bleeding) has relation with the advent of labour preterm, placental abruption, and spontaneous abortion before 24 weeks (1). The present paper aims to study the relationship between vaginal bleeding and preterm birth in patients admitted to the University Hospital in Bushehr.

Material and Methods

In a retrospective cohort study, the statistical population included the women admitted to Maternity Clinic of Martyrs hospital in Bushehr from February 2013 to January 2014. The study was conducted on 1045 pregnant women. The inclusion criterion of this study was that all admitted patients should be older than 18 and younger than 40 years with singleton pregnancy and normal blood pressure. Anybody with any kind of infection, diabetes, preeclampsia, placenta previa and placental abruption, past history of preterm delivery, uterine anomalies, and cigarette consumption was excluded. The relevant information was gathered with the help of a questionnaire, a set of interviews, and full investigation of records of these patients. The patients participated in the study after giving written consent. All relevant information was fully recorded in the questionnaire. The admission and delivery time for each patient was registered in the maternity hospital. At first, after thorough checking of medical history and performing ultrasounds along with other necessary laboratory tests, the patients were given essential tips and told about warning signs, including signs of bleeding, pain, and infection. According to routine, the time schedule of next prenatal visits was organized on the basis of instructions till the 36th week and then once a week. Further monitoring of the patients was performed in hospital clinic and maternity hospitals at admission time. The information was registered in the personal questionnaire and the remaining data was extracted from medical records of the patients. In this respect, necessary variables, including age, parity, gestational age based on ultrasounds and the date of the last menstrual period, education level, occupation, history of abortion, preterm delivery, smoking, drugs related to the mother's disease, bleeding, bleeding episodes, intensity bleeding, premature rupture of membranes (PROM), mother's blood pressure and vital signs, and gestational age at delivery, are determined.

Statistical Analysis

Data was expressed through mean, standard deviation (SD), and absolute and relative frequency, and was analysed by *t* test, chi-square, and logistic regression in SPSS version 16 software (SPSS Inc., Chicago, IL, USA). Confidence interval of 95 and *P* values of less than 0.05 were considered to indicate statistical significance.

Results

From the 1045 women considered for this study, 35 were excluded because their deliveries were conducted in another hospital and there was no possibility to communicate with them. Among the remaining women, five had hardworking conditions. As many as 67.9% of the participants had less than three children, and 184 cases of abortion had been recorded. The frequency distribution of demographic and fertility collective variables among the participants was showed in Table 1. Among 1010 women, 260 were involved in preterm birth and 306 in preterm rapture of membranes, while 201 women had vaginal bleeding. The highest reported bleeding was related to spotting (Table 2). According to Tables 3 and 4, hardworking condition ($P=0.17$, CI: 1.3–105.18), vaginal bleeding reports ($P=0.0001$, CI: 5.75–11.34), severity of vaginal bleeding ($P=0.0001$), and preterm rapture ($P=0.0001$, CI: 2.05–3.71) were significantly related with preterm birth. There was no significant relation between age, gravidity, abortion report, pregnancy age, and preterm birth. But, in general, there is significant relation ($P=0.0001$, CI: 7.39–148.39) between vaginal bleeding pregnancy period and preterm rapture of membranes (Table 5). By equalization of patients in terms of age, gravidity, hardworking

Table 1. Frequency Distribution of Demographic and Fertility Collective Variables in Women Participating the Study in Bushehr (2013-2014)

Variable		Number	Percent
Hard work	Yes	5	0.5
	No	1005	99.5
History from abortion	Yes	184	18.2
	No	826	81.8
Gravidity	<3	686	67.9
	≥3	324	32.1

Table 2. Frequency Distribution of Preterm Birth, Preterm Rapture of Membranes, Vaginal Bleeding Report, Sever Vaginal Bleeding, Pregnancy Age of Vaginal Bleeding and Age of Patients

Variable		Number	Percent
Preterm Labor	Yes	260	25.7
	No	750	74.3
Premature rupture of membrane	Yes	306	30.1
	No	704	69.9
History of bleeding	Yes	201	20.1
	No	809	79.9
Amount of bleeding	Spotting	168	16.6
	Menstruation	29	2.9
	More of menstruation	5	0.5
Gestational age of bleeding	NO	809	80.1
	14 wk	177	17.5
	14-27 wk	24	2.4
Age of patient	<35 y	880	87.1
	≥35 y	130	12.9

Table 3. The Relation Between the Variables of Hard Working Condition, Vaginal Bleeding, Abortion Report, and Preterm Birth in Women Under Study

Variable		Preterm Labor		P Value	Odds Ratio	95% CI	
		Yes	No			Lower	Upper
Hard work	Yes	4 (80%)	1 (20%)	0.017[a]	11.7	1.3	105.18
	No	256 (25.5%)	749 (74.5%)				
Abortion	Yes	57 (31%)	127 (69%)	0.077[a]	1.37	0.97	1.95
	No	203 (75.4%)	623 (24.6%)				
Gravid	<3	188 (27.4%)	498 (72.6%)	0.09[a]	1.321	0.968	1.803
	≥3	72 (22.2%)	252 (77.8%)				
Gestational bleeding	Yes	125 (61.9%)	76 (38.1%)	0.0001[a]	8.08	5.75	11.34
	No	135 (16.7%)	673 (83.3%)				

[a] Fisher exact test.

Table 4. The Relation Between Vaginal Bleeding, and Severity of Bleeding, Rapture of Membranes, Abortion Report, Pregnancy Age and Preterm Birth in Women Under Study

Variable		Preterm Labor		*P* Value	Odds Ratio	95% CI	
		Yes	No			Lower	Upper
Premature rupture of membrane	Yes	122 (40.1%)	182 (59.9%)	0.0001[a]	2.76	2.05	3.71
	No	138 (19.5%)	568 (80.5%)				
History of bleeding	Yes	125 (62%)	76 (38. %)	0.0001[a]	8.08	5.75	11.34
	No	135 (16.7%)	672 (83.3%)				
Amount of bleeding	No	135 (16.7%)	674 (83.3%)	0.0001[b]	-	-	-
	Spotting	104 (61.9%)	64 (38.1%)				
	Menstruation	18 (62.1%)	11 (37.9%)				
	More of menstruation	3 (75%)	1 (25%)				
Age	<35 y	225 (25.6%)	655 (74.4%)	0.748[a]	1.07	0.7	1.62
	≥35 y	35 (26.9%)	95 (73.1%)				
Gestational age of bleeding	14 wk	114(64.4%)	63 (35.6%)	0.115[a]	2.139	0.905	5.053
	14-27 wk	11 (45.8%)	13 (54.2%)				

[a] Fisher exact test; [b] Chi-square test.

Table 5. Relation Between Vaginal Bleeding and Preterm Rapture of Membrane in This Study

Variable		Premature of Membrane		*P* Value	Odds Ratio	95% CI	
		Yes	No			Lower	Upper
Gestational bleeding	Yes	145(72.1%)	56 (27.9%)	0.0001**	10.42	7.39	148.39

Table 6. The Adjusted Odds Ratio and CI of 95% in Terms of Age, Gravidity, Hard Working Condition, and Abortion Report for The Impact of Independent Variables on Dependent Variable (Preterm Birth)

Variable		B	P *value*	Odds Ratio	95% CI	
					Lower	Upper
Premature of rupture membrane		1.18	0.0001	3.28	2.34	4.58
Gestational age of bleeding	14 wk	2.31	0.0001	10.1	6.87	14.82
	14-27 wk	1.5	0.001	4.51	1.9	10.73

condition, medicine consumption, and abortion report, the adjusted odds ratio of membrane rapture and preterm birth is 3.28, and the adjusted odds ratio is 10.1 for the first trimester and 4.51 for the second trimester (Table 6).

Discussion

The present study shows that hardworking conditions have direct relation with preterm birth. The record of abortion has no impact on preterm birth, and the reason may be the omission of reasons, such as uterine abnormalities, that are effective in preterm birth. After the omission of these trouble-making factors, the relation between bleeding during the first and second trimesters and preterm birth was studied. The result showed that the probability of occurrence of preterm birth in the vaginal bleeding group increased 8.94 times and its real value with 95% CI is at least 6.26 to 12.77. The probability of preterm birth in the first trimester (CI: 6.87–14.82, OR: 10.1) is more than that in second trimester (OR: 4.51, CI: 1.9–10.73). Sharami et al (16) indicated that vaginal bleeding has been associated with an increased 3-fold risk of preterm birth. They also showed that the feature of bleeding, including time, frequency, and severity, has significant relation with preterm birth, which is consistent with our study. The study by Amirkhani et al (17) also verifies this relation. The study conducted by Arafa et al in 1503 singleton preg-

nancies reported 10.6 % vaginal bleeding during pregnancy, of which 63.5% was during the first trimester and 36.5% during the second trimester. Here vaginal bleeding, abortion, and preterm labour were more common among women ≥35 years. The results were less than desirable among women who reported more bleeding than those who never had bleeding, and, therefore, the risk of such significant results show increases in bleeding in the second trimester. For women with first trimester bleeding or second trimester bleeding, early foetus loss is significantly reduced by increasing the interval between pregnancies (18). Leung et al showed that unexplained bleeding before birth (before 34 weeks of gestation) is associated with high risks of preterm delivery (29.3%) (19).

In our study, the spotting and bleeding increased the risk of preterm birth, which is consistent with the study by Weiss et al (20). The study by Edwards et al (21) indicated that bleeding in the form of spotting is not consistent with preterm birth and only severe bleeding could lead to an increment in preterm birth. Vaginal bleeding could actually move towards thrombin and proteolytic cascades, which could damage f0etal membranes and lead to preterm rupture of such membranes (22,23). Thrombin stimulates uterine contractions. Besides the direct impact, bleeding could also be a manifestation of subclinical infection and inflammation of the uterus, which could lead to preterm birth (23) . According to this study conducted on patients, vaginal bleeding in the first and second trimesters was associated with preterm rupture of membranes. However, the study conducted by Hossain et al (24), which considered 2678 cases of birth, reported no preterm rupture of membranes. But here preterm birth was associated with first trimester bleeding. However, the study by Yang et al (25) on 56 women with vaginal bleeding in the first and second trimesters associates vaginal bleeding with the risk of preterm birth regardless of the amount and time of bleeding reported two times more and the risk of preterm rupture of membranes in women with record of bleeding in the first trimester reported to be more than control group. Bleeding with demolition of chorioamniotic space and chronic inflammation probably accelerates preterm birth (26). The retroperitoneal hematoma pair could also lead to uterine contractions, which is consistent with our study. Coleman et al (27) believed that if women exposed to the risk of preterm birth could be identified, then they would have better prenatal prognosis.

Conclusion

The risk of preterm birth in two target and test groups showed significant differences, as found by the present study. The emergence of preterm birth increases in patients with bleeding during the first and second trimesters. With respect to the related impacts during the first and second trimesters on the emergence of preterm birth and preterm rapture of membranes, it seems that a prescription of progesterone suppository with fewer side effects, instead of beta agonists, would prevent the consequent complications.

Ethical Issues

Approval for this study was received from the ethics committee of Bushehr University.

Confilict of Interests

None.

Financial Support

None.

Acknowledgments

The authors are grateful to the Bushehr University of Medical Sciences and vice-chancellor of the research & technology affairs for approval of the proposal. The relevant data was collected from Miss Nasiri's thesis.

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