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ORIGINAL ARTICLE

Prevalence and associated risk factors of ante-partum hemorrhage among Arab women in an economically fast growing society

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Abstract

Objective: The aim of this study was to determine the prevalence and associated risk factors of antepartum hemorrhage (APH) in the third trimester of Arab women residing in Qatar and their neonatal outcome.

Design and Setting: A prospective hospital-based study was conducted in the Women's Hospital and Maternity Clinics.

Materials and Methods: The study was based on pregnant women in the third trimester from the first week of January 2010 to April 2011. A total of 2,056 pregnant women, who had any kind of maternal complications, were approached and 1,608 women (78.2%) expressed their consent to participate in the study. The questionnaire covered variables related to socio-demographic factors, family history, medical history, maternal complications and neonatal outcome. Multiple logistic regressions were used to describe the association between socio-demographic factors and APH.

Results: The overall prevalence of APH among Arab women residing in Qatar was 15.3% with 6.7% among Qatari's and 8.6% among non-Qatari Arab women; the difference in ethnicities was not significant. Among maternal socio-demographic characteristics, lower education (primary or below AOR 1.72; 95%CI 1.22-2.43, and intermediate education AOR 1.41; 95%CI 0.88-2.26; *P*=0.005) compared to university education was significantly associated with APH. As for maternal biological characteristics, family history of G6PD (AOR 1.87; 95% CI 1.18-2.95; *P*=0.007) and family history of Down's Syndrome (AOR 1.88; 95%CI 1.35-2.62; *P*=<0.001) were significantly associated with APH at the multivariable level; family history of hypertension (OR 1.78; 95%CI 1.30-2.44; *P*<0.001) was significant at the univariate level. Neonatal outcomes as a result of APH included increased risk of Apgar score at 1 minutes <7 (AOR 1.44; 95%CI 1.12-2.02; *P*=0.04) and minor congenital anomaly (AOR 2.82; 95%CI 1.39-5.71; *P*=0.004).

Conclusion: Qatar has a high prevalence of APH. Poor education, family history of hypertension, G6PD and Down's syndrome were found to be significantly associated with increased risk of APH in Qatar. Neonates of APH are at significantly increased risk of adverse outcome. Thus it is essential that obstetricians are alerted to these risk factors for early detection and to decrease the negative effects of APH.

Key words: Ante-partum hemorrhage, APH, Arabs, bleeding, prevalence, Qatar

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Introduction

Antepartum hemorrhage is a serious condition which accounts for a high percentage of maternal and neonatal morbidity and mortality.[1] It is defined as hemorrhage from the birth canal after the 24th week of gestation at any time until the second stage of labor is complete and has a reported incidence of 3.5% which varies with socio-demographic variables.[2,3] The four main causes of APH include placenta previa, placental abruption, uterine rupture and unknown etiology.[4] While a number of studies have been conducted on these separate conditions, very few have measured the prevalence and socio-demographic factors related to APH as a whole. This is in spite of the fact that the main outcome of APH, irrespective of cause, is preterm birth and low birth weight.[5,6]

In general, the international literature has found associations between chronic maternal hypertension;[7,8] pre-eclampsia,[2,9] multiparity,[10] maternal smoking[2,11,12] and placental abruption. On the other hand maternal smoking was found to be less frequent in mothers with placenta previa in some studies[5] or to have a weak association in others.[13] In addition, history of previous cesarean birth[6,14] and increased maternal age[15] were noted to be associated with placenta previa.

It is particularly important to investigate the risk factors associated with APH in Qatar, as Qatar is currently undergoing rapid economic development. It now boasts one of the highest per capita incomes in the world, yet to date; the risk factors for APH have not been documented. Thus the aim of this study was to determine the prevalence and associated risk factors of antepartum hemorrhage (APH) in the third trimester of Arab women residing in Qatar and their neonatal outcome.

Materials and Methods

This is a prospective hospital-based study which was conducted among the Arab pregnant women residing in Qatar in the third trimester over a period from January 2010 to April 2011. The study was based on the registry of the Women's hospital which registers all the pregnant women visiting antenatal clinics of the Women's hospital of the Hamad Medical Corporation. The Research Assistants screened the outpatient register of Women's hospital during the study period and prepared a list of 2,056 Arab pregnant women above 24 weeks who came to the outpatient clinic with a complication in their pregnancy. A series of pregnant women with complications were taken consecutively from the register and included in the study sample. Only participants who agreed to participate were included in the study. A total of 2,056 pregnant women, who had any kind of maternal complications, were approached and sought their informed consent. A total of 448 of them were excluded either because of incomplete questionnaires or because they did not want to respond to the questionnaire due to lack of time resulting in 1,608 women (78.2%) for final analysis. Research assistants screened medical files of the subjects for any queries about the pregnancy and neonatal complications. Women with maternal complication reporting directly to emergency department were not included in the study.

During the study period, there were total of 16,188 deliveries in the Women's hospital. Our study sample included 1,608 pregnant women which is 9.9% of the mothers who delivered. The study was approved by the both IRB at the Weill Cornell Medical College and Hamad Medical Corporation prior to commencing data collection. Each participant was provided with brief information about the study and was assured of strict confidentiality.

In the State of Qatar, cost-free health care is offered to all pregnant women in maternity clinics at the Primary Health Care (PHC) Center and Women's Hospitals. Practically all pregnant women attend these clinics.

Definitions

Antepartum hemorrhage was defined as bleeding into and or from the genital tract after the 24th week of gestation at any time until the second stage of labor is complete, irrespective of cause (placental abruption, placenta previa or unknown etiology). Information on APH was ascertained through information on bleeding collected by patient recall during face-to-face interviews. Details on the timing and severity of bleeding episodes were not available. Age was considered as a continuous variable and categorized into <30, 30–34, 35–39, and 40–45 years.

Face-to-face interview was conducted by qualified nurses using a validated self-administered questionnaire in the local language (Arabic). The questionnaire covered socio-demographic characteristics of the pregnant women, family and medical history, type of maternal complication and the pregnancy and neonatal outcome. A translated Arabic version of the questionnaire was revised by a bilingual consultant. The survey instrument was then tested on 100 randomly selected pregnant women from the list for the validity of the questionnaire. The investigators had made the necessary corrections and modifications after considering the minor differences and discrepancies that had been found during the pilot study.

Statistical analyses were performed using SPSS Version 18.0 (SPSS Inc., Chicago, IL). Fisher's exact test and Chi-square analysis were performed to test for differences in the proportions of categorical variables between two or more groups. Student's t-test (two-tailed) was used to determine the significance of difference between two

continuous variables and confirmed by nonparametric Mann–Whitney test. Multiple logistic regression analysis using the forward inclusion and backward deletion method was used to assess the relationship between dependent and independent variables and to adjust for potential confounders and orders the importance of risk factors (determinant) for APH. The level $P<0.05$ was considered as the cut-off value for significance. Model adequacy was assessed through Hosmer and Lemeshow goodness of fit test. The insignificant P value of Hosmer and Lemeshow revealed that the model was good fit.

Results

Table 1 shows the socio-demographic and other characteristics of pregnant women visiting the Women's Hospital. Table 2 presents the biological risk factors of APH among pregnant women visiting the Women's Hospital using univariate logistic regression analysis. The overall prevalence of APH among Arab women residing in Qatar was 15.3% with 6.7% among Qatari's and 8.6% among non-Qatari Arab women; the difference in ethnicities was not significant. Results of univariate logistic regression showed that poor level of education, family history of hypertension, Down's syndrome, G6PD deficiency, malpresentation, minor congenital anomaly among neonates and Apgar score of <7 at 1 minute were significantly associated with APH.

Maternal family history of G6PD deficiency (OR 1.98; 95%CI 1.28-3.07; $P=0.002$), Down Syndrome (OR 1.62; 95%CI 1.17-2.24; $P=0.003$) and hypertension (OR 1.78; 95%CI 1.30-2.44; $P=0.001$) were significantly associated with APH. In addition, malpresentation of fetus (OR 6.60; 95% CI 3.44-12.68, $P<0.001$), minor congenital anomaly among neonates (OR 2.87; 95% CI 1.45-5.66; $P=0.002$) and Apgar score at 1 minute <7 ($P=0.044$) were significantly associated with APH.

Table 3 presents results of multivariable analysis for predictors of Antepartum hemorrhage in Qatar. All of the significant variables at the univariate level were predictors of APH at the multivariable level except for family history of hypertension.

Table 1: Socio-demographic and other characteristics of pregnant women visiting women hospital ($N=1608$)

Variables	*n* (%)
Age group (years)	
<30 years	635 (39.5)
30-34	403 (25.1)
35-39	336 (20.8)
40-45	234 (14.6)
Nationality	
Qatari	746 (46.4)
Non-Qatari	862 (53.6)
BMI	
<25	513 (31.9)
25-30	601 (37.4)
>30	494 (30.7)
Education level	
Secondary and above	1187 (73.8)
Intermediate	141 (8.8)
Primary and below	280 (17.4)
Occupation	
House wife	975 (60.6)
Sedentary/professional	443 (27.5)
Police/army/manual	190 (11.8)
Housing condition	
Villa	1053 (65.5)
Traditional house	425 (26.4)
Apartment	130 (8.1)
Living area	
Urban	1373 (85.4)
Rural	235 (14.6)
Monthly income (QR)	
<10,000	755 (46.9)
10,000--14,999	335 (20.8)
15,000--20,000	349 (21.7)
>20,000	169 (10.5)
Parental consanguinity	796 (49.5)
Maternal complications	
Placenta previa	136 (8.5)
Vasa previa	115 (7.2)
Abruption placenta	180 (11.2)
Mode of delivery	
Vaginal delivery	1367 (85)
Cesarean section	241 (15)
Malpresentation	
Yes	38 (2.4)
No	1570 (97.6)

QR = Qatari riyal

Discussion

Antepartum hemorrhage (APH) which complicates approximately 3.5% of pregnancies[2] was associated with a number of maternal socio-demographic and biological risk factors and adverse neonatal outcomes. The prevalence rate of APH in our study was 15.3% with 6.7% among Qatari's and 8.6% among non-Qatari Arab women. This is a dramatically higher rate than what was mentioned in the literature, but there may be several reasons for this.[16,17] Rates reported by other studies which were undertaken 5–35 years ago, were all smaller than the present study. The true rate may therefore have been under-reported or the rate may be increasing.

Maternal characteristics associated with lower socio-demographic status, namely lower education, were the main variable associated with APH in our study. While, to date, no previous study has investigated the socio-demographic

Table 2: Prevalence and biological risk factors of antepartum hemorrhage among pregnant women visiting women hospital (*N*=1608)

Variables	N	Prevalence of APHn (%)	Crude OR (95% CI)	*P**
Total number of subjects	1608	246 (15.3%)		
Family history of				
Diabetes	255	46 (2.9)	1.26 (0.89-1.80)	0.186
Hypertension	298	66 (4.1)	1.78 (1.30-2.44)	0.001
Down syndrome	291	61 (3.8)	1.62 (1.17-2.24)	0.003
Parental consanguinity	796	125 (7.8)	1.06 (0.81-1.39)	0.655
G6PD deficiency	119	30 (1.9)	1.98 (1.28-3.07)	0.002
Smoking/sheesha				
No (ref.)	1521	229 (14.2)	1	0.260
Yes	87	17 (1.1)	1.37 (0.79-2.37)	
<2 (ref.)	432	55 (3.4)	1	
2-3	428	64 (4.0)	0.60 (0.32-1.11)	0.231
4-6	666	111 (6.9)	0.72 (0.39-1.33)	
>6	82	16 (1.0)	0.82 (0.46-1.47)	
Antenatal care?				
Yes (ref.)	1248	183 (11.4)	1	
No	360	63 (3.9)	1.23 (0.90-1.69)	0.188
Previous abortion				
No (ref.)	1317	204 (12.7)	1	0.650
Yes	291	42 (2.6)	0.92 (0.64-1.31)	
Malpresentation				
No (ref.)	1571	226 (14.1)	1	<0.001
Yes	37	20 (1.2)	6.60 (3.44-12.68)	
Neonatal birth weight (g)				
2500-4000 (ref.)	1371	200 (12.5)	1	
<2500	107	23 (1.4)	1.60 (0.98-2.60)	0.121
>4000	130	23 (1.4)	1.25 (0.78-2.02)	
Inter pregnancy interval				
≥3 years (ref.)	598	90 (5.6)	1	0.655
Two years	871	131 (8.1)	0.99 (0.74-1.33)	
One year	139	25 (1.6)	1.23 (0.76-2.01)	
Neonatal outcome				
Congenital anomaly (y/n)	47	14 (0.9)	2.43 (1.28-4.61)	0.007
Growth retardation (y/n)	55	12 (0.8)	1.57 (0.82-3.03)	0.175
Neonatal sepsis (y/n)	70	11 (0.7)	1.03 (0.53-1.99)	0.921
Apgar score at 1 minute				
≥7 (ref.)	398	68 (4.2)	1	0.044
<7	1210	178 (11.1)	1.41 (1.10-2.14)	
Apgar score at 5 minutes ≥7 (ref.)	153	32 (2.0)	1	0.858
<7	1455	214 (13.3)	1.12 (0.75-1.41)	

*Two sided P value based on -2 loglikelihood test, ref = Reference category. APH = Antepartum hemorrhage

characteristics associated with APH, a number of studies have investigated socio-economic factors and placenta previa or placental abruption. For instance, a study conducted in Peru found no association between placental abruption and socio-economic status,[9] although this study was conducted among lower SES women. On the other hand a study conducted in the USA found that women on Medicaid support were more likely to have placental abruption.[11] In general the literature has noted an effect of socio-demographic characteristics on placental abruption but not on placenta previa.[2]

Table 3: Multivariable analysis for predictors of antepartum hemorrhage in Qatar (N=1608)

Predictors	Adjusted OR (95% CI)	*P* value*
Education level		
Secondary and above (ref.)	1	0.005
Intermediate	1.41 (0.88-2.26)	
Primary and below	1.72 (1.22-2.43)	
Family history of G6PD		0.007
No (ref.)	1	
Yes	1.87 (1.18-2.95)	
Family history of Down's syndrome		<0.001
No (ref.)	1	
Yes	1.88 (1.35-2.62)	
Apgar score at 1 minute		0.044
≥7 (ref.)	1	
<7	1.44 (1.12-2.02)	
Neonatal outcome		
Congenital anomaly(y/n)§	2.82 (1.39-5.71)	0.004
Malpresentation		
No (ref.) Yes	17.06 (3.62-13.75)	<0.001

ref. = Reference category , adjusted OR (95% CI) = Adjusted odds ratios based (95% confidence interval), *Two-sided P value based on -2 log likelihood statistics. Outcome variable: antepartum hemorrhage (1 = Yes, 0 = No). §Down syndrome, Edward's syndrome, cleft lip/palate, congenital heart disease, esophageal atresia, congenital dislocation of hip, diaphragmatic hernia

While the association between family history of hypertension and APH was significant at the univariate level it was not significant at the multivariable level. This may be due to the fact that we measured for all causes of APH. Other studies have noted associations between family history of hypertension and placental abruption.[7,8,13,18] Maternal cigarette smoking has also been consistently noted as a risk factor for placental abruption in a number of populations.[8,11] However, in our study due to the low frequency of smoking, this variable was not a risk factor.

Family history of G6PD deficiency was one of the main maternal biological predictors of APH in our study. This is a particularly important finding as G6PD deficiency is highly prevalent in the Arabian Gulf region.[19-21] Our study is one of the first studies to note this association with APH. The only blood disorder noted in the literature to be related to placental abruption is iron deficiency anemia.[11] In addition, this study also found significant association between APH and maternal family history of Down syndrome. Most

likely justification for this association could be the result of higher prevalence of Down syndrome (19.5 per 10,000 live births)[22] and consanguineous marriages (54%)[23] among the Qatari population. To the best of our knowledge none of the studies have reported this association before.

Ethnicity was not found to be significantly associated with APH in our study. However, a previous study conducted in the USA found that Blacks were more likely to experience placental abruption even after adjusting for SES.[24] A larger study with more specific nationalities and comparison needs to be conducted in order to determine the relationship between ethnicity and APH.

Our study confirmed the established finding that those with APH were more likely to have adverse neonatal outcome[5,25] such as low Apgar score at 1 minute and congenital anomalies. Similar to our study a previous study conducted in Croatia found that an Apgar score of <7 at 1 minute and at 5 minutes among those neonates whose mother experienced APH as a result of placenta previa[6] In addition, another study found that mothers who had placental abruption were more likely to give birth to a neonate with congenital anomaly.[26] Tikannen[18] noted that this was mainly due to preterm birth of most neonates whose mothers suffer from APH.

Conclusion

In conclusion, Qatar has a high prevalence of APH. Lower education and family history of hypertension, G6PD, and Down's syndrome were found to be significantly associated with increased risk of APH in Qatar. Neonates of APH are at significantly increased risk of low Apgar score at 1 minute and congenital anomalies. Thus it is essential that obstetricians are alerted to these risk factors for early detection and to decrease the negative effects of APH.

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