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Prevalence and Factors Associated with Hypertension in Pregnancy among Pregnant Women attending Fort Portal Regional Referral Hospital in Uganda

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ABSTRACT

Hypertension in pregnancy is a significant public health issue affecting a large number of pregnant women worldwide. In Uganda, the prevalence of hypertension in pregnancy is not well understood, and little is known about the factors associated with hypertension in pregnancy among pregnant women attending regional referral hospitals. To determine the prevalence of hypertension in pregnancy and to identify the socio-demographic and obstetric factors associated with hypertension in pregnancy among pregnant women attending Fort Portal Regional Referral Hospital in Uganda. A hospital based retrospective descriptive cross-sectional study was carried out among 100 pregnant women who attended Fort Portal regional referral hospital between April 2022 to July 2022. Systematic random sampling was employed. Data on demographic and obstetrical history, and blood pressure measurements was collected using a pretested questionnaire. Logistic regression analysis was used to determine the factors associated with hypertension in pregnancy using SPSS Version 25. Prevalence of hypertension in pregnancy in this study was found to be 7.0%. Maternal age between 21-29 years was statistically significant and pregnant women between these years were less likely to develop hypertension in pregnancy. On the other hand, family history of hypertension was statistically significant and pregnant women who had it positive were more likely to develop hypertension in pregnancy. The prevalence of hypertension in pregnancy was low. Statistically significant association was found between hypertension in pregnancy and family history of hypertension and age. Hence, this study recommends that early detection and management of pregnant mothers with hypertension in pregnancy be mandatory as part of antenatal care so as to improve maternal and fetal outcomes.

Keywords: prevalence, hypertension in pregnancy, pregnant women

INTRODUCTION

While motherhood is a beautiful experience, many pregnant women are experiencing suffering, illness, and death. Around 15% of pregnant women are expected to develop life-threatening complications during pregnancy, at delivery or post-partum [1-7]. Such complications include hemorrhage, obstructed labor, sepsis, abortion and hypertension [8]. Hypertensive disorders of pregnancy are significant contributors to these complications and sufferings [9]. A pregnant woman is considered hypertensive if her blood pressure is greater than or equal to 140/90 mmHg on two consecutive measurements [10]. HDP is a general term which is used for increased blood pressure during pregnancy. It includes pregnancy induced hypertension (PIH) (without proteinuria), preeclampsia (with proteinuria) and eclampsia (preeclampsia with convulsions), gestational hypertension and chronic hypertension [11]. Pregnancy-induced hypertension is most likely to complicate approximately 10% of all pregnancies [12]. Around 40,000 women, mostly from developing countries, die each year due to preeclampsia or eclampsia [13-17].

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Preeclampsia alone is estimated to account for about 40% to 60% of maternal deaths in developing countries [18]. For instance, a hospital-based study conducted in South Africa showed that HDP contributed for 20.7% of maternal deaths in the country [11]. Similarly, HDP accounts for 19% of maternal deaths in Ethiopia [19]. The prevalence of hypertension in pregnancy, in Uganda, is not well documented. However, a recent study indicated ranges of 1.2% to 18.25% [20]. This study is inconsistent and inconclusive to show the national magnitude. It is therefore necessary to discover factors associated with the condition among pregnant mothers attending Fort Portal regional referral hospital in order to add on existing literature and design appropriate intervention. It is because of the above-mentioned data that this study was pursued so as to determine the prevalence of Hypertension in pregnancy and its associated factors with the aim of providing preliminary information for intervention as well as for a more detailed future investigation.

Methodology

Study Design

This study employed a retrospective descriptive cross-sectional study design [21].

Study Area

Fort Portal Regional Referral Hospital, sometimes referred to as Buhinga Hospital by the locals, is a hospital in the town of Fort Portal, within Kabarole District in Western Uganda.

Study Population

The population for the study targeted pregnant women who attended Fort Portal Regional referral hospital in Uganda.

Selection Criteria

Inclusion Criteria

Only the files of pregnant women that attended Fort Portal regional referral hospital during data collection time were considered.

Exclusion Criteria

All the files of the pregnant women which had incomplete information were excluded from the study.

Sample Size Determination

The sample size was determined using the formula of Kish Leslie (1965) which is listed below:

$$\boldsymbol{n} = \frac{\boldsymbol{z^2 P(1-p)}}{\boldsymbol{e^2}}$$

Where;

n = estimated minimum sample size required
p = proportion of women with PIH (7%) as per a study at Mulago.
z = 1.96 (for 95% Confidence Interval)
e = margin of error set at 5%

Therefore; $\mathbf{n} = \frac{1.96^2 \; x \; 0.07 \; x \; (1-0.07)}{0.05^2}$

n = 100 participants.

Data Collection Method and Management

This study used a checklist questionnaire which was a closed structured questionnaire. It involved a list of specific questions and aimed at collecting information on socio-demographic characteristics and obstetric factors of the pregnant women whose files had met the selection criteria. This was all done by the researcher and involved no patients physically present as it was a retrospective study.

Data Processing and Analysis

The data was checked for inconsistencies and missing values and amendments were considered as needed, coded and entered into MS excel 2019 then exported to SPSS (Statistical Package for Social science) version 25 for analysis. The extent of relationship between the independent and dependent variables was examined using adjusted odds ratio with a 95% Confidence Interval. P-value less than 0.05 was considered as significant. Finally, results were presented in charts and tables.

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Ethical Considerations

Permission was sought and granted by the Executive Director of Fort Portal regional referral hospital before pursuing this study. Ethical approval was also sought from IREC of KIU-TH to ensure that the study adhered to acceptable ethical guidelines.

Selection of Participants

The participants were selected using a systematic random sampling technique while strictly adhering to the eligibility criteria. When the required sample size was obtained, the collection exercise was closed. No bias was involved in terms of tribe, religion, race or any interest group.

Informed Consent

Participating in the study was voluntarily. Counselling and education about the study was done & explained to the voluntary recruitment in the language best understood by them. They were given consent forms to sign.

Privacy and Confidentiality

No names were used for identification of patients other than codes which were used. The collection of data was done in privacy and the details of the questionnaire were securely kept throughout the course of the study.

RESULTS

Table 1 shows descriptive analysis of socio-demographic characteristics of the pregnant women attending Fort Portal regional referral hospital. The biggest percentage of pregnant women were between the ages of 21-29 years (64%) and almost 80% of them were residents of urban areas. Majority of the pregnant women had no formal education (53%) and most of them did peasantry (74%) as their occupation. 92% of the women were married and approximately above 90% of them didn't smoke or consume alcohol.

Table 1: Socio-demographic characteristics of the participants

Variable		Frequency, n=100	Percentage, %
Age	20 and below	3	3.0
	21-29	64	64.0
	30+	33	33.0
Residence	Urban	20	20.0
	Rural	80	80.0
Education Level	No formal education	53	53.0
	Primary	38	38.0
	Secondary	4	4.0
	Tertiary	5	5.0
Occupation	Peasant	74	74.0
	Employed	7	7.0
	Business	19	19.0
Marital status	Married	92	92.0
	Not married	8	8.0
Smoking	No	98	98.0
	Yes	2	2.0
Alcohol consumption	No	93	93.0
	Yes	7	7.0

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Table 2 shows descriptive analysis of obstetric factors of the pregnant women attending Fort Portal regional referral hospital. Very few of the participants were primigravida (2%) and about 95% of the pregnant women had a negative family history of hypertension in pregnancy. Approximately 3% of the mothers had a history of pre-eclampsia and 11% had a history of abortion. Majority of the pregnant women had an interpregnancy interval of less than 5 years (91%) and most of them had a singleton pregnancy (98%).

Table 2: Obstetric factors of the participants

Variables		Frequency, n=100	Percentage, %
Gravidity	1	2	2.0
	2	50	50.0
	3+	48	48.0
Family History of hypertension	Yes	5	5.0
	No	95	95.0
History of pre-eclampsia	Yes	3	3.0
	No	97	97.0
History of abortion	Yes	11	11.0
	No	89	89.0
Interpregnancy interval	Less than 5 years	91	91.0
	More than 5 years	9	9.0
Number of fetuses	1	98	98.0
	2	2	2.0

Majority of the participants (93%) didn't have hypertension in pregnancy hence only 7% of them had been diagnosed with hypertension in pregnancy as shown in *figure 2* below.

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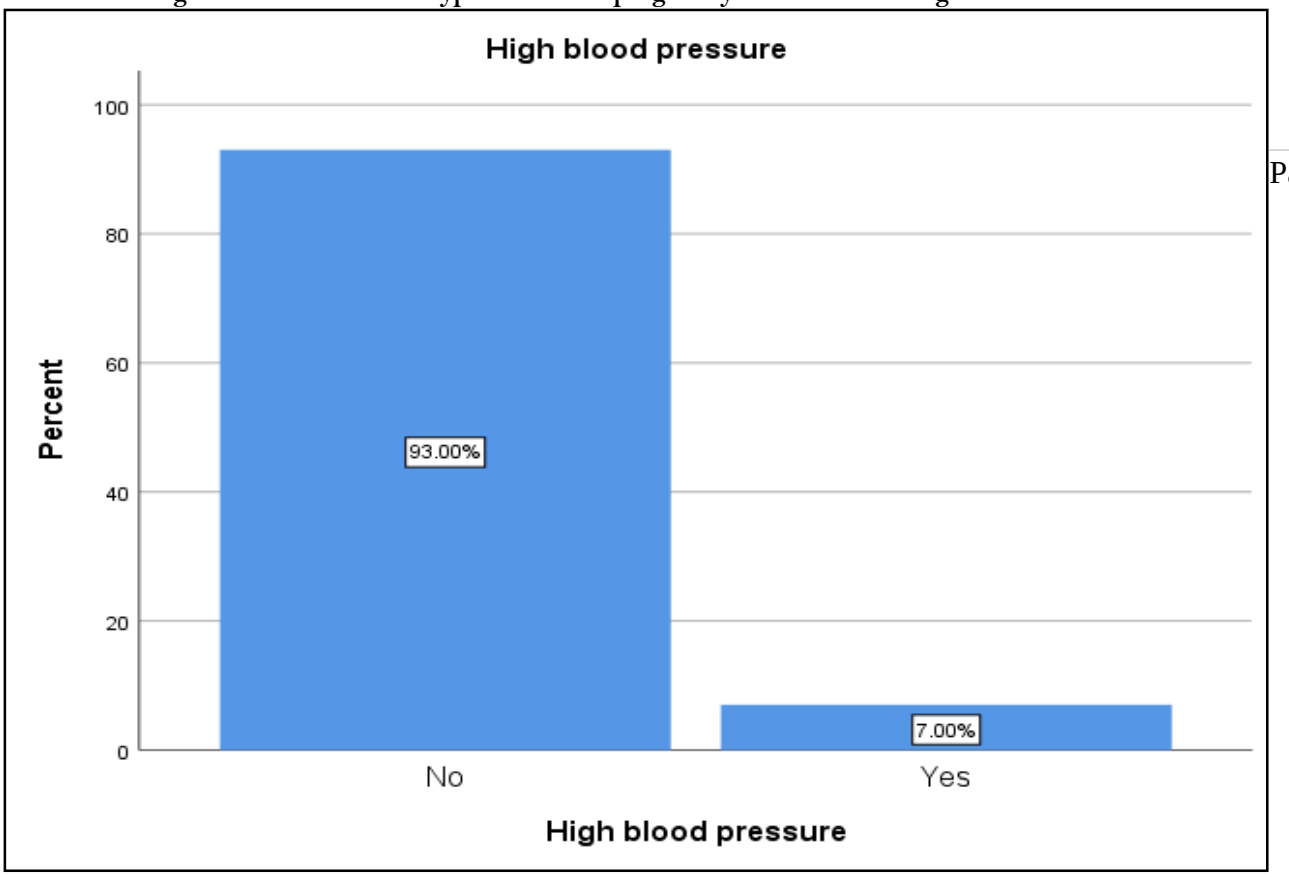
Figure 1: Prevalence of hypertension in pregnancy at Fort Portal regional referral



Binary logistic regression was used to determine whether the socio-demographic factors were associated with the likelihood of developing hypertension in pregnancy. The model was statistically satisfying (x^2 (9, n=100) = 31.270, $p < 0.05$), suggesting that it could distinguish between those with or without hypertension in pregnancy. The model explained between 21.5% (Cox & Snell R square) and 36.7% (Nagelkerke R square) of the variance in the dependent variable and correctly classified 83.2% of the cases. As shown in *table 3*, only age significantly contributed to the model ($p<0.05$). This means that pregnant women who were between 21-29 years of age were less likely to develop hypertension in pregnancy (cOR = 0.1; $p < 0.05$). There was no significant overall effect of marital status, education level, residence, occupation, smoking and alcohol consumption with development of hypertension in pregnancy.

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Table 3: Logistic regression analysis of hypertension in pregnancy on associated socio-demographic characteristics among pregnant women

Variable	Hypertension		p value	cOR	95% CI	
	No	Yes			Lower	Upper
Age						
20 and below	2 (2.2%)	1 (14.3%)	0.434	2.8	0.212	37.033
21-29	63 (67.7%)	1 (14.3%)	**0.031**	0.1	0.010	0.796
30+	28 (30.1%)	5 (71.4%)	-	1		
Residence						
Urban	18 (19.4%)	2 (28.6%)	-	1		
Rural	75 (80.6%)	5 (71.4%)	0.231	0.36	0.033	0.560
Marital status						
Married	85 (91.4%)	7 (100%)	-	1		
Not married	8 (8.6%)	0 (0%)	0.074	0.89	0.561	0.987
Education level						
No formal education	49 (52.7%)	4 (57.1%)	-	1		
Primary	36 (38.7%)	2 (28.6%)	0.121	0.52	0.122	0.963
Secondary	3 (3.2%)	1 (14.3%)	0.056	1.23	0.961	1.565
Tertiary	5 (5.4%)	0 (0.0%)	0.211	0.58	0.234	0.765
Occupation						
Peasant	69 (74.2%)	5 (71.4%)	-	1		
Employed	7 (7.5%)	0 (0.0%)	0.051	0.78	0.421	1.123
Business	17 (18.3%)	2 (28.6%)	0.491	1.21	0.780	1.534
Smoking history						
No	92 (98.9%)	6 (85.7%)	-	1		
Yes	1 (1.1%)	1 (14.3%)	0.200	0.61	0.110	0.991
Alcohol consumption						
No	87 (93.5%)	6 (85.7%)	-	1		
Yes	6 (6.5%)	1 (14.3%)	0.992	0.54	0.233	1.011

Table 4 shows the logistic regression results on obstetric factors predicting the development of hypertension in pregnancy. The full model was statistically significant ($x2$ (14, N = 100) = 42.802, $p < 0.05$). thus, the model was successfully able to distinguish between participants who had hypertension in pregnancy and those who didn't have. The Cox and Snell R squared value was 27.7% whereas Nagelkerke R squared was 43.1%. The model also correctly classified 84.5% cases. The results indicate that family history of hypertension was significantly associated with hypertension in pregnancy ($p < 0.01$). This shows that pregnant women who had a positive family history of hypertension in pregnancy were four times more likely to develop hypertension in pregnancy in their current pregnancy (cOR = 4; $p < 0.01$). This was the only variable which was found to be significantly associated with hypertension in pregnancy. Gravidity, history of pre-eclampsia, history of abortion, interpregnancy interval and number of fetuses were not significantly associated with hypertension in pregnancy.

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Table 4: Logistic regression analysis of hypertension in pregnancy on associated obstetric factors among pregnant women

Variable	Hypertension		P value	cOR	95% CI	
	No	Yes			Lower	Upper
Gravidity						
1	1 (1.1%)	1 (14.3%)	0.112	11.0	0.573	211.168
2	48 (51.5%)	2 (28.6%)	0.381	0.5	0.080	2.627
3+	44 (47.3%)	4 (57.1%)	-	1		
Family history of hypertension						
No	92 (98.9%)	3 (42.9%)	**<0.001**	4	1.211	9.397
Yes	1 (1.1%)	4 (57.1%)	-	1		
History of pre-eclampsia						
Yes	1 (1.1%)	2 (28.6%)	-	1		
No	92 (98.9%)	5 (71.4%)	0.987	1.28	0.754	2.341
History of abortion						
Yes	7 (7.5%)	4 (57.1%)	-	1		
No	86 (92.5%)	3 (42.9%)	0.624	0.10	0.021	0.600
Interpregnancy interval						
Less than 5 years	90 (92.8%)	1 (33.3%)	-	1		
More than 5 years	7 (7.2%)	2 (66.7%)	0.231	0.51	0.254	0.687
Number of fetuses						
1	96 (98.9%)	2 (66.7%)	-	1		
2	1 (1.1%)	1 (33.3%)	0.120	0.78	0.233	1.010

DISCUSSION

The prevalence of the hypertension in pregnancy among pregnant women attending Fort Portal regional referral Hospital in this study was 7.0%. This is comparable to 6% reported in Mulago hospital [22]. Moreover, [23] reported that HDP affect 5% - 22% of all pregnancies in the world. However, prevalence in this study is lower than the reported prevalence of 11.5% and 19.9% in Kenya and Tanzania respectively [24, 25]. The factors that may be accounting for the low prevalence of hypertension in pregnancy at Fort Portal regional referral hospital could be due to time small sample size in this study. Hypertension in pregnancy is influenced by varying and intricate interconnected factors and logistic regression analysis in this study showed that odds of developing hypertension in pregnancy were less in pregnant women who were between the ages of 21 and 29 years [26-29]. Likewise, a study conducted in UK showed that advanced maternal age to be significantly associated with hypertension in pregnancy [30]. The odds of developing hypertension in pregnancy increased with age as 5 (71.4%) of the pregnant women who had hypertension were aged 30+ years. Likewise, a study conducted in USA showed that maternal age extremes were significantly associated with hypertension in pregnancy [31]. Besides, [32] reported that pregnancy-induced hypertension was one of common complication in faced by the elderly primigravida. In this study, only a positive family history was found to be significantly associated with hypertension in pregnancy. Likewise, a study conducted in UK showed that advanced maternal age and a positive family history of hypertension to be significantly associated with hypertension in pregnancy [30]. A positive family history of hypertension in pregnancy was found to be a significant factor for developing it in this study. Women with a positive family history of hypertension in pregnancy were more likely to develop hypertension in pregnancy four times than their counterparts. Amaral et al., [33] also reported the same. 57.1% of the respondents who had hypertension had family history of hypertension whereas 42.9% had no family history of hypertension. 57.1% of hypertensive cases in this study had a gravidity of 3+. However, there was no significant association between hypertension in pregnancy and gravidity in the binary logistic regression. A prospective study conducted by [34-37] in India revealed that 3+ gravidity increased the odds of developing hypertension in pregnancy by 10 times. There was no significant relationship between history of DM and hypertension in pregnancy. This finding concurs with that of [35, 38] in Woreda South Ethiopia who reported that most of the respondents (96%) did not have history of gestational diabetes. However, this contradicts a finding by [36, 39] in Northern Ethiopia which showed that DM was a factor that was associated with hypertension in pregnancy.

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CONCLUSION

The prevalence of hypertension in pregnancy among pregnant women attending Fort Portal regional referral was 7.0% which is low compared to other studies done in Africa. The socio-demographic factors associated with hypertension in pregnancy among the pregnant women attending Fort Portal regional referral was only age. The study showed that pregnant mothers who were between 21-29 years of age were less likely to develop hypertension in pregnancy. The obstetric factors associated with hypertension in pregnancy among the pregnant women attending Fort Portal regional referral were gravidity and a family history of hypertension in pregnancy. Pregnant mothers who had a positive family history of hypertension, were more likely to develop hypertension in pregnancy.

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