Prevalence and Associated Factors of Hypertension among Pregnant Women Attending Aldayat and Saad Abu Elela Teaching Hospital Khartoum State -2020

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Abstract

Background: Pregnancy induced Hypertensive are the major causes of severe acute morbidity, long-term disability and death among mothers and babies. The worldwide prevalence of pre-eclampsia is 5–10%.

Objectives: The objective of the study was to study the prevalence and associated factors of pregnancy-induced hypertension among pregnant women attending Aldayat and Saad Abu Elela Teaching Hospital Khartoum State-2020.

Materials and methods: This descriptive hospital-based study was conducted in Aldayat and Saad Abu Elela Teaching Hospitals, the study covered all pregnant women in a period of two months from January to February 2020 to obtain a sample size of 239 pregnant women. Data were collected using WHO standardized questionnaire after modification to suit the study. Data were analyzed using Statistical Package for Social Studies (SPSS) version 23. The association between different variables was checked using the chi-square test, P-value ≤ 0.05 was considered significant.

Results: The overall prevalence of hypertension among pregnant women was 7.5%. The distribution of prevalence of hypertension associating to age group among those affected: 44.4% among age group 18-30 years old then 33.3% among age group less than 18 year old and 11.1% in both group 31-45 and >45 years old, respectively. The study revealed that the associated factors of hypertension among pregnant women were: Family history and first relative relationship, number of pregnancies, follow-up blood pressure during pregnancy, with 39%, 100.0%, 44.3%,100.0% , respectively, socio-demographic characteristics such as education level illiterate 5.5% khalwa 27.7% primary/basic = 5.5% intermediate/secondary 25.5% university/post-university 33.3%),employment status employed 41%, Not employed 59%,nature of work sitting 27.8% Stand22.2%, Moved33.3%, all mentioned 16.7%,no. of hours per shift4 hours 11.7% 5-8 hours 56.1% > 8 hours 32.2%, family monthly income in SDG< 1500 31.1%, 1500-3500 38.9%, > 3500 29.7%. From the interview with Medical Director and the Metron the main factors associated with hypertension were: family history, nutrition status, the number of pregnancies and obesity. The statistics showed a strong association between blood pressure among pregnant women from a side and education level, the number of pregnancies, follow-up during the pregnancy and

family history from another side with P-value = 0.01, 0.02, 0.01 , 0.026 , 0.02 , respectively. There was no association between employment status, nature of work, increase of blood pressure during and b efore pregnancy, knowledge and time of diagnosis from a side and hypertension among pregnant women from another side with P-values (0.4, 0.47, 0.38, 0.42, 0.35), respectively.

Conclusion: The **study revealed that the prevalence of hypertension among pregnant women associated with many factors such as: family history, age group, and follow-up during pregnancy, level of education, so based on the findings the study recommended that the pregnant women should be sensitized on the preventive measures for managing high blood pressure, health and nutrition education including physical education for all pregnant women with particular emphasis on the most affected age group, and there must be continued follow-up.**

Keywords

Hypertension, pregnant women, Khartoum State.

INTRODUCTION

The pregnant woman is considered hypertensive if her blood pressure is greater than or equal to 140/90 mmHg on two consecutive measurements (WHO, 2016). Pregnancy induced hypertension is a common health problem with adverse effects for both mother and fetus/neonate. It is believed to be a multifactorial health condition the pathogenic mechanism of which is not as yet fully understood. (Kintiraki, *et al.,* 2015).

Addressing behavioral risk factors, as; unhealthy diet, harmful use of alcohol and physical inactivity, can prevent hypertension. Tobacco use increases the risk of complications of hypertension. If no action is taken to reduce exposure to these factors, cardiovascular disease incidence, including hypertension, will increase (WHO, 2017). According to WHO, Pregnancy Induced Hypertension (PIH) is one of the main causes of maternal, fetal and neonatal mortality and morbidity.

It is the most common cause of maternal death in Europe. In a retrospective study over the period 2000-2009 in a tertiary center in India, PIH was the third cause of maternal death. In a similar study, over the period 1996-2009 in Henan Province, China, PIH was the second cause of maternal death. One tenth of maternal deaths in Africa and one quarter in Latin America are due to PIH-associated complications (Chhabra and Kakani, 2015).

According to the Canadian Hypertension Society, PIH refers to one of four conditions: pre-existing hypertension; gestational hypertension; pre-existing hypertension plus superimposed gestational hypertension with proteinuria and unclassifiable hypertension (Helewa, *et al.*, 2015). Hypertension is responsible for at least 45% of deaths due to heart disease (WHO, 2017) and affects both the child's and mother's morbidity and mortality (Evangelia, *et al.,* 2017).

Pregnancy-induced hypertension complicates one-ten of all pregnancies. Around 40,000 women, mostly from developing countries, die yearly due to preeclampsia or eclampsia. Preeclampsia alone is estimated to account for about 40% to 60% of maternal deaths in developing countries (Berhe *et al*., 2018). Maternal mortality is exceptionally high in Sudan with pre-eclampsia/ eclampsia which accounts for 4.2% of the obstetric complications Kassala, Eastern Sudan and represents18.1% of the direct cause of maternal deaths (Ishag, 2018). This study aimed to study the prevalence and associated factors of pregnancy induced hypertension among pregnant women attending Aldayat and Saad Abu Elela Teaching Hospital Khartoum State-2020.

MATERIALS AND METHODS

Research design

This study is a descriptive cross-sectional hospital-based study.

Study area

This study was conducted in Aldayat and Saad Abu Elela Teaching Hospital. Khartoum is the Capital of Sudan and the State of Khartoum. It is located at the confluence of the White Nile, flowing north from Lake Victoria, and the Blue Nile, flowing west from Ethiopia.

Study population

Study population was the pregnant women attending Saad Abu Elela and Aldayat hospital, the admission rate was 150-200 pregnant women every day at each hospital (FMoH, 2019).

Selection criteria

Inclusion criteria

Pregnant women attending to Aldayat and Saad Abu Elela Teaching Hospital during the study period who are in their second half of pregnancy- after 20 weeks.

Exclusion criteria

Those who refuse to participate or suffer from serious conditions.

Sample size

The sample size was total coverage of all pregnant women attending Aldayat and Saad Abu Elela Teaching Hospital.

Sampling techniques

The study covered all the pregnant women attending the two hospitals within a period of two months from January to February 2020. Based on the outpatient attendance rate (30-50 and 50-70) in Saad Abu Elela and Aldayat, respectively we obtained 239 pregnant women in the second trimester of their pregnancy. (105 were from Aldayat Hospital and 134 pregnant women from Saad Abu Elela Teaching Hospital).

Data collection

Data was collected using the following tools:

Questionnaire

a WHO standardized questionnaire was used after modification to suit the study. Then it was directed to the pregnant women to collect data regarding their demographic and socio-economic characteristics, knowledge, dietary, family history and different aspects associated with hypertension …etc.

Interview

With Medial Director and the Merton was conducted to gather data regarding the study area, services and outpatient attendance rate and associated factors, of hypertension.

Medical check

The Nurses conducted the clinical examination. Blood pressure is measured with a sphygmomanometer; a sphygmomanometer is a device that measures blood pressure. It is composing of an inflatable rubber cuff, which is wrapped around the arm. A measuring device indicates the cuff's pressure. A bulb inflates the cuff and a valve releases pressure. A stethoscope is used to listen to arterial blood flow sounds. As the heart beats, blood forced through the arteries cause a rise in pressure, called systolic pressure, followed by a decrease in pressure as the heart's ventricles prepare for another beat. This low pressure is called the diastolic pressure (Vischer and Burkard, 2016).

Procedures

The Nurses were taking the clinical examination to obtain blood pressure measurement, they used an appropriately, sized blood pressure cuff. The length of the cuff's bladder should be at least equal to 80% of the circumference of the upper arm. Wrap the cuff around the upper arm with the cuff's lower edge one inch above the antecubital fossa (Vischer and Burkard, 2016).

Lightly press the stethoscope's bell over the brachial artery just below the cuff's edge. Some health care workers have difficulty using the bell in the antecubital fossa, so we suggest using the bell or the diaphragm to measure blood pressure. Rapidly inflate the cuff to 180mmHg. Release air from the cuff at a moderate rate (3mm/sec) (Vischer and Burkard, 2016). Record the pressure in both arms and note the difference; also record the subject's position (supine), which arm was used, and the cuff size (small, standard or large adult cuff) (Vischer and Burkard, 2016).

Data analysis

Data collected was analyzed using a computer program Statistical Package for Social Science (SPSS) version 23.0 and the association between deferent variables was checked using χ^2-test, p-value ≤ 0.05 was considered significant.

Ethical consideration

Written approval notes from the hospital granted to conduct the study. Also, there is a verbal consent to inform the participant about the required data and procedures and obtain their consents before indulging into interviews.

RESULTS

This descriptive cross-sectional hospital-based study was conducted among pregnant women attending Aldayat and Saad Abu Elela Teaching Hospital, Khartoum, Sudan. The study revealed the following findings as explained in the tables below:

Table (1) shows the socio-demographic characteristics of the pregnant women attending Aldayat and Saad Abu Elela Teaching Hospital 2020.

Table (2) shows that 94.4% of the pregnant women were diagnosed in routine follow-up while 5.6% were diagnosed in emergency center.

Table (3) indicate that 22.2% of pregnant women were diagnosed for the first time and 50.0% of them diagnosed within less than 5 years while 27.8% were diagnosed more than 5 years.

The table (4) illustrates that 61.1% of the pregnant women were diagnosed in hospital and 27.8% were diagnosed in PHCC while 11.1% were diagnosed in health center.

Table (5) displays that 95.4% of pregnant women their blood pressure not change while 4.6% of pregnant women their blood pressure was change.

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Table (6) shows that 28.4% of pregnant women their blood pressure were increasing, while 71.6 of the pregnant women their blood pressure not increased.

Table (7) indicate that 8.8% of the pregnant women with blood pressure their blood pressure was increasing during the first pregnancy, and 13.2% increased during the second pregnancy and 29.4% increased during the third pregnancy and 27.9% increased during the 4th pregnancy in comparison 20.5% were increasing after their 4th pregnancy.

A table (8) explains that 61.1% of the pregnant women were not prescribed medicines while 38.9% have medicines to lower their blood pressure.

Table (9) describes that all of them 100% not following certain diet.

Table (10) shows that 88.3% of pregnant women were taking milk while 11.7% of pregnant women were not taking milk.

Table (11) indicates that 88.9% of pregnant women were changing their dietary habit after blood pressure while 11.1% of them not change.

Table (12) describe that 85.8% of the pregnant women were not practicing physical activity while 14.2% are practicing physical activities.

Table (13) shows that 79.4% of the pregnant women from those who practiced physical activities were practicing walking, while 20.6% were practicing swimming.

Table (14) show that 97.9% of pregnant women is watch TV or sitting to computer screen while 2.1% of them were not.

The statistics describe that there was no significant association between hypertension and age, (p-value =0.2), table 15.

The statistics show that there was a significant association between hypertension and education level (p-value = 0.01), table 16.
The statistics show that there was no significant association between hypertension and employment status (p-value =0.4), table 17.

The statistics show that there was no significant association between nature of work and prevalence of hypertension with (p-value =0.47), table 18.

The statistics confirms that there was no significant association between family income and the prevalence of hypertension with (p-value = 0.3), table 19.

The statistics show there was a significant association between hypertension and the number of pregnancies with (p-value=0.02), table 20.

The statistics show that there was no significant association between number of weeks of pregnancy and prevalence of hypertension (p = 0.1), table 21.

The statistics indicate that there was no significant association between Knowledge about hypertension among pregnant women and hypertension (p-value = 0.42), table 22.

The statistics show there was a significant association between hypertension and pregnant women follow-up their blood pressure during pregnancy (p=0.026), table 23.

The statistics show there was a significant association between hypertension and pregnant women who have family member had blood pressure before (p= 0.026), table 24.

The statistics show there was a significant association between hypertension and pregnant women who had family member had blood pressure before whom have relationship (p< 0.04) , table 25.

INTERVIEW RESULTS

From the interview with medical director and metron below, the main factors, associated with hypertension were - Family history, nutrition status, age group and late marriage, number of pregnancies, and obesity). While the recommendation of the medical director was to follow certain diet by pregnant women and routine follow-up of blood pressure during the pregnancy.

Socio-demographic characteristic	Age Group	No.	%
Age/years	< 18	45	18.8
	18-30	95	39.7
	31-45	76	31.8
	>45	23	9.6

	Total	**239**	**100.0**
Education level	Illiterate	10	4.1
	Khalwa	21	8.8
	Primary/basic	69	28.9
	Intermediate/ secondary	81	33.9
	University/ Post- University	58	24.3
	Total	**239**	**100.0**
Employment status	Employed	98	41.0
	Not employed	141	59.0
	Total	**239**	**100.0**
Nature of work	Sitting	74	31.0
	Stand	84	35.1
	Moved	53	22.2
	All mentioned	28	11.7
	Total	**239**	**100.0**
No. of hours per shift	4 hours	28	11.7
	5-8 hours	134	56.1
	> 8 hours	77	32.2
	Total	239	100.0
Family monthly income/ SDG	<1500	75	31.4
	1500-3500	93	38.9
	>3500	71	29.7
	Total	**239**	**100.0**

Table 1: Socio-demographic characteristics of the pregnant women attending Aldayat and Saad Abu Elela Teaching Hospital 2020 (n=239)

Types	No.	%
Routine	17	94.4
Emergency	1	5.6
Total	**18**	**100**

Table 2: Types of diagnosing by blood pressure among pregnant women who have at Aldayat and Saad Abu Elela Teaching Hospital Khartoum State -2020 (n=18)

Time	No.	%
First time	4	22.2
< 5 years	9	50.0
> 5 years	5	27.8
Total	**18**	**100**

Table 3: The distribution of pregnant women according to time of starting diagnosis for hypertension at Aldayat and Saad Abu Elela Teaching Hospital Khartoum State-2020 (n=18)

Place	No.	%
Health center	2	11.1
PHCC	5	27.8
Hospital	11	61.1
Total	**18**	**100**

Table 4: Place of routine follow-up for blood pressure of affected pregnant women at Aldayat and Saad Abu Elela Teaching Hospital Khartoum-2020 (n=18)

Blood pressure Change	No.	%
Change	11	4.6
Not change	228	95.4
Total	**239**	**100**

Table 5: Change in blood pressure among Pregnant women during last 12 months, at Aldayat and Saad Abu Elela Teaching Hospital Khartoum-2020 (n=239)

Increase	No.	%
Yes	68	28.4
No	171	71.6
Total	**239**	**100**

Table 6: Increase of pregnant
women blood pressure during pregnancy at Aldayat and
Saad Abu Elela Teaching Hospital Khartoum-2020. (n=239)

Time	No.	%
1st pregnancy	6	8.8
Second pregnancy	9	13.2
Third pregnancy	20	29.4
Fourth pregnancy	19	27.9
More than fourth pregnancy	14	20.5
Total	**68**	**100**

Table 7: The distribution of pregnant women according to
time of increase of blood pressure at Aldayat and Saad Abu Elela
Teaching Hospital Khartoum-2020 (n=68)

Type	No.	%
Yes	11	61.1
No	7	38.9
Total	**18**	**100**

Table 8: Receiving prescribed medication
among affected pregnant women to lower their blood pressure at
Aldayat and Saad Abu Elela Teaching Hospital Khartoum-2020

Follow	No	%
Yes	Zero	0.0
No	239	100.0
Total	**239**	**100.0%**

Table 9: Following a certain
diet system among pregnant women at Aldayat and
Saad Abu Elela Teaching Hospital Khartoum-2020 (n=239)

Taking milk	No	%
Yes	211	88.3
No	28	11.7
Total	**239**	**100.0**

Table 10: Taking milk among
pregnant women or not at Aldayat and Saad Abu
Elela Teaching Hospital Khartoum-2020 (n=239)

Changing	No	%
Yes	2	11.1
No	16	88.9
Total	**18**	**100.0**

Table 11: Changing dietary habit among
affected pregnant women after blood pressure at
Aldayat and Saad Abu Elela Teaching Hospital Khartoum-2020 (n=18)

Practicing physical activity	No	%
Yes	34	14.2
No	205	85.8
Total	**239**	**100.0%**

Table 12: Practicing physical activities among pregnant
women at Aldayat and Saad Abu Elela Teaching Hospital Khartoum-2020 (n=239)

Types of physical activity	No	%
Walking	27	79.4
Swimming	7	20.6
Total	**34**	**100.0%**

Table 13: Types of physical activity among
pregnant women who practicing physical activities at
Aldayat and Saad Abu Elela Teaching Hospital Khartoum- 2020 (n=34)

Watching TV/ computer	No	%
Yes	234	97.9
No	5	2.1
Total	**239**	**100.0%**

Table 14: Watching TV or sitting to computer screen
among pregnant women at Aldayat and Saad Abu Elela
Teaching Hospital Khartoum-2020 (n=239)

Diagnosis	No.	Age				Total
		< 18	18-30	31-45	>45	
Hypertensive	n	6	8	2	2	**18**
	%	33.3%	44.4%	11.1%	11.1%	**7.5%**
Not hypertensive	n	39	87	74	21	**221**
	%	17.6%	39.3%	33.4%	9.5	**92.5%**
Total	n	45	95	76	23	**239**
	%	**18.8%**	**39.7%**	**31.7%**	**9.6%**	**100%**

Table 15: The association between hypertension and age among pregnant women attended
Aldayat and Saad Abu Elela Teaching Hospital Khartoum State-2020 (n=239)

$\chi 2$= 4.9; p-value =0.2

Diagnosis	No.	Education level					Total
		Illiterate	Khalwa	Primary/ basic	Intermediate/ secondary	University/ Post -University	
Hypertensive	n	1	5	1	5	6	18
	%	5.5%	27.7%	5.5%	27.7%	33.3%	7.5%
Not hypertensive	n	9	16	68	76	52	221
	%	3.8%	6.7%	28.5%	31.8%	21.8%	92.5%
Total	n	10	21	69	81	58	239
	%	**4.2%**	**8.8%**	**28.9%**	**33.9%**	**24.3%**	**100.0%**

Table 16: The association between pregnant women education level and prevalence of hypertension at Aldayat and Saad
Abu Elela Teaching Hospital Khartoum State -2020 (n=239)

$\chi 2$= 12.6; p-value =0.01 (significant)

Diagnosis	No.	Employment status		Total
		Employee	Not employee	
Hypertensive	n	6	12	18
	%	33.3%	66.6%	7.5%
Not hypertensive	n	92	129	221
	%	41.6%	58.3%	92.5%
Total	n	98	141	239
	%	**100.0%**	**100.0%**	**100.0%**

Table 17: The association between pregnant women employment status and
prevalence of hypertension at Aldayat and Saad Abu Elela Teaching Hospital Khartoum State -2020 (n=239)

$\chi 2$= 0.47; p-value =0.4 (Not significant)

Diagnosis	No.	Nature of work				Total
		Sedentary position	Stand	Active situation	All mentioned	
Hypertensive	n	5	4	6	3	**18**
	%	27.8%	22.2%	33.3%	16.7%	**7.5%**
Not Hypertensive	n	69	80	47	25	**221**
	%	31.2%	36.2%	21.3%	11.3%	**92.5%**
Total	n	74	84	53	28	**239**
	%	**31.0%**	**35.1%**	**22.2%**	**11.7%**	**100.0%**

Table 18: The association between pregnant women nature of work and prevalence of hypertension
at Aldayat and Saad Abu Elela Teaching Hospital Khartoum State -2020 (n=239)

χ2= 2.5; p-value =0.47 (Not significant)

Diagnosis		Family income			Total
		<1500 SDG	1500-3500 SDG	>3500 SDG	
Hypertensive	n	3	9	6	18
	%	16.7%	50.0%	33.3%	7.5%
Not Hypertensive	n	72	84	65	221
	%	30.1	35.1	27.2	92.5%
Total	n	75	93	71	239
	%	33.9%	42.1%	32.1%	100.0%

Table 19: The association between pregnant women monthly income and prevalence of hypertension at Aldayat and Saad Abu Elela Teaching Hospital Khartoum State -2020 (n=239)

χ2= 0.20; p-value = 0.3 (Not significant)

Diagnosis	No.	No. of pregnancy				Total
		1	2	3	> 3	
Hypertensive	n	3	4	3	8	18
	%	16.7%	22.2%	16.7%	44.4%	7.5%
Not Hypertensive	n	59	79	49	34	221
	%	26.7%	35.7%	22.2%	15.4%	92.5%
Total	n	62	83	52	42	239
	%	25.9%	34.7%	21.8%	17.6%	100.0%

Table 20: The association between pregnant women numbers of pregnancies and prevalence of hypertension atAldayat and Saad Abu Elela Teaching Hospital Khartoum State -2020 (n=239)

χ2= 9.7; p-value = 0.02 (significant)

Diagnosis	No.	No. of weeks of pregnancy				Total
		< 12	12-24	25-36	> 36	
Hypertensive	n	7	7	2	2	18
	%	38.9%	38.9%	11.1%	11.1%	7.5%
Not Hypertensive	n	43	68	63	47	221
	%	19.5%	30.8%	28.5%	21.3%	92.5%
Total	n	50	75	65	49	239
	%	20.9%	31.4%	27.2%	20.5%	100.0%

Table 21: The association between pregnant women number of weeks of pregnancy and prevalence of hypertension at Aldayat and Saad Abu Elela Teaching Hospital Khartoum-2020 (n=239)

χ2= 6.70; p-value = 0.1 (Not significant)

Diagnosis		Knowledge		Total
	No.	Yes	No	
Hypertensive	n	13	5	18
	%	72.2%	27.8%	7.5%
Not Hypertensive	n	181	40	221
	%	81.9%	18.1%	92.5%
Total	n	194	45	239
	%	81.2	18.8	100.0%

Table 22: The association between Knowledge of pregnant women about hypertension and prevalence of hypertension among pregnant women attending Aldayat and Saad Abu Elela Teaching Hospital Khartoum-2020 (n=239)

χ2= 2.4; p-value = 0.42 (Not significant)

Diagnosis	No.	Follow- up of blood pressure during the pregnancy		Total
		Yes	No	
Hypertensive	n	3	0	3
	%	100%	0.0%	1.3%
Not Hypertensive	n	28	208	236
	%	11.9%	88.1%	98.7%
Total	n	31	208	239
	%	12.9%	87.1%	100.0%

Table 23: The association between pregnant women follow-up of blood pressure during the pregnancy and prevalence of hypertension at Aldayat and Saad Abu Elela Teaching Hospital Khartoum-2020 (n=239)

χ2= 7.3; p-value =0.026 (significant)

Diagnosis	No.	Family history of blood pressure		Total
		Yes	No	
Hypertensive	n	7	11	18
	%	39%	61%	7.5%
Not Hypertensive	n	59	162	221
	%	27%	73%	92.5%
Total	n	66	173	239
	%	28%	72%	100.0%

Table 24: The association between blood pressure among pregnant women and family history at Aldayat and Saad Abu Elela Teaching Hospital Khartoum-2020 (n=239)

χ2= 12.4; p-value =0.026 (significant)

Diagnosis	No.	Degree of relativeness		Total
		First degree family relationship	Second degree family relationship	
Hypertensive	n	7	11	18
	%	38.9	61.1	10.6%
Not Hypertensive	n	123	98	221
	%	55.7%	44.3%	89.4%
Total	n	130	109	239
	%	54.4%	45.6	100.0%

Table 25: The association between blood pressure among pregnant women and degree of irrelativeness with family members with hypertension at Aldayat and Saad Abu Elela Teaching Hospital Khartoum-2020 (n=239)

χ2= 5.5; p-value =0.04 (significant)

DISCUSSION

This descriptive cross-sectional hospital-based study was conducted among pregnant women attending Aldayat and Saad Abu Elela Teaching Hospital Khartoum-2020.The objective of the study was to study the prevalence and associated factors of hypertension among pregnant women.

The study reveals that the prevalence of hypertension among pregnant women was found to be (7.5%). This finding is similar to the result of study conducted in India by (Sajith *et al*., 2014) prevalence of blood pressure among pregnant women was 7.8%. also is similar to the finding of study done in Iran by (Khosravi *et al*., 2014), the prevalence of hypertension among pregnant women was 9.8%.

The study shows that approximately half of the pregnant women (44.4%) were in age group 18-30 years old, this finding not comply with a study carried by (Yogev *et al.,* 2015*)* who found59.7% advanced maternal age the hypertension prevalence among women ≥45 years.

Moreover, the present study showed that 12.9% of pregnant women their education level was illiteracy. This finding is similar to the results of study conducted by (Silva *et al*., 2008a) stated that the absence of school education, identified as an independent risk factor for hypertensive disorder in pregnancies with 38.4%.

The study showed that hypertension was increasing during third pregnancy by 28.4%. This study contrast to the study findings conducted by (Saurel-Cubizolles*et al*., 1991). showed that 34.2% of pregnant women had increase their blood pressure early in pregnancy,

Also, the current study reflected that all pregnant women who having hypertension did not follow a certain diet. This finding is consistent with that of Fasola *et al*., (2018) where mothers did not follow to a good dietary practiced for about half of the respondents.

In relation to physical activity, the study showed that 14.2% of pregnant women were practicing physical activity. The finding in contrast to study carried by (Pereira *et al*., 2007) concluded that women 11.9% of pregnant women were practicing physical activity during pregnancy progresses.

The study showed that there was no association between employment status and hypertension, (P-value =0.4).Also the study revealed that Hypertension was not significantly more occurred among

pregnant women, who were working more than 8 hours per shift, (P-value =0.47).A recent cohort study carried by (Vollebregt *et al*., 2008) agrees to this study finding showed that there was no association between pregnancy-induced hypertension and risk in women with 32 hours weekly working hours compared to those with, 32 hours,   (P-value 0.61).

The study found that hypertension was no association between prevalence of hypertension among pregnant women and monthly income, (P-value 0.3). This finding contradicted to study carried by (Shen and Wei, 2008) stated that there is an association between family monthly income and hypertension, (P-value 0.02).

Furthermore, the study revealed that there was association between hypertension among pregnant women and number of pregnancy (P-value 0.02). This finding contrast with other studies carried by (Jasovic-Siveska *et al*., 2011, Morikawa *et al*., 2012) stated that the hypertension is commonly occurs in the first delivery, (P-value 0.02, 0.04) , respectively.

The study showed that hypertension was not significantly occurred among pregnant women whose weeks of pregnancy were less than 12 weeks, (P-value = 0.1). This finding not away from the statement by (Ammaro *et al*., 2009) stated that elevated blood pressure in the first trimester of pregnancy, or an increase in blood pressure between the first and second trimesters, raises the chances of a high blood pressure disorder of pregnancy, (P-value 0.03).

Moreover, the study showed that there was association between hypertension and pregnant women who have family member had blood pressure before, (p-value =0.026). This finding is consistent with that of studies conducted in Pakistan (Parveen *et al*., 2009), Ghana (Wolde *et al*., 2011) and New York (Middendorp *et al*., 2013) which showed that family history of chronic hypertension and family history of PIH had strong association with PIH.

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