

ASSESSMENT OF RISK FACTORS FOR HYPERTENSION IN PREGNANT WOMEN CASE – CONTROL STUDY ⁺

Muna Abdul Kadhum Zedian [□]

Abstract:

One of the most important complications during pregnancy is hypertension which is responsible for a widespread range of harms in mothers and fetuses. The aims of this study were to identify risk factors that were related to hypertension in pregnant women and compare that with control sample. A case control study was conducted in Al- Washash & Bab-Almoadham primary health centers. A total of 300 pregnant women were studied, 100 pregnant women with hypertensive and 200 pregnant women without hypertensive. The data was collected by self recording of a previously designed questionnaire to obtain socio-demographic information and the sampling was (non probability convenient). About 55% of the pregnant women was in age group (20-29) and lowest percentage in the age group (40-49) years. The illiteracy rate was higher among the pregnant women with hypertension (5% and about 3.5%) compared to control. The housewives rate was higher among the pregnant women with hypertension 88%. Family history of hypertension was higher among pregnant with hypertension and about 66%. Conclusion show that the factors that might be related to hypertension in pregnancy were (early reproductive age, housewife, family history of hypertension, multiparity, history of abortion, short birth intervals, smoking, and moderate of exercise).

Key words: PIH, Risk Factors, pregnant Women.

تقييم عوامل الخطورة لارتفاع ضغط الدم في النساء الحوامل دراسة الحالات والشواهد

منى عبدالكاظم زيدان

المستخلص:

واحدة من اهم المضاعفات خلال الحمل هو ارتفاع ضغط الدم حيث انه مسؤول عن الانتشار الواسع للمضار في الامهات والجنّة.

الهدف من هذه الدراسة هو تحديد عوامل الخطورة المرتبطة بارتفاع ضغط الدم عند النساء الحوامل ومقارنتها مع نموذج من غير المصابات . وهي دراسة حالات وشواهد اجريت في المركز الصحي في الوشاش والمركز الصحي في باب المعظم. وقد تمت دراسة ما مجموعه 300 امرأة حامل , 100 امرأة حامل مصابات بارتفاع ضغط الدم و200 امرأة حامل غير مصابات بارتفاع ضغط الدم . حيث جمعت المعلومات والبيانات باستخدام الاسئلة المباشرة طبقا لاستبانة

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[□]Assistant Lecturer /College of Health and Medical Technologies/ Baghdad

معدة مسبقا للحصول على المعلومات الاجتماعية والديموغرافية للعينة الغير الاحتمالية (غرضية). . حوالي 55% من عينة النساء الحوامل كانت في عمر (20 – 29) سنة، ونسبة القليلة في الفئة العمرية (40-49) سنة. معدل الجهل كان مرتفع عند النساء الحوامل المصابات بارتفاع ضغط الدم (5% وحوالي 3.5 %) مقارنة مع غير المصابات. وغالبية النساء الحوامل المصابات بارتفاع ضغط الدم كن ربات بيوت (88%) والتاريخ العائلي للاصابة بارتفاع ضغط الدم كان عالي عند النساء الحوامل المصابات بارتفاع ضغط الدم وكانت النسبة حوالي 66%. أظهرت الدراسة ان العوامل التي لها علاقة بارتفاع ضغط الدم في الحمل كانت عمر الانجاب المبكر، وربات البيوت ، والتاريخ العائلي للاصابة بارتفاع ضغط الدم، والتاريخ سابق للاصابة بالاجهاض، وقصر فترة المباحة بين حمل واخر، التدخين، والقيام بالتمارين الرياضية المعتدلة.

Introduction:

Hypertensive disorders of pregnancy (HDP) are among the main public health issues world - wide. It is estimated that globally 6-8% of pregnancies are complicated by hypertension. Hypertensive disorders account for 10-15% of all maternal death in developing as well as some developed countries, namely 18% in United States [1]. In Iraq a survey about risk factors of non communicable disease conducted in 2006 showed a prevalence of hypertension was 40.4%. [2].

Previous reports defined hypertension in pregnancy as a condition presented with a diastolic blood pressure of at least 90 mmHg or a systolic blood pressure of at least 140 mmHg, or a rise in diastolic blood pressure of at least 15 mmHg or a rise of 30 mmHg in systolic blood pressure [3,4]. The etiology of PIH is still unclear; however, various theories relating to dietary factor, immune system, vascular system and genetics have been tied with the formulation of the condition in a pregnant mother. Generally there have been various studies made on the association of certain risk factors with the development of PIH amongst pregnant mothers; however there were various interpretations on these risk factors [4,5]. For instance, it was noted that diet which are low in salt content do not have a significant effect in lowering diastolic blood pressure amongst pregnant women [5,6]. Another study noted that in fact salt restriction could actually worsen PIH among pregnant mothers [5].

Several studies have analyzed the risk factors for hypertensive disorders in pregnancy and the identified risk factors include obesity, a family history of hypertension, alcohol intake, heart failure, stroke and left ventricular hypertrophy and smoking [7,8]. Several risk factors have been described as predisponent to hypertensive disorders in pregnancy worldwide, such as: family history of preeclampsia, preeclampsia in a previous pregnancy, multi fetal gestation, obesity, null parity, diabetes, chronic hypertension, and extremes of maternal age, The knowledge of the most important risk factors in our population could be useful to identify the patients who have higher chances to develop the hypertensive disorders, and, subsequently, adequate prenatal care could contribute to decrease this mortality ratio [9].

Aim of the study:

To identify risk factors that were related to hypertension in pregnant women and compare that with control samples.

Patients and methods:

A case control study was conducted in Al- Washash & Bab-almoadham primary health care centers. The sample was selected by (non probability convenient sampling) and sample size was 300 included 100 cases with hypertensive disorders and 200 controls subjects matched by age. The study started from 1st January till 31 of December 2011. the data was collected by direct interview using special questionnaire to obtain socio-demographic information (age, education, family history of hypertension, parity, and birth space interval,.....ect).

For cases: Inclusion Criteria: Patients with Pregnancy Induced Hypertension. Exclusion criteria: pregnant women with normal blood pressure during pregnancy, pregnancies complicated with chronic hypertension, cases of twin gestations were excluded from the study. **For control :** pregnant women were selected with the exception of those who fulfilled the pre defined criteria of pregnancy induced hypertension, preeclampsia, eclampsia or chronic hypertension. Case – control ratio was 1:2.

Blood pressure was measured by using a mercury sphygmomanometer, After 10 minutes of resting, two readings of the systolic and diastolic BP separated by 5 minutes were averaged to the nearest 2 mmHg from the top of the mercury meniscus. Systolic BP was recorded at the first appearance of sounds, and diastolic BP at phase at the disappearance of sounds. Hypertension in pregnancy was defined as a condition in which, the diastolic blood pressure is at 90 mmHg or above, or a systolic blood pressure is at 140 mmHg or above.

Socio-economic status scales (SESS): SES is defined in terms of a standard sociological paradigm consisting of three components: (a) occupation; (b) education; and (c) income. The income component for this study is difficult to be obtained directly from the patients or their family. But the investigator attempts to calculate through the following objective indicators: Crowding index ; house ownership ; house expenses (properties) and possession of a car. Each item has scored according to its importance and its score ranged from (150-89 and less) as the following: High score = 150-121 , Middle score = 120-90 , Low score = 89 & less [10].

Assessment of physical activity Recreational physical activities of participants were assessed using the PARmed-X for Pregnancy ; Low levels (physical activity) are defined as either no physical activity or activity <1 to 2 times per week and for <20 min per session; moderate levels (physical activity) are defined as activity 1 to 2 times per week for >20 min per session or >2 times per week but for <20 min per session; high levels (physical activity) are defined as activity >2 times per week and for >20 min per session (16).

Data was analyzed by SPSS package version 17, X² test was used for significance of p value of <0.05 was considered significant. Odds ratio with 95% confidence interval was used to appreciate the impact of different variables on the risk of presenting hypertension.

Results:

Table (1) Distribution of sample according to age, education, occupation, Family history of hypertension & Socio-Economic Status

Variables	Case (100)		Control (200)		P-value
Age (years)	No.	%	No.	%	
≤20	11	11%	35	17.5%	0.001
20-29	55	55%	117	58.5%	
30-39	32	32%	46	23%	
40-49	2	2%	2	1%	
Education					
Illiterate	5	5%	7	3.5%	0.158
Read & write	7	7%	14	7%	
Primary	17	17%	18	9%	
Intermediate	27	27%	66	33%	
Secondary	24	24%	69	34.5%	
University	20	20%	26	13%	
Occupation					
worker	10	10%	69	34.5%	0.049
housewife	88	88%	123	61.5%	
student	2	2%	8	4%	
Family history					
Yes	66	66%	16	8%	0.000
No	34	34%	184	92%	
SES					
Low	17	17%	28	14%	0.465
Moderate	75	75%	142	71%	
High	8	8%	30	15%	

This table shows that the higher percentage (55%) of the pregnant women was in age group (20-29) and the lowest percentage was in the age group (40-49) years. The illiteracy rate was higher among the pregnant women with hypertension (5% vs 3.5%) compared to control. The higher percentage of occupation of the pregnant women in this study , were housewives 88% in pregnant with hypertension group and 61.5% in pregnant without hypertension with significant association (p value < 0.05). Family history of hypertension was higher among pregnant with hypertension (66%.vs 8%) compared to control. The highest percentage of pregnant with moderate socio economic status 75% and 71% in the pregnant with hypertension and pregnant without hypertension respectively

Table (2) Distribution of study population according to gestational age:-

Variables	Case (100)		Control (200)		p. value
Gestation (months)	No.	%	No.	%	
1 st trimester	-	-	1	0.5%	0.000
2 nd trimester	24	24%	105	52.5%	
3 rd trimester	76	76%	94	47%	
Total	100	100%	100	100%	

This table shows the gestational age of the most pregnant women with hypertension were at 3rd trimester (76%) followed by (24%) at 2nd trimester compared to control, this difference was statistically significant (p-value = 0.000).

Table (3) Distribution of study population according to obstetric history:-

Variables	Case (100)		Control (200)		OR	(95% C1)	p. value
Gravid							
primigravida	30	30%	28	14%	-	-	0.004*
2-3	38	38%	93	46.5%	0.3814	0.2014 to 0.7221	
4 & more	32	32%	79	39.5%	0.3781	0.1956 to 0.7305	
No. of abortion							
None	41	41%	100	50%	-	-	0.014*
1	38	38%	84	42%	1.1034	0.6507 – 1.8711	
2	12	12%	10	5%	2.9268	1.1728 – 7.3044	
>3	9	9%	6	3%	3.6585	1.2238 – 10.9370	
Birth space Interval (years)							
<1	61	61%	60	30%	-	-	0.000*
1-2	36	36%	131	65.5%	0.2703	0.1619 to 0.4514	
>3	3	3%	9	4.5%	0.3279	0.0846 to 1.2703	

□ Statistically significant

This table shows the association of hypertension and the obstetric history in this study, shows that the percentage of multigravida were 38% in the pregnant with hypertension & about 46.5% in pregnant without hypertension, The risk of hypertension significantly increased 0.3814 times in the pregnant women with 2-3 gravida. Pregnant women who had two previous and more than 3 previous abortions showed significant association with develop hypertension (OR= 2.9268; 95%CI= 1.1728 – 7.3044), (OR= 3.6585; 95%CI= 1.2238 – 10.9370); P<0.05. The highest percentage of pregnant women with birth spacing < 1year was 61% and 30% in the pregnant with hypertension and pregnant without hypertension groups respectively the risk of developing hypertension significantly increased 0.2703 times in the pregnant women with birth spacing 1-2 years p< 0.05.

Table (4) Distribution of studied sample of pregnant women according to some personal habits.

Variables	Case (100)		Control (200)		OR	(95% C1)	p. value
Smoking							
current Smoker	44	44%	36	18%	3.5794	2.0967 - 6.1106	0.0001
Never	56	56%	164	82%	-	-	
exercise							
High level (physical activity)	16	16%	91	45.5%	0.0454	0.0177 to 0.1163	0.000
Moderate level (physical activity)	53	53%	101	50.5%	7.579	2.58- 12.97	
Low level (physical activity)	31	31%	8	4%	-	-	

This table shows that the frequency of current smoker was 44% in cases while in controls it was 18% , the current smoker carries very highly significant association of develop hypertension in pregnant women (OR= 3.5794; 95%CI= 2.0967 to 6.1106). The highest percentage of moderate level (physical activity) was among the cases of pregnant with hypertension than the cases of pregnant without hypertension groups (53% and 50.5%) respectively. Significant association were found between hypertension disorder and Moderate exercise OR=7.579; 95% CI=2.58- 12.97.

Table (5) Comparison of Systolic and Diastolic blood pressure among cases and control

parameters	Case (n=100)	Control (n=200)	p. value
	Mean $\pm$ sd	Mean $\pm$ sd	
Systolic BP (mm Hg)	152 $\pm$ 15.40	116 $\pm$ 6.38	0.000
Diastolic BP (mm Hg)	100.14 $\pm$ 9.31	74.31 $\pm$ 5.12	0.000

This table shows the mean systolic blood pressure was 152 $\pm$ 15.40 in cases while the Diastolic blood pressure was 100.14 $\pm$ 9.31.

Discussion:

The hypertensive disorders of pregnancy affect up to 8% of all gestations and are the second leading cause, after embolism, of maternal mortality in United States, accounting for almost 15% of such deaths [12,13]. Iraq has witnessed an epidemiological transition with increasing prevalence of chronic non-communicable diseases with their contributory risk factors being the leading causes of morbidity and mortality [14].

The present study was designed to determine risk factors related to hypertension in pregnant women and compare that with control sample. In this study, most of the pregnant in both study groups belong to the age 20-29 years age group. Thus the maternal age of 20-29 years has been found to be the significant age group for induced hypertension with p value <0.001. the finding of the present study is in agreement with findings reported by Pierre, et al, 2011 in Cameroon [15], adeyinka, 2010 in Nigeria [16], and Ferha, et al, 2011 in South Asian [17], they have identified young age as a risk factor for hypertension during pregnancy with p value <0.001. This could be explained by the extreme ages of reproductive years are well know risk factors for hypertension during pregnancy with high incidence rates in teenagers [18]. Being housewives found to affect the occurrence of hypertension in pregnancy compared to being workers most pregnant women with hypertension were housewives 88% while the percentage from workers was 10% and lowest percentage was 2% from students, in this study the housewives are more risky group for hypertension ; this result confirms the finding of Adinegara, 2004 in AlorGajah [19], and Pierre, et al, 2011 in Cameroon [15], they found that the majority of pregnant women (93%), (93.5%) respectively were housewives. This could be explained by stress may occur not only at work places but also at the home environment where a housewives would be facing multiple duties such as caring for the other children and other household such as cleaning the house and cooking [19]. Regarding family history of hypertension was higher among pregnant women with hypertension (66%) compared to control group (8%) with significant association p value <0.001, this result is in a ccordance with the finding of Caroline,2011 in Southern Brazil [9], and Gaio ,2001 in Brazil [20], and Kahhale, 1995 in Rio de janeriro [21], and Ferha, 2011 in South Asian [17], they found that significant association between hypertension in pregnancy and family history of hypertension with p value <0.001. these agreements may be explained by genetic susceptibility. Gestational age variable strongly associated with induced hypertension in pregnancy p value <0.000. the finding of the present study is in agreement with findings reported by Joset....et al, 2010 in Netherland [22], they found gestational hypertension occurs in the second half of pregnancy in previously normotensive women . these agreements may be explained because of the potential heterogeneity in etiology of hypertension in pregnancy. Parity have significant association with induced hypertension in pregnancy p value <0.05 the risk of induced hypertension significantly increased 0.3814 times in pregnant with history of multiparity this result disagree with study of Assis, 2008 [23], identified primiparity as a risk factor for

gestational hypertension (OR:5.435; 95%CI: 1.9-15.4) and Pierre, et al, 2011 in Cameroon [15], they found that nulli parity was associated with a nearly 2 fold risk for hypertensive disorders in pregnancy (OR:1.8; 95%CI: 1.2-2.7), and Caroline ,2011 in Southern Brazil [25], identified nulliparous women have a 2 fold increase in the risk of developing hypertension disorders in pregnancy, and Ferha, et al, 2011 in South Asian [22], identified primi gravidae were more likely to develop gestational hypertension when compared with multi gravidae p value =0.004.this may be because, an indication of a genetic cause is the observation that women are at greater risk of preeclampsia in their first gravidity if they have a sister or mother who has experienced preeclampsia [24]. In this study, there is significant association between previous abortions and induced hypertension p value =0.014. the results disagree with Pierre, et al, 2011 in Cameroon [15], they found no association between history of abortions with induced hypertension p value > 0.05. A possible explanation for this may be due to the contrast in time and place of the studies and presented medical services. Significant association was found between the last birth intervals and induced hypertension. Pregnant who conceived within 1- 2 year were at greater risk of having hypertension (OR:0.2703; 95%CI: 0.1619-0.4514) when compared with reference group. Similar finding were reported by Luealon , 2010 in Thailand [25].they found that an increased chance of hypertension in pregnancy with short interval between births. This might be explained by incomplete return of the maternal physiology and nutritional reserves to normal levels encountered among rapid conceivers. This study demonstrated that the current smokers were (OR: 3.5794) times more prone to develop hypertension than other group, 95% CI=2.0967 - 6.1106 which carried a very highly significant association p value <0.000, the results disagree with Caroline,...etal,2011 in Southern Brazil [9], who identified no significant association between smoking and induced hypertension in pregnancy(p > 0.05). This may be because smoking during pregnancy is an important cause of ill health for both mother and foetus-it increases risk of placental complications, pregnancy induced hypertension, reduced fetal growth and perinatal death [26] . Regarding life style factor such as exercise, the present study demonstrated an increased risk of having hypertension among pregnant with Low level (physical activity) (p value <0.000), the results disagree with Adinegara, 2004 in AlorGajah [19], reported no association between physical activity and induced hypertension in pregnancy (p > 0.05). This disagreement may be due to the contrast in time and place of the studies and presented health education.

Conclusions:

The risk factors associated with hypertension in pregnancy was (early reproductive age, housewife, family history of hypertension, multiparity, history of abortion, short birth intervals, smoking, and moderate of exercise).

Recommendations:

Health education of the hypertension pregnant women regarding the risk factor which effect on their blood pressure by medical and paramedical staff, newspaper, T.V., radio, and posters, further studies concentrating on the relation of hypertension in pregnancy and body mass index.

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