

A study of hypertension and associated risk factors in pregnant women in primary health care centers in Ramadi city: cross-sectional study

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Abstract

Background: Hypertension during pregnancy is one of major causes in our country (Iraq), and at AL – Ramadi city (PHCCs) for morbidity in pregnant women. Several risk factors have been studied to show the impact on induced hypertension during pregnancy.

Objectives: TO find out associations between certain risk factors and their effects on pregnancy induced hypertension in PHCCs.

Materials and Methods: A cross-sectional study in two main PHCCs was conducted In First sector in AL-Ramadi city. (AL-ANDULUS), and (AL-TASH) PHCCs which represent urban and rural area respectively .the data was collected from March through September- 2022 in PHCCs. Questionnaire was designed for purpose of study. Both cases and controls were examined for hypertension. The cases (170) hypertension women, were diagnosed by examination and information of pregnant women and repeated measurement of blood pressure, and (210) healthy pregnant women. Analysis by chi – square test, p-value less than (0.05) were significant association.

Results: The present study shows that significant association between risk factors and hypertension during pregnancy a include maternal age , level of education parity, BMI , family history , smoking during pregnancy , previous type of delivery, previous history of PIH, spacing , ,Contraception more association in use pills, .

Conclusion: The study shows that there was significant association between the following risk factors and PIH. Age of pregnant hypertensive women, education level more in low education level . Parity more ≥ 5 , BMI, positive Family history, Smoking, Elective C/S, Previous history PIH .Spacing 2-3 years interval .Use of contraception more in pills users .

Keywords: (PIH), pregnancy induced hypertension, (HDP) hypertensive disorder in pregnancy, risk factors.

INTRODUCTION

Pregnancy induced hypertension (PIH), are considered a major cause of fetal and maternal morbidity and mortality. Including chronic hypertension, gestational hypertension, and preeclampsia / eclampsia, . They are also associated with an increased risk of renal, cardiovascular diseases long after delivery (1) . There are different entities of severity of PIH with their classification across different countries. Many studies shows that hypertensive disorders in pregnant woman affect between 5% and 10% of pregnancies , with risks of preeclampsia ranging from 1% to 7% depending on the characteristics of the pregnant women selected and the parity.

Gestational hypertension is development of new hypertension in pregnant women after 20 weeks of gestation without the presence of protein in the urine or other signs of preeclampsia (1) .In both developed and developing countries genetic aspect for PIH within families has been recognized since 19th century suggesting a genetic component of disorder (2).

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A UK study reported that one- third of severe maternal morbidity was a consequence of hypertension in conditions (3).

Gestational hypertension in a future pregnancy ranges from (16%) to (47%) in pregnancies. PIH complicates 6-7% of pregnancies and resolved postpartum.

Preeclampsia affects approximately 2-8% of all pregnancies in all countries, and the onset of symptoms in the late second or third trimester most commonly after the 32nd week (4).

Pregnancy induced hypertension is associated with sever maternal morbidity, pregnancy induced hypertension lead to preterm labor, fetal growth retardation, low birth weight, abruption placenta, and fetal death (5).

In PIH, it has been estimated that 5-10% of US pregnancies are complicated by HDP. .The prevalence of PIH is believed to be increasing due to obesity and childbearing in older aged women (6).

Eclampsia, is one form of preeclampsia which a pregnant women who previously presented with signs of increased blood pressure begins to start new generalized seizures .Up to 70% of pregnant women with eclampsia experience complications associated with pregnancy especially in first pregnancy. Hypertensive disorder fall into four classification : chronic hypertension, (transient) hypertension ,preeclampsia/eclampsia, While the exact incidence of each condition is difficult to determine , about 10% of all pregnancies are thought to be complicated by high blood pressure and nearly 30% of first pregnancies are thought to be affected by gestational hypertension ,preeclampsia (7) .

In spite of frequent occurrence, relatively little studies has been conducted into the long term effects of hypertension induced during pregnancy. Both hypertension during pregnancy and preeclampsia may be associated in later life with increased hypertension and renal and cardiovascular disease. Many studies have examined only hypertension as an outcome and have been limited number of cases sizes and inappropriate control groups, or short follow up.(8) .

During pregnancy, blood pressure continues to fall until 22-24 weeks of gestation. And after that there is a gradual increase in blood pressure until delivery. Immediately after delivery blood pressure usually falls, then increases postnatal over the first five days. Pregnant women whose blood pressure was normal throughout pregnancy may experience increase hypertension in early postpartum period ,may be reflecting a degree of vasomotor instability .Women with hypertension during pregnancy have higher risk of complications ,like : abruption placenta, cardiovascular accident and or disseminated intravascular coagulopathy , while the fetus has an increased risk of intrauterine growth restriction ,prematurity ,intrauterine death(9) .

In both developed and developing countries genetic aspect for pregnancy induced hypertensive within families has been recognized since 19th century suggesting a genetic

component of the disorder (10) .

In women with pregnancy induced hypertension(PIH) , we should take care of the following risk factors that need additional assessment, older age pregnant women, spacing of more than 10 years, null parity ,family history of preeclampsia or hypertension during pregnancy , multiple pregnancy, family history of hypertension.

Once the diagnosis of mild pregnancy induced hypertension(PIH) is made ,follow-up treatment will depend on results of fetal and maternal evaluation .In general ,pregnant women with mild(PIH), developing at 37 weeks gestation or longer have a pregnancy outcome similar to that found in normal hypertension pregnancy.

Hypertensive pregnant women in the early stages of pregnancy have been shown to improve the health of the child both in its first year of life, and its later life. It has been estimated that fetal genes designed to increase the women blood pressure are so benefit the potential negative effects that can come from preeclampsia (11) .

The aims of the current study are to find out associations between risk factors during pregnancy and hypertension.

Materials and Method:

This study was conducted during the period from March through September-2022. A cross-sectional study was conducted among pregnant women in two main primary health care centers in AL-RAMADI City (First Ramadi sector) . A total of (380) cases of pregnant women were taking ,examination information and repeated measuring of blood pressure were done for each pregnant woman seated for 5-10 minutes, BP was measured three times, from the right arm in sitting position standard mercury sphygmomanometers. SBP was measured at first appearance of pulse sound, and the DBP after disappearance of pulse sound. Hypertension was defined as systolic Blood pressure ≥ 140 mmHg, or diastolic blood pressure ≥ 90 mm Hg. (170) pregnant women with hypertension have risk factors and(210)pregnant women with non- hypertension have risk factors. These two PHCCs out of (19) PHCCs in(First Ramadi Sector) which represent rural and urban areas. Data of Non-probability convenient sample was collected from two primary health care center .The questionnaire form was filled for every primary health care in (Al-ANDULUS, AL-TASH), to collect information about risks induced hypertension in pregnant women, through direct interview .

To describe the components of risks induced hypertension, a questionnaire form was conducted to explore the risks factors associated with induced hypertensive disorder such as , age, parity, overweight, spacing, uses contraception , smoking ,family history of hypertension, and type of previous delivery.

While exclusion criteria include pregnant women with gestational or pre-pregnancy diabetes mellitus, thyroid

disease (hypothyroidism and hyperthyroidism), autoimmune disease such as (SLE), rheumatoid arthritis), or diagnosed with heart or renal diseases, or neuropathy before pregnancy. Statistical analysis: The collected samples were analyzed by using chi-square test, p- value of less than (0.05) was considered significant.

In this current study there's a bias, non-response bias, recall bias, information bias. In order to avoid bias, the questionnaire was predesigned to be simple with closed ended questions, conducted through interviews.

Result:

Total sample (380) cases (pregnant women) collected were completed and available for analysis, from this presented study frequencies and percentage were calculated. Prevalence of pregnancy induced hypertension (44.7%) The table shows the distribution of maternal age. From total of pregnant women (170) were hypertensive .(42%) ≥35 years of which were higher percentage.(26%) of which ≤18 years low percentage and (32%) 19-35 were (32%). from total (210) Non-hypertension pregnant women represent (55.3%) of which (55%) 19-35 years were higher percentage ,and (12%) ≥35 years were low percentage. A significant statistical association between pregnancies induced hypertension women and maternal age (p value.0.000).

Regarding level of education shows that (67%) represent low education, (illiterate and primary) were of hypertensive women higher percentage, and higher education level represent secondary and high education (33%) for hypertensive pregnant women .Non-hypertension pregnant women (55.3%). Were (71%) represent low education level while (29%) represent higher education level .A significant statistical association between education level and pregnancy induced hypertension women (p value 0.006). Regarding parity shows that (50%) ≥5 were higher percentage while 1-4 parity (20%) low percentage in hypertensive pregnant women . while non- hypertensive pregnant women shows that 1-4 parity (50%) higher percentage ,and ≥5 (12%) low percentage .A significant statistical association between parity and pregnancy induced hypertension women (p value 0.00). Regarding BMI, shows

that out of (170) hypertension pregnant women 25-29.9 (55%) over weight higher BMI and 18.5-24.9 (12%) normal weight low BMI, while out of (210) non-hypertension pregnant women 25-29.9 (64%) higher BMI and ≥30 low BMI. A significant statistical association between BMI and pregnancy induced hypertension women (p value 0.00). Regarding family history shows that out of (170) hypertension pregnant women 70 (71%) higher percentage with no family history, while out of (210) non-hypertension pregnant women shows that 147 (70%) higher percentage with no family history. A significant statistical association between pregnancies induced hypertension women and family history (p value 0.00). Regarding smoking the table shows that out of (170), 100 (59%) hypertension pregnant women higher percentage with no smoking, (35%) of hypertension pregnant women have passive smoking .while out of (210) non-pregnant hypertension women 170 (80%) higher percentage with no smoking. A significant association between pregnancies induced hypertension women and smoking. (p value 0.00). In type of previous, NVD 46 (27%) with low percentage out of 170 in PIH. While NVD 148 (70%) higher percentage and assisted VD low percentage out of (210) in non-hypertension pregnant women .A significant statistical association between PIH and type of delivery (p value 0.000). The table shows that higher percentage (57%) out of (170) had PIH .While (91%) higher percentage out of (210) had no previous hypertension in non-hypertension women .A significant PIH. (p value 0.00) Regarding spacing, the study shows that the higher percentage in group 2-3 (32%) out of (170) and lowest percentage (12%) in group ≥6.

While In non-hypertension pregnant women shows the higher percentage. (47%) in group ≤1, and lowest percentage (3%) in group ≥6 of 210 non-hypertension pregnant women. A significant statistical association between PIH and spacing (p value 0.000). Regarding use of contraception the study shows that the higher percentage (47%) of (170) had used pills , and lowest percentage in group use IUCD (8%). While higher percentage in non- hypertensive women in group use lactation (41%), and low percentage (5%) in group use injectable. A significant statistical association between spacing and PIH. (P value 0.000).

Table :- Risk Factors induced Hypertension during pregnancy

Risk factors	Hypertensive NO.170		No hypertensive NO. 210		Chi square X ²	Degree of freedom df	P value
Age(years)	No	RF %	No	RF %	45.4	2	0.000
18 years≤	44	(26)	70	(33)			
19-35	55	(32)	115	(55)			
35≥	71	(42)	25	(12)			
Education level							
Illiterate	45	(26)	55	(26)	12.39	3	0.006

Primary	70	(41)	95	(45)			
Secondary	42	(25)	46	(22)			
High	13	(8)	14	(7)			
Parity							
Null Para	50	(30)	80	(38)	71.2	2	0.00
1-4	35	(20)	105	(50)			
≥5	85	(50)	25	(12)			
BMI							
18.5-24.9	20	(12)	55	(26)	35.8	2	0.00
25-29.9	95	(55)	135	(64)			
≥30	55	(33)	20	(10)			
Family history							
Yes	50	(29)	63	(30)	4.6	1	0.000
No	70	(71)	147	(70)			
Smoking							
Active	10	(6)	15	(7)	22	1	0.00
Passive	60	(35)	25	(12)			
NO	100	(59)	170	(80)			
Previous delivery type							

Table :- Risk Factors induced Hypertension during pregnancy							
NVD	46	(27)	148	(70)	70.9	2	0.000
Elective c/s	70	(41)	34	(21)			
Assisted VD	54	(32)	28	(13)			
Previous history of PIH							
Yes	97	(57)	18	(9)	104.5	1	0.000
No	73	(43)	192	(91)			
Spacing							
≤ 1	43	(25)	98	(47)	23.6	3	0.000
2-3	55	(32)	82	(39)			
4-5	52	(31)	24	(11)			
≥6	20	(12)	6	(3)			
Contraception							
Pills	80	(47)	80	(38)	21.544	1	0.000
injectable	15	(9)	10	(5)			
Lactation	20	(12)	86	(41)			
IUCD	14	(8)	19	(9)			
USED	129	(76)	195	(93)			
NO USED	41	(24)	15	(7)			

Discussion:

In the present study the cases have hypertension disorder during pregnancy was 170 cases represent (44.7%) prevalence of PIH, and non-hypertension pregnant women represent (55.3%).

In the current study the age of pregnant women was significantly risky related to induce hypertension. This similar to (Liang KY and Zeger) who conclude that extreme age association with induced hypertension during pregnancy (12).

In the present study (32%) between 19-35 years, while (42%) cases in the age ≥35 years which were found to be high risk for PIH. Similar to Knuist M, Bonsel et al who

found that age during pregnancy risky for PIH. The findings of the current study similar with case-control study in south Tehran for age over 35 years a risk for PIH (13). Physiological changes occur in women age, collagen gradually replaces normal muscles in the walls of myometrium arteries. These lesions may gradually impaired blood flow to the placenta. These changes in vascular in old age women may result in impaired vascularization of the placenta. so play important roles in causing placenta hypoxia and in turn PIH.

In the present study out of 170 cases of pregnant hypertensive women (41%) were primary level of education, and (26%) of cases were illiterate while (25%) of cases were secondary level of education and (8%) of cases from pregnant hypertensive women were high level of education. In the

present study, the level of education is a risk factor for pregnant hypertensive women ($p=0.006$). A study done for maternal education as a risk factor for induced hypertension agrees with present study that education level is a significant association (14). Also Italian study in pregnant hypertensive women agrees with study results for education level (15). The present study agrees with study done in Baghdad primary health care centers, 2013 in evaluation of risk factors in pregnant hypertensive women showed that the illiterate is a risk factor for PIH (16).

In the current study the parity was significantly related to pregnant hypertensive women was more seen among nulliparous and multiparous (≥ 5) and represent 30% and 50% respectively ($p=0.00$). WHO study show that null parity has increased risk for pregnant hypertensive women and preeclampsia and this similar to current study (17). Another study revealed that multipara had increased risk of PIH similar to current study (18). Another follow up study similar to current study results in that nulliparous women increase of Pregnancy induced hypertensive women. The findings could be explained by biological and immunological factors (19).

In the current study, the rate of body mass index was significantly associated to the Pregnant hypertensive women, normal body mass index, overweight, and obese were ($p=0.00$) 12%, 55%, 33% respectively. Therefore the elevated baseline cardiac output in overweight women, when aggravated by further pregnancy associated hemodynamic alterations, may alter the capacity of vasodilation. Therefore overweight women may develop hypertension while sustaining the increase blood flow, increasing the endothelial injury and leading to the clinical features of preeclampsia

Similarly a case control study show obesity as a risk factor for Pregnant hypertensive women agrees with current study results that increase BMI risk for PIH (20). While retrospective study done in Iran disagree with the current study (21).

In the present study, the group of oral contraceptive pill represent 47%, while group used injectable 9%, lactation 12%, IUCD 8% Represent (76%) all types used contraception has significant risk for pregnant hypertensive women ($p=0.00$).

The current study finding is in agreement with a prospective study in that contraception pills have increased risk for hypertensive disorders during pregnancy (22). A study done in regional hospital in Cameroon shows that contraceptive pills increase risk for (PIH). And this agrees with current study (18). Hypothesized that preeclampsia and hypertensive disorder during pregnancy is probably an adverse vascular reaction to the high levels of progesterone and estrogen in pregnancy. Many women, most of them developing preeclampsia, may have been already warned of their increase vascular over-reactivity by previous adverse reactions to taking contraceptive progesterone and estrogen.

(23)

In the present study, positive family history for hypertension shows there is an association (29%), ($p=0.00$), in first degree relatives. The findings could be explained genetically and immunologically. A prospective study by Dukitt concluded that positive family history increases risk for preeclampsia at antenatal visit and this agrees with present study (24). A case-control study in south India concluded that positive family history of hypertension was significantly associated with preeclampsia (25).

In the current study, for smoking the group of non-smokers represent 59% of cases, the group of passive smokers represent 35% while active smokers represent 6%. ($p=0.00$). It has association with risk for hypertension. Maternal smoking has been lead to different adverse outcomes during pregnancy. The risk for Pregnancy induced hypertension among smokers has been consistently observed to be higher than that in non-smokers. A study in Japan, BMC Journal shows that smoking carries risk factor for PIH, this agrees with current study result (26). Another study which is prospective cohort for risk of hypertension disorders of pregnancy among Hispanic women shows that smoking increases risk of hypertensive disorders in pregnancy. (27). A population-based retrospective cohort study done in the US disagrees with present study in that shows cigarette smoking in pregnancy is protective. The contradiction for this study is not definitely known. However the damaging effects of smoking on health and pregnancy outcomes more than the benefits in decreasing the occurring PIH (28).

In the present study rate of cesarean delivery, normal vaginal delivery and assisted delivery 41%, 27%, 32% respectively ($p=0.000$). The result revealed that C/S delivery and assisted delivery had significant risk for pregnancy induced hypertensive women. Because delivery remains the only known cure for pregnant hypertensive women and preeclampsia, the therapy of choice will be near term induction of labor. A study by Coppage K et al concluded that sudden abdominal delivery did not improve perinatal outcome in severe hypertension and preeclampsia, induction labor did not lead to increase diseases and death. Cesarean section is reported to be associated with pregnancy induced hypertension (29). A prospective cohort study of different risk of hypertensive disorder of pregnancy among Hispanic women claims that increase cesarean section rates related to a significant association with hypertensive disorders in pregnancy (27).

In the current study, positive previous history of hypertensive disorders during pregnancy and preeclampsia, represent 57% of cases, and this is significant association ($p=0.00$). The study results could be explained as multifactorial in nature. A prospective cohort study by Dukitt K concluded that positive previous history increases risk for preeclampsia at antenatal booking visit in systematic review of controlled studies, and this agrees with present study results (24). Also a case-control study report from south India agrees with the current study

results in that positive previous history increases risk for pregnancy induced hypertensive women (25).

In the current study, the interval between pregnancies, the group of one year and less represents 25% of cases, it has risk for pregnancy induced hypertensive women and preeclampsia, the group of (2-3) years spacing represent 32% of cases, the group of (4-5) represents 31% while group ≥ 6 represent 12%. ($p=0.000$), there's association between interval between pregnancies and pregnancy induced hypertensive women. In present study a low risk of hypertensive disorders in pregnancy associated with longer interval between pregnancies. A prevalence study from Uruguay agrees with present study in that women with 4-5 years between pregnancies had significant increase of PIH (30). Similarly a meta-analysis found that increasing spacing between pregnancies was significant association with risk for pregnancy induced hypertension and preeclampsia and this agree with present study (31). A Dukitt K study stated that ten years interval since previous pregnancy increases risk for preeclampsia in a cohort study for risk factors for preeclampsia, and this disagrees with present study (24).

Limitations of study:

A cross-sectional study is a descriptive study and not provides the same association as case-control (retrospective) and cohort (prospective), not determine the temporal relationship between exposure and outcome. Not determine prognostic factor from risk factors. Liable for information bias (recall or interviewer bias).

Conclusion and Recommendation:

Conclusion:

1-The study shows a significant association between extremes of maternal age, smoking, C/S, assist vaginal delivery, BMI, oral and injectable contraception's and risk for PIH. While one year's interval or less was significant association with PIH. Education level more in primary. Parity more in multipara. positive Family history. Previous history of hypertension association with PIH.

Recommendations:

Importance of encouraging marriage and conceiving from 19-34 years old. Trend towards 2-4 parity. Advice mothers to reduce interval between children to less than three years.

Advices mothers to reduce oral and injectable contraception and increase their awareness that it will increase risk for PIH. The study recommends primary care physicians and paramedical staff to increase awareness and knowledge regarding pregnancy hypertensive disorders risk factors and encourage them to get their responsibility in health promotion and prevention through promoting antenatal care program of Family planning and early diagnosis of PIH and

preeclampsia. Encourage couples avoid oral and injectable contraceptive, and advice women with previous or family history of pregnancy hypertensive disorders to get preconceiving assessment to avoid the consequences of complication, and cooperative with social media to enhance women and their families knowledge about obesity and smoking consequences of complications on both mother and fetus.

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