

Relationship between Pregnancy-induced Hypertension with Neonatal and Maternal Complications

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Abstract

Background

Prevalence of hypertension has a relatively high prevalence especially in developing countries. In order to prevent and control the disease, it is important to know the extent of the complications. The aim of this study was to investigate the relationship between pregnancy-induced hypertension with neonatal and maternal complications.

Materials and Methods

This prospective, descriptive study was conducted on 230 overweight women, with hypertension (n=115) and normal blood pressure (n=115) during pregnancy, referring to Hamedan hospitals. Researcher-made questionnaire including demographic characteristics and maternal and neonatal complications were used to collect required data. Data analysis was performed using Chi-square, t-test and ANOVA based on the difference between the data at a level of error less than 5%.

Results: There was no significant difference between the two groups in terms of demographic characteristics, smoking history, and mean weight, number of pregnancies, number of births, history of abortion and the reception of care during pregnancy ($P > 0.05$). Significant relationship was observed between pregnancy and maternal outcomes, such as cesarean section, infection, bleeding, hydramnios, diabetes, proteinuria, edema, headache and hospitalization time, as well as neonatal outcomes such as low birth weight, preterm delivery, Apgar, and longer hospitalization ($P < 0.05$).

Conclusion

Regarding the proved significant relationship between pregnancy and maternal hypertension, it is highly recommended to prevent these complications by controlling the blood pressure and providing necessary measures during pregnancy.

Key Words: Complications, Hypertension, Mother, Neonate, Pregnant.

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1- INTRODUCTION

Pregnancy hypertensive disorders, which affect about 5-10% of pregnancies, are known to be the second leading cause of maternal mortality (1). Increased blood pressure in pregnancy is associated with increased mortality and morbidity of both the mother and the infant (2). In developed countries, 16% of maternal mortality occurs due to hypertension during pregnancy (3). Pregnancy hypertensive disorders include a range of conditions including preeclampsia-eclampsia, gestational hypertension, chronic hypertension and the combined effect of preeclampsia added to chronic hypertension (4). Hypertension after 20 weeks of pregnancy is defined as an increase in gestational hypertension, which may be associated with proteinuria and other systemic disorders (5). Preeclampsia is also classified into mild and severe forms. The blood pressure defined for severe preeclampsia is 160/110 mmHg or higher in American sources and 170/110 mmHg or higher in English sources (8).

About 30% of pregnancy-related abnormalities are caused by chronic blood pressure, 70% of which begin during pregnancy (6). Pregnancy-related hypertension is seen in women whose systolic blood pressure reaches 140 mm Hg or higher or their diastolic blood pressure reaches 90 mm Hg or less during pregnancy, but there is no evidence of proteinuria. From the 12th week of pregnancy, blood pressure returns to normal level (7). Preeclampsia often occurs in young and nulliparous women, and the incidence is also largely affected by race (8). In Dawson et al. study, high maternal age, multiple sex, neonatal parity, and gestational diabetes mellitus have been identified as risk factors for hypertensive disorders (9). Pregnancy-induced hypertensive disorders are common in women who encounter chorionic villus for the first time, women with a large number

of chorionic pelvic infections including those with hydatid cysts, women who already have kidney or cardiovascular disease, and women who are genetically exposed to hypertension during. The occurrence of any hypertension during pregnancy is an indicator of increased morbidity and mortality associated with cardiovascular disorders in the later stages of life (3). Since hypertension ultimately damages blood vessels throughout the body, including vital vessels such as the brain, the kidneys, the heart and the eyes, leading to harmful and non-therapeutic consequences for the mother and the fetus and the harmful effects, it imposes huge costs on families; the disease is still a major cause of maternal and perinatal deaths and complications all over the world (10). However, few studies have been carried out in this regard in our country. Therefore, in order to identify the complications of hypertension in pregnancy and prevent and control this disorder, and given the limited research in this regard, especially in Hamadan, this study was conducted to determine the Relationship between pregnancy-induced hypertension with neonatal and maternal complications.

2- MATERIALS AND METHODS

2-1. Study design and population

The sample size of the present prospective, descriptive study was determined to be 200 subjects according to the following formula: $n = Z^2 \cdot \alpha / 2 \cdot P(1-P) / d^2$ and $\alpha = 0.05$, $P = 0.5$ and $d = 0.05$. However, due to the increased accuracy of the study, a larger sample of 230 women referring to Hamedan's two hospitals were selected with a ratio of 85 and 15% (based on referral ratio), with 115 subjects in both groups of women with hypertension ($n=115$), and normal blood pressure ($n=115$) during pregnancy. Sampling was done by two undergraduate nursing students who had received the

necessary education. All women were investigated when the women hospitalized for delivery until they discharged from the hospital.

2-2. Measuring tools

Used research-made questionnaire contained demographic questions and questions related to blood pressure and maternal and neonatal complications, which were formulated using different scientific texts in line with the research objectives. The validity of the data collection form was determined by content validity method and the use of corrective and expert opinions of 10 faculty members of midwifery and internal nursing department of nursing and midwifery faculty and gynecologists. Also the reliability of the instrument measured by Cronbach's α was 0.800.

2-3. Inclusion and exclusion criteria

The inclusion criteria were like the followings: pregnant mothers admitted to the educational hospitals, Pregnant women with a definite diagnosis of hypertension (for selecting women with pregnancy-induced hypertension), or a normal blood pressure (for selecting women without any pregnancy hypertension disorders) by the physician, fluency in the language, lack of background history of the disease other than hypertension, and the lack of home therapy for controlling hypertension.

2-4. Ethical consideration

Informed consent was completed by all the patients and they were assured that their information would be confidential.

2-5. Data Analyses

The collected data was analyzed using SPSS software version 16.0 and descriptive statistics as well as Chi-square, T-test and ANOVA.

3- RESULTS

The aim of present study was to investigate the relationship between pregnancy-induced hypertension with neonatal and maternal complications. The demographic characteristics of the subjects under study are summarized in **Table.1**. The results of statistical tests showed that none of these variables were significantly different between two groups of women with hypertension and normal blood pressure during pregnancy ($P > 0.05$). Most of the subjects (over 46%, $n = 106$) turned out to be nulliparous. There was no significant difference between women with hypertension and normal blood pressure during pregnancy in regard with the number of mothers' pregnancy ($P > 0.05$). The highest percentage of subjects (more than 50%) in both pregnant mothers with hypertension ($n = 60$), and normal blood pressure ($n = 62$) had their first delivery. There was no significant difference between maternal deliveries in two groups of mothers ($P > 0.05$).

Also, the majority of subjects (more than 75%) in both women with hypertension ($n = 86$) and normal blood pressure during pregnancy ($n = 89$) had no history of abortion, and this difference was not statistically significant ($P > 0.05$). In addition, most of the subjects (over 95%) had received prenatal care in both groups of mothers. In regard with the history of hypertension in the mothers with hypertension, 14.3% ($n = 17$) of them had a history of pre-pregnancy hypertension, while 3.2% ($n = 4$) of the mothers with normal blood pressure had a history of pre-pregnancy hypertension. The statistical test showed that this difference was statistically significant ($P < 0.05$). Regarding the type of delivery, 18.1% ($n = 21$) of the mothers with hypertension and 34.1% ($n = 40$) of the mothers with normal blood pressure gave birth naturally, and this difference was statistically significant ($P < 0.05$).

Also, Chi-square test showed that the rate of pregnancy complications in the mothers with hypertension was more than the mothers with normal blood pressure and this difference was statistically significant ($P < 0.05$) (**Table.2**). Complications such as infection more than 15%, bleeding (8.6% in mothers with hypertension and 10% in mothers with normal blood pressure), runny nose (1.9% in mothers with hypertension and 6.4% in mothers with normal blood pressure), diabetes (3.8% in the mothers with hypertension and 4.4% in the mothers with normal blood pressure); 19% of the mothers with hypertension had proteinuria, while the most common problem in the mothers with normal blood pressure (9.6%) was headache. The history of preeclampsia was reported in 5.8% in the mothers with hypertension and 0.6% in the mothers with normal blood pressure. Infection was the

most complicated and hydramnios was the lowest common complications observed among pregnant women. The mean of hospital stay in the mothers with hypertension was 3.38 with a standard deviation of 2.03 days and the mothers with normal blood pressure were 2.03 with a standard deviation of 0.959 days. There is a significant statistical difference between the mean time of hospitalization in the mothers with hypertension and normal blood pressure during pregnancy. In addition, the findings of this study showed that most of the infants were born in the mothers with hypertension (93.3%, $n = 107$), and the mothers with normal blood pressure (96.5%, $n = 110$), are born alive and no difference was found between the two groups of mothers, but other neonatal complications were significant between the two groups of mothers (**Table.3**).

Table-1: The comparison of the demographic characteristics of the mothers with hypertension and normal blood pressure during pregnancy

Variables		Mothers with normal blood pressure	Mothers with hypertension	P-value	Statistical test
Age		26.37±5.67	27.42±6.01	0.107	T=1.616
Weight		62.34±11.63	68.58±13.03	0.000	T= 4.549
Location	Urban	67 (58%)	75 (65.7%)	0.161	Chi-square=1.969
	Rural	48 (42%)	40 (34.3%)		
Education	Illiterate	6 (4.8%)	6 (4.8%)	0.991	Chi-square=0.105
	Elementary	41 (36%)	42 (37.1%)		
	secondary school	56 (48.4%)	54 (46.7%)		
	Academic	12 (10.8%)	13 (11.4%)		
Occupation	Employed	6 (5%)	10 (9.5%)	0.475	Chi-square= 3.516
	Housewife	109 (95%)	95 (90.5%)		
Smoking	Yes	2 (1.6%)	0 (0%)	0.193	Chi-square= 1.692
	No	113 (98.4%)	115 (100%)		

Table-2: The Comparison of Pregnancy Complications in the mothers with hypertension and normal blood pressure during pregnancy

Symptoms	Hypertension	
	No, (Mothers with normal blood pressure), Number (%)	Yes, (Mothers with hypertension) Number (%)
Proteinuria	3 (2.3)	22 (19)
Edema	2 (1.6)	18 (15.3)
Headache	11(9.6)	13 (11.4)
Other Symptoms	23 (20.3)	49 (42.9)
No symptoms	76 (66.2)	13 (11.4)
Total	115 (100)	115 (100)
Test	Pearson Chi-square=124.356, P=0.000	

Table-3: The Comparison of Neonatal Characteristic in the mothers with hypertension and normal blood pressure during pregnancy

Variables	Independent t Test	Mothers with normal blood pressure	Mothers with hypertension
Birth Age (week)	T=4.729, P=0.000	37.62±3.76	35.61±3.78
Birth Weight (gr)	T=5.392, P=0.000	2946.4±698.53	2489.71±891.36
Apgar score (First Minute)	T=3.398, P=0.001	8.27±1.67	7.55±2.35
Apgar score (Fifth Minute)	T=3.659, P=0.000	9.32±1.74	8.51±2.51
Length of hospitalization	T=2.946, P=0.003	3.36±2.28	5.28±3.63

4- DISCUSSION

The present study attempted to find out the relationship between pregnancy-induced hypertension with complications related to mother and infant in pregnant women. The incidence of pregnancy complications in people with hypertension is significantly higher than others. The occurrence of any pregnancy-induced hypertension is an indicator of an increased risk of morbidity and mortality in later life, as well as a significant increase in the risk of Type 2 diabetes (11). In addition, the overall risk of Placental abruption and bleeding during pregnancy is 1 in every 200 to 300 pregnancies in healthy subjects and 1 in 60 to 120 in subjects with pregnancy

hypertension (12). Hypertension is associated with various maternal complications such as Placental abruption, acute liver and kidney failure, pre and postpartum hemorrhages, and maternal mortality. Women with prenatal blood pressure are at risk of pregnancy seizure, high postprandial hypertension, metabolic syndrome, cardiovascular disease and stroke (13). Lisonkova et al. showed that the risk of cardiovascular, respiratory, central nervous system, renal and hepatic impairment increases in patients with gestational hypertension (14). The results of Davies et al. revealed that there is a positive and significant relationship between preeclampsia and preterm delivery (odds ratio 4.43, 95% confidence

interval) (15), and an excess risk of preeclampsia subsequent to a preterm birth has been reported (16). Furthermore, the result of Omu et al.'s study indicated that preterm delivery, cesarean delivery, low birth weight, and perinatal mortality were significantly higher in women with hypertension in comparison with healthy subjects (17). Each of these consequences of hypertension during pregnancy is associated with several complications. Preterm labor is a major cause of perinatal mortality, morbidity, and long-range neurological disability (18, 19). There are a variety of complications such as haemorrhage, postpartum sepsis, bladder injury and visceral trauma that may be potentially very serious when they occur (20). Also, neonates with low birth weight is a leading cause of newborns' mortality and morbidity (21, 22).

Therefore, maternal hypertension and its consequences can be very fatal for both mother and newborn. Nanda et al also showed a significant relationship between gestational hypertension and maternal and neonatal complications, which is consistent with the results of our study (18). Ahmadzadeh Sani et al. also stated that overweight women who have high blood pressure in pregnancy experience several complications like gestational diabetes (23). Odell et al. also studied maternal and neonatal complications due to pregnancy-related hypertension in African women; they stated that mothers with high blood pressure had a high risk of developing gestational diabetes and 10% of infants had been born with Low birth weight (LBW) (24). In Shobeiri et al. study, history of abortion and high marriage age were a positive relation with mastalgia and anxiety was slightly more prevalent in mastalgia group (25). Saadat et al. also showed that maternal hypertension during pregnancy causes complications such as respiratory distress, low birth weight, gestational diabetes risk

and maternal mortality (26). Lo et al. found that high blood pressure in the mother could be a risk factor for maternal and neonatal mortality (27). Fallahian and Eahidosadati in his study stated that mothers with pregnancy-induced hypertension are at risk of infant mortality 7.5 times, low Apgar score 9 times and Premature infants 3.5 times more than the babies of healthy mothers (28). All the above-mentioned examples indicate a higher rate of pregnancy complications in women with high blood pressure. Since proper behavior requires appropriate training and can cause a significant change in the treatment of patients (29), therefore, educating mothers and performing careful care during pregnancy, such as the use of non-pharmacological methods like sedation (30), meeting the emotional needs of mothers and reducing their anxiety (31), and providing other necessary measures to reduce and prevent pregnancy hypertension is recommended.

4-1. Limitations of the study

This study also had some limitations, such as the reluctance of mothers with hypertension to fill the questionnaire due to special mental and physical conditions, as well as lack of awareness. With the necessary explanations about the risk factors and their impact on the treatment process, efforts were made enhance the participation of subjects as much as possible.

5- CONCLUSION

The results of the present study indicated a significant relationship between pregnancy-induced hypertension with maternal and neonatal complications. Understanding these complications can be used to facilitate people's access to health care and to make optimum use of provided health services.

6- CONFLICT OF INTEREST: None.

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