



The Examination of the Risk factors for Pre-Eclampsia in the Pregnant Coming to Fatemiyeh Hospital, Hamadan, 2005-2015 (Retrospective Case-Control Study)

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Abstract

The present study was carried out and aimed to examine the risk factors of preeclampsia, which is the common disorder of pregnancy, to carry out the precautionary measures, due to its high prevalence and serious side-effects of this syndrome. This is a retrospective case - control study which was conducted by using existing cases in Fatemiyeh Hospital, Hamadan during 2005-2015. The Data collection method was done through referring to the existing cases in Fatemiyeh Hospital, and extracting the information related to patients with Preeclampsia and without Preeclampsia. Thus, 726 pregnant with Preeclampsia were included in case group and the same number of pregnant without Preeclampsia were put in the control group. Then the required data was collected through a researcher made questionnaire. SPSS 21 software and chi-square test and logistic regression were used to analyze the data. Significance level was considered lower than 0.05. Majority of women in case and control group were at the age range of 39 - 40 years old. Findings of the current study showed that there is a significant relationship between the occurrence of Preeclampsia and increasing age, low Apgar score in infant, history of previous blood pressure, first pregnancy and delivery, and male gender ($P < 0.05$). As there is a relationship between the occurrence of Preeclampsia and increasing age, the history of prior blood pressure, null parity and the male gender, that was important that the necessary measurements to recognize the pregnant exposed to the risk were considered to control and prevent.

Keywords: Preeclampsia, Maternal and Fetal Complication, Gender

Introduction

Preeclampsia is a common disorder occurs after 20 weeks of gestation, and it is specified by the systolic blood pressure equal to or greater than 140 and diastole equal to or greater than 90 mmHg and proteinuria [1]. The prevalence of preeclampsia is between 1.8-16.7% around the world based on the detection criteria and the case study population [2]. The prevalence of preeclapsia was reported, in Iran, between 1-12% in accordance with according to the scattered studies [3, 4]. This syndrome is associated with bleeding and death-threatening infections, and includes a large proportion of morbidity and mortality in the pregnancy [5]. Preeclampsia is considered as the third leading cause of maternal mortality in the world and the second common cause of maternal mortality in Iran [6] which is allocated 18% of the maternal mortality in Iran [7]. It is supposed that preeclampsia leads to the long term side effects in the later steps of the mother and infant life as well as short-term side-effects, such as cardiovascular disorders [8-10]. The maternal and fetal complications of this disorder include intrauterine growth retardation, intrauterine death, early delivery, hospitalization and etc. [11]. Despite the extensive studies in the previous decades, the way of initiating or exacerbate hypertension in pregnancy is still unclear and this disorder is considered as the most important unresolved problem in the midwifery course [12, 13]. Obviously, a single mechanism is not responsible of all the related symptoms associated with the preeclampsia, but several various mechanisms interact with each other and or exacerbate the effects of each other [14]. Researcher have found that various types of biological, biochemical, biophysical characteristics and immunology in pathophysiology of preeclampsia to be effective, especially in anticipating its occurrence [15]. Some factors are effective on the pregnancy blood pressure, such as first gestational age, high age, race [4, 16], genetic factors, environmental factors and multiplexes, as well as the prevalence of hypertension among women in the lower socio-economical class despite the existence of control on the race factors [17]. Causes such as oxidative stress, vascular endothelial dysfunction, and etc. have been reported as the factors involving in this disorder [18, 19]. Risk factors are different in the various studies and various populations, which may be due to the genetic factors or other unknown following problems. Therefore in order to identify the nature of this syndrome, studies should be conducted in various communities [20]. Since, there is no sufficient knowledge to find the cause and pathogenesis of this complicated disease,

despite of extensive studies over the past few decades, therefore, a single cause cannot be considered for that. Thus, identification of the risk factors of the disease before the clinical manifestation is important to identify the patients' needs special care and attention. Considering the existing contradictions in the various studies and the importance of the identification of the underlying factors of preeclampsia to control this syndrome as fast as possible, the present study was done to determine the effective risk factors on the occurrence of the preeclampsia.

Materials and Methods

This is a retrospective case - control study which was conducted though using the existing cases in the in Fatemiyeh Hospital in Hamadan during a 10-year period. Data was collected after taking the Ethic Committee of Hamadan University of Medical Sciences approvals and gaining anonymous license, through reviewing the existing medical cases include patients' personal information (age, education, occupation, the pregnancy age, number of delivery, abortion), their disease records (diabetes, heart, kidney, blood pressure diseases) and infants' information including sex and Apgar at birth. the Inclusion criteria included: all pregnant along with single pregnancy and hospitalization after the 20 weeks of pregnancy with preeclampsia diagnostic criteria in the given maternity clinic between 2005-2015 had complete medical records and exclusion criteria included incompleteness of medical records of the patients. Preeclampsia diagnostic criteria was systolic pressure greater than 160ml/M and diastolic pressure greater than 110 ml/M after the 20 weeks of pregnancy along with the proteinuria greater than 300 ml per liter in the 24-hour urine or protein concentration of 30 mg or greater than two random urine samples were provided at least within 6 hours [4]. The Data collection method was done through referring to the existing cases in Fatemiyeh Hospital, and extracting the information related to patients with Preeclampsia and without Preeclampsia by the administrators of the plan as follows:

First, codes related to all pregnant mothers during last 1- years (2006 - 2016) were reported. Files were taken according to the codes, and biographies and case summary were reviewed and they were selected based on the initial and final diagnosis. Thus 726 women with Preeclampsia were included in case group and the same number of women without Preeclampsia were put in the control group. Then required data was collected based on the researcher made questionnaire.

Data was analyzed through SPSS 21 and Descriptive-analytical statistics (Chi-square test, independent T-test and logistic regression). The significant level was considered lower than 0.05.

Findings

With a ten-year investigation of files during 2005 - 2015, the occurrence of Preeclampsia in women referring to Hamadan Fatemiyeh Hospital was reported as 726. Indicates absolute and relative frequency distribution in research units in two groups of patients with and without Preeclampsia in terms of personal characteristics. Majority of participants were at age range of 39-40 years old, and two groups were homogeneous in terms of age. Majority of them were housewife and there was no significant difference in two groups. Most mothers in the group with Preeclampsia (30.9%) and in control group (52.2%) had diploma. Distribution of disease history in two groups showed significant differences ($P < 0.001$), and most mothers in the group with Preeclampsia (42.1%) had hypertension, and majority of women in control group had none of the aforementioned diseases (82.2%). Distribution of number of pregnancy in two groups showed a significant difference ($P < 0.001$). In the Preeclampsia group, 58.5 percent of women had one pregnancy and 86 percent of women in control group had one pregnancy, which was statistically significant ($P < 0.001$). Also, frequency of pregnancy was compared in two groups by using independent two-group t-test and it was observed that the number of pregnancies in the Preeclampsia group (1.81 ± 1.26) was significantly higher than the control group (1.29 ± 0.93) ($P < 0.001$), but in both groups the ratio of women with the first pregnancy was higher. Distribution of the number of pregnancy in two groups showed a significant difference ($P < 0.001$). Ratio of nulliparous women was higher in both groups (Table 1). Distribution of infant gender in two groups showed a significant difference ($P < 0.001$). As observed ratio of male infants in Preeclampsia group was 68.7 percent and 58.9 percent in control group (Table 2). The Results of logistic regression model indicates the adjusted effects of variables under study on Preeclampsia logarithm of odds of this table gives estimation of parameters and odds ratios based on fitting the logistic regression model along with other parameters derived from the model (Table 3). Negative coefficients means preventive effect and positive coefficients means direct effect on logarithm of the odds of Preeclampsia. In investigation of qualitative variables effect, one level is considered as the basic level, and estimate effect is as comparison of

the respective group or groups and basic level. Interpretation of odd chance is simpler in logistic regression. Value 1 means ineffectiveness of the given variable. Thus results are expressed according to it. Following results were obtained:

The age has significant impact on the chance of Preeclampsia ($P < 0.001$). Increasing age leads to the increase the chances of getting eclampsia. Also, odds of Preeclampsia in the male gender, the first pregnancy and the lower child with a history of previous blood pressure were increased (Table 4).

Discussion

The present study was conducted and aimed at the determination of the maternal and infant risk factors in the women with Preeclampsia. Findings suggested that majority of mothers with Preeclampsia had prior hypertension, and they were primarigravida. Also Apgar of infants of these individuals was lower than control group, and most of the infants were male. The results of the present study also showed that age increasing will increase the probability of preeclampsia occurrence. These findings were in accordance with the Magnus et al. (2001) studies, which found that women with the age over 35 were exposed to more risk of preeclampsia [21]. Age over 35 is regarded as a risk factor for Preeclampsia [22]. According to the studies Rampal (2008)[23], Mohan (2007)[24], Ostchega (2007)[25] and Oparil (2006) [26], the increase of the hypertension was observed along with the increase of age which can be due to the increases of the vascular resistance and formation of atherosclerosis plaques, increasing blood pressure with the age increase [27-29]. It was observed in the present study that the probability of preeclampsia occurrence in individuals with the blood pressure history is more than. Alongside this study, in Shahidi et al. study was seen that there was a significant difference between the history of suffering from diabetes and hypertension with preeclampsia. In Lecarpentier et al. (2013) study also showed that chronic blood pressure in women before pregnancy increased the risk of preeclampsia which was consistent with the results of the present study [30]. The Results also showed that number of nulliparous individuals is higher in both groups than the others, and the prevalence of preeclampsia was higher in women without pregnancy, which is consistent with findings by Bilano [31]. Also, in Kashaniyan et al. study, the occurrence of nulliparity was significantly higher among the women of the case group, so that nulliparity was considered as a risk factor for

preeclampsia can be suggested the background of genetic or behavioral phenomenon in an individual [32]. Distribution of infant gender in both groups

showed a significant difference (P<0.001). Ratio of male infants in Preeclampsia group was 68.7 percent .

Table 1. Frequency distribution of research units in terms of personal characteristics in Preeclampsia and control group

Variable		Preeclampsia		Control		Test	p-value
		Number	Percent	Number	Percent		
Mother's Job	Housewife	698	96.1	708	97.5	2.29	0.319
	Employed	26	3.6	17	2.3		
	Self-Employed	2	0.3	1	0.1		
	Total	726	100	726	100		
Mother's Education	Illiterate	120	16.5	47	6.5	112.34	0.001
	Elementary school	109	15.0	61	8.4		
	Secondary school	190	26.2	210	28.9		
	High school	224	30.9	379	52.2		
	Academic	83	11.4	29	4.0		
	Total	726	100	726	100		
History of Disease	Rental	11	1.5	3	0.4	269.98	<0.001
	Cardio	22	3.0	5	0.7		
	Diabetes	94	12.9	21	2.9		
	Hypertension	306	42.1	100	13.8		
	No disease	293	40.4	597	82.2		
	Total	726	100	726	100		
Frequency of Pregnancy	0	430	59.2	627	86.4	138.02	<0.001
	1	170	23.4	55	7.6		
	2	91	12.5	28	3.9		
	3	20	2.8	8	1.1		
	4	8	1.1	5	0.7		
	5	3	0.4	0	0.0		
	6	2	0.3	1	0.1		
	7	2	0.3	2	0.3		
	Total	726	100	726	100		
Frequency of Pregnancy	1	425	58.5	624	86.0	144.71	<0.001
	2	142	19.6	48	6.6		
	3	90	12.4	26	3.6		
	4	39	5.4	15	2.1		
	5	17	2.3	7	1.0		
	+6	13	1.8	6	1.6		
	Total	726	100	726	100		

Table 2: Frequency distribution of research units in terms of infant gender in Preeclampsia and control group

Variable		Preeclampsia		control		Test	p-value
		Number	Percent	Number	Percent		
Infant Gender	Female	227	31.3	321	44.2	25.90	<0.001
	Male	499	68.7	405	55.8		
	Total	726	100	726	100		

Table 3. Frequency distribution of research units in terms of infant gender in Preeclampsia and control group

variable	Mean	SD	Min.	Max.	Mean	SD	Min.	Max.	Test statistics	p-value
Apgar score	8.77	0.62	4.60	9.10	8.88	0.79	0.0	10.0	-3.063	0.002

Table 4. Estimation of parameters and odds ratios based on fitting logistic regression model

Variable	Estimate	Standard error	Sig. Level	Odds Ratio (OR)	95% confidence distance for OR
Constant	4.027	1.604	0.012	56.078	-
Age	0.040	0.010	0.001	0.961	(0.94 0.98)
Frequency of pregnancy	0.145	0.193	0.509	1.16	(0.80 1.67)
Frequency delivery	-0.113	0.357	0.772	0.89	(0.45 1.79)
Number of children	0.293	0.269	0.319	1.34	(0.79 2.28)
Apgar	-0.103	0.092	0.258	0.90	(0.75 1.08)
Gender					
Male	-	-	-	1	-
Female	-0.239	0.153	0.108	0.79	(0.59 1.05)
History of disease					
Rental	2.230	0.725	0.002	9.30	(2.25 38.51)
Cardio	1.789	0.571	0.002	5.99	(1.94 18.34)
Diabetes	1.893	0.297	0.001	6.64	(3.71 11.89)
Hypertension	1.311	0.171	0.001	3.71	(2.66 5.18)
Healthy	-	-	-	1	-

and 58.9 percent in control group. There was no significant relationship between infant gender and Preeclampsia in the studies by Phillips et al. (2004)[33] and Rudra et al. (2005) [34] and Shah Gheybi et al. (2014)[35], which is inconsistent with findings in this work. Maybe the reason of this difference is due to different sample size and/or sampling communities. On the other hand, in the study by Shahidifar et al. [36], most of the infants of mothers with Preeclampsia were male, which is consistent with the present research and supporting it. In the current research, Apgar score of infants of women with Preeclampsia was lower than control group, which is consistent with the findings by Khadem (2007)[37] and Kashanian et al. (2008)[32].according to the results of the aforementioned studies, the Apgar score decreases in women with preeclampsia . One of the reasons of the low Apgar score in these infants can be the effect of blood pressure on the placental uterus perfusion and or the low birth weight of infants. Examination of the patients with preeclampsia in the form of retrospective and based on the nosocomial cases was one of the

limitations, therefore the examination of other factors may affect this disease was not possible. Thus, it is suggested that extensive retrospective studies will be conducted on the effective risk factors on the preeclampsia, given the importance of this syndrome in the pregnancy and its irreversible consequences.

Conclusion

As there is a relationship between the occurrence of Preeclampsia and increasing age, the history of prior blood pressure, null parity and the male gender, that was important that the necessary measurements to recognize the pregnant exposed to the risk were considered to control and prevent.

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