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Research Article

Comparison of Incidence of Preeclampsia between Warm seasons (summer and spring) and Cold Seasons (autumn and winter) in Pregnant Women Visiting Teaching Hospitals in Jahrom Town in 2006-2010

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ABSTRACT

Introduction: Preeclampsia is a multifactorial disorder, which only occurs during human pregnancy. The incidence of preeclampsia seems to be higher in cold seasons than warm seasons. Hypertensive disorders of pregnancy are very important because these disorders are still one of the main causes of death and maternal and perinatal complications all over the world. Therefore, this study aimedto compare the incidence of preeclampsia in warm seasons (summer and spring) and cold seasons (autumn and winter) to reduce the incidence of preeclampsia in order to give proper timing for pregnancy.

Methods: This was a cross-sectional study. The incidence of preeclampsia was determined and compared in warm seasons (summer and spring) and cold seasons (autumn and winter) by studying the records of those women giving birth in Peymanieh Hospital and Motahari Hospital in Jahrom Town in cold and warm seasons in 2006-2010.

All women with preeclampsia who delivered their babies in PeymaniyehHospital and Motahari Hospital in Jahrom Town in 2006-2010 entered the study. Those women with incomplete records and a history of hypertension were excluded from the study. The collected data was analyzed using SPSS version 11 with descriptive statistics, Chi-square Test and Fisher's Exact Test.

Results: The overall incidence of preeclampsia was 2.85%. The incidence of preeclampsia in warm seasons was 2.5% and in cold seasons was 3.2%. The incidence of preeclampsia in cold seasons was higher than warm seasons (2.5% vs. 3.2%, p = 0.01). The incidence of preeclampsia in the spring was 16.4%, in the summer was 18.5%, in the autumn was 38.3% and in the winter was 26.5%. Therefore, the incidence of preeclampsia in cold seasons was 3.2% and in the warm seasons was 2.5%.

Conclusion: The results of this study showed a significant difference between the incidence of preeclampsia in warm and cold seasons. The incidence of preeclampsia in cold seasons was higher than warm seasons.

Keywords: Preeclampsia, Winter, Summer, Spring, Autumn

INTRODUCTION

Hypertensive disorders are the most common medical problems encountered during pregnancy, complicating 5-10% of pregnancies. These disorders are the cause of 16% of maternal mortality in developed countries. Hypertensive disorders during pregnancy are classified into two categories of chronic hypertension and pregnancy-specific hypertension. Preeclampsia is classified into the second category. Thirty percent of cases of hypertensive disorders in pregnancy are due to chronic hypertension and 7% of the cases are

caused by development of hypertension during pregnancy [2]. Preeclampsia is an idiopathic disorder that only occursduring pregnancy. Preeclampsia and eclampsia complicate 6-8% of pregnancies [1]. The incidence of preeclampsia depends on many demographic variables including the age of the mother and underlying medical problems. It is necessary to understand the etiologyand impact of hypertension in pregnancy because these disorders are still one of the main causes of death and maternal and perinatal complications worldwide [2]. Preeclampsia syndrome only occurs during human pregnancy [1] in which blood flow to organs is reduced due to vascular spasm and endothelial activation[1]. Preeclampsia syndrome is defined as a classic triad of hypertension, proteinuria and other symptoms (persistent cerebral symptoms, epigastric pain with nausea and vomiting, fetal growth restriction or thrombocytopenia and abnormal liver enzymes[1]) [2]. Hypertensive disorder in pregnancy is defined as systolic blood pressure>140 mm Hg or diastolic blood pressure > 90 mm Hg in two separate intervals with at least six-hour and at maximum one-week delay. This disorder is also defined as systolic blood pressure> 30 mmHg anddiastolic blood pressure > 15 mmHg after 20 weeks of pregnancy. Proteinuria was defined as a 24-hour urinary protein excretion of more than 300 mg or persistent proteinuria (30 mg/dl, 1+ dipstick) in random urine samples. However, the patients may not be detected with a random urine sample since there is variation in excretion of urinary protein during 24 hours [3]. Severity of preeclampsia is categorized into two classes of mild and severe. Mild preeclampsia is defined as diastolic blood pressure < 110 mmHg, systolic blood pressure < 180 mmHg, proteinuria≤ +2, normal serum creatinine and negligible elevationin serum transaminases. Severe preeclampsia is defined as diastolic blood pressure ≥ 110 mm Hg, systolic blood pressure ≥ 180 mm Hg, proteinuria ≥ +3 and such symptoms as headache, visual disturbances, upper abdominal pain or pain in the right upper abdominal quadrant, liver dysfunction, pulmonary edema, apparent fetalgrowth restriction and low platelet counts, elevated serum creatinine and oliguria [2]. It is essential to monitor patients with any type of mild preeclampsia because both types may immediately progress to severe preeclampsia. Eclampsia is characterized as onset of seizure in women with preeclampsiawhere seizures cannot be attributed to other causes. Seizures are usually generalized tonic-clonic and may appear before, simultaneously with, or after delivery [3]. Preeclampsia occurs in 4-7% of all pregnancies [1].Prevalence of this disease is reported as 6.4% in Iran [1]. Preeclampsia is more common in primiparous women and usually occurs after 20 weeks of pregnancy [2]. The incidence of this disorder has increased by forty percent in developed countries in 1990-1999, which is due to higher age of mothers and increased number of multiple pregnancies [2].

The risk factors of preeclampsia are divided into three categories.

1) Mental Risk Factors
2) Primiparity
3) A history of preeclampsia in the first-degree relatives

Some references mentioned that deficiency or increased intake of some nutrients are involved in development of preeclampsia (e.g. meat, proteins, fat, dairy products, salt). Sometimes, it is recommended to avoid these nutrients but the results were not promising. John *et al.*(2002) found out that a diet rich in fruits and vegetables with antioxidant activity reduces blood pressure in the general population. These results were consistent with the results of a case-control study by Zehank*et al.* (2002). In the former study, less than 85 mg daily intake of ascorbic acid in women increased theincidence of preeclampsia by two-fold. Obesity is also a major risk factor for preeclampsia. This evidence also confirms involvement of nutrition in development of preeclampsia. Wolf *et al.*(2001) showed that c-reactive protein (CRP) elevates in obese pregnant women,which

increases the incidence of preeclampsia [3]. Although the etiology of preeclampsia is unknown, evidence suggests that the disease develops in early pregnancy.Hidden pathophysiological parameters vary during impregnation. It is recommended to assessbiological, biochemical and biophysical parameters involved in pathophysiology of preeclampsia in early pregnancy. These efforts aimed to offer useful strategies with low sensitivity and positive predictive value for detecting preeclampsia. There is no reliable, credible and economical screening test for preeclampsia. One of the objectives of the network of maternal-embryonic medical units is identification of the afore-mentioned factors. In this section, a number of selective tests are described [3]. Although the etiology of preeclampsia is unknown, evidence shows that the disease develops in early pregnancy and hiddenpathophysiological parameters vary during impregnation. If delivery fails, these variations ultimately lead to multi-member involvement and a spectrum of clinical problems varying from unidentified complications to large pathophysiological disturbances that may be risky for the mother and the fetus. As mentioned earlier, these complication are probably caused bycoronary artery spasm, endothelial dysfunction and ischemia. Various types of preeclampsia-causing maternal complications are usually described based on member systems but they are numerous and often clinically overlapping [1].

As mentioned earlier, delivery is the only treatment of preeclampsia. Gynecologists prefer immediate delivery after diagnosis of severe osteoporosis. It is commonly stated thatlabor induction to achieve vaginal birth is the best option for treatment of the mother with hypertension during pregnancy.

However, several gynecologistsrecommend cesarean delivery in case of short cervix length that prevents labor induction to achieve vaginal birth, emergency cases and the necessity to consult with Neonatal Special Care Unit [4]. Different studies in different regions reached contradictory results on the relationship of preeclampsia with warm and cold seasons (5).

METHOD:

This was a cross-sectional study. All pregnant women visiting Peymaniyeh Hospital and Motahari Hospitals in Jahrom Town in 2006-2010 were studied. Consecutive purposive sampling method was used to select the sample. All the patients with preeclampsia visiting Peymaniyeh Hospital and Motahari Hospitals in Jahrom Town in 2006-2010 entered the study. Preeclampsia syndrome is defined as a classic triad of hypertension, proteinuria and other symptoms (persistent cerebral symptoms, epigastric pain with nausea and vomiting, fetal growth restriction or thrombocytopenia and abnormal liver enzymes). The incidence of preeclampsia was determined and compared in warm seasons (summer and spring) and cold seasons (winter and autumn). All women with preeclampsia who delivered their babies in MotahariHospital and Peymani Hospital in Jahrom Town in 2006-2010 entered the study. Those women with incomplete records and a history of hypertension before pregnancy were excluded from the study. Data collection tool was a questionnaire filled out by reviewing patient records. In this study, 24246 cases were investigated. Data confidentiality was ensured. The collected data was analyzed with SPSS using descriptive statistics, Chi-square Test and Exact Fisher's Test.

RESULTS

In a five-year period (from 2006 to 2010), 24246 deliveries were performed at Peymanieh Hospital and Motahari Hospital in Jahrom. Of these, 691 had pre-eclampsia. Of these, 70 had hypertension before pregnancy that were excluded from the study. Three patients had incomplete records who were also excluded from the study. Forty-nine pregnant women with preeclampsia delivered their babies in spring, 114 in autumn, 79 in winter and 55 in summer. The incidence of preeclampsia in these 5 years was 2.85% (p = 2.85%).The incidence of preeclampsia in cold seasons was higher than

warm seasons (3.2% vs. 2.5%, p = 0.01). Prevalence of preeclampsia was 16.4% in spring, 18.5% in summer, 38.3% in autumn and 26.5% in winter. Therefore, the incidence of preeclampsia in cold seasons was 3.2% and 2.5% in warm seasons. Fifty-one percent of women with preeclampsia cases were from 21 to 30 yearsold, 13% were between 15 and 20 years old, 38% were ≥ 31 years old. Eighty-seven percent of women with preeclampsia had no history of diabetes and 13% had a history of diabetes.

Table 1 : the incidence of preeclampsia in different seasons

	Frequency	Percent	Valid percent	Cumulative percent
Spring	49	16.4	16.5	16.5
Summer	55	18.5	18.5	35
Autumn	114	38.3	38.4	73.4
Winter	79	26.5	26.6	100
Total	297	99.7	100	
Missing system	1	0.3		
Total	298	100		

Table 2 : the incidence of preeclampsia by age

Percent	Number	Age
13	38	15-20
51	151	21-30
38	113	≥ 31

DISCUSSION

The incidence of preeclampsia was higher in winter and autumn when temperature is lower than other season in PeymaniyahHospital and Motahari Hospital in Jahrom (3.2% vs 2.5%, P = 0.01). Different studies in different regions reached contradictory results on the relationship ofincidence of preeclampsia with warm and cold seasons [6]. However, most results showed that lower temperatures in winter or rainy seasons increases the incidence of preeclampsia and eclampsia [7]. The present study aimed to examine the relationship between such factors as season, history of hypertension and diabetes in pregnancy. The results of this study showed a significant relationship between incidence of preeclampsia and season. The highest incidence of preeclampsia belonged to winter and the lowest to summer. Since pathophysiology of preeclampsia involves vascular contraction, increased incidence of preeclampsia in cold and humid seasons can be attributed to vascular contraction in lower temperature and humid conditions. The effect of seasonal changes on hypertension was investigated in a study in Zimbabwe. The results were consistent with the results of this study [8]. The incidence of preeclampsia peaked inthe beginning of rainy and cols season (autumn) in this study while the incidence of this disorder reached the maximum level at the peak of the cold and rainy season (winter) in most other studies. Certainly, some of these contradictions are due to type of the study and the criteria for selecting samples.The results of this study showed that humidity and low temperature may influence blood vessels and vasoactive drugs. On the other hand, dry and rainy seasons contribute to agricultureand nutrition, which contribute to physiopathology of preeclampsia[9]. Vida studied the effect of seasonal changes on the prevalence of hypertensive disorders. Studied women were classified into three categories of preeclampsia, healthy and eclampsia. The results showed that the prevalence of preeclampsia does not depend on the season but the prevalence of eclampsia is higher in rainy seasons and lower temperatures compared to warm and dry seasons. Nevertheless, preeclampsia and eclampsia were categorized into one category in this study.The results of a study in various Canadian hospitals in 2000 showed thatlow age of pregnant women, rainy seasons, prim parity, multiple pregnancies and absence of prenatal care are risk factors for preeclampsia [10]. Variations in blood pressure in different seasons was investigated in a study in Japan in 2008. Blood pressure of pregnant women was repeatedly measured in different months of pregnancy at home. The lowest blood pressure belonged to 20th week of pregnancy and the highest blood pressure belonged to 26th week of pregnancy. Ten-degreereduction in temperature significantly reduced systolic pressure by 2.5 mm Hg. This reduction was also attributed to age of pregnancy [10]. The results of a study in the United States in 2007 was not

consistent with the results of this study. No relationship was found between the time of pregnancy and the incidence of preeclampsia in the former study [11]. Zahiri*et al.* studied 12142 delivers inAl-Zahra Hospital in Tehran in 1999-2001 and reported the incidence of preeclampsia as 5%. There was no significant difference in incidence of preeclampsia between different seasons in the former study [12]. Nanbakhsh*et al.* studied 2824 pregnant women in Motahari Hospital inUrmia in 2007-2008. Of these, 1666 hadpreeclampsia (prevalence of preeclampsia = 5%). The incidence of preeclampsia in cold seasons (winter and autumn) was higher than warm seasons (spring and summer) in the former study (p = 0.038) [13]. Kashanian*et al.*studied 636 pregnant women in Akbar Abadi Teaching Hospital in Tehran in 2006-2007 (prevalence of preeclampsia = 4.8%). A significant difference was found in incidence of preeclampsia between warm and cold seasons in former study and the incidence of the disease was higher in cold seasons [1]. The results of other studies in different regions of Iran such as Tehran and Urmia showed thatprevalence of preeclampsia in Jahrom seems to be lower than average in Iran. This difference can be due to higher average temperature in this city.

Recommendations

This study could be a prominent guide for determining average prevalence of preeclampsia in Iran. The findings of this study can offer new ideas for future studies including the effect of maternal nutrition and other factors in different seasons on development of preeclampsia. Useful measures can be taken toprevent preeclampsia (e.g. nutrition of pregnant women in prenatal care) and reduce serious complication that are risky for both the mother and the fetus.

REFERENCES:

1. Winer N, Tsasaris V. Latest development management and treatment of pre-eclampsia. J Gynecol ObstetBiolReprod 2008;37:5-15.
2. Scoot J, Gibbs R.and et al. Danforth obstetrics and Gynecology.9th edution. New York ,Lippancott Williams and wikius. Philadelphia.2003;257-272.
3. Cunnigham F,leveno ,and et al.williamsObstetrics, 22 edition. New York,MC Grow Hill companies. 2005;l271-1294
4. Mostello D, Catlin TK, Roman L, Holcombe WL Jr., Leet T. Preeclampsia in the parous woman: who is at risk? Am J Obstet Gynecol. 2002;l87(2):425-9.
5. Norwitz ER. Prevention of pre-eclampsia: is it possible? Clinical obstetrics and gynecology. l999;42:446-54.
6. Alderman BW, Boyko EJ, Loy GL, Jones RH, Keane EM, Daling JR. Weathern and occurrence of eclampsia. Int J Epidemiol. 1988;17 :582-8. doi: 10.1093/ije/173.582.
7. Neela J , Raman L. Seasonal trends in the occurrence of eclampsia. Natl Med J India. 1993;6:l7-8.
8. Wacker J, Schulz M, Fruhauf J, Chiwora FM, Solomayer E, Bastert E. Seasonal change in the incidence of pre eclampsia in Zimbabwe.ActaObstet Gynecol Scand 1998;77:712-6.
9. Dech emeyA , Nathan L.Current obstetric &Gynecologic Dignosis&Treatment.10th edition. NewYork , MC Grow companies.2008;338-353
10. Hacker N,McoreG.Essential of obstetrics Gynecology . edition,Chicago.2004;345-367.
11. vvww.muschids.com/health-library /hr pregnant/2005/1 1/2606:31 :19pregnancy induced hypertention.
12. Ziba zahiriSoroori ,SeyedehHajarSharami, RoyaFaraji. Seasonal variation of the onset of preeclampsia and eclampsia.JRMS. 2007; 12(4): 198-202
13. FaribaNanbakhsh, FarzaneBroomand, HamideMohaddesi, S Nefoozi, PouyaMazloomi. Seasonal variation in the incidence of preeclampsia based on the time of conception.Life Science Journal 2012;9(4).