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A Comparison of Physical Activity and Nutritional Practices in Hypertensive and Non- hypertensive Pregnant Women

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ABSTRACT

Introduction: Hypertension is the most common medical problem affecting pregnant women during pregnancy contributing to one third of substantial maternal mortality and varieties of fetal and neonatal health problems, while representing health status of a society. This study aimed to investigate the links between a healthy life style and developing hypertension during pregnancy in order to improve healthier behaviors. **Methods**: In a case-control study from October 2009 to April 2010, physical activity and nutritional practices of two groups of pregnant women (220 in each group) with gestational age of 20 weeks or more, single pregnancy, without any previous medical disorders were compared. Samples in case group had pregnancy induced hypertension. Data were collected using a two-part questionnaire after obtaining informed written consents from mothers before enrollment; later the data were analyzed using the SPSS 13 and Stata software. **Results**: Women in two groups did not differ regarding their socioeconomic characteristics. There were no significant differences in nutritional practices and level of physical activity in pregnant women of study groups; mean score of physical activity was 54.6±14.8 in test and 57.3±15.0 in control group (P=0.06) and it was 72.9±10.3 and 73.719.5 about nutritional habits in test and control group respectively. Mean pre-pregnancy BMI was higher in case group (P=0.02); these women also had a higher percentage of previous prenatal mortality and history of hypertension. **Conclusion**: Results state that health during pregnancy is relevant to healthy life style especially preconceptional period; therefore employing proper strategies to improve women knowledge and attitude of the important dimensions of healthy life considering good and healthy diet and active life seem to solve the problem; this needs to unite all health workers to set proper educational programs and courses and support of health policy makers.

Introduction

Pregnancy, one of the most important events in a women's life, brings along hope and happiness or turn into grief or sorrow due to some maternal and fetal disorders that may develop throughout this process. Maternal mortality is a valuable national health indicator[1]; it is announced that maternal mortality in Iran is about 25 per 10000 pregnancies.[2] Pregnancy induced hypertension (PIH), one of the fatal factors of this period, is one of the most common causes of maternal mortality around the world contributing to up to 8% of all maternal deaths.[3] Preeclampsia, as the leading cause of ICU admissions in pregnant women[4], is responsible for a five-fold increase in prenatal mortality in infants. Delivery due to preeclampsia accounts for 15% of all preterm births[5] resulting in SGA (Small for gestational age), IUGR (Intrauterine growth restriction) and other acute problems at birth.[6]

Health indicators, being strongly affected by healthy life style, represent health status of the people living in a country. It is believed that 7 of 10 leading factors of death could be hindered by proper changes in life style. A healthy life style is defined as attitudes, behaviors, physical activity, nutritional practices, sleep patterns, resting, and stress compatibility, family support, recreational activities, serving in desired job, improving mentality and well being.[7]

It is widely-accepted that pregnancy is positively-influenced by healthy life style; regular prenatal care, participation in educational classes, regular exercises during pregnancy, taking required minerals and vitamins, adequate weight gain and healthy diet. However, negative habits including smoking, alcohol consumption,

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inadequate diet and late or absence of prenatal care would be of converse consequences.[7] PIH in pregnant mothers have been explained based on different theories relating to dietary factor, immune and vascular system and genetics.[8] Physical activity as a part of life style may influence pregnancy outcome; In a review study, it was revealed that jobs with high physical activity increase the chance of preterm birth, IUGR and hypertension up to 20-40% while some others emphasize on limited physical activity especially in mothers with PIH and cardiovascular disorders.[9,10]

Sheybaei and coworkers found that birth weight and gestational age can be affected by life style.[8] Results of Yadollahi *et al*. showed a converse relation between stress and gestational age, gravidity and physical activity, and level of education, diet and physical activity.[11] Similarly, Oken *et al*. suggested a relation between taking required amounts of calcium, folate and antioxidants and reduced risk of preeclampsia[12]; therefore, the role of nutrients and healthy diet on PIH should not be neglected.

Overall, numerous studies have been carried out on the association of certain risk factors with the development of PIH in pregnant women all of which have also been associated with varied interpretations. Considering the life threatening nature of preeclampsia in pregnancy and different cultural aspects existing in our country, we designed a study to detect nutritional status and physical activity among hypertensive and non-hypertensive pregnant women in order to highlight the related risk of PIH.

Materials and methods

In a case-control study carried out from October 2009 to April 2010, life styles of two groups of pregnant women attending special clinics, emergency, delivery, high risk pregnancy and post partum wards of four hospitals (Alzahra, Talegani, Shams and Shahriar) were compared. Participants were pregnant women with gestational age of 20 weeks or more, single pregnancy, without any previous medical disorders, history of placenta previa, placental abruption, vaginal bleeding and sign of preterm labor throughout the present pregnancy; samples in the case group had pregnancy induced hypertension.

Due to different socio-economical levels of attending patients, we selected two public and two private hospitals of Tabriz city accidentally; sample size was estimated at 220 patients for both case and control groups based on the data of previous studies. Institutional Review Board of Tabriz University of Medical Sciences Research and Ethics Committee approved the study.

Data Collection

A two-part questionnaire was prepared consisting of questions about demographic and socio-economic characteristics and previous pregnancy history in the first section; 12 questions about the diet and 11 questions about the physical activity. The questionnaire was face validated by five academic members of Tabriz University of Medical Sciences, and later pilot tested and revised. The reliability was made through a pilot study with a Cronbach's alpha of 80%.

Informed written consent was obtained from mothers prior to enrollment. Questioners were filled out after studying patient file by face to face interview. The women in the control group were followed up until the second postpartum day to confirm their normal blood pressure. If they had developed PIH, they were allocated to the case group. Distribution of women in both groups was identical regarding gravidity (pregnancy number) and maternal age. Data were analyzed using the SPSS for windows statistical package version 13 and Stata software. It consisted of descriptive statistics including calculation of the frequencies, mean scores for the items, Pearson's chi-square and T test. Statistical significance was set at 0.05. The data were expressed as mean ± SD or n (%).

Results

There were no significant differences in nutritional practices and level of physical activity in pregnant women of study groups; mean score of physical activity was 54.6±14.8 in test and 57.3±15.0 in control group (P=0.06) and it was 72.9±10.3 and 73.7±9.5 about nutritional habits in test and control groups respectively (scores were obtained out of 100); they even did not differ due to socioeconomic characteristics (Table 1).

Mean of Pre-pregnancy BMI was higher in case group; they also had higher mean of maternal age. Most of the women in groups were experiencing their first or second pregnancies; 49(22.37%) of the case women and 31(23.03%) of the control group had abortion in their previous pregnancies; more women in case group had history of preterm labor.

PIH in previous pregnancies was found in 11(8.6%) of case group where as only six (2.71%) of them in the other group had a history of previous PIH (P=0.03). Some medical disorders of the studied pregnant women throughout their previous pregnancies are compared in Table 2.

Discussion

There has always been a relation between physical activity, diet and healthy life; obesity, unhealthy nutrition and inactive life will predispose the patients to diabetes type 2, HTN and cardiovascular disease.[13] Our findings report an unsatisfactory physical activity status among pregnant women in both hypertensive and non-hypertensive groups that might have arisen from the cultural issues or inadequate education during or pre-pregnancy. Women in Shabany study had also experienced poor physical activity[7]; studied women in both studies were of almost the same socio-economical characteristics whereas Heggard *et al*. claimed that there is an interaction between exercise

Table 1. Socioeconomic characteristics of study groups

Socioeconomic characteristics	Case group (n=200) N%	Control group (n=201) N%	Group (n=401) N%	P value
Alzahra Teaching Hospital	137(62.50)	100(45.24)	237(53.9)	-
Taleghani Public hospital	78(35.15)	97(43.89)	175(39.50)	
Shams and Shahriar private hospitals	5(2.27)	24(10.85)	29(6.6)	
Maternal age (years)				
Under 18	18(8.20)	4(1.80)	22(5.00)	P=0.03
18-35	168(73.3)	203(91.9)	371(84.1)	
Over 35	34(5.15)	14(6.30)	48(10.9)	
Occupation				
In-house work	14(4.60)	20(9.00)	34(7.73)	P=0.58
Not working	198(90)	195(88.2)	393(89.09)	
Employee	8(3.7)	6(2.7)	14(3.18)	
Spouse's Occupation				
Employee	28(12.79)	45(20.36)	73(16.6)	P=0.09
Self-employed	188(58.3)	173(78.28)	361(81.80)	
Unemployed	4(1.83)	3(1.36)	7(1.6)	
Educational level of women				
Illiterate	27(12.33)	13(5.88)	40(9.09)	P=0.23
Elementary school	60(27.45)	52(23.53)	112(25.45)	
Guidance school	47(21.46)	41(18.55)	88(20.00)	
High school	64(28.77)	87(35.29)	142(32.05)	
University student	3(1.37)	7(3.17)	10(2.27)	
Bachelor's degree and higher	19(8.68)	30(13.57)	49(11.14)	
Educational level of women' spouse				
Illiterate	17(7.76)	7(3.17)	24(5.45)	P=0.22
Elementary school	64(29.22)	47(21.27)	111(25.23)	
Guidance school	75(34.25)	63(28.51)	13(31.36)	
High school	44(19.63)	70(31.67)	114(25.68)	
University student	4(1.83)	10(4.52)	14(3.18)	
Bachelor's degree and higher	16(7.31)	24(10.86)	40(9.09)	

Table 2. Gestational characteristics and medical disorders of pregnant women in previous pregnancies

History	Case group (n=200) N%	Control group (n=201) N%	Group (n=401) N%	P value
Gravid				
1	83(37.44)	85(38.46)	168(37.95)	P=0.14
2	70(31.96)	97(43.89)	167(37.95)	
3	34(15.53)	23(10.41)	57(12.95)	
4	16(7.31)	12(5.43)	28(6.36)	
5 and more	1797.85)	4(1.81)	21(4.77)	
Number of alive children				
0	46(2.55)	55(24.89)	101(22.77)	P=0.14
1	100(45.66)	101(49.32)	209(47.50)	
2	54(24.66)	46(20.81)	100(22.73)	
3	14(6.39)	15(4.52)	24(5.45)	
4	4(1.83)	0(0)	4(0.91)	
5	2(0.91)	1(0.45)	3(0.68)	
Abortion				
1	31(14.16)	28(12.67)	59(13.40)	P=0.31
2	9(4.11)	3(1.36)	12(2.7)	
3 or more	9(4.11)	0(0)	9(2.2)	
Perinatal mortality	6(2.74)	7(3.17)	14(3.18)	P=0.02
Preterm labor				
1	31(14.16)	9(4.07)	40(9.09)	P=0.06
More	5(2.28)	2(0.90)	7(1.59)	
PIH	19(8.68)	6(2.71)	25(5.68)	P=0.03
GDM	2(0.45)	1(0.45)	3(0.68)	P=0.06

before or during pregnancy and decreased risk of Gestational Diabetes Melitus (GDM) and PIH.[14] Kazemi *et al*. concluded that rather than type of physical activity and its intensity, the more specified time of the exercise is associated with a lower probability of PIH.[15] Although reduced physical activity throughout the day for a pregnant woman diagnosed with preeclampsia is believed to be of benefit, this hypothesis has not yet been proven and there is still an uncertainty about the association between employment, high physical activity and adverse pregnancy outcomes.[9,10]

It is believed that maternal age, BMI, diet, physical activity, ethnicity and genetic factors contribute to developing high blood pressure[16]; in our study the prevalence of previous hypertension was higher in the case group women and additionally a straight relation between BMI>30 and pregnancy induced hypertension was noted which was in line with the results of Koobashi *et al*. who studied the genetic and environmental factors associated with development of hypertension in pregnant women and conclude that BMI >24, familial history of HTN, genetic factors during pregnancy and stressors and salty diet in preconception period will increase the chance of PIH.[8] Recent studies have discovered a relation between die and commencement or progression of hypertension. Deficiency or fluctuations in Ca and Mg metabolism was suggested to cause PIH[17] whereas Oken *et al*. did not confirm taking adequate calcium, foliate, Mg or antioxidants decrease the chance of PIH[12] which was in conflict with the findings of Rashid Porayi *et al*.[18] Maleki *et al*. in their study investigated serum levels of selenium in hypertensive and non-hypertensive pregnant women; the amount was lower in women diagnosed with PIH.[19] There were not remarkable differences in nutritional practices of women in two studied groups in our study; this may be due to the same nutritional advice and education by health providers and physicians during pregnancy and the same assessment of preconception diet.

Conclusion

Improving maternal health as the cornerstone of family will effect family and society

health; what we found clears that health during pregnancy is relevant to healthy life style especially preconceptional period; therefore, employing proper strategies to improve women knowledge and attitude towards important aspects of healthy life considering good and healthy diet and active life seems a logical solution; this, however, requires unity of all health workers to set proper educational programs and courses and also support of health policy makers.

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