Original Article

Association of Vitamin E in Pregnancy Induced Hypertension

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ABSTRACT

Objective: To observe the association of vitamin E with pregnancy induced hypertension.

Study Design: Cross sectional study

Place and Duration of Study: This study was conducted at the Department of Gynaecology, Shalamar Hospital, Lahore from July 2016 to December 2016.

Methodology: Study was started after ethical approval from institution ethical board and completed within duration of July 2016 to December 2016. SPSS version 23 was used to analyze data. After calculations of frequencies for categorical variables like stratified age, BMI and mean for numerical variables like BMI, vitamin E level. Linear regression was applied to see the association between PIH and vitamin E level. P value ≤0.05 was considered as significant.

Results: A total number of 100% (n=323) women were included in this study. The mean age, BMI, parity, gravidity and vitamin E level of the women was 28.64±5.67 years, 28.28±2.81 BMI, 3.03±1.21, 3.71±1.70 and 7.37±2.96(µg/mL)respectively. To check of association of vitamin E level with pregnancy induced hypertension, linear regression was applied and it was observed that BMI and pregnancy with PIH were associated with Vitamin E level with p-values 0.040 and 0.000 respectively.

Conclusion: The observations of our study concluded that vitamin E level has significant association with pregnancy induced hypertension in each trimester of pregnancy.

Key Words: PIH, Vitamin E, Trimester, Blood pressure

INTRODUCTION

Pregnancy is basically the process of development of an embryo or fetus in the uterus of a woman as a result of fertilization[1]. The duration of pregnancy is 40 wks starting from last normal menstrual period (LNMP). Beginning with the ovulation and passing through the processes of fertilization, implantation and embryogenesis, female body undergoes many changes in preparation for conception. Prenatal development of fetus is in three periods of pregnancy which are termed as trimesters, each having duration of three months. First trimester begins from the conception and ends at 12th wk of pregnancy, second trimester is between 13 and 27 wks of pregnancy and third trimester is between 28 and 40 wks of pregnancy[3].

In normal pregnancies, there is initial decrease in the blood pressure until 18 to 20 wks of gestation. If there is a high blood pressure either before pregnancy, or during the first trimester of pregnancy, there is increased risk of developing Pregnancy induced hyper-

tension (PIH) or pre-eclampsia[4,5]. One of the most common disorders of human pregnancy is gestational hypertension. It is defined as having blood pressure higher than 140/90 mmHg measured on two separate occasions, and there should be a gap of more than 6 hrs between two readings, provided there is no Proteinuria, and it is diagnosed after 20 wks of gestation[6,7].

Normally a low concentration of oxidative agents is required for body[8]. Very few studies were conducted on association of vitamin E with PIH and few of them failed to prove their correlation. Vitamin E and other oxidative agents play their role in various processes such as normal cellular growth, gene expression, protection against infections and as second messengers in mediating various biochemical processes within the cell[9]. In addition various low molecular weight substances, such as vitamin E have major role in reduction of PIH.[10]

Very few studies have been conducted on this topic; we designed this study to observe association of vitamin E in pregnancy induced hypertension. We used large sample size for this study instead of sample size used in previous studies. Our study is a reference for further research work on this topic.

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MATERIALS AND METHODS

This cross sectional study was conducted in the department of Gynaecology Shalamar Hospital, Lahore. Study was started after ethical approval from institution

ethical board and completed within duration of July 2016 to December 2016. After complete briefing about study, informed consent was taken from patients and data of 323 (100%) patients was included in the study. Sample size was calculated from online source openepi.com with following figures: CI 95%, Power of test 80% and percentage of previous study (RR 1.75, 1.11-2.75, P = 0.02). . Women of already on antihypertensive, protienurea, having medical disorders like diabetes, hypothyroidism, and already taking vitamin E were excluded from the study.

After patient's selection,patient's vitamin E level was sent to laboratory at 12th week for baseline vitamin E level and at 24th and 36th weeks to observe association of vitamin E in each trimester. Follow ups were conducted after 12 weeks (12, 24 and 36 weeks). On every visit patient's blood pressure was noted and urine for analysis sent to laboratory with all septic measures for protienurea. At any occurrence of pregnancy induced hypertension patients urine analysis, lipid profile and uric acid was investigated to label the severity of disease. All information was recorded on a predesigned Performa.

Data was entered in a computer software SPSS version 23 and analyzed. Frequency (percentages) were calculated and presented for qualitative variables like stratified age and BMI, similarly mean ± SD values were calculated for quantitative variables like age, BMI, vitamin E level. Linear regression was applied to see the association between vitamin E level and pregnancy induced hypertension in each trimester. P value of (P)= 0.05 was considered as significant.

RESULTS

A total number of 100% (n=323) women were included in this study. The mean age, BMI, parity, gravidity and vitamin E level of the women was 28.64±5.67 years, 28.28±2.81 BMI, 3.03±1.21, 3.71±1.70 and 7.37±2.96(µg/mL)respectively (table 1).

The main outcome variable of this study was vitamin E level in pregnant women. It was observed that the mean vitamin E level in 1st trimester in normal pregnancy was 9.18±2.86(µg/mL)and pregnancy with PIH was 6.37±2.17(µg/mL). In 2nd trimester it was noted that in normal pregnancy the mean vitamin E level was 9.09±2.76(µg/mL)and in PIH pregnancy was 5.54±1.98(µg/mL). The mean level of vitamin E in 3rd trimester was 8.86±2.68(µg/mL) in normal pregnancy while in PIH pregnancy it was 5.12±1.85(µg/mL) (table 3).

When women were stratified into different age and BMI groups, it was noted that majority of women i.e. 38.7% (n=125) were aged from 26 to 32 years while 32.8% (n=106) were aged from 17 to 25 years and only 28.5% (n=92) were aged from 33-38 years. It was also noted that majority of the women i.e. 68.4% (n=221)

were BMI from 23 to 29 and only 31.6% (n=102) were BMI from 30 to 38 (Table 1).

To check of association of vitamin E level with pregnancy induced hypertension, linear regression was applied. It was observed that BMI and pregnancy with PIH were associated with Vitamin E level with p-values 0.040 and 0.000 respectively (Table 2).

Table No. 1: Demographic Variables: (n=323)

Descriptive Statistics		
	Mean	**S.D**
Age (years)	28.64	5.67
BMI	28.28	2.81
Parity	3.03	1.21
Gravidity	3.71	1.70
Vitamin E Level	7.37	2.96
Characteristics	Frequency	Percentage (%)
Stratified Age		
17-25 years	106	32.8
26-32 years	125	38.7
33-38 years	92	28.5
Total	323	100.0
Stratified BMI		
23-29 BMI	221	68.4
30-38 BMI	102	31.6
Total	323	100.0

Table No.2: Regression Analysis

Coefficients				
Term	**Coef**	**SE Coef**	**T-Value**	**P-Value**
Constant	12.93	2.14	6.04	0.000
Age	-0.0026	0.0333	-0.08	0.938
BMI	-0.1511	0.0732	-2.06	0.040
Parity	0.172	0.134	1.29	0.199
Gravidity	0.0169	0.0819	0.21	0.837
Trimesters				
2nd Trimesters	-0.401	0.443	-0.91	0.366
3rd Trimesters	-0.152	0.552	-0.27	0.784
Pregnancy Type				
Pregnancy with PIH	-3.226	0.282	-11.46	0.000

Table No.3: Mean Levels of Vitamin E (µg/mL) in Pregnancy Induced Hypertension (n=323)

Trimesters	Pregnancy Type	Mean±S.D
1st Trimesters	Normal Pregnancy	9.18±2.86
	Pregnancy with PIH	6.37±2.17
2nd Trimesters	Normal Pregnancy	9.09±2.76
	Pregnancy with PIH	5.54±1.98
3rd Trimesters	Normal Pregnancy	8.86±2.68
	Pregnancy with PIH	5.12±1.85

DISCUSSION

Pregnancy induced hypertension is a serious condition during pregnancy if occurs at any stage of pregnancy. Carrying pregnancy with hypertension is a challenge for female specially for primigravida[11,12]. Among lots of causes deficiency of vitamin E (α-tochoferol) is also cause of pregnancy induced hypertension. Its role in PIH have been described in very few books and investigated by very few persons. In this present study we have seen that vitamin E is strongly associated with PIH.

In a study Sushil K et al[13] compared normotensive and hypertensive groups by investigating their vitamin E level at the time of delivery and concluded that vitamin E is highly associated with pregnancy induced hypertension. He draw blood sample of patients from both groups and sent to laboratory for vitamin E level and noted that hypertensive group have low vitamin E values than normotensive females (22 ± 1 vs 27 ± 1 nmole/ml, $p<0.03$).

In 2005 Rumbold AR et al[14] conducted a study on correlation of vitaminC and E with hypertension disorders in pregnancy. In his study he concluded that vitamin E is highly associated with hypertensive problems during pregnancy. This association was significant as ($p=0.02$). Results of this study were comparable with our results. A limited number of studies available in which association of vitamin E was evaluated otherwise most of studies conducted on combined correlation of vitamin C and E with pregnancy induced hypertension.

At the same time Basaran A et al[15] reported in a study that combined use of vitamin C and E increase the risk of pre-eclampsia and pregnancy induced hypertensive issues. In this study vitCE group was compared with placebo group. Hypertensive disorder was found in 9.7% cases in vitCE group and 9.5% in placebo group.

Another study conducted by Zulfa et al[16] on effect of palm oil vitamin E on PIH and reported that use of palm oil vitamin E reduce the risk of PIH and preeclampsia in all three trimesters. According to his results in vitamin E group PIH was found in 2.6% patients and in placebo group it was found in 7.4% patients. Similarly in pre-eclampsia patients it was 0.7% and 3.4% in vitamin E and placebo groups respectively.

Sahu S et al[17] conducted a study on effect of peroxidation and vitamin E level in pregnancy induced hypertension and found that there was a markable low level of vitamin E in patients who were not using vitamin E than those were using vitamin E supplement in patients of pregnancy induced hypertension. We can compare our results with our results, conclusion of this study was close enough to our conclusion. All studies given above were in favour of our results axcept one. In many trials it was reported that there was no benefit of vitamin C and E use during pregnancy to reduce PIH. Result of his study wasRR, 0.94; 95% confidence interval; 0.82-1.07. This study was against our findings[18,19].

In another study the role of vitamin C and E was accepted for prevention of PIH and pre-eclampsia. Combination of these two vitamins acts in synergy to prevent PIH by preventing lipid peroxidation. Vitamin E also act as anti inflammatory, this property of α-tochoferol also specified the role this vitamin in activation of NAD(P)H oxidase[20].

CONCLUSION

Observation of our study concluded that vitamin E level has significant association with pregnancy induced hypertension in each trimester of pregnancy.

Author's Contribution:
Concept & Design of Study: Uzma Jamil
Drafting: Uzma Jamil
Data Analysis: Uzma Jamil, Muhmmad Kamran Ali
Revisiting Critically: Muhmmad Kamran Ali
Final Approval of version: Usma Jamil

Conflict of Interest: The study has no conflict of interest to declare by any author.

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