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Nutritional profile of patients with Gestational Hypertension

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Abstract

Gestational hypertension (GH), formerly known as pregnancy-induced hypertension or PIH, is the onset of hypertension after 20 weeks of gestation. There are few studies related to GH in South India, regarding their nutritional profile, prevalence, risk factors etc .The present study encompasses the various facets of the disorder including nutrient intake of patients with GH. The parental history and nutritional profile of subjects were mapped .Majority (86%) of subjects had a parental history of hypertension and sizeable number of subjects had parental history of diabetes. Among the subjects, majority belonged to either normal (44.4%) or overweight (42%) category and majority had insufficient or excessive weight gain during the pregnancy period. Nutrient consumption level was found to be significantly lower than RDA. Pre-pregnancy BMI and inappropriate weight gain were found to be major factors associated with GH, along with inappropriate nutrient intake and prevalence of a family history of hypertension, diabetes and co-morbidities.

Keywords: *Gestational Hypertension, Nutritional status, Dietary intake*

Introduction

Gestational hypertension or pregnancy-induced hypertension (PIH) is the development of new hypertension in a pregnant woman after 20 weeks gestation without the presence of protein in the urine or other signs of preeclampsia. Pregnancy-induced hypertension (PIH) affects approximately 10% pregnant women. Though PIH is seen in 10% of total pregnancies, the etiology of the pre eclamsia is not exactly clear and often PIH is proposed secondary to malnutrition.

Hypertension is defined as having a blood pressure greater than 140/90 mm Hg, when blood pressure readings are documented at least four hours apart. Gestational hypertension is severe when systolic blood pressure is >160 mmHg and/or diastolic blood pressure is >110mmHg on two consecutive blood pressure measurements at least four hours apart. Hypertensive disorders during pregnancy are classified into 4 categories, as recommended by the National High Blood Pressure Education Program Working Group on High Blood Pressure in Pregnancy: 1) chronic hypertension, 2) preeclampsia 3) preeclampsia superimposed on chronic hypertension, and 4) gestational hypertension (transient hypertension of pregnancy or chronic hypertension identified in the latter half of pregnancy).

Methodology

The survey was conducted at 'LISIE HOSPITAL' a tertiary care multispeciality hospital located in Ernakulam district, Kerala. The study was conducted on all pregnant women who visited the Gynecology department of the selected hospital during a period of 3 months. A total of 36 pregnant women between age 18-34 years, who were diagnosed with gestational hypertension during this period. Patients identified were from various socio-economic strata with various grades of hypertension .The tool used for further collection of data was an interview schedule.The interview schedule was formulated to collect the data pertaining to the following areas:Age, gender, educational qualification, occupation of the family,patient's medical background,dietary pattern,life-style pattern,information pretaining to nutrition knowledge.

The height and weight was measured and BMI was calculated .Blood pressure was also measured using sphygmomanometer.The dietary assessment was done by 24 hour diet recall method and food frequency questionnaire. The 24 hour diet recall method is an informal, qualitative method of asking the patient to recall all of the foods and beverages that were consumed in the last 24 hours, including the quantities and methods of preparation were done and Food Frequency Questionnaire (FFQ) uses a limited checklist of foods and beverages with a frequency response section for subjects to report how often each item was consumed over a specified period of time was used. The intake of foods were classified as high, moderate or low as per the frequency of inclusion in diet.

The collected data was tabulated and results were interpreted. SPSS version 20.0 was used to consolidate and apply statistical tests.

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Table1: Comparison of Pre-pregnancy BMI by pregnancy weight gain

Pre pregnancy BMI	n=36	Pregnancy weight gain			Likelihood ratio
		Ideal (%)	Insufficient (%)	Excessive (%)	
Underweight(<18.5)	3	1(33.5)	2(66.5)	0	0.038
Normal(18.5-24.9)	16	10(62.5)	4(25)	2(12.5)	
Overweight(25.0-29.9)	15	7(46.7)	2(13.3)	6(40)	
Obese(>30)	2	0	0	2(100)	
Total	36	18	8	10	

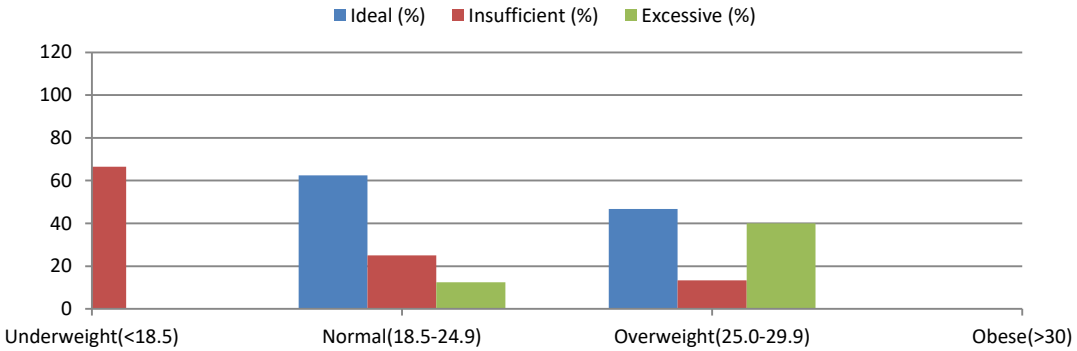

Figure 3: Pregnancy weight gain pattern

Results and discussion

The present study was done on 372 pregnant women out of which 36 subjects were clinically diagnosed with gestational hypertension .Thus it can be understood that prevalence rates for gestational hypertension is almost ten percent.

Majority of underweight subjects had insufficient (66.4%) weight gain. Even 25% of those who had normal BMI had insufficient and 12.5% had excessive weight gain. This reinstates the fact that the GH subjects had inappropriate weight gain pattern and this helps in understanding risk behind pregnancy weight gain and pregnancy induced hypertension.The likelihood ratio showed that there was a significant relationship between Pre-pregnancy BMI and Pregnancy weight gain.

Dantas.*et al*., (2005) confirmed the importance of ideal weight gain during pregnancy. He reported that pre-pregnant BMI and weight gain during pregnancy can be important factor influencing the occurrence of PIH and the neonates' birth weight. A weight gain during pregnancy over 18 kg gave rise to higher risk of PIH in normal and underweight mothers, but in overweight group, PIH occurred at a significantly higher rate when a weight gain of more than 9 kg was recorded.

According to the Nan *et al*., (2013), maternal pre-pregnancy obesity and excessive Gestational weight gain were associated with greater risks of pregnancy-induced hypertension, caesarean delivery, and greater infant size at birth. This study is supported by reports by Heude *et al*., (2012) that higher net gestational weight gain was significantly associated with an increased risk of LGA only after accounting for blood pressure and glucose disorder. Table 2 indicates that Energy, carbohydrate, protein, fat, calcium, iron, carotene, thiamine, riboflavin, niacin, folate, Vitamin C intake level were significantly varying negatively from RDA.

There are other studies which help in confirming these results. According to the Kazemian *et al*., 2014, pre-pregnancy obesity, excessive gestational weight gain, and increased intake of energy were potential risk factors of developing gestational hypertension. Also, according to Schoenaker *et al*., (2014) higher total energy and lower magnesium and calcium intake measured during pregnancy were identified as related to Hypertension disease of pregnancy. Unadjusted intakes of magnesium and calcium were lower for the hypertension disease of pregnancy cases, compared with pregnant women without Hypertension .

According to Kazemian *et al*., (2013) higher intakes of energy, mono-unsaturated fatty acids and poly-unsaturated fatty acids as well as lower intakes of vitamin C, potassium and magnesium were positively correlated with the risk of developing gestational hypertension.

As there are many studies which support the importance of calcium supplements for the management of gestational hypertension, frequency of consumption of calcium rich food was assessed. 50 percent of subjects had medium intake of calcium and 25 percent had high or low intake of calcium. Calcium rich foods selected were milk, yoghurt, cheese, soyabean, and green leafy vegetables.

Table 2: Nutrient intake of the subjects (N=36)

S.No	Nutrients	RDA	Mean±Standard deviation	Percentage Deficit
1	Energy (K cal)	2250	1523±195	32.3
2	Protein (g)	78	49±9.6	37.1
3	Fat (g)	30	29±11	3.3
4	Fibre (g)	50	4±1.05	92
5	Calcium(mg)	1200	540±149.7	55
6	Iron(g)	35	9±2.1	77.1
7	Carotene(mcg)	6400	923±1826.7	85.6
8	Thiamin( )	1.2	0.8±0.21	33.3
9	Riboflavin( )	1.4	0.68±039	51
10	Niacin( )	14	10.9±1.7	22.1
11	Folate( )	500	106.2±64.9	78.7
12	Vit C(mg)	60	27.3±90.1	54.5

*ICMR (2010)

According to Ritchie *et al*., (2000) there is a large body of evidence that calcium plays a role in the etiology, prevention, and treatment of pregnancy-induced hypertension. Pregnant teens, populations with inadequate calcium intake, and women at risk of developing PIH, may benefit from consuming additional dietary calcium.

Table 3: Frequency of consumption of Calcium rich food

Calcium rich food		
Classification	N=36	Percentage
High(10-15)	9	25
Medium(7-9)	18	50
Low(<6)	9	25
Total	**36**	**100**

* Maximum score-15

In a similar effort, Symonds *et al*., (1995) in a placebo control trial found the incidence of PIH in Ca-group was 2.2%, compared to 8.8% of Non-Ca group. The decrease in blood pressure after taking calcium during the first half of the pregnancy was much greater in Ca-group than in the normotensive group.

According to Imdad *et al*., (2012),epidemiological and clinical studies have shown that an inverse relationship exists between calcium intake and development of hypertension in pregnancy.

Table 4: Frequency of consumption of Vitamin C rich food

Vitamin C rich food		
Classification	N=36	Percentage
High(45-66)	0	0
Medium (30-44)	2	6
Low(20-29)	33	92
Poor(<19)	1	3
Total	**36**	**100**

*Maximum score – 66

Majority of the subjects (92%) had low intake of Vitamin C rich food. The selected Vitamin C rich foods were cabbage, bell pepper, cauliflower, onion, potato, spinach, sweet potato, tomato, carrot, cucumber, green peas, gooseberry, apple, grapefruit, guavas, lemon and lime, watermelon, orange, papaya, pineapple, banana, and mango.

According to the Klemmensen *et al*., (2009)low dietary intake of Vitamin C was associated with a trend towards an increased incidence of severe pre-eclampsia, eclampsia or HELLP syndrome (Hemolysis, elevated liver enzymes, low platelet count) . A small increase in the incidence of severe disease was also seen in the group of women with a high intake of vitamin E from supplements and dietary sources. Supportive to the above study Zhang *et al*., (2002) and Kiondo *et al*., (2011) women with low plasma vitamin C were at an increased risk of pre-eclampsia and efforts to increase intake of fruits and vegetables rich in vitamin C and other antioxidants may reduce the risk of preeclampsia.

Beazley *et al*.,(2005) suggest that the potential benefit of Vitamin C and E supplementation to prevent preeclampsia in women with clinical risk factors is smaller than estimated.

Table 5: Frequency of consumption of Vitamin E rich food

Vitamin E rich food		
Classification	N=36	Percentage
High(25-33)	0	0
Medium (19-24)	2	6
Low(12-18)	26	72
Poor (<11)	8	22
Total	**36**	**100**

*Maximum score -33

Majority of the subjects (94%) had low and poor intake of the Vitamin E rich food. The selected vitamin E rich food are tomatoes, spinach, pumpkin, green beans, almonds, papaya, raw mango, wheat, butter, butter, shrimps. There are many studies which suggest that intake of Vitamin does help in preventing the risk of pregnancy induced hypertension.

According to Poston *et al*., (2008) and Rao *et al*., (2005) suggest that multiple other actions of alpha-tocopherol besides its antioxidant properties could be

advantageous in the prevention of the pregnancy induced hypertension and oxidative stress in the disease and cite the biochemical rationale for clinical trials of antioxidants to prevent and treat pregnancy induced hypertension.

According to Basaran *et al*., (2010) combined Vitamin C and E supplementation does not decrease the risk of preeclampsia and should not be offered to gravidas for the prevention of preeclampsia or other pregnancy induced hypertensive disorders. Furthermore, combined supplementation with Vitamin C and E increased the risk of GH but decreased the risk of placental abruption.

Conclusion

Prevalence rate of GH was found to be 10 percent. Subjects had inappropriate weight gain pattern and the relation was statistically associated with pre-pregnancy BMI. Thus Pre-pregnancy BMI and inappropriate weight gain were found to be major risk factors associated gestational hypertension. Regarding nutritional intake of the subjects, intake of all nutrients were deficient when compared to RDA. The subjects had unsatisfactory consumption of foods rich in nutrients like calcium, vitamin, folate, magnesium, omega6-fatty acid omega-3-fatty acid,vitamin C, vitamin E.

The other risk factors like family history and medical history were also assessed and it was found that a majority of GH patients had a family history of hypertension, diabetes and also co-morbidities.

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