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Dietary factors and their association with hypertensive disorders of pregnancy in rural area of Kashmir valley: A cross-sectional study

Reyana Qulsum[1], Rohul Jabeen Shah[2], Uroosa Farooq Allaqband[1*], Rauf-ur Rashid Kaul[2]

[1] Senior Resident, Department of Community Medicine, Sher-i- Kashmir Institute of Medical Sciences, Soura, Srinagar, Jammu and Kashmir, India

[2] Professor, Department of Community Medicine, Sher-i- Kashmir Institute of Medical Sciences, Soura, Srinagar, Jammu and Kashmir, India

Abstract

Background: Hypertensive disorders of pregnancy are among the major complications of pregnancy and are important causes of maternal and peri-natal morbidity and mortality. Evidences have indicated that higher energy intake during pregnancy are the modifiable risk factors of developing hypertension in pregnancy.

Aim and Objective: To identify the dietary factors and its association with hypertensive disorders of pregnancy.

Material and Methods: The cross sectional study was conducted in a rural area of Kashmir Valley. The data so collected was compiled and subjected to analysis using SPSS version 20.00.

Results: The mean daily intake of calories (kcal) in women with hypertension was found to be significantly higher (2203±375) as compared to normotensive women (1995.80±505.296).

Conclusion: Unbalanced diet may be the possible associated factor for hypertension in pregnancy.

Keywords: pregnancy, hypertension, diet

Introduction

Hypertensive disorders of pregnancy are among the major complications of pregnancy and are important causes of maternal and perinatal morbidity and mortality [1].Several studies have analyzed the risk factors for hypertensive disorders in pregnancy and the identified risk factors include obesity, a family history of hypertension, alcohol intake, heart failure, stroke and left ventricular hypertrophy and smoking [2]. Although there is little data regarding dietary intake and HDP, few evidences have indicated that higher energy intake during pregnancy to be the modifiable risk factors of developing gestational hypertension [3].

Material and Methods

This is a cross-sectional study conducted at the sub-center level in a rural area of Kashmir Valley. All pregnant women registered with the selected sub-centers and who consented for the study were included. 24-hour dietary recall method was used for calculating total dietary intake. Self-designed food frequency questionnaire was used for assessing frequency of consumption of different foods. The study was carried out for a period of one year. The data so collected was compiled and analysed using SPSS version 20.00.

Ethical Clearance

Approval was obtained from the Institutional Ethical Committee, SKIMS.

Results

Table 1: Dietary Intake of the study population

Dietary intake	Mean ± SD	RDA
Total calorie intake (Kcal/d)	2011.21±499.357	2250-3200
Proteins(g/d)	59.31±16.319	78
Fats(g/d)	28.81±7.979	30
Iron(mg/d)	16.36±6.062	35
Calcium(mg/d)	684.61±217.226	1200

Table 1 shows the dietary assessment of the studied population using 24-hr dietary recall method. The mean calorie intake was 2011.21±499.357 as against RDA of 2250-3200. The mean protein, fat, iron and calcium intake was 59.31±16.319 gm, 28.81±7.979 gm, 16.36±6.062 mg and 684.61±217.226 mg against RDA of 78 gm, 30 gm, 35 mg and 1200 mg, respectively.

Table 2: Dietary Habits of the study population

Frequency	Meat/poultry N (%)	Fish N (%)	Pulses N (%)	Milk/eggs N (%)	Vegetables N (%)	Fruits N (%)	Nuts N (%)
Daily	7(2.00)	0	135(38.57)	171(48.86)	333(95.14)	224(64.00)	2(0.57)
Biweekly	20(5.71)	0	67(19.14)	39(11.14)	10(2.86)	29(8.29)	5(1.43)

Weekly	72(20.57)	0	64(18.29)	106(30.29)	7(2.00)	45(12.86)	7(2.00)
Fortnightly	126(36.00)	3(0.86)	35(10.00)	9(2.57)	0	18(5.14)	15(4.28)
Monthly	116(33.15)	55(15.71)	46(13.14)	17(4.86)	0	24(6.86)	38(10.86)
Rarely	9(2.57)	292(83.43)	3(0.86)	8(2.28)	0	10(2.85)	283(80.86)

Consumption of meat/poultry as fortnightly, monthly, weekly, biweekly, rarely and daily was 36%, 33.15%, 20.57%, 5.71%, 2.57% and 2% respectively. Majority of the women were consuming fish rarely (83.43%), 15.71% consuming monthly and only 0.86% consuming fortnightly. Almost 95.14% were consuming green leafy vegetables daily, 2.86% biweekly and 2% weekly. 47.43% were consuming pulses monthly followed by 38.57 % weekly and 14.00% daily. 48.86% used to take the milk/eggs daily, 30.29% weekly, 11.14% biweekly, 4.86% monthly, 2.57% fortnightly and 2.28% rarely. Most of the women used to take fruits daily (64%) followed by 12.86% weekly,8.29% biweekly,6.86% monthly,5.14% fortnightly and 2.85% rarely. 80.86% of the women used to consume nuts rarely,10.86% monthly, 4.28% fortnightly, 2% weekly,1.43% biweekly and only 0.57% daily Table 2.

Table 3: Association of hypertension to Dietary Intake

	Hypertensive	**Normotensive**	**p-value**
Daily Calorie Intake (Kcal) Mean ± SD	2203.27 ± 375.232	1995.80 ± 505.296	0.041
Daily Protein Intake(g) Mean ± SD	61.35 ± 16.935	59.15 ± 16.284	0.510
Daily Fat Intake(g) Mean ± SD	30.77 ± 9.799	28.66 ± 7.811	0.195
Daily Iron Intake (mg) Mean ± SD	15.91 ± 6.745	16.39 ± 6.014	0.698
Daily Calcium Intake (mg) Mean ± SD	701.54 ± 219.966	683.25 ± 217.292	0.680

Table 3 shows the mean daily intake of calories (Kcal) in women with hypertension was found to be significantly higher (2203±375) as compared to normotensive women (1995.80±505.296). However, no statistical significance was seen between hypertension in pregnancy with mean daily intake of proteins, fats, iron and calcium.

Table 4: Association of Hypertension to Dietary Habits

	Hypertensive N=26(%)	**Normotensive N=324(%)**	**Total N=350(%)**	**p-value**	**OR (95% CI)**
Frequency of Meat/Poultry Intake					
Daily/Biweekly	0(0.0%)	27(100.0%)	27(100.0%)	0.234	1.21(0.52-2.8)
Weekly/Fortnightly	17(8.6%)	181(91.4%)	198(100.0%)	0.362	
Monthly/Rarely	9(7.2%)	116(92.8%)	125(100.0%)	0.655	
Frequency of Fish Intake					
Fortnightly	0(0.0%)	3(100.0%)	3(100.0%)	1.00	2.59(1.06-6.29)
Monthly	8(14.5%)	47(85.5%)	55(100.0%)	1.00	
Rarely	18(6.2%)	274(93.8%)	292(100.0%)	0.030	
Frequency of Milk/Eggs intake					
Daily/Biweekly	18(8.6%)	192(91.4%)	210(100.0%)	0.056	2.67(0.89-7.95)
Weekly/Fortnightly	3(2.6%)	112(97.4%)	115(100.0%)	0.069	3.5(1.01-12.15)
Monthly/Rarely	5(20.0%)	20(80.0%)	25(100.0%)	0.004	9.33(2.06-42.18)
Frequency of pulses intake					
Daily/Biweekly	21(10.4%)	181(89.6%)	202(100.0%)	0.075	5.57(0.73-42.45)
Weekly/Fortnightly	4(4.0%)	95(96.0%)	99(100.0%)	0.087	2.76(0.92-8.26)
Monthly/Rarely	1(2.0%)	489(8.0%)	49(100.0%)	1.00	2.02(0.22-18.58)
Frequency of green vegetables intake					
Daily	26(7.8%)	307(92.2%)	333(100.0%)	0.625	0
Weekly/Biweekly	0(0.0%)	17(100.0%)	17(100.0%)		
Frequency of fruits intake					
Daily/Biweekly	21(8.3%)	232(91.7%)	253(100.0%)	0.010	1.90(0.67-5.44)
Weekly/Fortnightly	0(0.0%)	63(100.0%)	63(100.0%)	0.221	
Monthly/Rarely	5(14.7%)	29(85.3%)	34(100.0%)	0.004	
Frequency of nuts intake					
Daily	2(28.6%)	5(71.4%)	7(100.0%)	0.051	4.95(0.91-26.87)
Weekly/Fortnightly	0(0.0%)	22(100.0%)	22(100.0%)	0.099	
Monthly/Rarely	24(7.5%)	297(92.5%)	321(100.0%)	0.384	

Table 4 depicts that hypertension was higher in women who were taking meat/poultry on weekly/fortnightly basis (8.6%) as compared to those who were taking monthly/rarely (7.2%)[OR=1.21(0.52-2.8)] but statistically insignificant

difference was seen (P=0.655). Hypertension in pregnancy was found to be significantly higher in women taking fish monthly (14.5%) as compared to those consuming rarely (6.2%)[OR=2.59(1.06-6.29), P=0.030). It was found that women who used to take milk/eggs monthly/rarely had significantly higher prevalence of hypertension (20%) as compared to those taking weekly/fortnightly (2.6%)[OR=9.33(2.06-42.18), P=0.004]. Association of hypertension to intake of pulses was not statistically significant, but odds ratio of hypertension was higher in those taking daily/biweekly (10.4%) as compared to those taking monthly/rarely (2%) [OR=5.57(0.73-42.45), P=0.075] and weekly/fortnightly (4%) [OR=2.76(0.92-8.26), P=0.087]. The prevalence of hypertension was significantly higher in those taking fruits monthly/rarely (14.7%) as compared to those taking daily/biweekly (8.3%) [OR=1.90(0.67-5.44), P=0.004). The odds ratio of hypertension was higher in women taking nuts daily (28.6%) as compared to women taking monthly/rarely (7.5%)), however there was no statistically significant relationship[OR=4.95(0.91-26.87), P=0.051].

Discussion

Our study revealed that mean daily energy intake (Kcal) was significantly higher in hypertensives (2203.27± 375.232) than normotensive women (1995.80± 505.296) [P=0.041]. These findings are in accordance with the findings of Kazemian E *et al* (2014) [3] who reported that mean energy intake was significantly higher in hypertensives (2,794.1±537.8) than normotensives (2,430.8±556.4) [P=<0.001]. Clausen *et al* (2001) [4] also reported odds of preeclampsia to be more in women with energy intake of >3350 kcal/d compared to women with ≤2000 kcal/d. However few studies have shown no relation between energy intake and the risk of hypertensive disorders of pregnancy[5-7]. Hypertension was found to be significantly higher in women taking fish monthly (P=0.030), milk/eggs monthly/rarely (P=0.004) and fruits monthly/rarely (P=0.004) as compared to women taking fish rarely, milk/eggs weekly/fortnightly and fruits daily/bi-weekly. The odds of hypertension were higher in those taking meat/poultry weekly/fortnightly [OR=1.21(0.52-2.8)], pulses daily/biweekly [OR=5.57(0.73-42.45)] and nuts daily [OR=4.95(0.91-26.87)] as compared to women taking meat/poultry, pulses and nuts monthly/rarely, respectively. However, there was no significant association with intake of green leafy vegetables. Ikem E *et al* (2019) [11] in their study in Denmark found that the Seafood diet characterized by high consumption of fish and vegetables was inversely associated with the odds of developing hypertension in pregnancy. Oken E *et al* (2007) [5] found lower risk of pre-eclampsia associated with higher intake of fish (OR 0.91, 95% CI 0.75–1.09 per serving/day). Agarwal S *et al* [12] in a national cross sectional study found that those consuming fruits weekly/occasionally, eggs daily, fish weekly had higher pre-eclampsia prevalence than those who never consumed them while those who consumed milk daily, green leafy vegetables daily or weekly, pulses or beans at least weekly, eggs weekly, or occasionally consumed fish or chicken/meat had reduced pre-eclampsia prevalence. In the MoBa study conducted by Brantsæter AL *et al* (2009) [13], inverse associations were found with development of pre-eclampsia in women with high scores on a dietary pattern characterized by vegetables, plant foods, and vegetable oils. Higher odds of developing preeclampsia were found in women with a dietary pattern characterized by processed meat, salty snacks, and sweet drinks.

Conclusion

Higher energy intake, low protein diet and decreased intake of fruits may be the associated risk factors for hypertension in pregnancy.

Recommendation

Diet containing adequate amount of calories, good amount of fruits, milk and eggs are important for a normal uncomplicated pregnancy.

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