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**Ragini Sen**  
Dept. of Food Science and  
Nutrition, College of Home  
Science, MPUAT, Udaipur,  
Rajasthan, India

**Dr. Renu Mogra**  
Dept. of Food Science and  
Nutrition, College of Home  
Science, MPUAT, Udaipur,  
Rajasthan, India

## Assessment of nutritional status of urban hypertensive women residing in Udaipur city

**Ragini Sen and Dr. Renu Mogra**

### Abstract

There are many diseases that affect women's health among which hypertension is one of the silent killer diseases. It often has no warning signs. Hypertension is becoming an important public health problem worldwide. Awareness of nutrition may help in controlling the disease and its progression. In this context the study was conducted with the objective to assess the nutritional status of hypertensive women in Udaipur city of Rajasthan. A sample size of ninety hypertensive women (30-60 year) having systolic and diastolic blood pressure more than 120/80 mmHg and willing to participate in the study was selected. Maharana Bhupal Government Hospital and Geetanjali Medical College and Hospital of Udaipur were selected to obtain the samples. Nutritional status was assessed by the help of self-structured questionnaire. Dietary intake of the respondents was collected using 24 hour recall method. Anthropometric measurements like height and weight provide important clues about health and nutritional well-being. The mean height of mild respondents was 154.43±8.80 cm, moderate was 156.93±6.71 cm and severe respondent's height was 154.36±9.40 cm. The mean weight of mild respondent's was 65.63±6.38 kg, moderate was 67.46±7.45 kg and severe respondents weight was 77.3±8.37 kg. 20 percent mild respondents 26.66 percent moderate respondents were lying in category of normal weight. In the present study 16.66 percent of mild respondents, 26.66 percent of moderate respondent and 50 percent were lying in obese class I. Further 'Z' values were calculated between the nutrient intake and RDA which revealed that the value of fat and sodium consumption was comparatively higher than RDA, whereas consumption of other nutrients were lower than RDA in all hypertensive respondents.

**Keywords:** Anthropometric measurement, nutrient intake, food intake

### 1. Introduction

Health is an important factor that contributes to human well-being. Hypertension is becoming an important public health problem worldwide. Normal blood pressure at rest is within the range of 100-140 millimeters mercury (mmHg) a systolic reading of 180 mmHg or higher or a diastolic reading of 110 mmHg or higher could be a sign of a hypertensive crisis that warrants immediate medical attention. Blood pressure does vary through the day, lowering during sleep and rising on awakening. It also rises in response to excitement, anxiety and physical activity (Bethesda, 2015) [4]. The symptoms of hypertension include severe headache, fatigue or confusion, vision problems, chest pain, difficulty breathing, irregular heartbeat, blood in the urine, pounding in chest, neck, or ears (Beckerman, 2016) [3]. Nutrition plays a major role in individual's overall health. The nutritional status of an individual is usually associated with the quantity and quality of food consumed. Consumption of a diet rich in refined grains, added sugars, added fats, and sodium has been associated with a higher disease risk and higher mortality rates, compared to higher-quality diets intake which include whole grains, lean meats, fish, low-fat dairy products, fresh fruits and vegetables (WHO, 2003) [8].

Dietary approaches to modify blood pressure should be an important strategy of cardiovascular health promotion. There is extensive literature demonstrating that multiple individual dietary components and several dietary patterns affect blood pressure. The strongest evidence for lowering blood pressure or preventing hypertension through dietary intervention includes adopting a dietary pattern such as the DASH diet or a Mediterranean diet, eating less saturated fat and total fat, getting plenty of potassium, limiting the amount of sodium in the diet, and limiting alcohol consumption. It is likely that other dietary factors, such as magnesium and fiber, may affect blood pressure, but the current evidence to support their recommendation is unsubstantiated.

### Correspondence

**Ragini Sen**  
Dept. of Food Science and  
Nutrition, College of Home  
Science, MPUAT, Udaipur,  
Rajasthan, India

Additional research that includes population subgroups and explores the role of other nutrient factors, functional foods, and dietary patterns in preventing hypertension is warranted. Despite the proven benefits of a dietary pattern, there are many cultural and societal forces and commercial interests that have an impact on whether people adopt and follow such a diet. Effective clinical and public health interventions that incorporate individual behavior changes that lead to sustained dietary changes and environmental changes that encourage and promote greater access to healthy food choices are needed. (Bazzano *et al.*, 2013) [2].

Awareness of nutrition may help in controlling the disease and its progression. Hence the investigator has taken up this problem to assess the nutrition status of urban hypertensive women

## 2. Methodology

A sample size of ninety hypertensive women (30-60 year) having systolic and diastolic blood pressure more than 120/80 mmHg and willing to participate in the study was selected. Maharana Bhupal Government Hospital

and Geetanjali Medical College and Hospital of Udaipur were selected to obtain the samples.

- As per the objective, the data were collected using anthropometric measurement techniques for height and weight and WHR. For calculating the body mass index which was expressed as ratio of weight (kg) to height in meter square. Further, the individuals were classified into different classes based on WHO, (2000).
- Food intake was also calculated using 24 hour recall method. Per cent adequacy of food intake was assessed by RDI for 30-60 year hypertensive women recommended by NIN-2010 used for analyzing the per cent adequacy of food intake.
- Nutrient intake was calculated using food composition tables (Gopalan *et al.* 1989) [5]. Mean nutrient intake for one day was compared with recommended dietary allowances (ICMR-2010) [6].

## 3. Result and Discussion

**Table 1:** Mean±SD of height and weight of the respondents (N=90)

S. No.	Anthropometry indices	Mild		Moderate		Severe	
		Mean±SD		Mean±SD		Mean±SD	
1.	Height (cm)	154.43±8.80		156.93±6.71		154.36±9.40	
2.	Weight(kg)	65.63±6.38		67.46±7.45		77.3±8.37	
3.	Waist-hip ratio	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD
		<0.8	>0.8	<0.8	>0.8	<0.8	>0.8
		0.46±0.50	0.53±0.50	0.33±0.47	0.66±0.47	0.1±0.30	0.9±0.30

- (a) **Height:-** Perusal of Table 1 Indicates that the mean height of mild, moderate and severe hypertensive women respondents' were 154.68±5.29 cm, 156.93±6.71 cm and 154.36±9.40 cm respectively.
- (b) **Weight:** Mean weight of mild, moderate and severe hypertensive subjects was 65.63±6.38 kg, 67.46±7.45 kg and 77.3±8.37 kg.
- (c) **Waist-Hip ratio:** Waist hip ratio (WHR) - It is evident from table 3 that mean WHR was observed to be <0.8 in subjects studied. About 0.46±0.50cm mild respondent had mean waist-hip ratio which was less than <0.8

whereas 0.53±0.50 cm mild respondent had >0.8 mean WHR. About 0.33±0.47 cm moderate respondent had mean waist-hip ratio which was less than <0.8 whereas 0.66±0.47cm moderate respondent had >0.8 mean WHR. About 0.1±0.30 cm severe respondent had mean waist-hip ratio which was less than <0.8 whereas 0.9±0.30 cm severe respondent had >0.8 mean WHR. Waist hip ratio is simple index of body fat distribution and provides an indication of the predominance of fat storage in the abdominal region (Ahuja *et al.*, 2004) [1].

**Table 2:** BMI classification of the respondents (N=90)

BMI	Type of malnutrition	Mild		Moderate		Sever	
		F	%	F	%	F	%
18.50 - 24.99	Normal range	6	20%	8	26.66%	-	-
25.00 - 29.99	Pre-obese	18	60%	14	46.66%	5	16.66%
30.00 - 34.99	Obese class I	5	16.66%	8	26.66%	15	50%
35.00 - 39.99	Obese class II	1	3.33%	-	-	6	20%
≥40.00	Obese class III	-	-	-	-	4	13.33%

Classification based on WHO, 2000

- (a) **Body Mass Index:** BMI provides a good correlation to fatness. It is a simple index of weight-for-height that is commonly used and classifies the nutritional status as underweight, overweight and obesity in adults. It appears that 13.33 percent respondents were obese class III, 20 percent obese class II and 50 percent subjects fall under the category of obese

class I 16.66 were pre obese in severe 26.66 percent moderate women were obese class I 46.66 percent pre obese and 26.66 percent were normal range and 3.33 percent mild women were obese class II 16.66 percent women were obese class I 60 percent women were pre obese and 20 percent were normal range.

## Dietary Intake of hypertensive subjects

Table 3: Mean daily nutrient intake of hypertensive subject (N=90)

Nutrients	RDA	Mild Mean $\pm$ SD	Percent (%)	Z-test	Moderate Mean $\pm$ SD	Percent (%)	Z-test	Sever Mean $\pm$ SD	Percent (%)	Z-test
Protein (g/d)	55	53.69 $\pm$ 12.50	97.61	-0.57 <sup>NS</sup>	51.66 $\pm$ 9.03	93.92	-2.02 <sup>NS</sup>	60.69 $\pm$ 13.63	109	2.29*
Fat (g/d)	25	45.05 $\pm$ 19.07	180	5.75***	36.81 $\pm$ 10.68	147.24	6.05***	47.60 $\pm$ 11.46	188	10.80***
Carbohydrate (g/d)	400	303.51 $\pm$ 158.28	75.87	-3.33**	321.67 $\pm$ 233.17	80.41	-1.84 <sup>NS</sup>	351.05 $\pm$ 111.47	87.76	-2.40*
Energy (Kcal/d)	2230	1605.70 $\pm$ 333.11	72	-10.26***	1493.62 $\pm$ 220.49	66.97	-18.29***	1728.46 $\pm$ 283.94	77.48	-9.67***
Calcium (mg/d)	600	521.99 $\pm$ 112.30	86.99	-3.80***	509.71 $\pm$ 133.51	84.95	-3.70***	502.98 $\pm$ 79.49	83.83	-6.68***
Iron (mg/d)	21	16.97 $\pm$ 5.17	76.19	-4.25***	15.71 $\pm$ 4.22	71.42	-6.85***	17.49 $\pm$ 4.00	80.95	-4.79***
$\beta$ - carotene ( $\mu$ g/d)	4800	2005.97 $\pm$ 1833.22	41.79	-8.34***	3010.19 $\pm$ 1978.41	62.71	-4.95***	2090.61 $\pm$ 1876.39	43.55	-7.91***
Ascorbic acid (mg/d)	40	32.09 $\pm$ 23.14	80.22	-1.87 <sup>NS</sup>	30.15 $\pm$ 18.27	75.37	-2.95**	26.93 $\pm$ 18.32	67.32	-3.91***
Sodium (mg/d)	1902	2229.32 $\pm$ 2220.13	117.19	0.80 <sup>NS</sup>	2301.27 $\pm$ 2144.84	120.99	1.02 <sup>NS</sup>	2451.63 $\pm$ 2212.76	128.86	1.36 <sup>NS</sup>
Potassium (mg/d)	3225	1882.03 $\pm$ 1287.72	58.35	-5.71***	1533.62 $\pm$ 425.19	47.55	-21.78***	1675.01 $\pm$ 568.91	51.93	-14.92***

RDI- Recommended Dietary Intake (NIN 2010).

\*Significant at 0.05% level of significance

\*\*Significant at 0.01% level of significance

NS-non significant

The mean intake of energy in mild women respondents was 1605.70 $\pm$ 33 kcal/d, in moderate 1493.62 $\pm$ 220.49 kcal/d and in severe was 1728.46 $\pm$ 283.94 kcal/d and their percentage of RDA was 72 per cent, 66.97 per cent and 77.48 percent respectively. The nutrient intake significantly lower ( $p < 0.001$ ) than RDA. The intake of protein by mild beneficiaries was 53.69 $\pm$ 12.50 g/d moderate beneficiaries 51.66 $\pm$ 9.03 g/d and severe beneficiaries 60.69 $\pm$ 13.63 g/d of which mild was 97.61, moderate was 93.92, and severe was 109 percent of RDA respectively. Average dietary intake of carbohydrates by mild respondents was 303.51 $\pm$ 158.28 g/d moderate respondent was 321.67 $\pm$ 233.17 g/d and severe respondents 351.05  $\pm$ 111.47 g/d and it was 80.41, 87.76, and 75.87 per cent of RDA respectively. In the present study mean (invisible and visible) fat intake of mild women found to be 45.05 $\pm$ 19.07 g/d, moderate 36.81 $\pm$ 10.68 g/d, severe 47.60 $\pm$ 11.46 g/d. Which was 180, 147.24, 188 per cent of the RDA respectively this was due to high intake of both visible and invisible fat intake by the respondents. The mean intake of calcium in mild was 521.99 $\pm$ 112.30 mg/d, moderate was 509.71 $\pm$ 133.51 mg/d, and severe was 502.98 $\pm$ 79.49 mg/d Perusal of Table 4 revealed that mean intake of iron in mild was 16.97 $\pm$ 5.17 mg/d, moderate was 15.71 $\pm$ 4.22 mg/d and severe was 17.49 $\pm$ 4.00 mg/d. The intake of  $\beta$ -carotene in mild respondent was 41.79  $\mu$ g/d, moderate was 62.71  $\mu$ g/d and severe was 43.55  $\mu$ g/d percent. Table 3 reveals that the mean intake of vitamin C in the mild subjects was 32.09 $\pm$ 23.14 mg/d, moderate was 30.15 $\pm$ 18.27 mg/d and severe 26.93 $\pm$ 18.32 mg/d. The mean intake of sodium in mild was 2229.32 $\pm$ 2220.13 mg/d, moderate was 2301.27 $\pm$ 2144.84 mg/d and severe was 2451.63 $\pm$ 2212.76 mg/d. The intake of potassium in mild respondent was 58.35, moderate was 47.55 and severe was 51.93 percent of RDA.

The dietary survey conducted by '24 hour recall method' for 1 day. Dietary intake of respondents in comparison to the Recommended Dietary Intake (RDI) was substantially low. The diet of rural and urban adolescent girls included fruits (11%, 17%), roots and tubers (22.5%, 27%), milk and milk products (66.66%, 74.33%), green leafy vegetables (55%, 59%) and pulses (21.33%, 24%) and cereals (57.87%, 57.27%), fats and oil (48%, 52%) other vegetables (25.5%, 31%) and sugar (33.33%, 50%). The diet of mild, moderate and severe hypertensive women included cereal (72.42%, 72.42%, 78.78%), Pulses (40%, 50.66%, 52%), milk (92%, 68.94%, 65.22%), Roots and Tubers (29%, 27%, 32%), GLV (43%, 22%, 47%), Other vegetables (52.5%, 40%, 41.5%),

Fruits (31%, 22%, 43%), Sugar (93.33%, 105%, 106.66%), Fats and oils (106%, 108%, 117.32%).

#### 4. Conclusion

Hypertension is commonly known as a silent, invisible killer because it seldom causes symptoms at an early stage and people are hardly aware of its possible danger, and thus tend to postpone medical examination and/or treatment. The subjects were categorized into three categories as mild, moderate and severe hypertensive and thirty subjects were selected in each category to study their nutrition status. From the findings of the present study it can be concluded that, the nutritional standards of urban hypertensive women in this study were found to be not satisfactory because they were including high salt, fried foods and sugar in their diet that increasing their blood pressure.

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