

COMPARATIVE ANALYSIS OF HYPERTENSION RELATED RISK FACTORS IN UPPER-MIDDLE CLASS MALES AND FEMALES OF JAIPUR CITY

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ABSTRACT

Introduction: Hypertension is a silent, invisible killer and a concomitant risk factor for coronary heart diseases, leading to heart failure, cerebrovascular disease and chronic renal failure. The morbidity and mortality statistics are higher in population presented with hypertension.

Objective: The present research study aimed to assess a comparison between the prevalence of hypertension related risk factors among urban upper/upper-middle class adult hypertensive population residing in Jaipur city.

Methodology: A group of sixty (30 males and 30 females) middle-aged hypertensive subjects were selected purposively from a well-known Cardiac clinic at Jaipur, Rajasthan. Data on anthropometry, clinical history, biochemical and biophysical parameters, physical activity and dietary information was collected using a semi-structured, pre-coded questionnaire schedule.

Results and Conclusion: More than half (56%) of the subjects belonged to 41-50-year age group. Majority (90%) were Hindus, living in joint families (58%), belonging to upper and upper middle Socio-Economic-Status. All the subjects were presented with at least one risk factor for hypertension. Smoking, alcohol consumption, and tobacco use was more prominent in males. Grade I obesity was higher in females (83%) whereas grade II obesity was more in males (23%). Women were less physically active. 96% of the women surpassed the recommended value of WHR of 0.85. Dietary fallacies including a higher intake of salt, sugar and fat and a low intake of fruits and vegetables were common in both the genders. The mean values for TC, TG and LDL were higher in males. HDL levels in females were lower than the recommendations.

Conclusion: Burden of hypertension related modifiable risk factors was found to be higher among women subjects of the present study. Interventions based on a promising preventive and curative care needs to be designed, for a better quality of life amongst women.

Key words: Hypertension, Prevalence, Risk factors, Nutritional status, Diet.

INTRODUCTION

Hypertension and cardiac diseases are being identified as the apical cause of death and disability, with one causing the other. The global burden of disease study (2016) ranks high blood pressure (BP) as the leading cause of cardiac diseases in south Asians. Various epidemiological and cross-sectional studies have highlighted a rising burden of the disease in the Indian sub-continent at an alarming rate (Mahmood et al, 2019; Ramakrishnan et al, 2019; Gupta and Xavier, 2018). The disease has been pre-eminently held accountable to encumber much of the societal cardiac health burden overtaxing the Indian healthcare system (Srinath et al, 2005; Leeder et al, 2004). In an earlier study, the prevalence percentage of the disease was projected to be 22.9 and 23.6 percent for Indian men and women, respectively by the year 2025 (Kearney et al, 2005). However, a nationally representative study on adult Indian population reported a prevalence of about 26.5% among men and women with HTN in the year 2018 (Geldsetzer et al, 2018).

Amongst all the other causes of hypertension, age and gender have been assigned as crucial factors responsible for upscaling the prevalence of the disease. A rising trend in the disease incidence is observed with an increase in age and is more frequent in men as compared to women (WHO,1998). NFHS-4 data (2015-16) reported a low prevalence rate of 11.3% of HTN among Indians, majorly because the data was based on adults in the age group of 15-49 years. Gender variations in the prevalence of hypertension are based on both biologic and habitual factors, which become more conspicuous in the adolescent years, persisting through adulthood upto the age, when women reach final menopause (Doumas et al, 2013). Behavioral risk factors responsible for hypertension include elevated BMI, smoking and low physical activity (Ghosh et al, 2016).

The advent of 21st century have brought along changes in the demographic and socio-economic structure resulting in an unhealthy lifestyle including frail dietary habits, tobacco use, alcohol abuse and insubstantial physical activity. Early identification of various risk factors, pertinent to specific gender, would not only help in exalting individual health status but would also help in maintaining further deterioration by controlling the risk factors and establishing healthy life-style habits).

To bridge the gap between known prevalence of the disease and the presentation of gender specific risk factors in an urban community, the present study was planned in an attempt to

identify the traditional and dietary risk factors of hypertension among a selected male and female hypertensive population of Jaipur, the capital city of Rajasthan.

METHODOLOGY

Selection of subjects: The study was contrived with an objective to compare and assess the prevalence of risk factors in hypertensive adult patients screened from Santokba Durlabji Memorial Hospital (SDMH), a well-known hospital catering to the medical needs of urban population residing in Jaipur city. The intake of patients in the selected hospital is majorly from upper strata of the society and hence the hospital was purposively selected. A sample of sixty mild to moderate hypertensive adults (30 males and 30 females) aged 30-50 years were selected purposively from the aforesaid clinical setting. Only volunteers with mild to moderate hypertension were selected, excluding those patients with any kind of renal disease or chronic cardiac disease. Pregnant and lactating females were also ruled out from the inclusion criteria of subject selection.

Background information: A semi-structured, pre-coded and pre-tested questionnaire was developed and was administered through an informed and consented interview schedule to elicit the desired information. The various sections of the questionnaire included information on general profile, disease profile, anthropometry, lifestyle, biochemical and biophysical parameters. Food practices followed by the subjects were also studied. Anthropometric measurements including height, waist and hip circumference were measured using standard procedures given by WHO (2004). Weight was measured using a portable standardized digital weighting scale (Omron HN-286). All manual measurements were taken thrice and an average of the three was used. Body-mass index (BMI) and Waist-Hip-Ratio (WHR) were then further calculated by standardized formulae, using observed values of height (m), weight (kg), WC and HC (cm) and interpreted as per cutoff given by WHO (2004) and WHO (2011).

Food consumption pattern: A food frequency questionnaire (FFQ) was developed based on food items identified to be high in sodium content. The information on the listed items was sought to assess the general food pattern over the past one year. The frequencies in the questionnaire were scored from daily, 2-4/week, 1-3/month and never. Thereafter, mean frequency scores were calculated for each food item consumed by each subject.

Statistical Analysis: The data were tabulated and statistically analyzed (Gupta, 2012).

RESULTS AND DISCUSSION

GENERAL PROFILE: Hypertension advances with age and this effect was clearly visible from the results of present study as there were a greater number of patients in the higher age group of 41-50 years (Table 1). There was a clear majority of Hindu subjects in both the genders. As against the modern trend of nuclear families in urban settings, more number of patients (58%) in the present study lived in joint families. SES status as assessed by modified Kuppuswamy scale (Gururaj and Maheshwaran, 2014) portrayed an almost equal number of patients in the upper and upper-middle sections of society.

Table 1: General profile of the subjects

Parameter	Demographic profile	MALES(n=30)	FEMALES (n=30)
AGE	30-40	12(40)	14(46.7)
	41-50	18(60)	16(53.33)
Religion	Hindu	28(93.33)	26(86.66)
	Muslim	2(6.66)	3(10)
	Christian	-	1(3.33)
Family	Nuclear	11(36.67)	14(46.67)
	Joint	19(63.3)	16(53.3)
SES(Kuppuswamy Scale, 2014)	Upper	15(50)	16(53.3)
	Upper-Middle	15(50)	14(46.67)

Figures given in parentheses denote percentages.

Lifestyle related risk factors

The role of lifestyle habits in eventuation of hypertension is of prime importance. Inquisition regarding food habits of the subjects revealed majority (78%) to be falling into vegetarian food category with the remaining (12%) subjects as non-vegetarians (Table 2). "Smoking causes an increase in blood pressure and heart rate and is associated with malignant hypertension" (Primatesta et al, 2001). Twenty percent males were found to be smoking beedi/cigarette for more than past five years. The number of females reported as smokers were 13.3%. Alcohol has been reported as an independent risk factor for HTN. Alcohol consumption was reported by 20%

females and 26.6 % males. Thirteen percent females and 16% males were found to be addicted to tobacco chewing.

Sedentary lifestyle increases the chances of hypertension (Gupta et al, 2003). Data on physical activity of the subjects shockingly revealed none of the subjects to be moderate or heavy workers. All the subjects, males and females of the present study had sedentary lifestyle in view of the calculated Physical Activity Level (PAL) score, which was less than 1.53, as evinced from Table 2. The mean PAL in males was found to be 1.47 ± 0.19 , whereas in females it was 1.42 ± 0.19 . The figures showcased a trend of low physical activity amongst females in comparison to their male counterparts. However, on analyzing the data, the difference in the mean PAL score of males and females was found to be statistically insignificant. Zachariah et al (2003) found low physical activity to be associated with increased risk of hypertension.

Table 2: Lifestyle related risk factors of the subjects

Parameter	Lifestyle parameter	MALES (n=30)	FEMALES (n=30)
Food-habits	Vegetarian	23(76.67)	24(80)
	Non-Vegetarian	7(23.3)	6(20)
Faulty lifestyle	Smoking	6(20)	4(13.3)
	Alcohol	8(26.6)	6(20)
	Tobacco	5(16.6)	4(13.3)
Physical Activity (PAL Score)	Sedentary (<1.53)	30(100)	30(100)
	Moderate (1.54-1.80)	-	-
	Heavy (1.81-2.3)	-	-

Figures given in parentheses denote percentages.

Anthropometric risk factors

Standing height, weight, WC and HC of all the participants was measured using standard procedures. From these initial values, BMI and WHR were calculated. Scientific evidences from WHO expert consultation suggests Asian populace having varied associations between BMI, body fat percentage, and the known health risks in comparison to a similar European populace. The expert consultation advocated that “the proportion of Asian people with a high risk of type-2 diabetes and cardiovascular disease is significant at BMI lower than the existing WHO cut-off point for overweight ($\geq 25 \text{ kg/m}^2$)” (WHO,2004). Research studies conducted in the past from

north India (Dudeja et al, 2001; Singh et al, 1992), also support the view of a normal BMI limit for Indians to rest at 22 kg/m², further adding 23.0 kg/m² as an ideal Body Mass Index limit for Asian Indians.

As displayed in Figure 1, 76% males and 83% females of the present study were in the Obese Grade I category of BMI (25-30 kg/m²). The number of men falling in grade II obesity category was higher than women (23% vs. 7%). Positive and significant relationship between BMI and blood pressure have not only been reported in a past studies (Dua et al, 2004), but also in recent ones (Lyall et al, 2017), further advocating that a higher BMI may lead to CHD and type-2 diabetes.

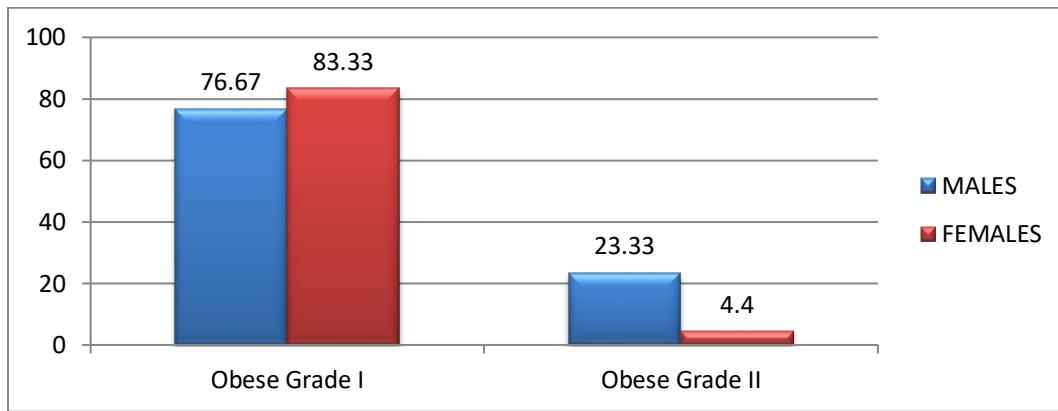


Figure 1: Comparison of grades of Central obesity in subjects

WHR has also been advocated as a strong risk factor, presenting strong associations with hypertension. Kaur et al (2008) indicated truncal obesity as the best screening measure for cardiovascular disease. When the subjects were screened on the basis of WHR, only 3.3% males and none of the females were found to be in the normal category. A larger proportion of men (76.6%) were found pre-obese with a WHR of 0.71-0.99, whereas 96% female surpassed the normal cut-offs of 0.85 and thus were in the obese category (Table 3).

Table 3: Comparative analysis of abdominal obesity in study subjects

MALES (n=30)			FEMALES (n=30)		
WHR	Category	n (%)	WHR	Category	n (%)
≤0.7	Normal	1(3.33)	≤0.7	Normal	-
0.71-0.99	Pre-obese	23(76.67)	0.71-0.84	Pre-obese	1(3.33)
≥1	Obese	6(20)	≥0.85	Obese	29(96.67)

Source: WHO, 2011.

Dietary Risk factors

Dietary factors enact a key role in conserving health and vitality. However, these are regulated by a number of determinants. An assessment of the dietary intake and habits is very important to assess the disease burden and risk profile sheet of an individual. When the data was analyzed regarding the faulty dietary practices adopted by the subjects, it was revealed that more than 50% of the subjects were consuming more than 1 kg of salt per month. The number of males (53.3%) was more than the females (50%) regarding the amount of salt consumed per month (Table 4). When enquired about the addition of salt at table, more number of males (67%) either often or always practiced adding the salt at the table as compared to females (60%). Studies are continuously providing evidence that excessive sodium consumption, especially in the form of salt has unfavorable estimates not only on cardiac health, but also aberrations on the overall health of an individual (He and MacGregor, 2009; Radhika et al, 2007).

Table 4: Comparison of Dietary risk factors

Dietary risk factor	Parameter	MALES (n=30)	FEMALES (n=30)	TOTAL (N=60)
Salt consumption/month	<1 kg	14(46.6)	15(50)	29(48.3)
	>1 kg	16(53.28)	15(50)	31(51.6)
Addition of salt at table	Often/always	20(66.6)	18(60)	38(63.3)
Dining out	Twice or more/month	21(70)	22(73.2)	43(71.6)
Breakfast cereal	Parantha/poori	18(60)	10(33.3)	28(46.6)
	Toast	20(66.6)	17(56.6)	37(61.6)
Fruit intake	<1/week	4(13.3)	4(13.3)	8(13.3)
	2-5/week	16(53.28)	19(63.3)	35(58.3)
	6-7/week	10(33.3)	7(23.3)	17(28.3)
Vegetable intake	1-2 serves/day	26(86.5)	21(70)	47(78.3)
	>2 serves/day	2(6.66)	3(10)	5(8.3)
Milk consumption	Cow's milk	10(33.3)	8(26.6)	18(30)
	Buffalo's milk	6(20)	4(13.3)	10(16.66)
	Packed milk	14(46.6)	18(60)	32(52.3)
Cheese consumption	Once or more/week	20(66.6)	19(63.3)	39(65)
Tea	3 or more	24(80)	19(63.3)	43(71.6)
Coffee	3 or more	8(26.6)	11(36.6)	19(31.6)
Aerated drinks	1 lt. or more /day	6(20)	4(13.3)	10(16.66)

Figures given in parentheses denote percentages.

The frequency of eating out was slightly more in females (73%) as compared to males (70%). The subjects reported the frequency of outside meals as twice or more than twice in a month. Even though the subjects of the study group were vegetarians, the intake of vegetables per day was just 1-2 servings in majority (78%) of the subjects. More numbers of male (86.5%) were consuming fewer vegetables as compared to females (70%). All the subjects of the present study were either in the upper or upper-middle income category, still the frequency of eating fruits on a regular basis was absent in majority of the subjects. 13% of the subjects were consuming fruits less than once in a week. 53% males and 63% females had a frequency of fruit intake only 2-5 times a week. WHO (2003) has recommended an intake of around 400-500 grams of fresh fruits and vegetables per day. This includes intake of berries, GLVs, cruciferous vegetables and legumes to lessen the threat of high blood pressure. Fruits and vegetables are power-packed with a variety of phyto-nutrients, along with potassium and the fibre, thus contributing to their share of cardiovascular health. Packed milk was consumed by an appreciable number of hypertensive subjects (46.65% males vs. 60% females) in comparison to natural cow milk which was consumed only by 30 percent of the total subjects. A total of 46.6% study participants (60% males and 33.3% females) were consuming parantha/poori as a breakfast cereal. Consumption of cheese on weekly basis was found to high in both the genders. Regarding tea and coffee consumption, the consumption of tea was preferred over coffee. More number of male subjects (80%) had an intake of about 3 or more cups of tea/day whereas it was 63% in their counterparts. All these dietary habits are known to raise hypertension.

Blood lipids

Data on hypertensive population in the Framingham Heart Study reported more than 80% subjects having at least one of the lipid fractions to be abnormal. In the year 2000, Kannel professed that “hypertension and hypercholesterolemia frequently coexist, causing what is known as dyslipidemic hypertension (DH)”. When comparisons were observed in the blood lipid picture of the subjects, it could be revealed that the values of serum lipids in both the genders were high as compared to the reference values given by NCEP(ATP) III panel, 2001(Table 5).

Mean values for Total Cholesterol, Triglycerides, LDL, and VLDL were higher in men. Women had HDL cholesterol levels lower than the reference of 50 mg/dl, whereas in men it was above the normal values of 40 mg/dl. Association of hypertension with high serum cholesterol and triglycerides was shown by Mohan et al (2007). An increasing trend of non-HDL cholesterol and

triglycerides to be associated with high prevalence of hypertension in upper middle-class population in Jaipur city was also demonstrated in an earlier study (Gupta et al, 2012).

Table 5: Comparison of Serum lipid picture of the subjects

Serum Lipid	MALES(n=30)	FEMALES (n=30)	t-value
Total Cholesterol(mg/dl)	198.2±22.56	195.0±15	0.63 ^{NS}
Triglycerides(mg/dl)	181.0±27.36	176.0±29.28	0.69 ^{NS}
HDL (mg/dl)	43.5±7.54	47.3±7.43	1.96 ^{NS}
LDL (mg/dl)	105.3±18.57	102.0±17.39	0.71 ^{NS}
VLDL (mg/dl)	35.8±7.28	32.0±5.41	2.31 ^{**}

Means±SD

CONCLUSION

It may be concluded from the present study that the burden of hypertension and related risk factors was higher in adult male and female subjects of Jaipur city. It is recommended that, with advancing age proper counselling sessions for adult men and women need to be organized, so as to make them more aware on the risk factors that can be modified and also they should be encouraged on ways to improve their lifestyle habits. The adults suffering from hypertension, diabetes and obesity should not only undergo a regular medical treatment to reduce the risk of other non-communicable diseases but should also follow a healthy diet and lifestyle regimen for a prompt response to medicaments. Normotensives, particularly those with family history of hypertension should undergo periodic screening. Interventions required for this can be achieved through a well-planned behavior change communication programme.

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