



Determinants of prevalence of hypertension and obesity among the adult population of 50 years and above

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Abstract

Background: Twentieth century has witnessed the demographic transition in which there is an increased proportion of elderly population. This increased longevity is associated with health and nutritional related problems. **Objective:** To assess the determinants of hypertension and obesity among the adult population of 50 years and above. **Material and Methods:** A community based cross-sectional study was carried out in urban and rural areas of Hyderabad and surrounding villages. Information of socio-demographic particulars and history of hypertension and diabetes was collected. Information was also collected regarding substance abuse such as tobacco and alcohol consumption. Anthropometric measurements like weight, height and waist circumference were measured. **Results:** A total of 81 adults (Men; 48.1%; Women: 51.9%) from rural areas and 58 adults (Men; 56.9%; Women: 43.1%) from urban areas were covered for the study. The prevalence of hypertension was 39.6% among the study subjects and the proportion of known diabetics was 9.8% each in both rural and urban adults. The prevalence of overweight/obesity (BMI \geq 23.0) and abdominal obesity was about 72% each and the proportion of smokers and alcoholics was 38% and 34%, respectively. **Conclusions:** In general, the prevalence of hypertension and overweight/obesity was significantly higher among the subjects with sedentary physical activity and those residing in urban areas. Adiposity in terms of BMI and WC was significantly higher in elderly with hypertension as compared to non-hypertensives. Therefore, it is imperative to initiate appropriate intervention measures during the adolescence and early adulthood to adopt and practice healthy life styles.

Key words: BMI; Hypertension; Obesity; Overweight

Introduction

During twentieth century, the world has witnessed the demographic transition in which there is an increased proportion of elderly (\geq 60 years) population [1]. The size of the elderly segment of the population is increasing even in developing countries with a concomitant increase in life expectancy; thus, these countries are likely to face an enormous burden of chronic non-communicable diseases in the near future [2]. Of these, hypertension is one of the most important causes of mortality and morbidity in the elderly [3], and accounts for a large proportion of cardiovascular diseases in the elderly [4]. The study of nutritional status of elderly is of particular importance, as they are at greater risk of malnutrition [5], and at the same time have an increased prevalence of many chronic diseases, which may be associated

with nutritional status [6,7]. The prevalence of obesity is increasing drastically in many countries in the recent decade [8] and it has become particularly high in the elderly population [9-11], and in India about 54% of elderly had overweight/obesity [2]. In the elderly, obesity has been associated not only with increased mortality [12,13], but also with elevated risks of type 2 diabetes, impaired glucose tolerance [14], hypertension [15], lipid abnormalities [16], stroke [17], and coronary heart disease [18]. Obesity also contributes to functional decline and disability in elderly people [19].

Anthropometric indicators are used to evaluate the prognosis of chronic and acute diseases, and to guide medical intervention in the elderly [20]. The use of simple anthropometric measures as health

outcome indicators, suitable for population screening, has aroused much interest [21]. Body mass index (BMI) and waist circumference (WC) have been used as simple anthropometric indices for assessing the amount and distribution of body fat [22,23] and are useful indices in predicting the risks of type 2 diabetes, hypertension, and cardio vascular diseases (CVDs) in adults [24,25]. Similarly, obesity represents a serious health concern that needs to be addressed to improve the health and well-being of the present and the future elderly population [26].

The data on hypertension is largely based on clinic or hospital based studies. However, such data based on community studies is not readily available in the state of Andhra Pradesh. Hence, keeping in view the objective, a community based study was carried out to assess the prevalence of hypertension and overweight/obesity among the ageing population.

Material and Methods

A community based cross-sectional study was carried out in urban and rural adult population aged 50 years and above in Hyderabad and surrounding villages of Hyderabad adopting purposive sampling. After explaining the purpose and objectives of the study, verbal consent was obtained from all the subjects. Information of socio-demographic particulars and history of hypertension and diabetes was collected. Information was also collected regarding substance abuse such as tobacco and alcohol consumption. Anthropometric measurements like weight and height of the subjects were measured using appropriate standard equipment and procedures. Weight was measured with minimum clothing using SECA digital weighing scale (nearest to 0.1 Kg). Height was measured using anthropometric rod, with the subject made to stand erect on a flat surface (without footwear) with feet together. BMI was calculated as weight (Kg) divided by height in meters square. The WHO recommended BMI cut-off values for Asian adults' were used to calculate overweight and obesity [27], while the WC cut-off values of ≥ 90 cm and ≥ 80 cm were considered for men and women respectively, to calculate abdominal or central obesity [28]. Blood pressure was measured thrice with five-minute interval on the left arm using appropriate cuff size and standard mercury sphygmomanometer. The cuff was wrapped closely to the arm and kept at the level of heart. The average of three readings was considered for analysis. Elderly with systolic BP of ≥ 140 mmHg and/or diastolic BP of ≥ 90 mmHg and/or those on medication for high BP [29] were considered as hypertensive.

Statistical analysis: Statistical analysis was performed using SPSS version 19.0 [30]. Appropriate descriptive statistics were calculated. Mean (\pm SD) height, weight, and BMI were calculated for each gender and age groups. The association between hypertension and overweight/obesity with different socio-demographic particulars was assessed using chi-square test. A p-value of <0.05 was considered as statistically significant.

Results

A total of 81 adults (Men; 48.1%; Women: 51.9%) from rural areas and 58 adults (Men; 56.9%; Women: 43.1%) from urban areas were covered for the study. The mean height and weight among rural adult men were $165.1 \text{ Cm} \pm 9.27 \text{ SD}$ and $71.7 \text{ Kg} \pm 15.00 \text{ SD}$, respectively, while the corresponding figures for women were $150.9 \text{ Cm} \pm 5.48 \text{ SD}$ and $52.3 \text{ Kg} \pm 13.08 \text{ SD}$, respectively. In case of urban adult men, the mean height and weight were $169.5 \text{ Cm} \pm 6.41 \text{ SD}$ and $74.0 \text{ Kg} \pm 9.63 \text{ SD}$, respectively, while the corresponding figures for women were $159.7 \text{ Cm} \pm 5.61 \text{ SD}$ and $65.0 \text{ Kg} \pm 8.28 \text{ SD}$, respectively. In general, 39.6% of subjects had hypertension and the proportion of known diabetics was 9.8% each in both rural and urban adults. The coverage of adults by socio-economic status, smoking & alcohol consumption, physical activity and obesity is presented in **Table-1**. In general, significant ($p < 0.001$) differences were observed with respect to variables such as socio-economic status, smoking & alcohol consumption, physical activity and obesity between rural and urban adults. The proportion of illiterates, labourers and those residing in kutcha (Mud wall + thatched roof) houses was significantly ($p < 0.001$) higher in rural areas. Similarly, the proportion of adult individuals belonged to lower socio-economic status was significantly ($p < 0.001$) higher in rural areas compared to those residing in urban areas. The prevalence of overweight/obesity and abdominal obesity was higher among the urban adults ($p < 0.05$), while the proportion of smokers was significantly ($p < 0.001$) higher in rural areas.

The association between nutritional status and socio-economic status, smoking & alcohol consumption, physical activity and obesity is presented in Table-2. In general, significant ($p < 0.05$) differences were observed between nutritional status and socio-economic status, alcohol consumption, physical activity and obesity except for smoking ($p > 0.05$) higher among adults of urban areas, with sedentary activity and those belonged to middle socio-economic status and residing in pucca houses.

Table 1: Coverage particulars

Particulars		N	Rural	Urban	P-value
Education	Illiterate	90	70.0	30.0	0.001
	School education	33	48.5	51.5	
	College & above	31	6.5	93.5	
Occupation	Labourer	66	86.4	13.6	0.001
	Service	21	9.5	90.5	
	Business	32	53.1	46.9	
	Idle or retired	35	14.3	85.7	
House	Pucca	94	24.5	75.5	0.001
	Semi-pucca	23	91.3	8.7	
	Kutcha	37	100.0	0.0	
SES	Low	71	98.6	1.4	0.001
	Middle	83	13.3	86.7	
Family	Nuclear	122	51.6	48.4	0.642
	Joint	32	56.3	43.8	
Diet	Veg	13	100.0	0.0	0.001
	Non-veg	141	48.2	51.8	
Activity	Sedentary	108	36.1	63.9	0.001
	Moderate	46	91.3	8.7	
Smoking	Yes	58	74.1	25.9	0.001
	No	96	39.6	60.4	
Alcohol	Yes	53	60.4	39.6	0.161
	No	101	48.5	51.5	
Salt	<10 g/day	11	100.0	0.0	0.001
	≥10 g/day	143	49.0	51.0	
Abdo. Obesity	Normal	43	65.1	34.9	0.53
	Obese	111	47.7	52.3	
BMI-ASIA	<18.5	12	100.0	0.0	0.004
	18.5 – 23	30	56.7	43.3	
	23-27.5	61	49.2	50.8	
	≥27.7	51	43.1	56.9	
BMI-WHO	<18.5	12	100.0	0.0	0.001
	18.5 – 25	50	60.0	40.0	
	25-30	72	38.9	61.1	
	≥30	20	55.0	45.0	

Table 2: Association between nutritional status and different variables among subjects

Particulars	Body Mass Index				P-value
	<18.5	18.5 – 23	23-27.5	>=27.5	
Area					
Rural	100.0	56.7	49.2	43.1	0.004
Urban	0.0	43.3	50.8	56.9	
SES*					
Low	91.7	56.7	42.6	33.3	0.02
Middle	8.3	43.3	57.4	66.7	
Education					
Illiterate	91.7	70.0	57.4	45.1	0.049
School education	8.3	20.0	18.0	29.4	
College & above	0.0	10.0	24.6	25.5	
Activity					
Sedentary	25.0	66.7	78.7	72.5	0.003
Moderate	75.0	33.3	21.3	27.5	
Smoking					
Yes	66.7	33.3	39.3	31.4	0.140
No	33.3	66.7	60.7	68.6	
Alcohol					
Yes	25.0	13.3	36.1	47.1	0.018
No	75.0	86.7	63.9	52.9	
Type of house†					
Pucca	16.7	50.0	67.2	70.6	0.000
Semi-pucca	8.3	13.3	13.1	19.6	
Kutcha	75	36.7	19.7	9.8	
Occupation					
Labourers	91.7	50.0	42.6	27.5	0.020
Service	0.0	6.7	18.0	15.7	
Business	0.0	23.3	18.0	27.5	
Idle/retired	8.3	20.0	21.3	29.4	

*SES: Socio-economic status.

† **Type of house:** Pucca- RCC roof + brick or stone wall; Semi-pucca- brick or stone wall + tin or asbestos roof; Kutcha – mud or brick wall + thatched roof

Table 3: Association between hypertension and different variables among subjects

Variables	Normal	Pre-hypertension	Hypertension	P-value
Age (years)				
50-60	42.9	36.7	50.8	0.408
≥ 60	57.1	63.3	49.2	
Residence				
Rural	57.1	70.0	39.3	0.015
Urban	42.9	30.0	60.7	
Salt				
<10 g/day	6.3	6.7	8.2	0.917
≥10 g/day	93.7	93.3	91.8	
Smoking				
Yes	25.4	53.3	42.6	0.020
No	74.6	46.7	57.4	
Alcohol				
Yes	25.4	33.3	44.3	0.086
No	74.6	66.7	55.7	
Activity				
Sedentary	65.1	56.7	82.0	0.024
Moderate	34.9	43.3	18.0	
BMI				
<23	34.9	36.7	14.8	0.018
≥23	65.1	63.3	85.2	
Abd.Obesity				
Normal	30.2	36.7	21.3	0.270
Obese	69.8	63.3	78.7	

The association between blood pressure and socio-economic status, smoking & alcohol consumption, physical activity and obesity is presented in **Table-3**. The prevalence of pre-hypertension and hypertension was significantly ($p < 0.05$) higher among adults of urban areas, with sedentary activity and overweight/obesity.

Discussion

The study presents the prevalence of hypertension and overweight/obesity and their association with socio-economic status, physical activity and consumption of tobacco, alcohol and salt among the rural urban adults of 50years and above. In general, about 40% (Men;

45%; Women: 33.8%) of the subjects are hypertensives. Arlappa et al reported the prevalence of hypertension as 47.3% and 53.3%, respectively among elderly men and women residing in rural India [31] and the corresponding figures for urban geriatric population as 61.1% and 70.9%, respectively [32]. In the present study, the prevalence of hypertension was lower as compared with the figures reported for the elderly (51.8%) in the state of Kerala [33], north India (58%) [34] and rural Himachal Pradesh (61%) [35]. The prevalence of prehypertension and hypertension was 19.5% and 39.6%, respectively and Srinivas et al reported it as 27.2% and 27.4% respectively among the adults in Andhra Pradesh [36], while the

corresponding figures were 24.2% and 20.4%, respectively in Vadodara, Gujarat [37].

The prevalence of overweight/obesity (BMI \geq 23.0) and abdominal obesity was about 72% each. While the proportion of overweight/obesity (BMI \geq 23.0) and abdominal obesity was about 73% and 66%, respectively among the urban elderly in Khammam town, Andhra Pradesh [32]. Adiposity in terms of BMI and WC was significantly higher in elderly with hypertension, compared to non-hypertensives, and a significant relationship was observed between adiposity and hypertension in both the genders, which is consistent with the findings reported by other studies [38,39].

The proportion of smokers and alcoholics was 38% and 34%, respectively in the present study and the proportion of smokers and alcoholics was relatively high in rural areas, while as reported by Arlappa, the proportion of smokers and alcoholics was 27.2% each among the urban geriatric population (32). Majority of adults in urban areas had overweight/obesity and abdominal obesity and majority of the adults had sedentary life style. A significant association was observed between sedentary life style and overweight/obesity, abdominal obesity and hypertension.

Thus, the prevalence of overweight/obesity and hypertension was high among the adults of 50 years and above in both rural and urban areas and majority of them had sedentary life style. Therefore, it is imperative to initiate appropriate interventions such as health and nutrition education (HNE), IEC activities and behavioural change communication (BCC) during adolescence and early adulthood to adopt and practice healthy life styles and prevention of development of risk factors (smoking, alcohol consumption, sedentary life style, overweight/obesity etc.) of non-communicable diseases during late adulthood and elderly.

Source of Funding: Nil

Source of Conflict: Nil

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Website: www.ijrhs.com

Submission Date: 05-10-2013

Acceptance Date: 09-10-2013

Publication Date: 31-10-2013

How to cite this article:

Qureshi AI, Qureshi AM, Kumar NK, Ravikanth C, Anuhya A, Bhaskar V, et al. Determinants of prevalence of hypertension and obesity among the adult population of 50 years and above. *Int J Res Health Sci* 2013;1(3):171-8.

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