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Original Research Article

Prevalence of hypertension and its associated risk factors in adults: a unique study at field practice area of urban health training centre

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ABSTRACT

Background: The theme for World Health Day 2013 based on controlling high blood pressure, a condition which affects more than one in three adults and leads to more than nine million deaths worldwide every year. There is a felt need for the community based studies in urban and rural areas of our country with a view to determine the geographic differences in the prevalence of hypertension. The knowledge about the existing risk factors of hypertension in the local community helps in developing prevention programs tailor-made to modify behavioral changes and promoting healthy lifestyles among the target groups. The present study was undertaken to estimate the prevalence of hypertension and examine its associated risk factors in an urban area. The aim and objectives were to find out the prevalence of hypertension in the field practice area of Urban Health Training Centre and to study the risk factors associated with hypertension.
Methods: A case control study after community based cross sectional study was conducted in the field practice area of Urban Health Training Centre of Government Medical College, Aurangabad, India. Subjects were examined with the help of pretested proforma. The blood pressure, weight, height of the subjects were measured and recorded according to standard protocol. Data was entered and analyzed using Epi Info statistical software.
Results: 305 study subjects were examined. The overall prevalence of hypertension was 26.2%. Prevalence of hypertension was more in females 33.3% than in males 16.8% which was found to be statistically significant. All risk factors were subjected to multiple logistic regression analysis. Out of fourteen risk factors submitted for multivariate analysis, five out to be significant and independent risk factors for hypertension i.e. (higher socioeconomic status, Mixed diet, Additional dietary salt intake, <8hrs of sleep and restless sleep).
Conclusions: These observations re-emphasize the need for tailor-made hypertension awareness programs. It also brings to light the need for follow-up, counselling and monitoring of hypertensive's to reduce non-compliance to anti-hypertensive medication and lifestyle modification in urban areas.

Keywords: Case control, Hypertension, Prevalence, Risk factors

INTRODUCTION

"The Doctor of the future will give no medication but will interest his patients in the care of human frame, in diet and in the cause and prevention of the disease !!! --Thomas Edison."[1] Every year, the World Health Organization selects a priority area of global public health concern as the theme for World

Health Day. The theme for World Health Day 2013 is controlling high blood pressure, a condition which affects more than one in three adults and leads to more than nine million deaths worldwide every year.[2] In India there is 24-30% of prevalence of hypertension in urban areas and 12-14% in rural areas. This year we have woken up to the challenges of tackling the rising threat of 'Hypertension'.[3] A study showed that cardiovascular diseases in India caused 2.3 million deaths in the year 1990, of which hypertension was directly responsible for 57% of all stroke deaths and 24% of all coronary heart disease deaths in India.[4] The number of adults with hypertension in 2025 is predicted to increase by about 60% to a total of 1.56 billion. According to the Global Burden of Diseases study, by the year 2025, cardiovascular diseases would be the major cause of deaths all over the world including the developing countries.[5] Accurate estimates of hypertension prevalence are therefore necessary to plan effective control measures. There is a felt need for the community based studies in urban and rural areas of our country with a view to determine the geographic differences in the prevalence of hypertension. More than prevalence data, from public health point of view, knowledge about the existing risk factors of hypertension in the local community helps in developing prevention programs tailor-made to modify behavioral changes and promoting healthy lifestyles among the target groups. The present study was undertaken to estimate the prevalence of hypertension and examine its associated risk factors in an urban area.

Aim and objectives

- To find out the prevalence of hypertension in the field practice area of Urban Health Training Centre.
- To study the risk factors associated with hypertension.

METHODS

Cross sectional study design is generally required for finding out the prevalence of any disease but to find out the association of various risk factors in causation of that disease a case control study design is an ideal one. A unique study carried out in the field practice area of Urban Health Training Centre under Government Medical College Aurangabad. Initially after calculating sample size, to find out the prevalence of hypertension a cross sectional study was undertaken. In order to find out the association of various risk factors in causation of the hypertension a case control study was later conducted. The known cases of hypertension and the cases diagnosed to have hypertension during cross sectional study from the same study sample were considered as cases and equal number of controls were selected from non hypertensive from the same study population and Matching done for Age (±5 years) and Sex of Controls with that of the Cases (Figure 1) and (Table 2). Population under study examined cross sectionally over a period of one year from 1 January 2012 to 31 December 2012. All adults aged ≥18 years in the randomly selected households were included in the study. If an adult of a household was either non-cooperative or could not be contacted even after two visits, he/she was excluded from the study. Persons <18 years of age, pregnant women & Severely ill persons were also excluded from study. JNC VII criteria is used for hypertension classification as it is the currently used criteria by most clinicians to diagnose, classify & treat hypertension routinely.[6] A person is considered hypertensive if :- The systolic BP ≥140 and/or Diastolic BP ≥90 mmHg. Persons already on antihypertensive treatment were also considered as Hypertensive after examination & confirming the evidences produced. The sample size to find out prevalence of hypertension was calculated by using the formula, as follows: considering the prevalence of hypertension as 21% from the National data (Study conducted by The Indian Council of Medical Research. Non Communicable disease Risk factor Survey Integrated Disease surveillance Project -phase I & II).[7] Estimated prevalence P = 21 , Confidence interval = 95%, (z=1.96) Absolute precision; d= 5% ; $n = z^2 [P (1-P)] \div d^2$; $n = 1.96 \times 1.96 [0.21 (1- 0.21)] \div 0.05 \times 0.05 = 254$. Sample size (n) = 254 with an expected non response rate of 20%, the required sample size was estimated as 305. The required sample size examined from the population under surveillance by systematic random sampling method. Urban health training centre caters around 30000 populations residing in the field practice area. As per the data of the local area available with us an average family consists of 5 individuals, of which 2 are above 18 years of age. So the average number of houses in the study area are 30000 ÷ 5 = 6000. Hence there are about 6000 × 2 = 12000 individuals above 18 years of age residing in the study area. In order to get a sample size of 305 (12000 ÷ 300 = 40) every 40^{th} house was visited until the desired sample size achieved. Those who were absent at the time of house visit were informed to be present in the next visit. In case the selected house hold was locked on two visits, the next household in the neighbourhood was included in the study. BP was measured with a standard mercury sphygmomanometer which was standardized frequently against a same instrument throughout the period of Data collection. The weight was taken on a portable weighing machine with a calibrated scale of 0.5 kg marked from 0 to 130kgs and the machine was frequently validated using a standard weight. Height was measured with a calibrated measuring tape marked in centimeters. The measurement was taken in erect position, barefoot with feet together, heels against the wall and looking straight ahead. For maintaining the uniformity during data collection, house-to-house visits were made in the morning time. Aim & objective of the study and the benefits to the people being examined were explained to the adults and their oral informed consent was obtained. The synopsis was submitted and Institutional Ethical Committee's approval sought before initiation of the study. No conflict of interest rested in the study conduction. A pilot study was

initially conducted to assess the feasibility in terms of time and resources required. All the subjects were personally contacted in their houses, examined and interviewed using the pretested proforma. On visiting the family, baseline data of the family members was taken and persons ≥18 were screened by taking two BP readings. A second visit was made to cover the missed subjects so that there was maximum participation of the subjects in all selected households. Before taking blood pressure measurement, it was ensured that the subject had not consumed food, tea, coffee, alcohol, had smoked or made any physical exertion for at least half an hour. The subject was also asked to empty the bladder, to make him/her relax & subject was made to seat for 15 minutes comfortably. Arm muscles relaxed and the forearm was comfortably supported with the upper arm at the level of the heart. The subject was also asked to avoid wearing anything with tight sleeves. Sphygmomanometer was kept at the eye level to avoid the effect of parallax. A standard adult size cuff of 20" x 6" inches applied evenly on the exposed right arm so that it will cover two third of the length of arm and two third of its circumference. Systolic blood pressure was recorded by palpatory method at the start to rule out auscultatory gap. Blood pressure was recorded as per standard guidelines.[6] The readings are made close to 2mm mark on the scale. Two such readings were recorded at an interval of 10 minutes and the average of the two readings was taken as the blood pressure of the person examined. Additional Dietary Salt Intake was accessed by enquiring whether they had the habit of consuming salted food, pickle, papad or adding extra table salt during meal routinely. Physical Activities were classified into sedentary, moderate and heavy work according to recommendations of the National Institute of Nutrition, ICMR Hyderabad.[8] B.G Prasad socioeconomic Classification adopted and modified according to all India consumer price index (AICPI) for the month of March 2013.[9] After collecting the information and doing the clinical examination of the individuals health education regarding risk factors, investigations, treatment, complications and preventive measures of hypertension was given to the family. The importance of regular treatment emphasized to the subjects on anti-hypertensive drugs and newly detected cases. All the subjects detected as hypertensive were referred to the urban health Training Centre for further investigations, management and follow-up. Investigator gave treatment for minor ailments by prescribing and providing drugs. Data analysis was done by Percentages, Chi Square, Fisher exact, Wilcoxan Rank Sum Test & Multiple logistic regression test using Epi-Info Statistical software.

RESULTS

After completing the house to house survey 305 study subjects were examined out of which 80 i.e. (26.2%) subjects were having hypertension. The overall prevalence of hypertension was 26.2%. Prevalence of hypertension was more in females 33.3% than in males 16.8% which was found to be statistically significant (Table 1). All hypertensive (n=80) taken as cases while (n=80) age and sex matched controls were selected from Non hypertensive subjects (n=225) from same study sample (Figure 1) (Table 2).

Table 1: Prevalence of hypertension.

		Hypertensive		Non Hypertensive		Total	p-value
		Frequency	Percent	Frequency	Percent		
Study subjects		80	26.2%	225	73.8%	305	---
Sex	Male	22	16.8%	109	83.2%	131	0.001
	Female	58	33.3%	116	66.7%	174	
	Total	80	26.2%	225	73.8%	305	

$\chi^2 = 10.56$; df=1; p-value =0.001.

Table 2: Age and sex matched cases and controls.

		Case		Control	
		Mean	Standard deviation	Mean	Standard deviation
Age		53.45	14.32	52.49	14.77
		Case		Control	
		Frequency	Percent	Frequency	Percent
Sex	Male	22	27.5%	22	27.5%
	Female	58	72.5%	58	72.5%
	Total	80	100.0%	80	100.0%

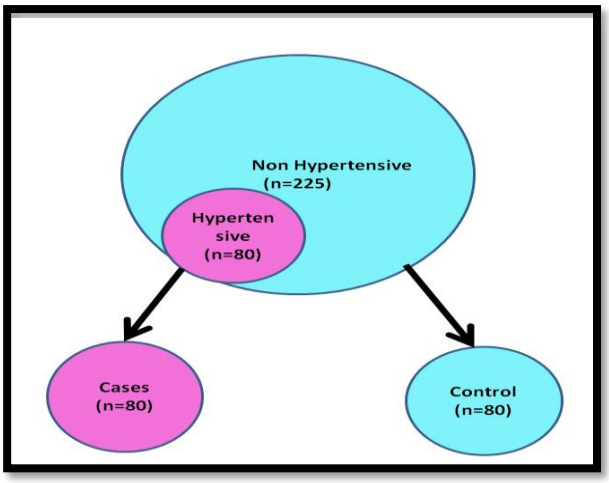

Figure 1: Selection of cases and controls.

Table 3 displays religion wise distribution showing more number of cases as Muslims followed by Hindus. There were 71.2% of cases as married and 85% controls were married [OR=0.4(0.2-0.9) p-value=0.035] thereby marriage appears to be protective factor for hypertension (Figure 2). Almost equal number of cases belongs to nuclear family as controls (Figure 3.)

Distribution of cases according to socioeconomic status shows there are 35% cases in Class I & II (Higher & Upper middle class) as compared to 22.6% controls. As the socioeconomic class decreases the number of controls compared to cases increases from class III to class V suggesting that there is increased risk of hypertension as socioeconomic class increases (Figure 4). However the difference is not statistically significant (p-value=0.414). Distribution according to Body Mass Index shows that There were 63.7% of cases having BMI ≥25 as compared to 35% controls, suggesting that there is increased risk of hypertension as BMI increases (Figure 5) and the difference is statistically significant (p-value=0.002).

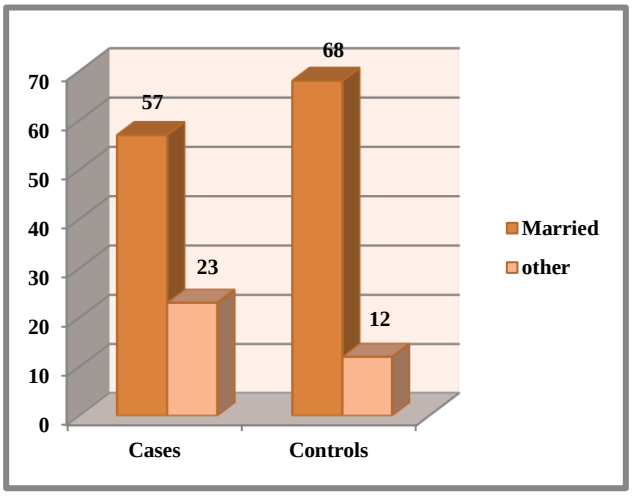

Figure 2: Distribution of cases and controls according to marital status.

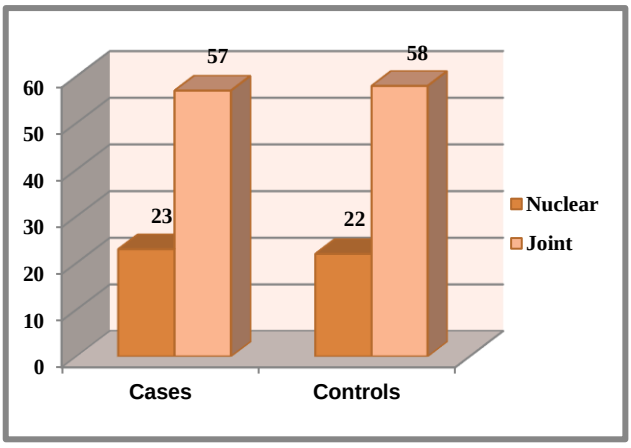

Figure 3: Distribution of cases and controls according to type of family.

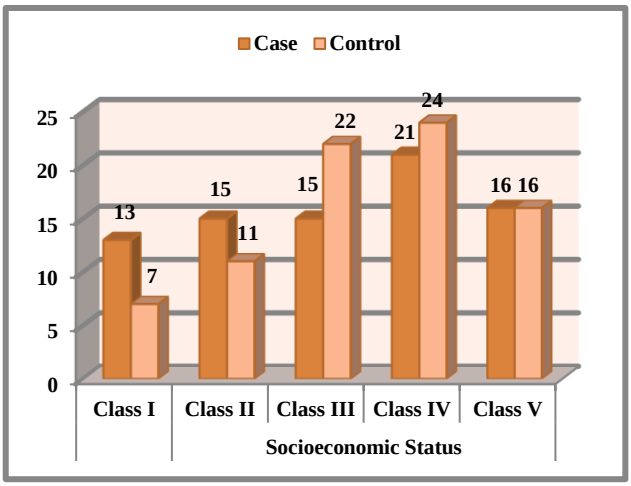

Figure 4: Distribution of cases and controls according to socioeconomic status.

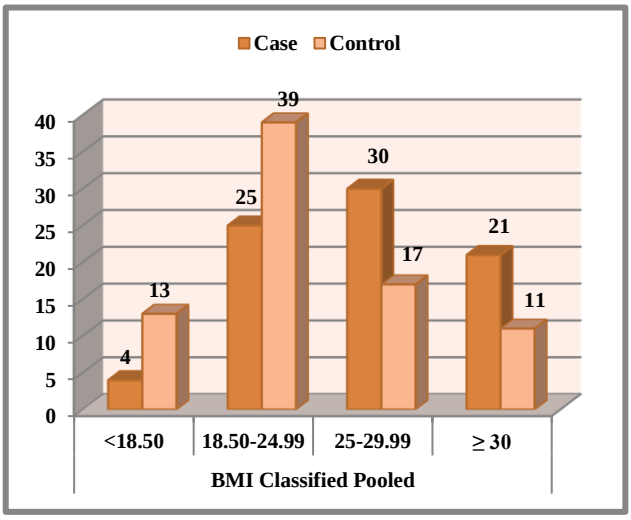

Figure 5: Distribution of cases and controls according to body mass index.

Table 3: Distribution of subjects according to socio demographic variables & associated risk factors.

		Case control				
		Case		Control		
Risk factor		Frequency	Percent	Frequency	Percent	p-value
Religion	Hindu	26	32.5%	33	41.3%	0.516
	Muslim	34	42.5%	30	37.5%	
	others	20	25.0%	17	21.2%	
	Total	80	100.0%	80	100.0%	
Socio economic status	Class I	13	16.2%	07	8.8%	0.414
	Class II	15	18.8%	11	13.8%	
	Class III	15	18.8%	22	27.5%	
	Class IV	21	26.2%	24	30.0%	
	Class V	16	20.0%	16	20.0%	
	Total	80	100%	80	100%	
Body mass index	<18.50	4	5.0%	13	16.2%	0.002
	18.50 - 24.99	25	31.2%	39	48.8%	
	25 - 29.99	30	37.5%	17	21.2%	
	≥ 30	21	26.2%	11	13.8%	
	Total	80	100%	80	100%	
		Case		**Control**		
Risk factor		**Number**	**Percent**	**Number**	**Percent**	**OR (C.I)**	**p-value**
Marital Status	Married	57	71.2%	68	85.0%	0.4 (0.2-0.9)	0.035
	Other	23	28.8%	12	15.0%		
	Total	80	100.0%	80	100.0%		
Type of Family	Nuclear	23	28.8%	22	27.5%	1.0 (0.5-2.1)	0.860
	Joint	57	71.2%	58	72.5%		
	Total	80	100.0%	80	100.0%		
Type of diet	Vegetarian	18	22.5%	26	32.5%	0.6 (0.2-1.2)	0.157
	Mixed	62	77.5%	54	67.5%		
	Total	80	100.0%	80	100.0%		
Additional dietary salt intake	Yes	35	43.8%	18	22.5%	2.6 (1.3-5.3)	0.004
	No	45	56.2%	62	77.5%		
	Total	80	100.0%	80	100.0%		
Tobacco	Yes	22	27.5%	8	10.0%	3.4 (1.4- 8.2)	0.005
	No	58	72.5%	72	90.0%		
	Total	80	100.0%	80	100.0%		
Smoking	Yes	9	11.2%	9	11.2%	1.0 (0.3-2.6)	1.000
	No	71	88.8%	71	88.8%		
	Total	80	100.0%	80	100.0%		
Alcohol intake	Yes	9	11.2%	7	8.8%	1.3 (0.4-3.7)	0.598
	No	71	88.8%	73	91.2%		
	Total	80	100.0%	80	100.0%		
Are you diabetic	Yes	15	18.8%	3	3.8%	5.9 (1.6-21.3)	0.003
	No	65	81.2%	77	96.2%		
	Total	80	100.0%	80	100.0%		
Family history	Yes	34	42.5%	20	25.0%	2.2 (1.1-4.3)	0.019
	No	46	57.5%	60	75.0%		
	Total	80	100.0%	80	100.0%		
Physical activity	Sedentary	35	43.8%	15	18.8%	3.3 (1.6-6.8)	0.001
	Non-sedentary	45	56.2%	65	81.2%		
	Total	80	100.0%	80	100.0%		
Duration of sleep	<8	41	51.2%	28	35.0%	1.9 (1.03-3.6)	0.038
	≥ 8	39	48.8%	52	65.0%		
	Total	80	100.0%	80	100.0%		
Nature of sleep	Calm	39	48.8%	55	68.8%	0.4 (0.2-0.8)	0.010
	Restless	41	51.2%	25	31.2%		
	Total	80	100.0%	80	100.0%		

Table 4: Distribution of cases and controls according to stress.

	Case		Control		P – value by Wilcoxan rank sum test
Perceived stress scale	Median	Inter quartile range	Median	Inter quartile range	
	9	±3	4	±3	0.001

There were 77.7% of cases as compared to 67.5% controls taking mixed diet [OR=0.6(0.2-1.2) p-value=0.157]. There were 43% of cases having habit of taking additional dietary salt intake [OR=2.6(1.3-5.3) p-value=0.004]. There were 27.5% of cases as compared to 10.0% controls having habit of tobacco chewing [OR=3.4(1.4-8.2) p-value=0.005]. There were 11.2% of cases and 11.2% of controls having habit of smoking. [OR=1.0(0.3-2.6) p-value=1.000]. There were 11.2% number of cases and 11.2% of controls having habit of drinking alcohol [OR=1.3(0.4-3.7) p-value=0.598]. There were more number of cases 18.8% having diabetes compared to 3.8% controls [OR=5.9(1.6-21.3) p-value=0.003] showing diabetes a significant risk factor for hypertension. While 42.5% cases were having family history of hypertension compared to 25% controls [OR=2.2(1.1-4.3) p-value=0.019] showing family history of hypertension is a significant risk factor. There were 43.8% of cases having sedentary physical activity compared to 18.8% controls [OR=3.3(1.6-6.8) p-value=0.001]. There were 51.2% cases having sleep duration of <8 hrs compared to 35% controls [OR=1.9 (1.03-3.6) p-value=0.038] showing <8hrs of sleep a significant risk factor. Cases having restless sleep were 51.2% as compared to 31.2% controls [OR=0.4(0.2-0.8) p-value=0.010] which was statistically significant. There is a significant difference in the perceived stress scale score between cases (Median 9 with IQR±3) and Controls (Median 4 with IQR±3) Shown by P-value=0.001. This shows that cases (hypertensive) have higher tendency to stress as compared to controls (non-hypertensive) (Table 4) (Figure 6). All risk factors were subjected to multiple logistic regression analysis. It is observed from above table that, out of fourteen risk factors submitted for multivariate analysis, five out to be significant and independent risk factors for hypertension(Higher socioeconomic status, Mixed diet, Additional dietary salt intake, <8hrs of sleep & Restless sleep) (Table 5). It means that these five risk factors have their own impact on hypertension even after controlling for other risk factors.

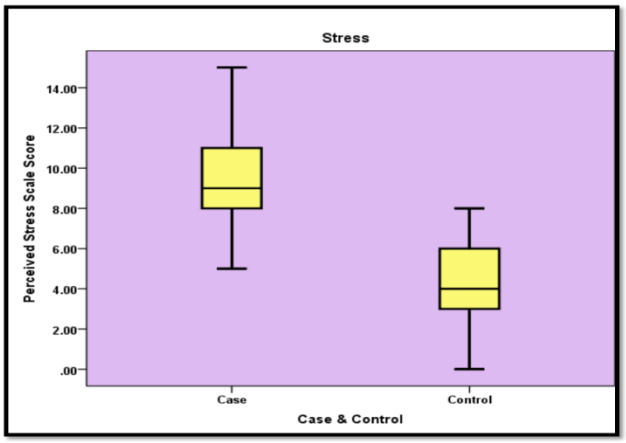

Figure 6 : Distribution of cases and controls according to stress.

Table 5: Multiple logistic regression analysis.

Variables	OR	95% C.I. for OR		P-value
		Lower	Upper	
Marital Status	2.452	0.089	6.708	0.081
Type of family	2.699	0.974	7.482	0.056
Socioeconomic status	**3.282**	**1.108**	**9.720**	**0.032**
Body Mass Index	2.081	0.901	4.807	0.086
Type of Diet	**3.548**	**1.180**	**10.664**	**0.024**
Additional Dietary Salt intake	**2.677**	**1.129**	**6.349**	**0.025**
Tobacco chewing	1.707	0.548	5.318	0.356
Smoking	0.767	0.173	3.391	0.727
Alcohol	1.268	0.246	6.531	0.777
Diabetes	3.359	0.770	14.660	0.107
Family History	1.397	0.612	3.192	0.427
Physical activity	2.308	0.830	6.422	0.109
Duration of sleep	**0.038**	**0.001**	**0.996**	**0.050**
Nature of sleep	**35.849**	**1.402**	**916.844**	**0.030**
Constant	0.045	---------	----------	0.000

DISCUSSION

Estimates of the prevalence of hypertension depend on the cut-off point by which it is defined. For this study we used the Joint National Committee (JNC VII) definition and found the overall prevalence of systemic hypertension to be 26.2%.which is higher than the National data (21%) and other studies done in urban area in Rewa (21.3%) and rural area in Nagpur (15.4%) which also used the same JNC VII criteria.[7,10,11] This could be because of variation in changes in social, economic and cultural backgrounds and difference in the year (time duration) when the study was conducted. In our study the prevalence of systemic hypertension was higher among females (33.3%) than males (16.8%) which is similar to a study done at Nagpur but opposite to the common findings seen in other studies.[7,10,11] This could be attributed to the fact that there were more number of females than males in the population surveyed. In a review by Gupta et al, the prevalence rate in urban India was reported to vary from 3.0% to 44.5% using recent WHO criteria he also states further that epidemiological studies have shown hypertension is present in 25% of urban and 10% of rural subjects in India.[4] The risk factors after univariate analysis were subjected to Multiple logistic regression analysis to adjust all risk estimates for covariates. In this current study, multivariate analysis revealed mixed diet, higher & upper middle class socioeconomic status, Additional dietary salt intake, <8 hrs and restless sleep as significant risk factors for hypertension. The findings of the present study show that 71.2% of hypertensive cases were married and 85% non -hypertensive controls were married [OR=0.4 (0.2-0.9) p-value=0.035] thereby marriage appears to be protective factor for hypertension. These findings are in agreement with an earlier study in Kerala.[12] However, another study showed higher risk among married group.[13] This could be due to more number of hypertensive cases were having stressful marital status such as widowed, divorced, grouped in others category.

Studies in western and Indian populations have shown that dietary salt intake is a significant risk factor for hypertension and cardiovascular disease. Similarly, other studies observed and reported that extra table salt intake is associated with hypertension.[13,14] Similar observation was also seen in this study as 43% of cases were having habit of taking additional dietary salt intake [OR=2.6(1.3-5.3) p-value=0.004] which is statistically significant. This shows that people who consume additional dietary salt are more susceptible for hypertension.

In our study, there is a strong association between BMI and hypertension, with the risk increasing with BMI. The risk is higher among those whose BMI is ≥25 (Overweight) compared to BMI less than 18.5. and the observed difference is statistically highly significant (p=0.002). Similar observations were also made by other studies.[15-20] Almost all the surveys indicate a positive correlation with BMI. This is because more number of persons were having a sedentary physical activity leading to increased BMI

A significant association between family history and hypertension established in this study. The risk of hypertension was higher among subjects who gave a positive family history compared with those who did not. [OR=2.2 (1.1-4.3)] and the difference was statistically significant (p=0.019). Our observations were consistent with that of earlier study which showed a significant positive association between family history and hypertension.[21] This could be due to various complex genetic and environmental interactions, posing a tendency for hypertension. Further studies are however needed to explore the mechanism of association between family history and hypertension, i.e. to separate the effect of genetic and environmental influences.

There are more number of cases 18.8% having diabetes compared to controls 3.8% [OR=5.9(1.6-21.3) p-value=0.003].which shows that diabetes is a significant risk factor for hypertension. Similar findings were also reported by Todkar , Gujrathi VV et al while Awoke et al states the risk is four times more which attributes to the micro vascular damage caused due to chronic hyperglycemia seen in diabetes.[22,23] There were more number of cases 27.5% as compared to controls 10.0% having habit of tobacco chewing [OR=3.4(1.4-8.2) p-value=0.005]. This finding is in agreement with a study done at urban area of Rewa.[24] This can be attributed to the fact that more number of subjects were having a habit of eating Zarda (Tobacco) pan after meal in the study area. Our study also explored the association of hypertension with smoking but there were almost equal number of cases and controls having habit of smoking [OR=1.0(0.3-2.6) p-value=1.000] which is statistically not significant. However, earlier studies observed significant association of smoking with hypertension.[14,15,17] The various studies across the Globe and India indicated that alcohol use as risk factor of hypertension.[13,25] However, in our study there is not much difference in the habit of drinking alcohol in cases and control [OR=1.3(0.4-3.7) p-value=0.598] which is statistically not significant. These could be attributed to the fact that being a community based study, subjects were quite reserved in answering about the habit of smoking and drinking alcohol in spite of adequate privacy given to them. There were many studies available showing socioeconomic status as a significant risk factor for hypertension.[14,26,27] While in our study there were more number of hypertensive cases in Class I&II (Higher & Upper middle class) as compared to controls while as the socioeconomic class decreases the number of controls compared to cases increases from class III to class V suggesting that there is increased risk of hypertension as socioeconomic class increases. However the difference is not statistically significant (p-value = 0.414).Similar findings were also reported by a study done by Khadilkar HA at Chanai but the relation was statistically significant this is attributed to the fact that as whole village was

screened in the above study there were more number of participants in the study.[28]

Although according to a WHO report some observational studies suggest association of several macronutrients (fat, fatty acids, carbohydrates, fiber and protein) with blood pressure, there is as yet no causal relationship with hypertension that has been proved.[29] In our study, There were more number of cases 77.7% as compared to controls 67.5% taking mixed diet. However the difference was not statistically significant [OR=0.6(0.2-1.2) p-value=0.157]. Similar findings were also reported by a study where they found the risk of hypertension was higher among those who consumed non-vegetarian diet.[30] While there are other studies which show findings exactly opposite revealing the role of non-vegetarian diet as a protective factor.[18,27,31] This could be attributed to the fact that most of the participants were consuming fish and sea food as their chief dietary source in the other studies. Regular aerobic physical activity is adequate to achieve at least a moderate level of physical fitness. It has been shown to be beneficial for both prevention and treatment of hypertension. In the current study. there were more number of cases 43.8% having sedentary physical activity compared to controls 18.8% [OR=3.3(1.6-6.8) p-value=0.001] which shows that sedentary physical activity is a significant risk factor for hypertension. Which is similar to earlier studies which observed that level of physical activity had a strong association with hypertension.[15-17] This is because most of the individuals were engaged in sedentary occupation and doing work of less physical work. Sedentary physical activity increases the tendency to put on weight and step towards the way on hypertension. In our study we found there were 51.2% cases having sleep duration of <8hrs compared to controls 35% [OR=1.9(1.03-3.6) p-value=0.038] Hence a sleep duration of <8hrs is a significant risk factor of hypertension. Cases having restless sleep are more 51.2% as compared to controls 31.2% [OR=0.4(0.2-0.8) p-value=0.010] which shows that restless sleep is a significant risk factor for hypertension. Similar observations were also made by other studies.[32,33] This could be due to more number of individuals were facing high amount of Stress. It was like a vicious cycle in which decreased duration and the restless nature of sleep pressurizes the individual and creates a platform for development of stress and in turn increased stress affects the quality of sleep. As the body and mind revival time (sleep) gets affected, the individual becomes more prone to develop hypertension. There is a significant difference in the perceived stress scale score between cases (Median 9 with IQR±3) and controls (Median 4 with IQR±3) Shown by p-value=0.001. This shows that cases (hypertensive) have higher tendency in developing stress as compared to controls (non-hypertensive). Similar observations were also seen in various studies done on stress & hypertension.[19,34-36] This is because there were more number of individuals facing family problems, maximum number were from upper middle & middle class striving to cope with changing and challenging, scenario of hectic life.

Limitations

We have put sincere efforts in explorating the web of hypertension but there were some limitations, like number of females were more than number of males, because the timing of the data collection was in the morning hours, hence many male subjects were not available at home as they had left for there working place. In this study only anthropometric and blood pressure measurements were taken. Patient's Bio-chemical profile was not done because of time and resource constraints. Prevalence estimates have based only on a single occasion measurement of blood pressure. Sample size for Case Control study was not calculated. All cases obtained from cross sectional study were taken & age-sex matched controls were selected from the same study sample. Results of the present study may not be generalized to the population of India due to differences in socio-economic variables, dietary habits and cultural practices existing in the country.

CONCLUSION

The present study was conducted to find out the prevalence of hypertension & associated risk factors in adults ≥18 years of age in an urban area. Total 305 subjects were examined & observations were denoted. A case control study was later conducted in the study population itself to find out the association of various risk factors in causation of the hypertension. All risk factors subjected to multiple logistic regression analysis showed subjects belonging to Higher & Upper middle class of socioeconomic status, Additional dietary salt intake, <8 hrs of sleep, Restless sleep and Mixed diet stand out to be significant and independent risk factors for hypertension. It means that these five risk factors have their own impact on hypertension even after controlling for other risk factors. These observations re-emphasize the need for tailor-made hypertension awareness programs keeping in mind the local influencing factors in the target population. It also brings to light the need for follow-up, counselling and monitoring of hypertensive's to reduce non-compliance to anti-hypertensive medication and lifestyle modification in urban areas. This has to be supplemented by the use of opportunistic blood pressure screening by various registered medical practitioners located in the local area. However further research is still required in this area to consolidate and enhance the knowledge in respect to an ice-berg of the disease called hypertension in real sense.

Recommendations

Prevalence of hypertension in our study was found to be 26.2 % which is higher than the national average. Hence additional research in the area of primary prevention of high BP should be encouraged. This should focus on the

development of cost-effective programs for primary prevention of hypertension, which can be implemented in the general population (population strategy) and more intensive programs for those at special risk of developing hypertension (targeted strategy). We have put a step forward by contributing a small bowl of water to a big pond of hypertension prevalence and its associated risk factors. But what is more important is large ocean's are always made drop by drop. Hence more number of studies are still needed to explore the vivid and dynamic nature of the biggest iceberg (Hypertension) in the sea of life, so our ship of health can sail safely.

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