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HYPERTENSION – PREVALENCE AND RISK FACTORS AMONG URBAN POPULATION IN NORTH KARNATAKA

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ABSTRACT

Background: Hypertension, a major public health problem, is directly responsible for 57% of all stroke deaths and 24% of coronary heart disease related deaths in India. The prevalence of hypertension is increasing rapidly in developing countries more in urban areas due to changing life style and increasing longevity.

Objectives: 1.To estimate the prevalence of hypertension and associated risk factors among urban population (18 years and above) of Raichur district of North Karnataka

Materials and Methods: Prevalence of hypertension among adults from the previous studies was found to be 35%. Sample size of 713 was calculated using the formula $4pq/L^2$ with 10% allowable error. Systematic random sampling was used and after taking informed consent, participants were interviewed using a pre tested questionnaire based on WHO STEPS approach for chronic disease risk factor surveillance and examined. Diagnostic criteria were based on JNC VII guidelines, SBP \geq 140mmHg and/or DBP \geq 90mmHg.

Data was analysed using Epi-info and SPSS version 17. proportions and chi square test were used.

Results: Prevalence of hypertension was found to be 37.6%; significantly associated with smoking, fruits and vegetables intake, salt intake, junk foods, family history of hypertension and obesity. There is no significant association with type of diet (vegetarian or non vegetarian) alcohol and physical activity.

Conclusion: prevalence of hypertension among urban population is high. Life style factors are significantly associated with hypertension. So there is an urgent need for life style modification among urban especially among those with positive family history

Keywords: Hypertension, Prevalence, risk factors, family history, urban

INTRODUCTION

Hypertension is the commonest cardiovascular disorder affecting at least 20% of adult population in several countries. It is one of the important risk factors for cardio-vascular mortality accounting for 20-30% of all deaths¹. It became evident in the early 1970s itself that only about half of the hypertensive subjects in the general population of most developed countries were aware of the condition, only about half of those aware of the problem were being treated. If this is the situation with highly developed medical services, the proportion treated in developing countries would naturally be far less¹. It is an interesting as well as a dangerous disease entity. It remains silent without any symptoms but causes continuous damage to person's cardio vascular system. For the same reason WHO has given the name "SILENT KILLER" as the disease does not cause any harm by itself but predisposes to other cardiovascular diseases like stroke, myocardial infarction etc. It is a major risk factor for cardiovascular disease, chronic renal disease and stroke²

Every year, 17th May is dedicated to World Hypertension Day (WHD). This is an initiative of the World Hypertension League, an affiliated section of the International society of Hypertension (ISH). The WHD was first inaugurated in May 2005 and has become an annual event ever since. The purpose of the WHD is to promote public awareness of hypertension and to encourage citizens of all countries to prevent and control this silent killer, the modern epidemic³. Hypertension is an iceberg disease. The CUPS study revealed that the RULE OF HALVES is still valid in the south Indian population⁴. So it is important to detect hypertension and treat promptly to avoid further life threatening complications. Since no other study has been conducted so far in this area, this study aims to estimate the prevalence of hypertension and its associated risk factors.

AIMS AND OBJECTIVES:

1. To estimate the prevalence of hypertension among subjects aged 18 and above.
2. To study the association between the hypertension and its risk factors.

MATERIALS AND METHODS

Study Design: Community based cross sectional study.

Duration of study: August 2010 – September 2012.

Study Population: people aged 18 years and above residing in the urban field practice area of Navodaya Medical College & Hospital, Raichur

Diagnostic criteria:

Based on JNC VII criteria, a person was considered hypertensive if-

1. SBP \geq 140 and/or DBP \geq 90 mmHg
2. Persons with history of hypertension and on anti-hypertensives.

Sample Size calculation

Prevalence of hypertension among adults from the previous studies was found to be 35% Sample size of 713 was calculated using the formula $4pq/L^2$ with 10% allowable error

Sampling method: Systematic random sampling. House was taken as the sampling unit.

Step -1: sampling interval, $m = \text{total number of houses} / \text{sample size} = 3625 / 713 = 3.73 \approx 4$

Step 2: k, random number should be less than or equal to sampling interval i.e., m

Random number was selected as 3 by using lottery method and so 3rd house was taken as the first house and from then on every 4th house was be visited to find the eligible person. If there were more than one eligible person at the time of visit, the subject to be interviewed was selected by lottery method. If the inhabitants were not at home at the time of visit, the next house was visited. **Step-3:** 3, 3+4, 7+4, 11+4.....

After taking informed consent, the participants were interviewed and examined.

Collection of data: Data was collected by interviewing the study subjects using a pre-tested

questionnaire based on WHO STEPS approach for chronic disease risk factor surveillance.

Measurement of blood pressure: The study participants were made to sit comfortably for 5 minutes before BP was measured. Blood pressure was measured using the auscultatory method with a standardized calibrated mercury column type sphygmomanometer and an appropriate sized cuff encircling at least 80% of the arm in the seated posture, with feet on the floor and arm supported at heart level. The first blood pressure measurement was recorded after obtaining socio-demographic information from the study subject, while the second was recorded after a brief clinical examination. The reading at which korotkoff sound is first heard will be considered as systolic blood pressure and at which the korotkoff sound disappears will be taken as diastolic blood pressure. We used the average of two readings of SBP and DBP to describe the blood pressure of the participant. In cases where the two readings differed by over 10 mm of Hg, a third reading was taken and average of the three measurements was taken.

STATISTICAL ANALYSIS: Data was analysed using Epi info and SPSS version-17.0. Proportions, was used to find out the Prevalence and Chi-square test was used to find the association between categorical variables.

RESULTS

Prevalence

The prevalence of hypertension was found to be 37.6%; 30.2% were in stage I HTN 7.4% of the subjects were in stage II hypertension. Among them 53.7% of hypertensives were already diagnosed to have HTN while 46.3% were newly detected hypertensives; this proves that hypertension is an iceberg disease. 40.4% were found to be pre hypertensives. This shows that more than 3/4th of the population is suffering from high BP.

Association with Risk factors

This study revealed that hypertension was significantly associated with body mass index, maximum in obese patients when compared to normal and underweight;(p<0.0001);significantly associated with central obesity (p=0.0001;p=0.006) in males and females respectively); There is significant association between smoking and hypertension; highest among past smokers(82.7%) followed by current smokers(51.5%) when compared to non smokers(27.6%), alcohol consumption(p<0.013) There is significant association with consumption of vegetables (p=0.0001) and fruits(p=0.06)There is no significant association with physical activity, vegetarian or non vegetarian diet , junk food consumption. However, salt intake > 6 grams/day and family history of hypertension were found to be significantly associated with hypertension. (p=0.009; p=0.003 respectively).

DISCUSSION

Prevalence of hypertension was found to be 37.6%. 30.2% were in stage I and 7.4% in stage II HTN (SBP 140-159 mmHg and/or DBP 90-99 mm Hg and SBP >160 mmHg and/or DBP > 100 mm Hg) respectively; 50.7% of hypertensives were already diagnosed to have HTN while 49.3% were newly detected hypertensives. This shows the submerged portion of the iceberg. Findings of our study are similar to Gupta, R in Jaipur, in urban adults in 2002 which showed prevalence of hypertension as 36% in men and 37% in women⁵ and a study conducted by Avadaiammal⁶ et.al in Trivandrum city, Kerala, south India in 2006 which showed the prevalence as 47%

In our study 40.4% were having pre hypertension. This was high when compared to a Study carried out by M.M.H,V.K Desai⁷ et al,2011 in urban area of south Gujarat region which showed the overall prevalence of prehypertensives as 34.5%But a study conducted by Chaudhry K et al in 2012 in Wardha, in young females 18-25 years showed that 58% were prehypertensives⁸

Our study revealed a positive correlation with family history of hypertension similar to studies conducted by Patnaik N⁹ et al in Orissa S.S.Reddy¹ in Tirupati in 2005, Haresh Chandwani¹⁰ in Gujarat in 2010.

Significant association of hypertension was found with smoking. studies done by PatnaikN⁹,S.S.Reddy¹ et al in Tirupati(2005), S.Yadav¹¹ et al(2008) ,HareshChandwani¹⁰ et al in Gujarat in 2010 also showed similar results. A recent case-control study from Bangalore also showed that smoking was an independent risk factor for hypertension¹² (odds ratio 2.25, p=0.014).

Our study showed a significant association between HTN and alcohol consumption (p=0.013).A study done by NC Hazarika¹³ et al in Assam in 2003 in elderly population found that Alcohol consumption increased the risk of hypertension in the study population. S.S.Reddy¹ in Tirupati in 2005, Patnaik N⁹ in Orissa in 2005, Haresh Chandwani¹⁰ et al in Gujarat in 2005 also revealed higher prevalence of hypertension among those who consume alcohol. Study conducted by M.M.H, V.K.Desai⁷ et al in Surat found that prevalence of hypertension was higher (40.1%) among alcohol consumer than non- drinker (27.2%).

Study by Saunders¹⁴ et al. found a significant positive association between hypertension and alcohol consumption. In their study, in most cases the BP level fell to normal levels after abstinence and remained so in those who continued to abstain but returned to the hypertensive state in those who resumed consumption of alcohol, thus indicating that alcohol is an important risk factor for hypertension.

The Chennai urban population study in 2003 showed BMI was more in hypertensives compared to non hypertensive individuals¹⁵. A multi-centric study conducted by Hypertension study group in 2001 among the elderly in Bangladesh and India found that High body mass index was an important

correlate of hypertension¹⁶. Studies done by Zachariah¹⁷ et al, S.S.Reddy in Tirupati¹ et al (2005), Patnaik N⁹ in Orissa (2005), S.Yadav¹¹ et al (2008) and Haresh Chandwani¹⁰ et al in Gujarat also revealed the similar findings.

There is significant association with increased waist hip ratio similar to Chennai Urban Population Study (CUPS)¹⁵ in 2003.Studies by Mehan M B¹⁸.in urban Indian population showed similar findings.

This study also found a positive correlation with salt intake, fruits and vegetable intake similar to studies done by Haresh Chandwani¹⁰ in Gujarat and Avadaiammal Vimala⁶ in urban population of Kerala.

Our study can be compared to study by Mehan M B et al which revealed that hypertension was found in all subjects who consume < 500 gm of vegetables and fruits per day.¹⁸. The INTERHEART STUDY in 2003 by Salim Yusuf¹⁹ et al found that low consumption of fruits, vegetables constitute a major risk for myocardial infarction worldwide in both sexes and at all ages in all regions

In our study, there is no significant association between Hypertension and physical activity. (p=0.586).Our study can be compared to a study done by L. Patnaik et al⁹ in Orissa in 2005 where there is no statistical significance between HTN and physical activity. (p>0.05).But studies conducted by S.S.Reddy in Tirupati¹ and Shantirani¹⁵ et al. in Chennai (Chennai Urban Population Study) found significant association with hypertension and physical activity in contrast to our study.

Our results can be compared with a study done by Avadaiammal Vimala⁶ which showed that the prevalence of hypertension among subjects on vegetarian diet vs. mixed diet was 41% vs. 49%, respectively but the difference was not statistically significant. (p= 0.09). A study done by Gilberts E C²⁰ et al in a south Indian population also did not find significant association between diet and hypertension.

CONCLUSION

Prevalence of hypertension was found to be 37.6%. pre hypertension is also high with 40.4%. There is significant association of hypertension with smoking, alcohol, fruits and vegetable consumption, junk foods, salt intake and positive family history. Body mass index and waist hip ratio also showed significant association. However, there is no association with physical activity and type of diet. So, life style factors certainly influence the occurrence of hypertension especially among urban population.

Almost half the hypertensives were newly detected during the course of the study. So screening of the population for BP is the only effective method for to diagnose this silent killer and treat adequately for prevention of further complications like stroke, coronary artery disease and renal failure. IEC activities has to be undertaken at the community level which should focus on weight reduction, cessation of smoking and alcohol, increased physical activity and restriction of dietary salt intake. Schools must provide opportunities for promotion of healthy life style in children and the youth. Mental relaxation techniques like yoga and meditation has to be promoted. Public education has to be the cornerstone for successful national campaign to detect, evaluate and treat high BP.

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Table 1: Classification of subjects according to their blood pressure status

21. Classification of BP	22. Frequency	23. Percent
24. Normal	25. 157	26. 21.9
27. Pre-hypertension 28. (SBP 120-139 and/or DBP 80-89 mmHg).	29. 288	30. 40.4
31. Stage - I hypertension 32. (SBP 140-159 mmHg and/or DBP 90-99 mm Hg).	33. 215	34. 30.2
35. Stage - II hypertension 36. (SBP >160 mmHg and/or DBP > 100 mm Hg);	37. 53	38. 7.4
Total	713	100

Table 2: Association between hypertension with its risk factors

Risk factor variables	Hypertensive (%)	Normotensive (%)	Total (%)	χ^2 value	p-value
BMI					
Underweight	18 (20.5)	70 (79.5)	88	124.506	P<0.0001
Normal	52 (21)	196 (79)	248		
Overweight	55 (37.7)	91 (62.3)	146		
Class I Obesity	84 (51.9)	78 (48.1)	162		
Class II Obesity	38 (79.2)	10 (20.8)	48		
Class III Obesity	21 (100)	0	21		
WHR (males)					
<= 0.9	156(30.4)	357(69.6)	513	39.08	P=0.0001
> 0.9	112(56)	88(44)	200		
WHR (female)					
<= 0.8	101(31.9)	216(68.1)	317	7.54	P=0.006
> 0.8	167(42.2)	229(57.8)	396		
Diet					
Vegetarians	35 (33.3)	70 (66.7)	105	0.95	P=0.33
Mixed diet	233 (38.3)	375 (61.7)	608		
Salt intake in grams					
<6	6(16.2)	31(83.8)	37	6.67	P=0.009
>6	262(38.8)	414(61.2)	676		
Vegetable intake					
<=3 times/week	169(50.6)	165(49.4)	334	43.52	P=0.0001
>3 times/week	99(26.1)	280(73.9)	379		
Fruit intake					
<=3 times/week	239(39.5)	366(60.5)	605	5.38	P=0.06
>3 times/week	29(26.8)	79(73.2)	108		
Junk food					
<=3 times/week	12(24)	38(76)	50	3.877	P=0.049
>3 times/week	256(38.61)	407(61.39)	663		
Physical Activity					
Physically Active	81 (39.1)	126 (60.9)	207	0.296	P=0.58
Physically Inactive	187 (37)	319 (63)	506		
Family history of hypertension					
present	99 (45.8)	117 (54.2)	216	8.98	P=0.003
absent	169 (34)	328 (66)	497		
Smoking habits					
Current smoker	53 (51.5)	50 (48.5)	103	103.29	P<0.0001
Non-smoker	145 (27.6)	380 (72.4)	525		
Past smoker	70 (82.4)	15 (17.6)	85		
Alcohol consumption					
Alcoholic	38 (50.7)	37 (49.3)	75	6.112	P=0.013
Non-alcoholic	230 (36.1)	408 (63.9)	638		

p value <0.05- significant

p value <0.001- highly significant