



## OIL INTAKE PATTERN AND ITS ASSOCIATIONS WITH HYPERTENSION AMONG URBAN POPULATION OF ELURU CITY, ANDHRA PRADESH, INDIA

### Medical Science

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### ABSTRACT

**BACKGROUND:** The prevalence of hypertension in the late nineties and early twentieth century varied among different studies in India, ranging from 2-15% in Urban India and 2-8% in Rural India. For the increase of hypertension problem, one of the reason is lack of awareness about oil intake quantity among rural people and urban people.

**OBJECTIVES:** To determine the demographic variables, type and quantity of oil intake and associations with hypertension in Urban area of Eluru.

**MATERIALS & METHODS:** This was a community based cross-sectional study conducted among the adult individuals (aged 30years) residing in the urban field practice area of a ASRAM Medical College, Eluru, during the period from June 2013 to June 2014. After getting the institution ethical committee, maintained confidentiality of the participants and necessary statistical tests like proportions, chi square and students 't' tests were applied.

**RESULTS:** Out of 533 study population, overall prevalence of hypertension was 24.9%. Of the total 533 study population, majority of them consumed palm oil for cooking that was 293 (54.9%), followed by groundnut oil which was 20.5% and lowest safflower oil usage. 53.8 % hypertensive's were consumed more than 1kg /day oil was observed. In the study population, about (46.8%) hypertensive individuals were having stress.

**CONCLUSIONS:** Based on the study results, majority of the population was using palm oil, more quantity, less physical activity and more stress observed in the study population. Need awareness about type of oil and quantity of oil and its adverse effects on health and its consequences to be educated to reduce the problem.

### KEYWORDS

Age, type of oil, quantity of oil, physical activity, stress, BMI.

### INTRODUCTION

Hypertension is a major public health problem and greatest challenge of 21<sup>st</sup> century. Hypertension was reported to be fourth contributory to premature death in developed countries and the seventh in developing countries. Recent reports indicate that nearly 1 billion adults had hypertension and this predicted to increase to 1.56 billion by 2025<sup>1</sup>. The World Health Organization and the Seventh report of Joint National Committee on Prevention, Detection, Evaluation and Treatment of high blood pressure (JNC-7) defines hypertension as systolic blood pressure more than or equal to 140mm Hg and diastolic blood pressure more than or equal to 90mm Hg<sup>2,3</sup>. Globally cardiovascular disease accounts for approximately 17 million deaths in a year, nearly one third of the total deaths. Of these, complications of hypertension account for 9.4 million deaths worldwide every year. Hypertension is responsible for at least 45% of deaths due to heart disease and 51% of deaths due to stroke<sup>4,5</sup>.

Epidemiological studies shows that there is significant geographical difference in the occurrence of hypertension and its complications both between and within the countries: this is considered to be influenced by the interaction of nutritional and environmental factors with the subjects genetic predisposition/susceptibility to hypertension<sup>6</sup>. Hypertension causes about 7.1 million deaths per year and 4.5 % of the disease burden which translates to 64 million disability adjusted life years (DALYs)<sup>7</sup>. The latest WHO Statistics report 2013 reveals that worldwide prevalence of hypertension is 29.2% for males and 24.8% for females. In the year 2005 the World Health Organization issued a plan 2012-2013 for NCD prevention and control which offers the health community a new global goal to reduce death rates from all chronic diseases by 2% per year over above<sup>7</sup>.

Review of epidemiological studies suggests that the prevalence of hypertension has increased in both urban and rural subjects and presently is 25% in urban adults and 10-15% among rural adults<sup>8</sup>. According to WHO Statistics 2012 the prevalence of hypertension in India is 23 % (urban 23.1%, rural 22.6%). According to Office of Register General of India, the prevalence of hypertension in urban population is 25 % and 10 % in rural population .The number of people with hypertension will rise from 118.2 million in 2000 to 213.5 million by 2025<sup>9</sup>.

Dramatic changes in life style from traditional to modern have lead to physical inactivity due to technological advances. Rising affluence has

modified the dietary pattern characterized by increased consumption of diets rich in fat, sugar and calories. Furthermore, increasing population growth at the current rate of about 2% in each year and technological advances have shrunken the employment opportunities particularly among adult generation – leading to stress and hypertension in adults<sup>10</sup>. Hypertension is an iceberg disease and the many studies were conducted on hypertension prevalence in many urban areas mainly in metro cities. Still some data is lacking, in view of gravity and lifestyles identification purpose in small towns like Eluru, we made an attempt to identify regarding oil quantity, type of oil and other risk factors associations with hypertension.

### OBJECTIVES:

1. To identify the demographic and other life style factors like oil intake, type and quantity of oil with hypertension associations.
2. To find the physical activity and stress associations with hypertension.

### MATERIALS AND METHODS

#### Study design and Setting:

This was a community based cross-sectional study conducted among the adult individuals (aged 30years) residing in the urban field practice area of a ASRAM Medical College, Eluru. There are six areas which comes under this field practice area Ashoknagar, Yettugattu, Ameenapet, Motheyvarithota, Harjanapeta and Fathebad . Being the field practice area for the students of ASRAM Medical College, the Urban Health training center provides an opportunity and responsibility for the Post Graduate and Under Graduate students. It would also serve the purpose of providing base line data of Hypertension in the target population of the UHTC, for future follow up and studies.

The study has been conducted from June 2013 to June 2014 (including 6 months of field work) individuals above 30 years of age residing in the field practice area of ASRAM Medical College were included in the study. Systematic random sampling method was used for collecting the data. Based on JNC VII<sup>3</sup> criteria, a person was considered hypertensive if SBP  $\geq$  140 and/or DBP  $\geq$  90 mmHg and Persons already on anti-hypertensive treatment. Data was collected by listing all the areas which comes under urban field practice area. As there were no prevalence studies in this area above 30 years age group, for calculating required sample size for the study, a pilot study was undertaken by considering 50 subjects above 30 years of age in one of

the urban field practice area yettu gattu with pretested questionnaire, and the prevalence of hypertension was 25%. So by taking the mean prevalence of Hypertension in this age group was 25%. Fixing the allowable error to be 15% the minimum required sample size was calculated is as follows:

$$\text{Sample size (n) estimation purpose using the formula } n = \frac{4 \times p \times q}{L^2}$$

Where, n= minimum sample required  
 p= prevalence of Hypertension which is 0.25% = 25/100  
 q = 100 - p i.e. 100 - 25 i.e. 0.75% = 75/100  
 L = Allowable Error of Prevalence i.e. 15% = 15/100 x 0.25 = 0.0375  
 Substituting the values,  $n = \frac{4 \times 0.25 \times 0.75}{(0.0375)^2} = 533$

For using the systematic Sampling Method a sampling frame was formed. The urban field practice area covers the total of 2487 households, first every household was given number and the required sample was obtained by dividing 533 households with the total households and got the number 4 as sample interval. First house has been chosen randomly from 1 to 4 households. Second household was chosen as first house from that every 4th household has been chosen. Eligible individual above 30 years was taken in to study if not found investigator had shifted to next house. Every house was given a number, than total required households was divided by total households, for sample interval.

Sample interval (SI) = total population / sample size  
**Hypertension** was defined as either an SBP ≥ 140 mm Hg, and/or a DBP ≥ 90mmHg, and/or treatment with antihypertensive medication

**STATISTICAL METHODS:**

Proportions were used to summarize the data. Continuous variables were presented as means (with the corresponding standard deviations). Chi square tests and Z Tests were used for inferential statistics with 95% confidence intervals.

**ETHICAL ISSUES:**

Informed Consent was taken from all the study subjects and maintained confidentiality.

**RESULTS:**

**Table 1: Distribution Of Study Subjects According To Their Blood Pressure Status And Age.**

Age group	Hypertension	Normotension	Total
30-40	30 (11.4%)	232 (88.6%)	262 (100%)
41-50	58 (63.7%)	91 (36.3%)	91 (100%)
51-60	29 (74.3%)	39 (25.7%)	39 (100%)
>60	16 (42.1%)	38 (57.9%)	38 (100%)
Total	133 (24.9%)	400 (75.1%)	533 (100%)

$\chi^2 - 53.0, df=3, p=0.0001$

Table 1 revealed that the prevalence of hypertension was 11.4% in 30-40age groups. The prevalence of hypertension increased by age as in age group 41-50 it was 63.7% and in age group 51-60 years it was 74.3%.

**Table 2: Distribution Of Study Subjects According To Their Blood Pressure Status And Habit Of Adding Extra Salt, Physical Exercise And Stress.**

Extra salt	Hypertension	Normotension	Total	P Value
Consumed	54(36.4%)	94(63.6%)	148(100%)	$\chi^2 - 14.6, df=1, p=0.0001$
Not consumed	79(20.5%)	306(79.5%)	385(100%)	
Total	133(24.9%)	400(75.1%)	533(100%)	
Physical exercise				P value
Yes	15(11.5%)	115(88.5%)	130(100%)	$\chi^2 16.5, df=1, p=0.0001$
No	118(29.2%)	285(70.8%)	403(100%)	
Total	133(24.9%)	400(75.1%)	533(100%)	
Stress	Hypertension	Normotension	Total	P value
Present	37(46.8%)	42(53.2%)	79(100)	$\chi^2 = 23.7, df=1, p=0.001$
Absent	96(21.1%)	358(78.9%)	454(100%)	
Total	133(24.9%)	400(75.1%)	533(100%)	

Table 2 depicts that among the study population, There was a statistical significant association was found between extra salt intake and

hypertension. High percentage of hypertensive's were found in those who do not do physical exercise 29.2%, compare to 11.5% hypertensive who do physical exercise. Among the study population (46.8%) hypertensive individuals were having stress full life were found to be having hypertension and when compare with those not having the stress was 21.1 %.

**Table 3: Distribution Of Study Subjects According To Their Blood Pressure Status With Type Of Diet, Junk Food, Type Of Oil And Quantity Of Oil:**

Type of diet	Hypertension	Normotension	Total	P value
Vegetarian	18(69.2%)	8(30.8%)	26(100%)	$\chi^2 = 28.6, df=1, p=0.001$
Mixed	115(22.6%)	392(77.4%)	507(100%)	
Total	133(24.9%)	400(75.1%)	533(100%)	
Junk food	Hypertension	Normotension	Total	P value
Yes	46(27.3%)	122(72.7%)	168(100%)	$0.837, df=1, p=0.361$
No	87(23.8%)	280(76.2%)	365(100%)	
Total	133(24.9%)	400(75.1%)	533(100%)	
Type of oil	Hypertension	Normotension	Total number	P value
Sunflower	24(24%)	76(76%)	100 (100%)	$\chi^2 - 7.60, df=3, p=0.055$
Groundnut	28(25.6%)	81(74.4%)	109 (100%)	
Palm oil	68(22.9%)	228(77.1%)	296 (100%)	
Safflower	13(46.4%)	15(53.6%)	28 (100%)	
Total	133(24.9)	400(75.1%)	533 (100%)	
				P value
Quantity of oil per month/head	Hypertension	Normotension	Total	P-001
0.5 to 0.75 Kg/head	44 (19.2%)	185 (80.8%)	229 (100%)	$P=0.001$
0.75 to 1.0 kg/head	40 (18.7%)	173 (81.3%)	213 (100%)	
>1kg/head	49 (53.8%)	42 (46.2%)	91(100%)	
Total	133 (24.9%)	400 (75.1%)	533 (100%)	

Table 3 revealed that among the study population, only 4.8% (26/533) were vegetarians. Palm oil users in the study population was 55.5% (296/533) and safflower oil users was only 5.2% and no family is using mixed oil culture in the study population. In the study population, 53.8 % hypertensive's those who consumed more than 1kg /day oil was found, 19.2% hypertensive's were consumed less than 1kg/day. Amount of oil was statistically significant association was observed with hypertension.

**Table 4: Distribution Of Study Subjects According To Blood Pressure Status With Body Mass Index And Its Means.**

BMI	Hypertension	Normotension	Total	P value
< 18.5 under weight	12(13.3%)	78(86.7%)	90(100%)	$\chi^2 - 40.1, df=3, p=0.0001$
18.5 to 25 normal weight	45(17.9%)	206(82.1%)	251(100%)	
> 25-29.99	41(47.6%)	79(52.4%)	120(100%)	
More than 30	35(48.6%)	37(51.4%)	72(100%)	$Z - 3.53, P < 0.004$
Total	133(24.9%)	400(75.1%)	533(100%)	
BMI	Mean BMI	Standard deviation	Standard error	
Males	26.89 (N=278)	5.71	0.11	
Females	25.14 (N=255)	5.7	0.12	

Table 4 shown that prevalence of hypertension is increasing with increased BMI, in the present study hypertension was more in obese (48.6%) followed by those who were in overweight range (47.6%). 16.8% (90/533) of study population were underweight. The association between hypertension and BMI was found to be statistically significant. In the study population, the mean body mass index among males was 26.8 and females it was 25.14. The observed difference between the two means of sex and body mass index was statistically significant.

## DISCUSSION

The present study was conducted to study the prevalence of hypertension in urban field practice area of ASRAM Medical College and to study some risk factors like oil intake, type and quantity with hypertension. In our study the overall prevalence of hypertension was 24.9%. These results were comparable to the rates obtained by shymal kumar et al<sup>14</sup> in his study titled 'prevalence of hypertension in urban population of west Bengal, representing eastern India, where the prevalence of hypertension has been reported to be 24.9% in urban adults and also similar rate was obtained by renu rani et al<sup>11</sup> in his study in urban area of Jammu. Present study prevalence among urban adults is comparable to the studies done by Anad P<sup>12</sup> (~27%) among executives of Mumbai, Fulchand Meshram<sup>13</sup> (22.5%) among police personnel of Nagpur & Mohan V<sup>11</sup> (~22%) among Chennai urban population.

In the present study the prevalence of hypertension was found to increase steadily with age. Early onset of hypertension in urban population may be as a result of leading a stressful and fast urban life-style, without sufficient rest to mind and body. In our study prevalence of hypertension was 11.4% in age group 30-40. The prevalence in our study in age group 30-40 was compared to the Renu rani<sup>11</sup> of hypertension study conducted among adults in urban area of Jammu reported a prevalence of 11.3% in the same age group. Increase of prevalence with age is well documented, and this could be attributed to the accumulated effects of various risk factors.

Among the 507 individuals with mixed diet 22.6% were found to be having hypertension. With comparison to vegetarians, among them 69.2% were having hypertension. A statistically significant association was found with type of diet and hypertension. Among the 78.8% individuals with mixed diet 27.3% were found to be having hypertension. With comparison to vegetarians, among them 15.9% were having hypertension. In the present study vegetarian population itself is more and hence need similar studies are required. This result may be due to less vegetarian people to compare.

In our study 46.4% hypertensive's were using safflower oil for cooking when compare to those who using palm oil for cooking in that 22.9% were hypertensive's, as there is no significant association found between type of oil and hypertension. In present study 53.8% hypertensive's consumes more than 1kg /day oil and only 19.2% hypertensive's were consume less than 1kg/day. A statistically significant association was found between quantity of oil and hypertension with p value 0.0001. However in present study 27.7% were consumed extra salt intake, among them 36.4% were hypertensive's. A significant association was found between extra table salt intake with hypertension. A study on Sodium intake and blood pressure in healthy individuals indicated that 5-16% of healthy persons have a "salt dependent BP" and may benefit from a decrease in dietary salt intake. A study among railway employees<sup>15</sup> showed an inverse relationship between salt intake and hypertension prevalence. A study by Cardiology Society of India<sup>16</sup> did not reveal any significant association between hypertension prevalence and high salt intake.

The present study found that people who were engaged in regular physical activity (Engage in regular aerobic physical activity such as brisk walking at least 30 min/day, at least 5 days/week) had less probability of developing hypertension compared to those who rarely do any physical activity. The prevalence of hypertension was 11.5% among those who did regular physical exercise and 29.2% among those who were not practising exercise. Exercise causes release of nitric oxide from the endothelial cells of the blood vessels, which causes vasodilatation and reduces peripheral vascular resistance. Studies have shown that regular physical activity reduces the Systolic blood pressure by 4 – 9 mmHg. Apart from this regular exercise also reduce atherosclerosis by lowering LDL and increasing HDL. Midha T et al<sup>17</sup> conducted a study on hypertension in Lucknow and inferred that people who were physically inactive were at increased risk of developing hypertension compared to people who did regular physical activity.

In our study, it was found that 48.6% of hypertensives had a BMI of  $\geq 25$  kg/m<sup>2</sup> compare to that of those who have less than 25kg/m<sup>2</sup>. Framingham study<sup>18</sup> showed that for every 10% increase in weight there was a rise of 6.5 mmHg in systolic pressure. The Jaipur urban (both sexes) and rural studies (only males)<sup>19</sup>. The Chennai urban population study<sup>14</sup> as well as Bombay executive study<sup>12</sup> have all shown a higher weight and BMI amongst hypertensive groups. Wamala JF et

al<sup>20</sup> in their study on hypertension in Uganda found that Odds of subjects having BMI  $\geq 30$  developing hypertension was 5.07 times more than that of subjects having BMI  $< 25$ . Shihab HM et al<sup>21</sup> revealed similar findings and also study done on urban north Indians and found same result by S. Yadav, R. Boddula et al<sup>22</sup>.

## CONCLUSIONS:

Based on the study results, in the study population high proportion of the people were using saturated fat, less physical activity and more stress due to various factors as this study area is under privileged society on the basis of low socioeconomic strata group in the Eluru. One of the limitation of the study is findings of this study cannot be generalized to the entire population of the Eluru as the sample size is less and all parts of the society not included. Need large scale similar studies to substantiate the present study findings.

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**Conflict of interest:** None.

Institutional ethical Committee clearance taken.

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