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A COMPARATIVE STUDY ON RISK ASSESSMENT FOR HYPERTENSION AMONG ADOLESCENT MALES OF GUNTUR DISTRICT, ANDHRA PRADESH

[1]Butta Nikhil, [2]*Dr. P. Radha Kumari and [3]Dr. M. Lakshmi Suryaprabha

[1]Final Year MBBS Student, Guntur Medical College, Guntur.
[2]Professor, Department of Community Medicine, Guntur Medical College, Guntur.
[3]Director (Research & Development), Dr. YSR UHS, Vijayawada.

***Corresponding Author: Dr. P. Radha Kumari**

Professor, Department of Community Medicine, Guntur Medical College, Guntur.

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ABSTRACT

Background: Hypertension is one of the major risk factors for the rising burden of cardiovascular diseases (CVDs) in developing region. It has been recognised as one of the major public health problems in developing countries since the early seventies and the rate is increasing not only in urban areas but in rural areas with low socio-economic status. The current prevalence of hypertension in children is estimated to be about 1-5%, with higher rates among minority adolescents. So we aimed to study the prevalence of risk factors for Hypertension among adolescent males. **Methodology:** The total sample (200) was divided by Probability Proportion to size (PPS) in which the village with more population required more sample and the village with less population required fewer sample. In the village, required sample was collected by using simple random sampling with random number. The selected houses were visited, any child aged between 12-19years, giving consent, was interviewed. **Results:** This study states that 46.4% adolescents of age group 16-17 years have history of excess salt intake in their diet, 41.2% have history of excess saturated fat in their diet, 35% have habit of eating outside, and 27.2% have habit of smoking. From the above date the age group 16-17 years has high risk for hypertension. **Conclusion:** In this study it was found that adolescents of age group 18-19 years and belonging to Above Poverty Line have high chances of developing Hypertension. As most of the risk actors are modifiable Life style modification can be made to prevent the development of hypertension.

KEYWORDS: Adolescent, Hypertension, Life style modifications, Poverty line.

INTRODUCTION

Hypertension is one of the major risk factors for the rising burden of cardiovascular diseases (CVDs) in developing region.[1] It has been recognised as one of the major public health problems in developing countries since the early seventies and the rate is increasing not only in urban areas but in rural areas with low socio-economic status.

The current prevalence of hypertension in children is estimated to be about 1-5%, with higher rates among minority adolescents.[2][3][4] Primary hypertension (PH), previously considered a disease of adulthood, has now become increasingly common in the pediatric population largely due to obesity epidemic.[5][6] Obese children are three times more likely to develop hypertension than their non-obese counterparts.[7][8] This review therefore focuses on obesity-related teenage hypertension. The relationship between obesity and hypertension has been clearly defined in multiple studies across different ethnic and gender groups.[2][8-13] The etiology of obesity related hypertension has been linked to sympathetic hyperactivity, insulin resistance and vascular structure changes.[14][15] Sorof et al[8] demonstrated the presence of sympathetic hyperactivity in obese school age children, evidenced by increased heart rate and blood pressure variability which contributed to the pathogenesis of isolated systolic hypertension in the cohort. Increased sodium content of the cerebrospinal fluid has been shown to increase sympathetic nervous system activity through activation of the renin- angiotensin-aldosterone pathway in the brain.[14][15] Obese individuals have selective insulin resistance, which leads to increased sympathetic activity and alteration of vascular reactivity and resultant sodium retention as evidenced by decreased urinary sodium excretion.[16] The lessons learnt from the study of obese hypertensive individuals can be largely applied to the diverse population of hypertensive children.

Hence, it is imperative to study the risk factors for hypertension among adolescents to address these issues

in order to improve the health of the adolescents. There were very few studies conducted in India on risk assessment of hypertension among adolescent males and very scanty numbers of studies were available in the rural area of Guntur district of Andhra Pradesh State and hence the present study was taken up.

The present study was conducted with the following objectives

1. To study the risk factors for hypertension among adolescent males.
2. To know the various factors effecting risk factors for hypertension

MATERIALS AND METHODS

Demography of the study area

The present study was carried out in Rural and Urban areas of Guntur district, Andhra Pradesh.

Rural and Urban areas near Guntur Medical College, Guntur were chosen for the research purpose.

Study design

Cross-sectional descriptive study among adolescent males of Guntur district.

Study population

Adolescent males (12-19 years) of the rural and urban areas of Guntur district.

Study Period

Study period was between October 2021 and November 2021. This period includes pilot study, data collection, analysis and writing of the report.

Sampling Method

The total sample size obtained was 200. Rural and Urban areas near Guntur Medical College, Guntur were chosen for the research purpose. The total sample (200) was divided by Probability Proportion to size (PPS) in which the ward with more population required more sample and the village with less population required fewer sample. In the ward, required sample was collected by using simple random sampling with random number table. The selected houses were visited, any child aged between 12-19years, giving consent, was interviewed. If the individuals were not available at the time of study or the house is locked, then second visit was made to that house after 1 week. If the child was still unavailable, then he was excluded and the next person assigned by the random number list was included in the study.

People who didn't give consent or those who met the exclusion criteria were excluded and the next numbers in the random list were included.

Inclusion criteria

All the adolescents who are willing to participate and have given consent were included in the study.

Exclusion criteria

Adolescents who are not willing to participate and who are suffering from known medical illness were excluded from the study.

Ethical Considerations

Institutional ethical committee approval was obtained before starting the study. Permission was obtained from the Principal, Guntur Medical College, Guntur and Superintendent, Government General Hospital, Guntur. Informed consent was taken from the study subjects after explaining the purpose of the study.

Pilot study

A pilot study was conducted on 30 subjects, on the basis of which a few modifications were made to the initial study questionnaire and the final study questionnaire was prepared. These subjects were not included in the final analysis.

Data collection

Data collection was carried out by interview method by house to house survey. Structured pretested questionnaire was administered to the Respondents and information regarding age, religion, education, socioeconomic status was elicited. Anthropometric measurements were done using Adult weighing scale and a flexible measuring tape.

Study tools

A pretested predesigned questionnaire, Adult weighing scale and a Flexible measuring tape.

Data Analysis

Information collected was entered into MS office Microsoft excel 2010 spread sheet. This raw data was exported to Statistical Package for the Social Sciences (SPSS) version 28 for analysis. The results were represented in the form of tables and charts.

RESULTS

There were 200 respondents aged between 12-19 years in the present study.

It is observed that 39% of the study population belongs to age group 16-17 years, 26% of the study population belongs to age group 18-19 years, 25% of the study population belongs to age group 14-15 years and 10% of the study population belongs to age group 12-13 years.

It is observed that 74% of the study population belongs to Above Poverty Line and 26% belongs to Below Poverty Line.

In the present study 53% had Family history of Hypertension, 42% had Family history of Diabetes and 28% had Family history of Obesity.

In the present study 22% were found to be obese according to BMI and 31% had central obesity according

to waist hip ratio.

It is observed that 69% of the adolescents have Waist-Hip ratio of <0.95, 31% have Waist-Hip ratio of ≥0.95.

It is observed that 28% of the adolescents have history of excess intake of salt in their diet, 80% of the adolescents have history of excess saturated fat in diet, 55% of the adolescents have history of adequate consumption of dietary fiber, 60% of the adolescents have habit of eating outside, 11% of the adolescents have habit of smoking, 8% of the adolescents have habit of consumption of Alcohol.

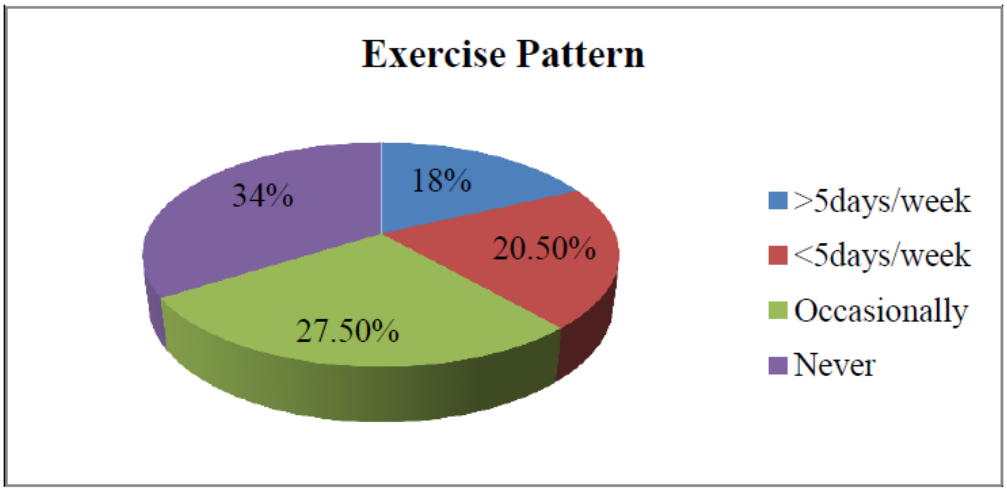

Figure 1: Exercise Pattern in Study Population.

The habit of regular exercise in the present study was found to be only 18%.

Table 1: Age vs BMI.

Age	BMI		
	<18.5	**18.5-24.9**	**>25**
12-13	4(20%)	16(80%)	0(0%)
14-15	6(12%)	42(84%)	2(4%)
16-17	2(2.56%)	74(94.8%)	2(2.56%)
18-19	0(0%)	44(84.6%)	8(15.4%)

In the present study as the age increases the prevalence of obesity is also increasing and maximum prevalence was found to be in the age group of 18-19%.

Table 2: Age vs Waist-Hip ratio.

Age	Waist-Hip ratio	
	<0.95	**≥0.95**
12-13	16(80%)	4(20%)
14-15	12(24%)	38(76%)
16-17	26(33.3%)	52(66.6%)
18-19	4(7.69%)	48(92.3%)

In the present study as the age increases the Waist-Hip ratio is also increasing and maximum prevalence was found to be in the age group of 18-19%.

Table 3: BMI vs Economic Status.

BMI	Economic Status	
	Above Poverty Line	**Below Poverty Line**
<18.5	8(4%)	2(1%)
18.5-24.9	130(70%)	48(24%)
>25	10(5%)	2(1%)

In the present study the BMI was found to be high in those who belong to Above Poverty Line but it is not found to be statistically significant whereas the waist hip ratio is found to be more than normal in study population belonging to Below Poverty Line (21%) than Above Poverty Line (5%).

It is observed that 64% of adolescents above the poverty line have Waist-Hip Ratio ≥0.95, 10% of adolescents above the poverty line have Waist-Hip Ratio <0.95, 21% of adolescents below the poverty line have Waist-Hip Ratio ≥0.95 and 5% of adolescents above the poverty line have Waist-Hip Ratio <0.95**.**

Table 4: BMI vs Waist Hip ratio in the adolescents Above the Poverty Line.

BMI	Waist-Hip Ratio	
	<0.95	**≥0.95**
<18.5	6(4.05%)	2(1.35%)
18.5-24.9	14(9.45%)	116(78.3%)
>25	0(0%)	10(6.75%)

Table 4 gives the comparison between BMI and Waist-Hip ratio in the adolescents Above the Poverty Line. Total adolescents population Above the Poverty Line is 148. It is observed that 6.75% of the adolescents have BMI >25 and Waist-Hip ratio ≥0.95.

Total adolescents population Below the Poverty Line is 52. It is observed that 3.84% of the adolescents have BMI >25 and Waist-Hip ratio ≥0.95.

Table 5: Risk Factors for Hypertension vs Age.

Age (years)	History of excess salt in diet	History of excess saturated fat in diet	History of adequate consumptio n of dietary fiber	Associated with Stress	Habit of eating outside	Habit of smoking	Habit of consumption of Alcohol
12-13	6(10.7%)	18(11.2%)	12(10.9%)	8(57.1%)	14(11.6%)	0(0%)	0(0%)
14-15	8(14.2%)	40(25%)	24(21.8%)	8(57.1%)	34(28.3%)	6(27.2%)	4(25%)
16-17	26(46.4%)	66(41.2%)	44(40%)	4(28.5%)	42(35%)	6(27.2%)	2(12.5%)
18-19	16(28.5%)	18(11.2%)	30(27.2%)	8(57.1%)	30(25%)	4(18.18%)	2(12.5%)

Table 5 gives the comparison between age and Risk Factors for Hypertension. It is observed that 46.4% adolescents of age group 16-17 years have history of excess salt intake in their diet, 41.2% adolescents of age group 16-17 years have history of excess saturated fat in their diet, 10.9% adolescents of age group 12-13 years have history of adequate consumption of dietary fibre in their diet, 57.1% adolescents of age groups 12-13years, 14-15 years, 18-19 years are associated with stress, 35% adolescents of age group 16-17 years have habit of eating outside, 27.2% adolescents of age group 14-15 years,16-17 years have habit of smoking, 25% adolescents of age group 14-15 years have habit of consumption of Alcohol.

Table 6: Risk factors for Hypertension vs Economic status.

Economic status	History of excess salt in diet	History of excess saturated fat in diet	History of adequate consumption of dietary fiber	Associated with Stress	Habit of eating outside	Habit of smoking	Habit of Consumption of Alcohol
Above the Poverty Line	44(78.5%)	126(78.7%)	82(74.5%)	16(57.14%)	96(80%)	14(87.5%)	14(100%)
Below the Poverty Line	12(21.4%)	34(21.2%)	28(25.4%)	12(42.8%)	24(20%)	2(12.5%)	0(0%)

Table 6 gives the comparison between Economic Status and Risk Factors for Hypertension. It is observed that 78.5% adolescents belonging to Above Poverty Line have history of excess salt intake in their diet, 78.7% adolescents belonging to Above Poverty Line have history of excess saturated fat in their diet, 74.5% adolescents belonging to Above Poverty Line have history of adequate consumption of dietary fibre in their diet, 57.14% adolescents belonging to Above Poverty Line are associated with stress, 80% adolescents belonging to Above Poverty Line have habit of eating outside, 87.5% adolescents belonging to Above Poverty Line have habit of smoking, 100% adolescents belonging to Above Poverty Line have habit of consumption of Alcohol.

TABLES

S. No.	Name of the Table
1	Age vs BMI
2	Age vs Waist-Hip ratio
3	BMI vs Economic Status
4	BMI vs Waist Hip ratio in the adolescents Above the Poverty Line
5	Risk Factors for Hypertension vs Age
6	Risk factors for Hypertension vs Economic status

FIGURE LEGENDS

S. No.	Name of the Figure
1	Exercise Pattern in Study Population

DISCUSSION

The present study was conducted in rural and urban areas of Guntur district where 200 adolescents in the age group of 12 to 19 years were included to assess the risk of hypertension. The factors which are associated with hypertension in our study were increasing age, obese, more Waist-Hip ratio, Above poverty Line.

The majority of study population was found to be of age group 16-17years (39%) which is similar to the study done by Weiying Zhao et al.[19]

We found similar result as Maria Kaczmarek et al[20] stating that the likelihood of developing prehypertension decreased with increased urbanization category, maternal education, paternal employment status and income adequacy.

Studies have shown variations in the prevalence of hypertension by geographical region, level of physical activity as well as socio-economic status. Some adolescents even in a school setting do not participate in co-curricular activities due to a tight academic schedule; they spend much of their time seated and studying week in week out.[21]

Among the study population of 200, it is observed that 5% of the adolescents have BMI of <18.5, 89% have BMI of 18.5-24.9 and 6% have BMI of >25 whereas the study done by Bonita Falkner et al[5] reported 16.7% were at risk of overweight and 20.2% were overweight.

Among 106 adolescents population with Hypertension among the Family members, it is observed that 5.66% of the adolescents have BMI >25 and Waist-Hip ratio ≥0.95 which states that the adolescents with hypertensive parents have high chances of obesity which is similar to the study done by Macedo ME et al.[9]

In the present study 8% of the adolescents have habit of consumption of Alcohol and 28% of the adolescents have history of excess intake of salt in their diet. However, the details of how much alcohol drunk and salt consumed were not investigated in this study. Other lifestyle factors such as exposure to persistent academic stress have been identified among adolescents and indicated as risk factors for hypertension.

In the present study 34% of the adolescents have no physical activity. Low level of physical activity was associated with significantly higher HPT risk among which is similar to the study done by Justyna Wyszyńska et al.[22]

CONCLUSION

Age, Economic status, Family history of hypertension, diabetes, obesity, Anthropometric measurements like BMI & Waist-Hip ratio, Exercise pattern and Food habits played a major significant role in the Risk assessment of hypertension among adolescents males in this study.

Thus it could be concluded that inculcation of Healthy Food habits along with Regular Exercise helps in reduction of risks of hypertension.

It is observed that adolescents of age group 16-17years and belonging to Above Poverty Line have high history of excess salt intake in their diet, history of excess saturated fat in their diet, history of adequate consumption of dietary fibre in their diet, are associated with stress, habit of eating outside, habit of smoking, habit of consumption of Alcohol, when compared to other categories. From the above date the adolescents of age group 16-17 years and above the poverty line have high risk for hypertension.

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REFERENCES

1. Makwana Naresh, Shah Viral, Khambhati Sudham, Choudhary Mahesh, Goswami Kalpesh, Yadav Sudha, "Assessment of Risk Factors of Hypertension: A Cross sectional Study", Journal Of Evolution Of Medical And Dental Sciences, October 2012; 1(4): 519 - 526.
2. Sorof JM, Lai D, Turner J, et al. Overweight, ethnicity, and the prevalence of hypertension in

school-aged children. Pediatrics, 2004; 113: 475–82.
3. McNiece KL, Poffenbarger TS, Turner JL, et al. Prevalence of hypertension and pre-hypertension among adolescents. J Pediatr, 2007; 150: 640–4, 644.e1.
4. Acosta AA, Samuels JA, Portman RJ, et al. Prevalence of persistent pre hypertension in adolescents. J Pediatr, 2012; 160: 757–61.
5. Falkner B, Gidding SS, Ramirez-Garnica G, et al. The relationship of body mass index and blood pressure in primary care pediatric patients. J Pediatr, 2006; 148: 195–200.
6. Flynn JT, Falkner BE. Obesity hypertension in adolescents: epidemiology, evaluation, and management. J ClinHypertens (Greenwich), 2011; 13: 323–31.
7. Sorof J, Daniels S. Obesity hypertension in children: a problem of epidemic proportions. Hypertension, 2002; 40: 441–7.
8. Sorof JM, Poffenbarger T, Franco K, et al. Isolated systolic hypertension, obesity, and hyperkinetic hemodynamic states in children. J Pediatr, 2002; 140: 660–6.
9. Macedo ME, Trigueiros D, de Freitas F. Prevalence of high blood pressure in children and adolescents. Influence of obesity. Rev Port Cardiol, 1997; 16: 27–30, 7–8.
10. Morrison JA, Barton BA, Biro FM, et al. Overweight, fat patterning, and cardiovascular disease risk factors in black and white boys. J Pediatr, 1999; 135: 451–7.
11. Wanzhu Tu, George J. Eckert, Linda A. DiMeglio, Zhangsheng Yu, Jeesun Jung, J. Howard Pratt, "Intensified effect of adiposity on blood pressure in overweight and obese children", Hypertension, November 2011; 58: 818–24, DOI: 10.1161/HYPERTENSIONAHA.111.175695.
12. Rosner B, Cook N, Portman R, et al., "Blood pressure differences by ethnic group among United States children and adolescents", Hypertension, 2009; 54: 502–508, DOI:10.1161/HYPERTENSIONAHA.109.134049.
13. Brady TM, Fivush B, Parekh RS, et al. Racial differences among children with primary hypertension, Pediatrics, November 2010; 126(5): 931-937; DOI: 10.1542/peds.2009-2972.
14. Julius S, Nesbitt S. Sympathetic over activity in hypertension. A moving target. Am J Hypertens, 1996; 9: 113S–20S.
15. Palatini P. Sympathetic over activity in hypertension: a risk factor for cardiovascular disease. Curr Hypertens Rep., 2001; 3(Suppl 1): S3–9.
16. Rocchini AP. Insulin resistance, obesity and hypertension. J Nutr, 1995; 125: 1718S–24S.
17. Hansen ML, Gunn PW, Kaelber DC. Underdiagnosis of hypertension in children and adolescents. *JAMA*, 2007; 298(8): 874–879.
18. Tanya M. Spruill: Chronic Psychosocial Stress and Hypertension, Curr Hypertens Rep., 2010 Feb; 12(1): 10–16.
19. Zhao W, Mo L, Pang Y. Hypertension in adolescents: The role of obesity and family history. J Clin Hypertens (Greenwich), 2021 Dec; 23(12): 2065-2070. doi: 10.1111/jch.14381. Epub 2021 Nov 16. PMID: 34783422; PMCID: PMC8696221.
20. Kaczmarek M, Stawińska-Witoszyńska B, Krzyżaniak A, Krzywińska-Wiewiorowska M, Siwińska A. Who is at higher risk of hypertension? Socioeconomic status differences in blood pressure among Polish adolescents: a population-based ADOPOLNOR study. Eur J Pediatr, 2015 Nov; 174(11): 1461-73. doi: 10.1007/s00431-015-2554-0. Epub 2015 May 9. PMID: 25956273; PMCID: PMC4623093.
21. Katamba, G., Agaba, D.C., Migisha, R. *et al.* Prevalence of hypertension in relation to anthropometric indices among secondary adolescents in Mbarara, Southwestern Uganda. *Ital J Pediatr*, 2020; 46: 76. https://doi.org/10.1186/s13052-020-00841-4.
22. Wyszyńska J, Podgórska-Bednarz J, Dereń K, Mazur A. The Relationship between Physical Activity and Screen Time with the Risk of Hypertension in Children and Adolescents with Intellectual Disability. Biomed Res Int., 2017; 2017: 1940602. doi: 10.1155/2017/1940602. Epub 2017 Nov 2. PMID: 29312991; PMCID: PMC5688362.