Journal of Advanced Zoology

ISSN: 0253-7214

*Volume **44** Issue **S-2 Year 2023** Page **498:508***

A COMPARATIVE STUDY OF SOCIO-DEMOGRAPHIC RISK FACTORS FOR ELEVATED BLOOD PRESSURE

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Article History
Received: 24 Aug 2023
Revised: 26 Sept 2023
Accepted: 05 Oct 2023

ABSTRACT

During the stage of adolescence, there exists a valuable opportunity to strengthen the advantages of engaging in positive behaviors by means of suitable messages and programs. An association has been observed between EBP and an increase in left ventricular mass among children and adolescents. The significance of this matter lies in the fact that left ventricular hypertrophy has been recognized as a distinct risk factor for CVS disease in the adult population. The objective of this study was to assess and compare the socioeconomic risk factors of Elevated blood pressure(EBP) among the UA and U-SA of Karad.Using a structured questionnaire comprised of five parts (SES characteristics, behavioral risk, lifestyle-related risk factor, anthropometric measurements, general physical examination including vitals (pulse, blood pressure), and hypertension knowledge), data were collected from a total of 310 adolescents in each area via home visits. In this study, we observed an EBP prevalence of 54 individuals, or 18.7% of the total sample. These individuals were pre-HTN in 34 (11%) and HTN in 24 (7.7%). The prevalence of EBP in the U-SA was found to be 46 (14.9%), with 29 (9.4%) individuals having pre-HTN and 17 (5.5%) individuals having HTN. EBP prevalence was higher in UA adolescents than in U-SA adolescents. Unfortunately, this association did not satisfy statistical significance. Statistically significant is the p-value. This study found HTN knowledge gaps among UA and U-SA adolescents. The slum study area had more adolescents with good HTN knowledge, but the UA had more.

Keywords: HTN, UA, U-SA, adolescents, EBP, CVS, left ventricular hypertrophy.

INTRODUCTION

NCDs are causing substantial disability, morbidity, and mortality in both urban and rural populations and across all socioeconomic(SES) strata in India, which is undergoing rapid demographic and epidemiological transitions according to many studies.[1] In 2016, noncommunicable diseases were responsible for an estimated 6.0 million deaths, or 62% of the total mortality that year, as reported by the ICMR State Level Disease Burden Initiative.[2] Significant increases have been seen in the prevalence of hypertension, the leading risk factor for CVD, among the Indian population over the past two decades by many researchers.[3] A leading risk factor for NCDs, tobacco smoking is responsible for over 1.3 million deaths annuallyaccording to studies.[4]

High systolic blood pressure has been found to be highly linked with the recent trend toward a higher body mass index (BMI) around the teen years.[5] The lack of physical activity, the consumption of fast food, and the culture of video games and computer games as a kind of leisure time activity have all been linked to this trend in the teen age group.[6] The definition of blood pressure in adults is based on a BP level that roughly corresponds to an increase in cardiovascular events and mortality. In children, however, the definition remains based on the top part of the normal BP range rather than on outcome data.[7] In contrast to adults, who utilize a single cutpoint for high blood pressure, children and adolescents are based on percentile values.[8] Hence, the goal of our study was to compare and evaluate the SES risk factor of EBP among the UA and U-SA of Karad.

AIM

To evaluate and compare SES risk factors for EBP among adolescents in UA and U-SA, Karad

INCLUSION CRITERIA

1. Patient aged between 10-18 years of age.
2. Patients who were permanent resident .

EXCLUSION CRITERIA

1. Patients with systemic disease.
2. Patients with secondary hypertension .

MATERIALS & METHOD

A cross-sectional study was undertaken, encompassing patients aged between 10 and 18 years, commencing in December 2017 and concluding in January 2019, within the esteemed confines of the Department of Community Medicine at KIMS, Karad.The study encompasses a population of 584,085 individuals, distributed across 5 towns and 217 villages. Of this total, 129,256 individuals reside in urban areas (UA), while 454,829 individuals reside in urabn slam areas(U-SA) with total of 310 adolescent in each area.

Data collection & methods

Data was collected by house to house visit, using structured questionnaire . One word from UA & 1 from U-SA. Each ward was approached, reached at approximate centre of the ward & main landmark was taken as starting point.At the first visit researcher had introduced themself with greeting.Every effort was taken to relax individual. Researcher have explained each patient about the study& assured that information given by them was only for study

purpose & would be kept confidential.Tools for the study was ISI marked mercury sphygmomanometer, adult acoustic stethoscope,non elastic measuring tape, standardized weighing machine with 0.1 kg accuracy , standard stadiometer with accuracy 0.5cm and proforma with writing material.In our study proforma includes 5 parts of questionnaire i.e. socio-demographic character,behavioural risk & lifestyle related risk factor, anthropometric measurements,general physical examination including vitals(pulse rate, blood pressure) and knowledge about hypertension.

RESULT

Socio-demographic character

Age in years n (%)	Urban			Urban slum		
	Gender		Total n (%)	Gender		Total n (%)
	Male n (%)	Female n (%)		Male n (%)	Female n (%)	
10	17 (7.8)	1 (1.1)	18 (5.8)	6 (3.1)	10 (8.6)	16 (5.2)
11	36 (16.5)	16 (17.4)	52 (16.8)	20 (10.4)	20 (17.1)	40 (12.9)
12	30 (13.8)	13 (14.1)	43 (13.9)	25 (13.0)	22 (18.8)	47 (15.2)
13	46 (21.1)	8 (8.7)	54 (17.4)	46 (23.8)	19 (16.2)	65 (21.0)
14	42 (19.3)	18 (19.5)	60 (19.3)	24 (12.4)	11 (9.4)	35 (11.3)
15	9 (4.1)	16 (17.4)	25 (8.1)	24 (12.4)	8 (6.8)	32 (10.3)
16	17 (7.8)	8 (8.7)	25 (8.1)	16 (8.3)	6 (5.1)	22 (7.1)
17	13 (6.0)	10 (10.9)	23 (7.4)	14 (7.3)	10 (8.6)	24 (7.7)
18	8 (3.6)	2 (2.2)	10 (3.2)	18 (9.3)	11 (9.4)	29 (9.3)
Total	218(100.0)	92(100.0)	310(100.0)	193(100.0)	117(100.0)	310(100.0)

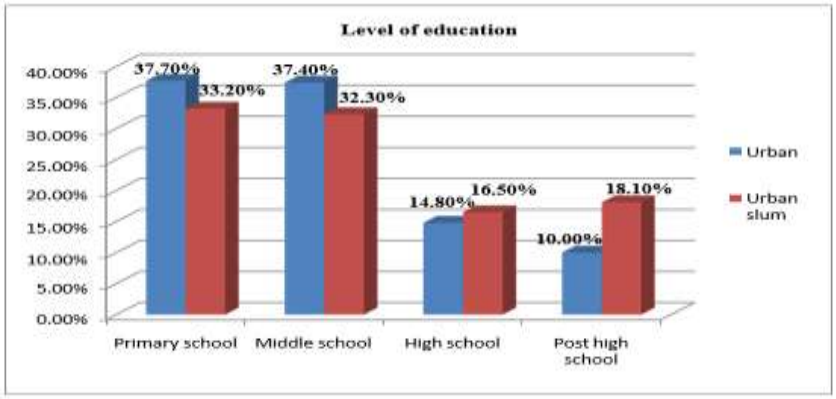
Table 1: Age & Gender-wise distribution

In our study we found that,in urban area , the average age of the adolescents was determined to be 13.41 ± 2.10 years. The average age of males was 13.23±2.09 years, while the average age of females was 13.83±2.06 years. Among the 310 adolescents who participated in the study, the majority were males (n = 218, 70.3%), while the remaining participants were females (n = 92, 29.7%). The distribution of age groups indicates that the majority of adolescents fell into the 14 and 13-year-old categories, with 60 individuals (19.4%) and 54 individuals (17.4%), respectively. Conversely, the smallest number of adolescents were found in the 18-year-old category, with only 10 individuals (3.2%). The largest proportion of male adolescents fell within the 13-year-old age group, comprising 46 individuals (21.1%). This

was followed by the 14-year-old age group, which accounted for 42 individuals (19.3%). The 11-year-old age group had the next highest representation with 36 individuals (16.5%), followed by the 12-year-old age group with 30 individuals (13.8%). The 10-year-old and 16-year-old age groups had an equal number of individuals, with 17 each (7.8%). The 17-year-old age group had 13 individuals (6.0%), while the 18-year-old age group had the lowest representation with 8 individuals (3.7%). Among the female participants, the majority (19.6%) were in the 14-year-old age group, followed by 16 (17.4%) in the 11 and 15-year-old age groups, 13 (14.1%) in the 12-year-old age group, 8 (8.7%) in both the 13 and 16-year-old age groups, 2 (2.2%) in the 18-year-old age group, and the fewest (1.1%) in the 10-year-old age group.

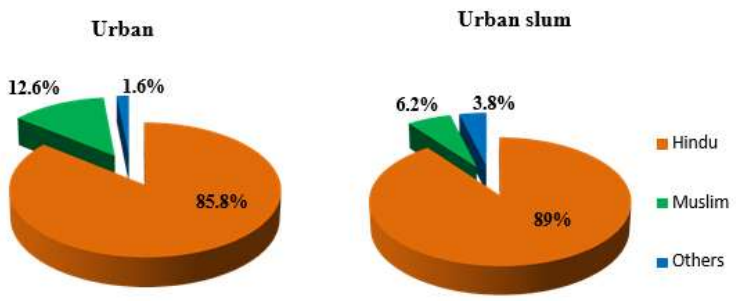
In urban slam area,the average age of the adolescents was determined to be 13.75 ± 2.31 years. The average age of males was 13.95 ± 2.19 years, while the average age of females was 13.41 ± 2.46 years. Among the 310 adolescents who participated in the study, the majority were males (n = 193, 62.3%), while the remaining participants were females (n = 117, 37.7%). The distribution of ages indicates that the majority of adolescents fell into the 13 and 12-year-old categories, with 65 individuals (21.0%) and 47 individuals (15.2%), respectively. Conversely, the smallest number of adolescents were found in the 10-year-old category, with only 16 individuals (5.2%). The majority of males, 23.8%, belonged to the 13-year-old age group, followed by 13.0% in the 12-year-old group. The 14-year-old and 15-year-old groups each accounted for 12.4% of the males, while the 11-year-old group represented 10.4%. The 18-year-old group accounted for 9.3% of the males, followed by 8.3% in the 16-year-old group and 7.3% in the 17-year-old group. The smallest percentage, 3.1%, was found in the 10-year-old group. Among the female participants, the highest number of individuals belonged to the 12-year-old age group, with a total of 22 participants, accounting for 18.8% of the total. This was followed by the 11-year-old age group, with 20 participants (17.1%), and the 13-year-old age group, with 19 participants (16.2%). The 14-year-old and 18-year-old age groups had the same number of participants, with 11 individuals each (9.4%). Similarly, the 10-year-old and 17-year-old age groups had 10 participants each (8.5%). The 15-year-old age group had 8 participants (6.8%), while the 16-year-old age group had the lowest number of participants, with 6 individuals (5.1%).

Level of education



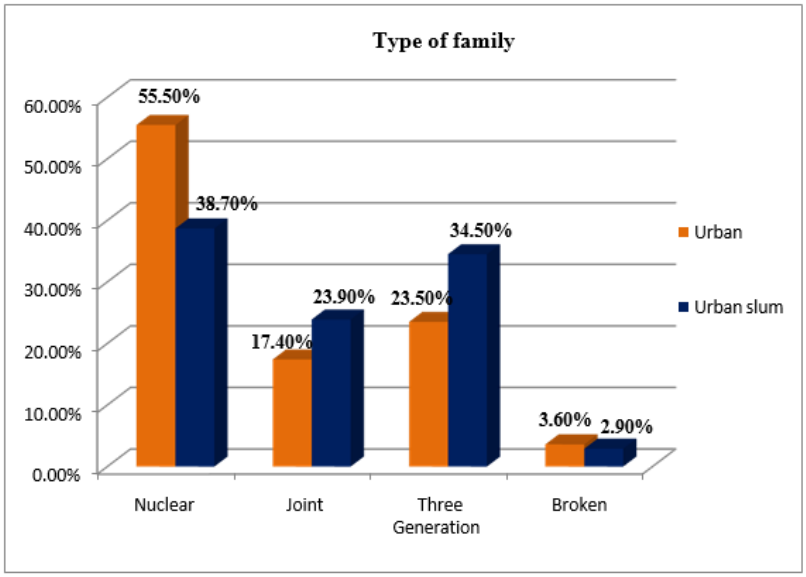
Graph 1: Education-wise distribution

In our study, we found that the majority of the patients were from primary school in both UA 117 (37.7%) and U-SA 103 (33.2%), while the least were among post-high school educates: 31 (10%) in UA and 51 (16.5%) in U-SA.



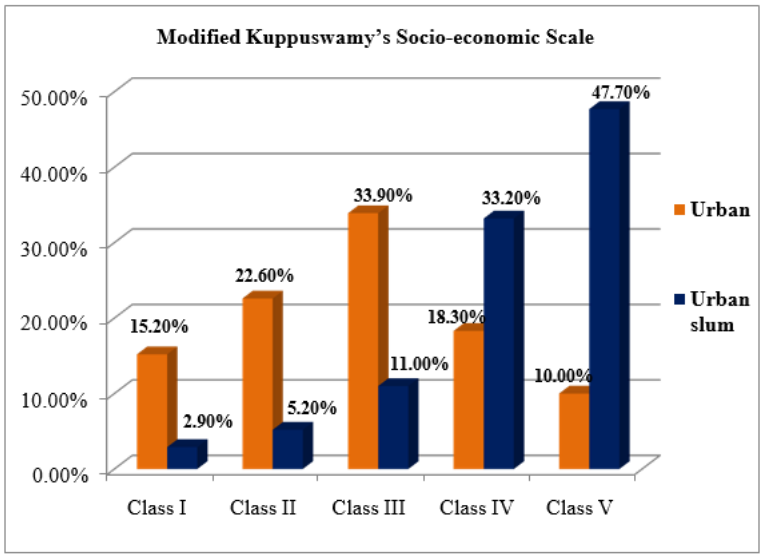
Graph 2: Religion–wise distribution

In our study, we found that the majority of patients were Hindu in both UA 266 (85.8%) and U-SA 276 (89%), while the least among other religions like Christians and Sikhs was up to 5 (1.6%) in UA and 15 (4.8%) in U-SA.



Graph 3: Distribution according to family type

In our study, we found that the majority of patients belong to the nuclear family in both UA 172 (55.5%) and U-SA 120 (38.7%), while the least belong to the broken family, i.e., UA 11 (3.6%) and U-SA 9 (2.9%).



Graph 4 : Distribution according to SES

In our study, we found that in UA, the majority of patients belong to middle class 175 (56.5%), followed by lower class 88 (19.3%), and least among upper class 47 (15.2%), while in U-SA, the majority belong to lower class 251 (80.9%), followed by middle class 50 (16.2%), and least among upper class 9 (2.9%).

Knowledge about HTN	Urban n (%)	Urban slum n (%)	Total n (%)
Poor	70 (22.6)	80 (25.8)	150 (24.2)
Satisfactory	117 (37.7)	165 (53.2)	282 (45.5)
Good	123 (39.7)	65 (21.0)	188 (30.3)
Total	310 (100.0)	310 (100.0)	620 (100.0)

Table 2: Distribution of study on knowledge about HTN

In our study, we found that the majority of patients had good knowledge about high BP in UA (123, 39.7%), followed by satisfactory knowledge (117, 37.7%), and the least had poor knowledge (70, 22.6%). Whereas a higher proportion of adolescents with satisfactory knowledge (165,53.2%) was found among U-SA,followed by poor knowledge (80,25.8%), and the least had good knowledge about high BP (65,21%).

Dietary risk factors	Urban n (%)	Urban slum n (%)	Total n (%)
Dietary Pattern			
Vegetarian diet	92 (29.7)	21 (6.8)	113 (18.2)

Mixed diet	218 (70.3)	289 (93.2)	507 (81.8)
Added salt intake			
No	201 (64.8)	231 (74.5)	432 (69.7)
Yes	109 (35.2)	79 (25.5)	188 (30.3)
Total	310 (100.0)	310 (100.0)	620 (100.0)

Table 3: Distribution of dietary risk factor,salt intake

In our study, we found that, among the study population, the majority followed a mixed diet UA 218 (70.3%), U-SA 289 (93.2%), and the rest followed a vegetarian diet (UA 92 (29.7%) and U-SA 21 (6.8%). Whereas, in both study groups, the majority of adolescents never had extra salt intake. UA 201 (64.8%), U-SA 231 (74.5%), and a minimum added salt intake of UA 109 (35.2%) and U-SA 79 (25.5%).

Behavioural risk factors	**Urban n (%)**	**Urban slum n (%)**	**Total n (%)**
Sleep duration at night			
Adequate	198 (63.9)	222 (71.6)	420 (67.7)
Inadequate	112 (36.1)	88 (28.4)	200 (32.3)
Addictions			
No	300 (96.8)	296 (95.5)	596 (96.1)
Yes	10 (3.2)	14 (4.5)	24 (3.9)
Total	310 (100.0)	310 (100.0)	620 (100.0)

Table 4: Distribution of behavioural risk factor

In our study we have found that,majority of patients had adequate sleep at night UA 198(63.9%), U-SA 222(71.6%) and rest had inadequate sleep UA 112(36.1%) & U-SA 88(28.4%). Whereas in both studies, we found that only a few had addictions: UA 10 (3.2%) and U-SA 14 (4.5%), while the majority had no addictions: UA 300 (96.8%) and U-SA 296 (95.5%).

Behavioural riskfactors	**Urban n (%)**	**Urban slum n (%)**	**Total n (%)**
Physical activity			
Active	218 (70.3)	189 (61.0)	407 (65.6)
Inactive	92 (29.7)	121 (39.0)	213 (34.4)

Body mass index			
Underweight	28 (9.0)	101 (32.6)	129 (20.8)
Healthy weight	147 (47.4)	111 (35.8)	258 (41.6)
Overweight	74 (23.9)	49 (15.8)	123 (19.8)
Obese	61 (19.7)	49 (15.8)	110 (17.7)
Total	310 (100.0)	310 (100.0)	620 (100.0)

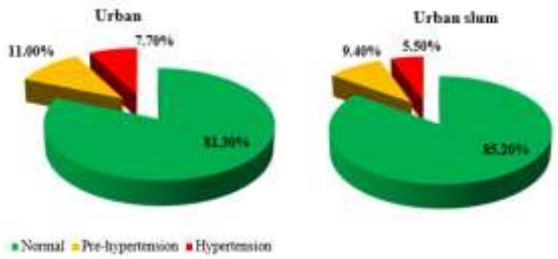
Table 5: Distribution according to behavioural risk factor

In our study, we found that the majority of study patients were found to be physically active in both UA 218 (70.3%) and U-SA 189 (61.0%), while the rest were physically inactive in UA 92 (29.7%) and U-SA 121 (39.0%). Whereas total patients included in the study were healthy (147, 47.4%), followed by overweight (74, 23.9%), obese (61, 19.7%), and least underweight (28, 9.0%). Similarly, in U-SA patients, the majority were healthy (111, or 35.8%), followed by underweight (101, or 32.6%), while the least proportion was overweight or obese (49, or 15.8%).

Other risk factors	**Urban n (%)**	**Urban slum n (%)**	**Total n (%)**
Family H/o Hypertension			
Yes	121 (39.0)	113 (36.5)	234 (37.7)
No	189 (61.0)	197 (63.5)	386 (62.3)
Total	310 (100.0)	310 (100.0)	620 (100.0)

Table 6: Distribution of risk factors

In our study, we found that a higher proportion of adolescents had no family history of HTN (UA 189 (61%), U-SA 197 (64.5%), while the rest had a positive family history of HTN (UA 121 (39%) and U-SA 113 (36.5%).



Graph 5: Prevalence of elevated BP among study population

In our study, it was observed that the prevalence of EBP in the UA group was 54 individuals, accounting for 18.7% of the total sample. Among these individuals, 34 (11%) were classified as having Pre- HTN, while 24 (7.7%) were diagnosed with HTN. In the U-SA, the prevalence of EBP was found to be 46 (14.9%), with 29 (9.4%) individuals having Pre-HTN and 17

(5.5%) individuals having HTN. The prevalence of EBP was higher in UA compared to U-SA adolescents. However, this association did not reach statistical significance. The p-value is greater than 0.05.

DISCUSSION

Age-wise distribution

In our study among urban subjects, maximum number of adolescents were in the age group of 10-13 years (53.9%) followed by 14-15 years age group (27.4%) and the least among 16-18 years (18.7%). Similar findings among urban adolescents were observed in studies by Shoor P *et al.*[1], Mahajan A *et al.*[2], Gupta GK *et al.*[3], Banerjee S *et al.*[5] & Bute J *et al.*[4]. In contrast to our study a higher proportion (50.9%) of study subjects in 14-16 years age group was observed by Kotecha PV *et al.*226 and in 15-19 years (41.8%) age group by Deka MK *et al.*227 Similar to urban subjects a higher proportion of urban slum adolescents were in 10-13 years age group 168(54.2%), followed by 16-18 years 75(24.2%) and the least among 14-15 years age group 67(21.6%).

Gender-wise distribution

In the case of both urban and urban slum adolescents, a higher proportion of males was observed as compared to females. In the urban adolescent population, males make up 70% of the total, while females account for the remaining 30%. A study conducted by Gopalakrishnan H et al.[8] in Trichy and another study by Aggarwal S et al.[9] in Uttarakhand observed a comparable distribution.

Religion wise distribution

Among urban adolescents, the maximum proportion of study subjects were Hindus (85.8%), followed by Muslims (12.6%) and others (1.6%). Similar findings were observed in studies from South India by Omidvar S *et al.*[10] and Manjula P *et al.*[11] Similar observation was also found in a study from Baroda by Kotecha PV *et al.*[12], Sucharitha ST *et al.*[13] and from Uttarakhand by Aggarwal S *et al.*[14] In contrast to our study, a higher proportion of Muslim adolescents (37%) and others (42.9%) was observed in studies by Nayak BS *et al.*[15] and by Shoor P *et al.*[1] from Karnataka.

Education

Education-wise distribution showed that both among urban and urban slum adolescents, the majority were in primary school (117, 37.7%), 103 (33.2%), and middle school (116, 37.4%), 100 (32.3%), respectively, followed by high school and post-high school diplomats.

SES

In this study, among urban adolescents, according to modified Kuppuswamy‘s socio-economic classification, the majority belonged to the middle class (56.5%) and the least to the lower class (10%), whereas in the urban slum group, the majority belonged to the lower class (80.9%) and the least to the upper class (2.9%).Similar findings supporting urban study populations were found in studies by Omidvar S et al.[10] and Aggarwal S et al.[9]

CONCLUSION

Our study revealed, the gaps in knowledge regarding hypertension among adolescents residing in both UA and U-SA. It was observed that a larger proportion of adolescents in the slum study area had satisfactory knowledge about HTN, whereas a higher proportion of

adolescents in the UA exhibited good knowledge. There is a dearth of studies on the knowledge of BP among adolescents in this region of Maharashtra, as well as in the broader Indian context.

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