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Study of blood pressure and factors affecting in adolescent males of slum area in Raipur city Chhattisgarh

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Abstract
Background: A Major urban population residing in slum area, which belongs to low socioeconomic status. Communicable diseases are very common in these population but recent studies reveals that noncommunicable diseases like hypertension, cardiovascular diseases, also a major health problem.
Trend of high blood pressure also raised in adolescent and childhood like older age group, above study is aimed to know the prevalence of blood pressure and factors affecting in adolescent of slum area.
Objectives: To assess the blood pressure and prevalence of hypertension and the associated factors among male adolescents (10-19 years).
Materials & Methods: This Cross sectional study was conducted among 600 adolescent males living in slum area in Raipur city from July 2012 to 2013. All adolescent males studied were undergone anthropometric measurement and calculate body mass index (BMI) and three times blood pressure measured and result were compared and analyze with WHO standard.
Results: Out of the total 600 adolescent males, 13 (2.1%) cases were hypertensive. Rising trend of BP is observed as age advanced except in age group of 12-13 years (1.65%). Maximum no of cases were seen in 18-19 years of age group (4.76%). The mean systolic blood pressure (SBP) 108.72 mm Hg and diastolic blood pressure (DBP) 64.23 mm Hg.
When compared the BP with BMI observed maximum no of hypertensive cases, 8.33% in overweight. In relation to addiction likes (smoking, tobacco chewing, and alcohol) the raised blood pressure seen in 5.2% of addicted population as compared to 1.44% in no addicted population.

Keywords: blood pressure, adolescent males, slum area

Introduction
Now a days due to changing life style, witness of obesity and high blood pressure not only in adults but also in children. Obesity is the main rising factor of childhood hypertension [1]. Blood pressure is influenced by various factors likes age, gender, height, weight, genetic factors. Blood pressure reading elevated on single occasion doesn't necessarily mean that there is high blood pressure, but it does warrant repeated measurements. Recommendations suggest that the BP must be measured at least three consecutive occasions before a child is diagnosed with hypertension.[2]
Therefore this study evaluate the prevalence of hypertension in adolescents of age group between 10-19 years in slum area of Raipur (C.G.).

Material and Methods
This study was based on cross-sectional observational descriptive and analytical study conducted in different slum area in Raipur city during period from September 2012 to September 2013. Sample size was 600, male adolescents aged between 10 –19 years.
The subjects was chosen from different slums area of Raipur city by applying random sampling method. Vocal consent was taken from child or his parents before measuring height, weight, and blood pressure.

Blood Pressure
- Prerequisite follow according to fourth report on diagnosis, evaluation and treatment of high blood pressure in children and adolescents [2].
- Before measuring the blood pressure, children's are divided into groups of 15 were taken to a separate place away from noise, and explained in details, the procedure of blood pressure recording neither painful, nor harmful.
- Measured in right arm in sitting position with appropriate cuff and same mercury sphygmomanometer was used throughout the study.
- Exclude cardiovascular, renal and others diseases affect blood pressure.

Body Mass Index (BMI)
Height
- Before measurement height marking on the wall with the help of measuring tape.
- Ask the child to stand straight, barefoot on the ground with heels, buttocks, upper back, and occiput must be firmly contact with the wall. The chin is tucked in slightly and the head is held erect.(to maintain Frankfort plane)
- The cardboard was pressed firmly onto the subject's head to form a right angle to the wall [3].

Weight
- Weight was recorded using standard weighing machine.
- Weight was measured at the same time of day, with same machine and to the same degree of accuracy to the nearest of 0.5 kg.

Body Mass Index (BMI)

Body Mass Index was calculated based on the formula-

BMI = Weight in kilogram / (Height in meter) 2.

Result

Prevalence of hypertension increases with age in adolescent except between age of 12 to 13 years minimum (1.65%) 1.71% between 10-11 years, 2.5% in 14-15 years, 4.4% in 16-17 years and maximum (4.76%) between 18-19 years of age. (Table-1)

The overall mean systolic blood pressure (SBP) 108.72 mm Hg (range 90-138 mm Hg) and mean diastolic blood pressure (DBP) 64.23 mm Hg (range 60-88 mm Hg).

Correlation of Body Mass Index with SBP and DBP was found significant. (Table-2)

Scatter Diagram

Showing correlation between BMI and SBP& DBP (Fig 1 & Fig 2)

When Blood pressure correlate with addicted adolescents out of 600,122 are addicted to smoking. BP raised in 5.2%, 1.45%. In addicted and no addicted cases respectively. (Table 3)

Table 1: Prevalence of Hypertension Adolescent Male Among

Age (Yrs)	No. of Cases	No. of Hypertensive	%
10-11	233	4	1.71
12-13	181	3	1.65
14-15	120	3	2.5
16-17	45	2	4.4
18-19	21	1	4.76
Total	600	13	2.1 %

Table 2: Correlation of Body Mass Index with SBP and DBP

	R	P Value	S/NS
SBP	0.68	<0.001	S
DBP	0.66	<0.001	S

r= pearsons correlation coefficient, p=highly significant two tailed value.
S=significant, NS= Not significant.

Present study show that correlation coefficient (r) of BMI with SBP and DBP are 0.68 and 0.66 respectively and p value <0.001.

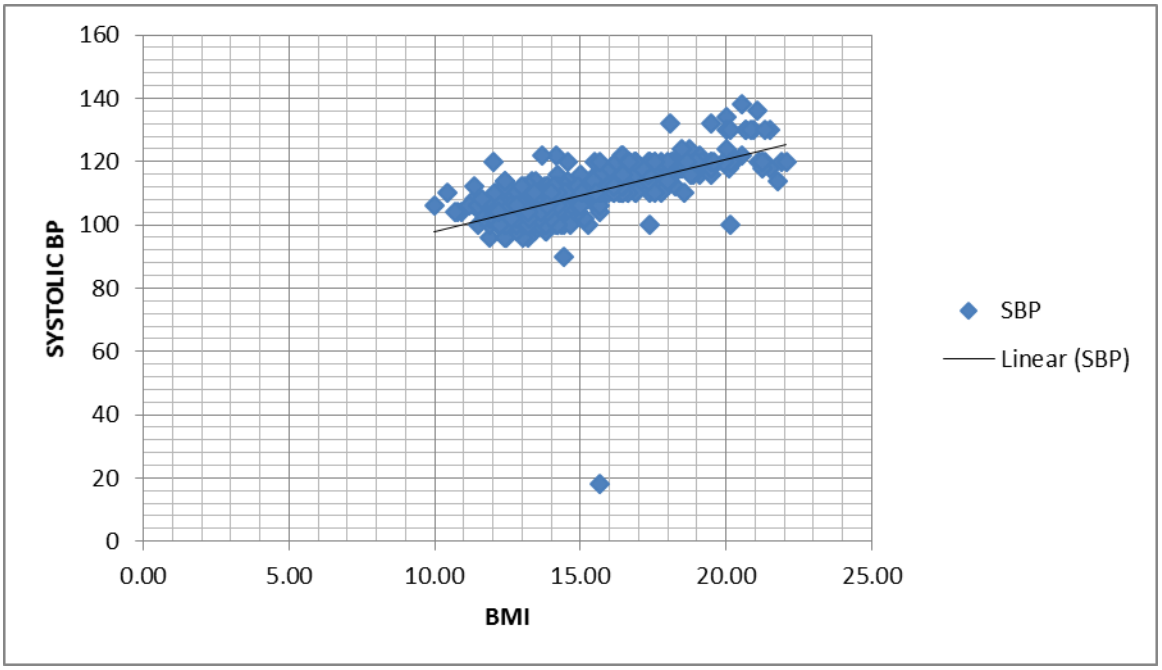

Fig 1: Scattered diagram - Showing correlation between BMI and SBP

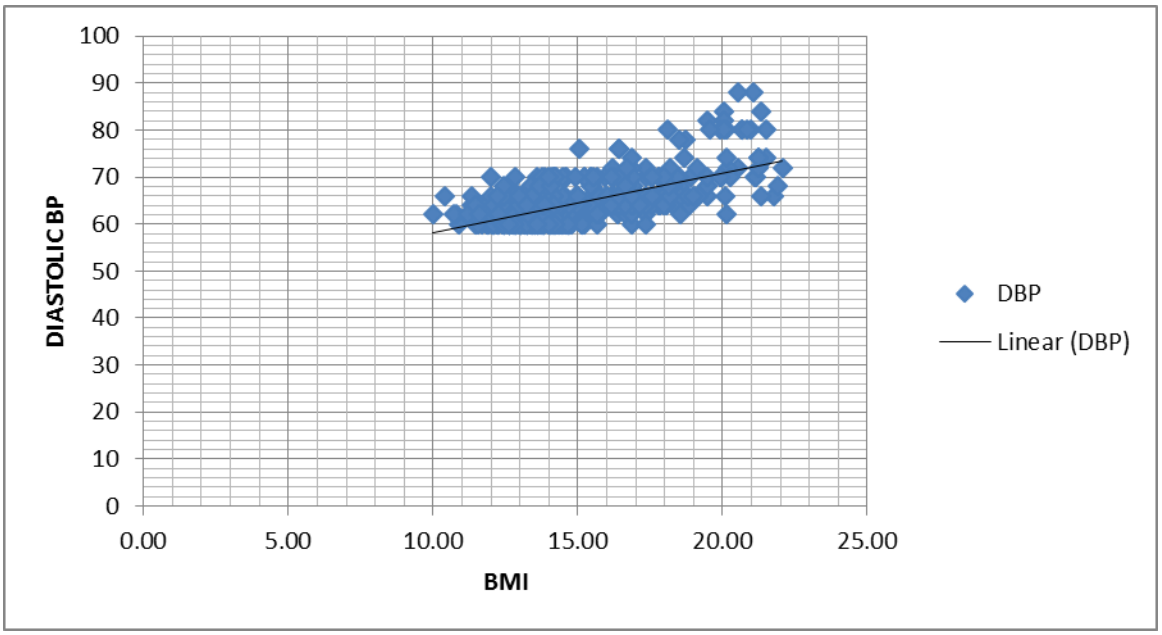

Fig 2: Scattered diagram: showing correlation between BMI and DBP

Table 3: Correlation of blood pressure with addicted and no addicted cases

Blood Pressure	No. of Addicted Cases	%	No. of Non Addicted Cases	%
Normal	115	94.27	471	98.55
<Normal	00	00.0	00	00.00
>Normal	07	5.72	07	01.45
Total	122	100	478	100

Discussion

Adolescent phase considered as the most important time when future health is determined. Blood pressure play as a very significant factor to produce cardiovascular diseases in children.

The present study was carried out in different slum area in Raipur city between age group of 10 to 19 years of age.

The overall mean systolic blood pressure (SBP) 108.72 mm Hg (range 90-138 mm Hg) and mean diastolic blood pressure (DBP) 64.23 mm Hg (range 60-88 mm Hg). In present study the correlation coefficients(r) of body mass index (BMI) with systolic blood pressure and diastolic blood pressure are 0.68 and 0.66 respectively (P<0.001),showing significant positive correlation between body mass index and blood pressures.

When blood pressure correlate with addicted and no addicted cases and p value calculated.

The two-sided P value is 0.0141, considered significant.

Similar Studied by Others Workers

SAHA *et al*., (2008) [4] prevalence of hypertension and variation of blood pressure with age among adolescent in chetla Kolkata. Found maximum cases between 18-19 yrs of age group (6.9%) and minimum between 10-11yrs & 14-15 yrs (1.9%) of age group. others age group 12-13 yrs, 16-17 yrs had 2.4% and 2.5% respectively.

The tendency of blood pressure to rise with age is supported by findings from Turkish study among 13-18 years22. Zambian school children (7-16 years) 23 and German study (4-18 years) 24. In the Jamaican study (6-16 years) 25, blood pressure increased with age in both boys and girls

M.B. Soudarssanane *et al*., (2006) [5] 673 adolescents (males 351, females 322) in the 15-19 years age group. MBP and prevalence of hypertension increased with, weight, height and BMI.

Srinivas in 1991 reported mean SBP of 117 mmHg and mean DBP of 74mmHg among 1025 adults with prevalence of hypertension of 5.5%.

Muralidharan (1996) followed the same cohort in 1996 and recorded mean blood pressure of 121/82 mmHg and prevalence and incidence of 7.1 % and 1.4% respectively.

Swanker Madhusudan *et al*., (2012) [6] Study conducted between age group of 11-19 years of Jaipur and compare rural and urban adolescent. Mean SBP and DBP among the male students were 108.8 mm hg and 72.6 mm hg.

Blood pressure correlate with BMI: N. L. Nanaware-1 *et al*., (2011) [7]

The statistical analysis was done using correlation t-test. There was significant positive correlation between BMI with both systolic as well as diastolic blood pressure.

Gilles Paradis *et al*., (2004) [8] by multiple linear regression analysis found that body mass index was consistently associated with SBP and DBP in all age-gender groups.

David S. Freedman *et al*. [9] found that overweight was more strongly related to elevated levels of DBP and concluded that overweight children and adolescents are at a substantially increased risk for adverse levels of several cardiovascular disease risk factors.

Berkey CS *et al*., (1998) [10] confirmed that greater BMI in adolescence is associated with raised BP.

Jonathan Sorof (2002) [11] concluded that obesity has become an increasingly important medical problem in children and adolescents. Obese children are at approximately a 3-fold higher risk for hypertension than nonobese children. In

addition, the risk of hypertension in children increases across the entire range of body mass index (BMI) values**.**

Aneesa M. Al -Sendi *et al*., (2003) [12] showed that weight and height in boys and weight only in girls were significantly associated with systolic BP independent of age or percentage fat. BMI and percentage body fat were significantly and positively associated with the risk of having high BP in the boys and girls.

Schiel R *et al*., (2006) [9] after investigating the associations and interactions between height, weight, body-mass index and blood pressure values in overweight / obese and normal weight children and adolescents found that overweight and obese children had significantly higher

Conclusion

1. Prevalence of hypertension increases with age, BMI and addiction.
2. Blood pressure values both systolic as well as diastolic than control subjects.

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