Original Research Paper

Community Medicine

TO ASSESS THE PREVALENCE OF ELEVATED BLOOD PRESSURE AMONG ADOLESCENTS

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ABSTRACT
Introduction: Hypertension is a major risk factor that majorly attributed for cardiovascular disease (CVD) that contributes to the increase in the economic burden of certain non-communicable diseases. Hypertension is reportedly affects almost about 1 billion adults which is associated with more than 8 million deaths across the world. **Materials and Methodology:** After obtaining permission from the school authorities, consent forms are obtained from each participant and they were clearly explained about the purpose of the study. There are certain inclusion criteria that were followed in this study include those all the willing students who showed their interest in participating in the study. Those students who were present at the time of study were distributed with the questionnaire with the act of collecting the data were simultaneously subjected to blood pressure examination using certain standard operating procedures. Certain exclusion criteria include those participants having any kind of physical disabilities and few congenital anomalies were excluded from the study. The questionnaire was prepared in their native language and the questionnaire was pretested and the content validity was ascertained by the group of experts. For this cross-sectional study purpose, a total of 790 students were screened who were in the age group of 10 – 18 years of age. Data were entered into a spread sheet and exported to Statistical Package for the Social Science® (SPSS) for windows, version-17.0 software for statistical analysis. **Results:** Students in the age group of 13 – 15 years were recorded the highest with 46.6%. Students in the age group of 10 – 12 years and 16 – 18 years were reported to be 29.5% and 23.9%. In this, there was a male predilection where increased number of boys was participated. Higher number of boys were reportedly having elevated blood pressure when compared to girls. 80.1% of the boys were observed with normal blood pressure readings and 77.9% were observed to be normal. 14.3% of the boys and 12.6% of the girls were reportedly having pre-hypertension stage. **Conclusion:** Screening for the high blood pressure and the associated risk factors should regularly be monitored at the school level. Students with the high risk profile should be kept under regular monitoring and school based counselling services like local health workers, trained teachers under National Health Mission (NHM).

INTRODUCTION

Blood pressure is the force exerted by circulating blood against the walls of the body's arteries, the major blood vessels in the body. The term 'Hypertension' is used when blood pressure is too high that is systolic pressure measuring above 140 mmHg and diastolic pressure measuring above 90 mmHg when recorded on two consecutive days[1] Hypertension is undeniably the greatest risk factors in precipitating cardiovascular diseases, disability and mortality globally. According to a estimation, hypertension is reportedly affects almost about 1 billion adults which is associated with more than 8 million deaths across the world.[2]

Moreover hypertension is less likely to be seen in children than in adults but in recent times it has showed its burden in children and adolescents in certain developed countries over the last decade which could possibly attributed to the surge in obesity.[3,4]

As estimated almost half of the adults presented with hypertension had elevated blood pressure readings even during their childhood.[5] The various other reasons that could possibly attribute to the elevated blood pressure during their childhood are certain secondary causes that include mostly renal parenchyma, reno vascular and endocrine aetiologies.[6]

Essential hypertension is a type which often presents with modest BP elevations. It is more commonly associated with being overweight or obese, a contributory family history (FH), increased dietary sodium intake and premature birth.[7] A simple and a more accurate screening method to identify paediatric hypertension is often required urgently. Obesity and positive FH are the major determinants of essential hypertension among the adults and children.[8] Overall and abdominal obesity, measured by body mass index (BMI) and waist circumference (WC) are reportedly the other common alternative measures of adiposity in clinical and public health scenario. Hence this study is conducted in order to assess the prevalence and risk factors of elevated blood pressure among children and adolescents.

MATERIALS AND METHODOLOGY

After obtaining the ethical committee approval from the institutional ethical committee, the study was carried out in few selected schools in the district. After obtaining permission from the school authorities, consent forms are obtained from each participant and they were clearly explained about the purpose of the study. There are certain inclusion criteria that were followed in this study include those all the willing students who showed their interest in participating in the study.

Those students who were present at the time of study were distributed with the questionnaire with the act of collecting the data were simultaneously subjected to blood pressure examination using certain standard operating procedures. Certain exclusion criteria include those participants having any kind of physical disabilities and few congenital anomalies were excluded from the study.

The questionnaire was prepared in their native language and the questionnaire was pretested and the content validity was ascertained by the group of experts. For this cross-sectional study purpose, a total of 790 students were screened who were in the age group of 10 – 18 years of age. Data were entered into a spread sheet and exported to Statistical Package for the Social Science® (SPSS) for windows, version-17.0 software for statistical analysis.

RESULTS

Table – 1 showed the sex-wise distribution among the students who were participated in the study. Students in the age group of 13 – 15 years were recorded the highest with 46.6%. Students in the age group of 10 – 12 years and 16 – 18 years were reported to be 29.5% and 23.9%. In this, there was a male predilection where increased number of boys was participated.

Table 1: Sex-wise distribution of students according to age group (n=790)

Age (years)	Boys (%)	Girls (%)	Total (%)
10 – 12	142 (29.5%)	98 (31.8%)	240 (45.4%)
13 – 15	225 (46.6%)	128 (41.5%)	353 (67.3%)
16 – 18	115 (23.9%)	82 (26.6%)	197 (37.2%)
Total	482 (100%)	308 (100%)	790 (100%)

In table-2, it has been seen that higher number of boys were reportedly having elevated blood pressure when compared to girls. 80.1% of the boys were observed with normal blood pressure readings and 77.9% were observed to be normal. 14.3% of the boys and 12.6% of the girls were reportedly having pre-hypertension stage.

Table 2: Sex–wise analysis of Blood pressure (n=790)

Blood pressure	Boys (%)	Girls (%)	Total (%)
Normal	386 (80.1%)	241 (77.9%)	627 (79%)
Pre-hypertension	69 (14.3%)	38 (12.6%)	107 (13.4%)
Hypertension	27 (5.6%)	29 (9.5%)	56 (28%)
Total	482 (100%)	308 (100%)	790 (100%)

Table – 3 Illustrated certain risk factors that have been distributed throughout the study participants.

Risk factors	Boys (n=482)	Girls (n=308)	Total (n=790)
Fruits and vegetables less than 5 times a week	95 (19.8%)	51 (16.7%)	146
Fast food less than 3 times a week	168 (35.1%)	97 (31.6%)	265
Extra salt intake	265 (55%)	84 (54.3%)	349
Tobacco usage (past 30days)	109 (22.7%)	-	109
Sedentary	104 (21.6%)	169 (54.8%)	273
Family history	166 (34.5%)	107 (34.7%)	273
Overweight and obesity	60 (12.6%)	56(11.6%)	116
Hypertension and pre-hypertension	95 (19.9%)	68 (22.1%)	163

Table – 4 showed the correlation of high blood pressure with bivariate and multivariate analysis.

Variables	Elevated blood pressure	
	O.R (95% C.I)	A.O.R (95% C.I)
Age (<15 years)	2.13 (1.51– 3.01)	2.27 (1.55 – 3.35)
Fruits & vegetables (>5 times/week)	0.91 (0.63– 1.27)	1.02 (0.69 – 1.55)
Fast food (> 3times/week)	0.82 (0.51– 1.25)	0.77 (0.49 – 1.27)
Extra salt intake	1.69 (1.19– 2.40)	1.55 (1.07 – 2.21)
Tobacco usage	0.91 (0.63– 1.25)	0.94 (0.67 – 1.37)
Physical activity	1.57 (1.09– 2.23)	1.74 (1.15 – 2.61)
Family history	1.04 (0.71– 1.49)	1.17 (0.79 – 1.71)
Increased BMI	2.55 (1.61– 4.05)	2.45 (1.51 – 3.99)

OR (Odd Ratio), AOR (Adjusted Odd Ratio)

DISCUSSION

The present cross sectional school based study had been conducted to study the prevalence of hypertension and its associated risk factors among the children and adolescents aged 10 – 18 years. In another study conducted by *Khan* MI et al[8] in the year 2010 revealed 9.78% were observed and reported to be hypertensive and *Sharma* et al[9] in the year 2010 in their study revealed the school students who were

hypertensive were observed to be 5.9% and pre-hypertension were reported to be 12.3%. Whereas *Kumar* D et al[10] in the following year 2011 revealed that the prevalence of elevated blood pressure among the urban school students were estimated to be 10% (25) versus the rural school students at 9.2% (23).

There are certain studies which estimated the prevalence of hypertension. *Buch* N et al (2011)[11] showed 6.48%, *Anisa* M et al (2011)[12] revealed 9.4%, *Shah* SS et al (2013)[13] illustrated 20.09%, *Sundar* JS et al (2013)[14] observed 21.5%, *Patil* RR et al (2014)[15] reported 3%. Table -3 depicted the ages group-wise 3.8%, 9.5% and 7% students of 10-12 years, 13-15 years and 16-18 years were hypertensive. In similar school based crosssectional study *Khan* MI, et al (2010)[8] the highest prevalence was found at 19 years of age (21.7 %), *Patel* YR et al (2015)[16] in the study, hypertension was predominant in the age group of 13 yrs (12.2%).

Table 5 founds in Bivariate analysis age > 15 years (median) (OR= 2.13), fast food intake (>3 times/week) (OR= 0.82), less physical activity (OR=1.57), increased body mass index (OR=2.55), significantly associated with high blood pressure. In Multivariate analysis age (AOR= 2.27), fast food intake (AOR= 0.77), less physical activity (AOR=1.74), increased body mass index (AOR=2.45) remains significant predictor. Various other studies like *Khan* MI et al (2010)[8] observed no association between hypertension and various other risk factors like extra salt, intake of junk food and the socioeconomic status. Another study by *Singh* AK et al (2006)[17] reported the risk factors associated with elevated blood pressure include sex, extra added salt, overweight and obese. *Shah* SS et al (2013)[13] observed that obesity is strongly associated with the elevated level of hypertension during childhood.

The quality of collected information through questionnaire on dietary behaviour of participants such as frequency of intake of fruits and vegetables, fast food intake, intake of extra salt intake with food etc. had some limitation due to recall bias among the children which is very much dependent on age of the participant, gender, intelligence, mood, attention, and consistency of eating pattern.

CONCLUSION

Routine screening for the paediatric elevated hypertension should be performed in children and adolescents with a BMI classification staging overweight or obesity. Screening for the high blood pressure and the associated risk factors should regularly be monitored at the school level. Students with the high risk profile should be kept under regular monitoring and school based counselling services like local health workers, trained teachers under National Health Mission (NHM).

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