Original Article

Prevalence, risk factors and socio demographic co-relates of adolescent hypertension in District Ghaziabad

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Abstract

Background: Hypertension is a chronic condition of concern due to its role in the causation of coronary heart disease, stroke and other complications. It is one of the major risk factors for cardio-vascular mortality accounting for 20-50% of all deaths. Children with higher blood pressure tend to maintain those levels during adulthood also.

Objectives: Assess the prevalence of hypertension in adolescents (11-18 years), its risk factors and their socio-demographic co-relates. **Material and Method:** Prevalence of adolescent hypertension in previous studies was 7% and the sample size accordingly came to be 1314 with a relative precision of 20%. Multistage sampling technique was used. Half each of the sample size was covered in urban and rural areas . Households in the selected colonies in the urban areas and villages were randomly selected and the adolescents interviewed and examined. Their responses were recorded on a pretested questionnaire and results drawn. Data were analysed using Epi-info and SPSS and chi-square test applied.

Results: Prevalence of adolescent hypertension was found to be 5.3% (72 out of 1340); significantly associated with type of family (P<0.001), educational status (P<0.001), occupation (P<0.001), BMI (P<0.01), and smoking habit (P<0.05). However, no relationship of hypertension was found with salt intake, type of diet, exercise, alcohol consumption, stress and family history of hypertension. **Conclusion:** Socio-demographic factors certainly influence the prevalence and probability of occurrence of adolescent hypertension but the effect of established risk factors (for adult hypertension) needs to be further evaluated for adolescent hypertension and more studies are required in this area.

Introduction

An elevated arterial pressure is probably the most important public health problem in both the developing and developed countries. It is common, asymptomatic, readily detectable, usually easily treatable, and often leads to lethal complications if left untreated. It is one of the major risk factors for cardiovascular mortality, which accounts for 20-50% of all deaths[1] . WHO convened expert committees whose report provides a broad perspective on prevention of hypertension (WHO, 1983). JNC reports offer detailed commentary on newer developments in the diagnosis and management of hypertension. The most recent report of JNC 7 defines hypertension as systolic blood pressure (SBP) >=140 mmHg and diastolic blood pressure (DSP) >= 90 mmHg which simplifies hypertension classification by including only stage I (SBP 140-159 mmHg and DBP 90-99 mmHg) or stage II (SBP >=160 mmHg and DBP >=100 mmHg). Perhaps the most important change is the new classification of "Pre-hypertension" (SBP 120-139 mmHg and DBP 80-89 mmHg) which combines the normal and high normal categories of previous JNC VI report, in recognition of the fact that even these levels of BP confer an increased risk of the development of hypertension and future cardio-vascular events. Individuals with pre-hypertension may require health promoting lifestyle modification to prevent the development of future hypertension and cardiovascular disease[2] .

The National Health and Nutrition Examination Survey done in the U.S. showed an overall prevalence of hypertension of 28.7% in 1999-2000, which varied from 7.2% in those aged 18-39 years to 65.4% in those 60

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years and older and which was greater in women(30.1% than in men(27.1%)[3]. Leupker et al reported that blood pressure normally increases with growth and development[4]. Children with higher blood pressure tend to maintain those levels of blood pressure during adulthood also[5]. So, it becomes increasingly important to detect and interrupt development of childhood hypertension to reduce long term ill effects of the disease. Thus, this study aims to find out the prevalence of adolescent hypertension and its associated factors.

AIMS AND OBJECTIVES:

The following study was undertaken with the following aims and objectives –

1. Assess the prevalence of hypertension in adolescents (11-18 years).

2. Study the risk factors for adolescent hypertension and its socio-demographic co-relates.

Material and Methods:

Study Design

Cross-sectional community based study.

Organization of Study

Santosh Medical College, Ghaziabad.

Period of study

June 2009-June 2010.

Sampling Frame

Colonies in urban areas of Ghaziabad and villages in rural areas of Ghaziabad.

Sample Size

Based on previous studies, the mean prevalence of adolescent hypertension was calculated to be 7%. Thus, the sample size came out to be 1314 (with a relative precision of 20%). Half of this sample was covered in urban and half in the rural areas.

Sampling Method

Multistage sampling technique was used for the study. **For the rural areas**, first, among the community development blocks, Dasna block was selected and then, two subcentres under Dasna block were randomly selected. In the next step, four of the total villages under the selected subcentres were randomly chosen and the sample size covered. Similarly, **for urban areas**, Vasundhara ward was randomly selected from the 80 urban wards and then, sectors 5 and 11 under this ward were randomly chosen and the sample size covered. The above sample was covered by house to house survey to collect the demographic data and all the adolescents in the age-group of 11-18 years were interviewed and examined and the information was recorded on a pre-tested questionnaire. Data thus

collected was coded and tables were drawn and analysed using Epi-info-6 and SPSS-17 software.

Results:

Prevalence

The prevalence of adolescent hypertension was found to be 5.3%, the maximum hypertensives being in the age group of 13-15years (6.2%).(Table 1)

Table-1

Age group	Study population	No. of hypertensives (%)
10-12years	371	18(4.8)
13-15years	530	33(6.2)
16-18years	439	21(4.8)
Total	1340	72(5.3)

Relationship with socio-demographic factors

Adolescent hypertension was found to be significantly associated with the type of family, being more prevalent in the joint family (9.5%) as compared to nuclear family (2.8%; **P<0.001**). Educational status had a significant effect on the adolescents' blood pressure, there being more cases of hypertension in those who were illiterates(14.5%) as compared to subjects completing primary school, middle school, high school or intermediate(4.7%, 3.2%, 3.8%, 8.2% respectively; **P<0.001**). It was also observed that hypertension was significantly associated with occupation. Hypertension was more in the group who were workers (15.2%) rather than those who were involved in business or were studying(12.1%, 4.5% respectively; **P<0.001**). (Table 2)

Table- 2

Socio demographic variables	Non hypertensives [n=1268(%)]	Hypertensives [n=72(%)]	Total (n=1340)	
1.Type of family				P<0.001
Nuclear	803(97.2)	23(2.8)	826	
Joint	465(90.5)	49(9.5)	514	
2. Educational status				P<0.0001
Illiterates	47(85.5)	8(14.5)	55	
Just literate + Primary	183(95.3)	9(4.7)	192	
Middle	273(96.8)	9(3.2)	282	
High school	451(96.2)	18(3.8)	469	
Intermediate	314(91.8)	28(8.2)	342	
3. Occupation				P<0.001
Student	1161(95.5)	55(4.5)	1216	
Business	51(87.9)	7(12.1)	58	
Workers	56(84.8)	10(15.2)	66	

Relationship with risk factors

This study revealed that adolescent hypertension was significantly associated with (a)the Body Mass Index (BMI), being maximum in obese individuals (11.8%) as compared to non-obese people (6.1%, 3.5%, 6.8%; P<0.01) and (b) the smokers (6.7%) as compared to non-smokers (4.1%; P<0.05) while it had no correlation with physical activity, stress and drinking habits. However, amount of salt intake, family history of hypertension and type of diet were found to be positively associated with hypertension (R.R>1.1). (Table 3)

Table- 3

Risk Factor variables	Non hypertensives [n=1268(%)]	Hypertensives [n=72 (%)]	Total (n=1340)	
1.BodyMass Index				
Underweight	229(93.9)	15(6.1)	244	
Normal	672(96.5)	24(3.5)	696	P<0.01
Overweight	262(93.2)	19(6.8)	281	
Obese	105(88.2)	14(11.8)	119	
2. Smoking habits				
Non smoker	671(95.9)	29(4.1)	700	
Smoker	597(93.3)	43(6.7)	640	P<0.05
3.Physical Activity				
Light exercise	606(95.4)	29(4.6)	635	P>0.05
Heavy exercise	662(93.9)	43(6.1)	705	
4. Stress				
Present	643(95.3)	32(4.7)	675	P>0.05
Absent	625(94.0)	40(6.0)	665	
5. Drinking Habits				
Non-alcoholic	527(94.8)	29(5.2)	556	P>0.05
Alcoholic	741(94.5)	43(5.5)	784	
6. Salt Intake				
Low/normal	240(94.1)	15(5.9)	255	P>0.05
High	1028(94.7)	57(5.3)	1085	
7. Type of Diet				
Vegetarian	491(93.7)	33(6.3)	524	P>0.05
Non vegetarian	777(95.2)	39(4.8)	816	
8.Family h/o Hypertension				
Present	412(93.4)	29(6.6)	441	P>0.05
Absent	856(95.2)	43(4.8)	899	

Discussion:

The prevalence of adolescent hypertension was found to be 5.3% in this study which is similar to the findings of Sharma A et al (5.9%) in the school children of Shimla in 2010[6], Mohan B et al (4.6%) in the school children of Ludhiana in 2004[7] and Malhotra P et al (4.5%) in the population of rural Haryana aged 16-70years in 1999[8].

In all these studies, the prevalence of hypertension was found to increase with age. Adolescent hypertension showed a significant association with the type of family which is also evident in the study by Kumar J et al in the rural adolescents of Wardha in 2012[9]. Our study revealed significant association of hypertension with the educational status and the occupation of the

adolescents. These findings are similar to the findings of Kumar J et al. A study done by Agrawal AK et al in Aligarh in 1994[10] also showed a direct impact of occupation on adolescent hypertension.

Adolescent hypertension in this study was significantly associated with the Body Mass Index (BMI), the finding being similar to the findings of Rahman et al[11] who did a similar study in the school children of Pakistan in 2010-11. Significant association of hypertension with BMI (overweight and/or obesity) was revealed in a number of studies in India viz. study by Kumar J et al[9] in Wardha, Durrani AM et al[12] in Aligarh, Sathish T et al[13] in Thiruvananthpuram, Raj M et al[14] in Kochi, Sharma A et al[6] in Shimla, Singh AK et al[15] in Delhi and Mohan B et al[7] in Ludhiana, Soudarssanane et al[16] in Pondicherry. Various studies on population of 4-18 years and 7-16years also identified weight to be a major determinant of blood pressure[17,18].

Smoking habits significantly influence the prevalence of adolescent hypertension as seen in this study. Similar findings were observed in studies by Kumar J et al[9], Sathish T et al[13] and Malhotra P et al[8]. However, Soudarssanane et al found no such association between the two. This study also found a positive correlation between amount of salt intake, type of diet and family history of hypertension. Kumar J et al[9] and Soudarssanane et al[16] also found a significant association of adolescent hypertension with the family history of hypertension. No relationship of adolescent hypertension with alcohol intake and physical activity has been observed in our study as well as the study by Soudarssanane et al.

Conclusion and Recommendation:

Prevalence of adolescent hypertension was found to be 5.3% (72 out of 1340); it was significantly associated with type of family (P<0.001), educational status (P<0.001), occupation (P<0.001), BMI (P<0.01), and smoking habit (P<0.05) of the adolescent. However, no relationship of adolescent hypertension was found with salt intake, type of diet, exercise, alcohol consumption, stress and family history of hypertension. So, socio-demographic factors certainly influence the prevalence and probability of occurrence of adolescent hypertension but the effect of established risk factors (for adult hypertension) needs to be further evaluated for adolescent hypertension and more studies are required in this area.

None of the adolescents were aware of their condition. So, it is essential to arrange regular health check-ups

in schools to identify the hypertensives as well as the high normotensives (as they are at a higher risk to progress towards hypertension later on). Also, in view of the detrimental effects of untreated hypertension, control and prevention of hypertension at the level of the community and that too, from a young age will be highly fruitful. Therefore, IEC activities should be undertaken in the community as well as in schools to sensitise the people regarding simple and healthy life style changes which will prevent the development of hypertension. This will in turn not only prevent the development of hypertension but also the development of other life style related diseases.

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