Volume : 4 | Issue : 1 | January 2015 • ISSN No 2277 - 8179

Research Paper

Prevalence of hypertension among boys (6-18 years) belonging to Tripuri tribal of Tripura

BIOLOGY

KEYWORDS : Blood Pressure, Overweight, Hypertension, Tripuri tribe

Sandeep Roy Sarkar — Department of Human Physiology, Tripura University, Tripura, India

Samir Kumar Sil — Department of Human Physiology, Tripura University ,Tripura, India

ABSTRACT

The present study was undertaken to evaluate the prevalence of sustained hypertension and prehypertension and to determine the relationship between body mass index (BMI), waist circumference (WC) and blood pressure among rural Tripuri tribal boys of Tripura. This cross-sectional study was performed involving 458 healthy boys aged 6 to 18 years from rural areas of Mohanpur and Jampuijala sub-divisions of West Tripura district, Tripura. Systolic and diastolic blood pressure was measured by auscultatory method using a mercury sphygmomanometer and stethoscope. Prevalence of overweight was observed 1.53% by using BMI as indicator. No trend of obesity was recorded. Systolic blood pressure and Diastolic blood pressure was progressively accelerated as the age advances with few fluctuations. The prevalence of prehypertension and hypertension combining all ages was found to be 9.39% and 2.62% respectively among rural Tripuri tribal boys. Positive correlations were observed between blood pressure, BMI and waist circumference.

INTRODUCTION

Hypertension is a major public health problem worldwide and is one of the risk factors for coronary artery disease and cerebrovascular disease. Development of adult hypertension may start very early in life, and children maintain their position in the blood pressure distribution over time (Shear et al., 1986). As the symptoms of childhood hypertension are largely nonspecific, most children with essential hypertension are likely to be asymptomatic (Tanne, 2002). The long-term health risks for hypertensive children and adolescents can be substantial; therefore, it is important that clinical measures be taken to reduce these risks and optimize health outcomes.

Overweight, obesity and hypertension are significant risk factors for increased morbidity and mortality, not only in high-income but also in developing countries like India. Thus, assessing the prevalence of overweight, obesity and hypertension in children and adolescents may predict the future health of a country's population (Bao et al., 1995). Although there have been steady increases in the prevalence of these parameters among the Indian population (Gupta, 2004; Deshmukh et al., 2006) there exists limited data on such issues among different populations of our country (Deshmukh et al., 2006; Gupta et al., 2007).

Tripuri tribes are considered to be a part of the Tibeto-Burmese ethnic group and physically they exhibit mongoloid features (DevBarman, 2004). Very few studies on growth have been reported on the Tripuris, the numerically major tribal population of Tripura (Sarkar et al., 2012; Sil et al., 2012; Sarkar and Sil, 2014), but studies relating hypertension are rare. Therefore this study was undertaken to determine the prevalence of sustained hypertension and prehypertension and also to determine the relationship between body mass index (BMI), waist circumference and blood pressure among apparently healthy school children residing in Tripura, north-eastern India.

METHODOLOGY

This cross-sectional, school-based survey was carried out from May to November 2012. The study was in accordance with the Helsinki Declaration of 1964, as revised in 2000 (Touitou, 2004). Childrens of aged 6-18 years were enrolled from rural localities of Abhicharan and Kamalghat (under Mohanpur sub-division), Takarjala, and Gabordi (under Jampuijala sub-division) of West Tripura district of Tripura. Cluster sampling method was followed for selecting 458 apparently healthy rural Tripuri tribal boys. Age of each subject was verified from school records. After obtaining informed consent from the parents, all childrens ware measured on schools. Those on anti-hypertensive medication and known to have chronic heart, renal or hepatic disease were excluded. Information on age, sex and family history of hypertension and cardiovascular disease was recorded. Family history was taken to be a history of hypertension in the parents or the grandparents.

Anthropometric measurements were taken following the protocol of International Biological Programme (Weiner and Lourie, 1969). Body weight was recorded to the nearest 0.5 kg with the subject standing motionless on a personal weighing scale. Height was measured to the nearest 0.1 cm with the help of an anthropometer. Waist circumference was measured with the subject in the standing position. BMI (kg/m^2) was also calculated. Participants were asked to remove their shows and to wear light underwear prior to taking measurements. Before blood pressure measurements, students were familiarized to the instrument and the nature of the procedure was explained. Blood pressure was determined by auscultation in right arm after a minimum rest of 30 minutes, by standardized method using the mercury sphygmomanometer (NIH, 2005). For each student, the blood pressure was measured thrice in the same visit with a minimum of 30 seconds rest between each determination and mean blood pressure was calculated. The systolic blood pressure was determined by the onset of the "tapping" Korotkoff-1 sound and the diastolic at its disappearance (Korotkoff-5). Students found to have hypertension or prehypertension on first visit were undergo a second set of blood pressure measurements at least four weeks later after the first measurement. The standard (NIH, 2005) norms were then used to conclude the presence or absence of hypertension or prehypertension. All anthropometric and blood pressure measurements were made by a single observer, the first author himself.

RESULTS

The analytical results for the distribution of two anthropometric variables of rural Tripuri boys according to ages are represented in Table 1. Mean values of all anthropometric variables are progressively accelerating with advancement of age with few fluctuations. The BMI cut-offs for overweight and obesity was >23.0 and >25.0 kg/m^2 respectively (WHO, 2000) The prevalence of overweight was observed 1.53% among rural Tripuri tribal boys of Tripura. No prevalence of obesity was observed.

Mean and Standard Deviation (SD) of Systolic blood pressure (SBP) and Diastolic blood pressure (DBP) of the study population were calculated. Systolic blood pressure and Diastolic blood pressure were found to be progressively accelerating with advancement of age (Fig.1). Prehypertension in children is defined as a systolic or diastolic pressure equal to or greater than the 90th percentile but less than the 95th percentile.

Table 1: Descriptive statistics of rural Tripuri tribal boys (6

Volume : 4 | Issue : 1 | January 2015 • ISSN No 2277 - 8179

to 18 years of age).

Age (yrs.)	n	Waist circumference (cm)		BMI (kg/m^2)	
		Mean	SD	Mean	SD
6	30	48.47	1.86	13.67	0.79
7	30	50.29	2.82	14.18	1.14
8	37	53.73	4.63	14.54	1.09
9	31	54.79	5.67	15.33	1.89
10	47	54.46	2.46	14.79	0.89
11	33	54.09	3.61	15.01	0.69
12	35	60.92	3.99	16.91	1.60
13	36	61.44	4.13	16.81	1.20
14	41	63.14	4.79	17.71	1.84
15	32	62.71	3.00	17.97	1.67
16	36	66.08	2.57	19.83	1.18
17	44	68.10	4.91	20.29	1.97
18	28	69.00	3.50	21.11	1.32

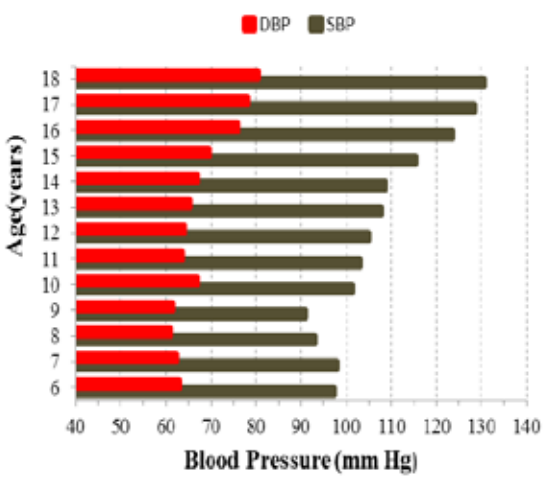

Figure 1: Blood pressure pattern with age in rural Tripuri tribal boys.

Hypertension in the young is defined as systolic or diastolic blood pressure that is repeatedly above the 95th percentile for age and sex (NIH, 2005). The prevalence of prehypertension was found 9.39% and prevalence of hypertension was found 2.62% among rural Tripuri boys (Table 2). Maximum hypertensive boys were found at age group of 16 yrs. Among 55 students combining prehypertension and hypertension, 12 (21.82%) had a family history of hypertension. Among 7 overweight students, 2 had hypertension and 3 had prehypertension. Rates of elevated blood pressure (prehypertension and hypertension) were higher among those with high BMI (overweight) compared to those with normal BMI.

DISCUSSION

It is important to determine the prevalence of hypertension and prehypertension in children, not only because it varies from one community to the other (Jafar et al., 2005), but also because it is essential to identify the population at risk. Early identification translates into early interventions and possibly prevention of later morbidity and mortality (NIH et al., 2005). In the studied school children 9.39% had prehypertension and an additional 2.62% had hypertension. This reflects an alarming situation, where these children need some intervention as guided by the Fourth Task Force recommendations (NIH et al., 2005). The rates of high blood pressure in our study are marginally lower than those reported by an Indian study (Sharma et al., 2010). Within India, regional differences in blood pressure among children were found (Krishna et al., 2007). The association between elevated blood pressure and high BMI observed by us has been noted by various workers including few from India (Peixoto et al., 2006; Anand and Tandon, 1996; He et al., 2006).

Table 2: Prevalence of hypertension among rural Tripuri tribal boys of Tripura.

Age (years)	BP percentile < 90th	BP percentile ≥ 90th – <95th	BP percentile ≥ 95th
	(Normal)	(Prehypertensive)	(Hypertensive)
6	27 (90)*	3 (10)	0
7	30 (100)	0	0
8	37 (100)	0	0
9	31 (100)	0	0
10	40 (85.11)	5 (10.64)	2 (4.26)
11	29 (85.29)	3 (8.82)	1 (2.94)
12	35 (100)	0	0
13	28 (77.78)	7 (19.44)	1 (2.78)
14	41 (100)	0	0
15	32 (100)	0	0
16	21 (58.33)	12 (30.77)	3 (7.69)
17	33 (75)	8 (18.18)	3 (6.82)
18	19 (73.08)	5 (19.23)	2 (7.69)
Total	403 (87.99)	43 (9.39)	12 (2.62)

** Figures mentioned in parentheses are percentage.*

For the determination of relationship between blood pressure and obesity we uses BMI and waist circumference as component of adiposity (Peixoto et al., 2006; Soudarssanane et al., 2008). The interrelationship between blood pressure and various anthropometric indices reveals that the correlation between Systolic blood pressure and height is 0.58; Diastolic blood pressure and height is 0.34; Systolic blood pressure and weight is 0.62; Diastolic blood pressure and weight is 0.33; Systolic blood pressure and BMI is 0.57; Diastolic blood pressure and BMI is 0.23; Systolic blood pressure and waist circumference is 0.50; Diastolic blood pressure and waist circumference is 0.23. These results were found similar with those reported by some other studies (Soudarssanane et al., 2008; Silva et al., 2009).

Findings of the present study suggest a need for larger population based studies adjusted for factors such as salt intake, physical activity and dietary habits, to accurately estimate the preva-

lence off hypertension among children from north-eastern part of our country.

ACKNOWLEDGEMENT

School authorities are thankfully acknowledged for their support during data collection. Thanks are also due to students and their parents participated in this study.

FUNDING

Financial support in the form of RET fellowship to the first author provided by Tripura University.

REFERENCE

1. Anand, N. K., Tandon, L. (1996). Prevalence of hypertension in school going children. Indian Pediatrics, 33, 377-381. | | 2. Bao, W., Threefoot, S. A., Srinivasan, S. R., Berenson, G. S. (1995). Essential hypertension predicted by tracking of elevated blood pressure from childhood to adulthood: the Bogalusa Heart Study. American Journal of Hypertension, 8, 657-65. | | 3. Deshmukh, P. R., Gupta, S. S., Dongre, A. R., Bharambe, M. S., Maliye, C., Kaur, S. (2006). Relationship of anthropometric indicators with blood pressure levels in rural Wardha. Indian Journal of Medical Research, 123, 657-664. | | 4. DevVarman, S. B. K. (2004). The Tribes of Tripura A Dissertation. Special Series no.1, Directorate of Research, Govt. of Tripura, Agartala. | | 5. Gupta, R., Rastogi, P., Sarna, M., Gupta, V. P., Sharma, S. K., Kothari, K. (2007). Body mass index, waist-size, waist-hip ratio and cardiovascular risk factors in urban subjects. Assoc Physicians India, 55, 621-627. | | 6. Gupta, R. (2004). Trends in hypertension epidemiology in India. Human Hypertension, 18, 73-78. | | 7. He, Q., Ding, Z. Y., Fong, D. Y. T., Karlberg, J. (2000). Blood pressure is associated with body mass index in both normal and obese children. Hypertension, 36,165-170. | | 8. Jafar, T. H., Islam, M., Poulter, N., Hatcher, J., Schmid, C. H., Levey, A. S. (2005). Children in south Asia have higher body mass–adjusted blood pressure levels than white children in the United States: A comparative study. Circulation, 111, 1291-1297. | | 9. Krishna, P., Bajaj, S., Thennarasu, K., Desai, N., Prasamma, K. M. (2007). Regional differences in the reference blood pressure in young Indians. Indian Pediatrics, 44, 921-923. | | 10. National Institute of Health (NIH). (2005). National High Blood Pressure Education Program Working Group on High Blood Pressure in Children and Adolescents. The Fourth Report on the diagnosis, evaluation and treatment of high blood pressure in children and adolescents. | | 11. Peixoto, M. R. G., Benı´cio, M. H. D., Latorre, M. R. D. O., Jardim, P. C. B. V. (2006). Waist circumference and body mass index as predictors of hypertension. Arq Bras Cardiol, 87, 416–423. | | 12. Sarkar, S. R., Saha, S., Roy, S., Sil, S.K. (2012). Nutritional status of Tripuri tribal adolescent boys of West Tripura district. Indian Pediatrics, 49(6), 494-495. | | 13. Sarkar, S. R., Sil, S. K. (2014). Somatotype of Tripuri Tribal Adolescent Boys (Aged 8 to 16 Years) of Tripura, North-east India. In: Chakrabarty D, editor. User Centered Design and Occupational Wellbeing. 1st ed. New Delhi. McGraw Hill Education (Ind) Pvt. Ltd. pp.727-731. | | 14. Sharma, A., Grover, N., Kaushik, S., Bhardwaj, R., Sankhyan, N. (2010). Prevalence of Hypertension Among School children in Shimla. Indian Pediatrics, 47, 873-876. | | 15. Shear, C. L., Burke, G. L., Freedman, D. S., Berenson, G. S. (1986). Value of childhood blood pressure measurements and family history in predicting future BP status: Results from 8 years of follow-up in the Bogalusa Heart Study. Pediatrics, 77, 862-869. | | 16. Sil, S. K., Saha, S., Roy, S., Sarkar, S. R. (2012). Nutritional status of urban Tripuri tribal boys of Agartala, Tripura. Anthropologist, 14(2), 167-169. | | 17. Silva, K. S., Silva, R. C. R., Duarte, M. F. S., Lopes, A. S., Silva, F. M. (2009). Undernutrition and Obesity Associated with High Blood Pressure in Children and Adolescents from Joa˜o Pessoa, Parai´ba, Brazil. Pediatric Cardiology, 30, 248–255. | | 18. Soudarssanane, M. B., Mathanraj, S., Sumanth, M. M., Sahai, A., Karthigeyan, M. (2008). Tracking of blood pressure among adolescents and young adults in an urban slum of Puducherry. Indian Journal of Community Medicine, 33(2), 107-112. | | 19. Tanne, J. H. (2002). Children should have blood pressure and cholesterol checked by age of 5. British Medical Journal. 325: 8. | | 20. Touitou, Y., Portaluppi, F., Smolensky, M. H., Rensing, L. (2004). Ethical principles and standards for the conduct of human and animal biological rhythm research. Chronobiology International, 21(1), 161-170. | | 21. Weiner, J. S., Lourie, J. A. (1969). Human Biology: a guide to field methods. International Biological Programme. Handbook no.9. Oxford, U.K.: Blackwell Scientific Publications. | | 22. World Health Organization. (2000). The Asia-Pacific Perspective: Redefining Obesity and its Treatment. Geneva: WHO. |