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Original article

Correlation between waist-height ratio and elevated blood pressure among children and adolescents

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ABSTRACT

PURPOSE:- Present study was planned to analyze the correlation between Waist-height ratio and elevated blood pressure among the children and adolescents.

METHOD:-All the participants were from Chavara Public school,was screen according to inclusion and exclusion criteria. Parents were briefed about the study and an informed written consent was obtained from the parents .Assessment done by waist height ratio and measures of Blood pressure .Assessment done once to observe the correlation of waist height ratio and elevated blood pressure. Girls and boys both were selected for study between 8 to 16 years old with informed concern. Anthropometric measures were taken in school clinics by a trained team. All measurements were performed twice. Height was measured without shoes to the nearest 0.1 cm using a portable Stadiometer. Waist Circumference was measured at the narrowest area above the umbilicus in a horizontal plane at the end of normal expiration, with the tape measure snugly fitted with the light fitted clothes. BP was measured using the standardized mercury sphygmomanometer with manually inflated cuff of suitable size and a stethoscope. It was measured on the right arm after the child was sitting quietly for 5 minutes to relieve anxiety, and seated with his or her back supported, feet on the floor, right arm supported, and cubital fossa at heart level left arm. Two readings were obtained at a 1-min. interval, and average was recorded.

CONCLUSION:-This study showed that elevated blood pressure in children was associated with waist circumference, which is both easier to measure than blood pressure and provides important information on metabolic risk.

RESULT:-In the study the total number of participants selected were hundred (n=100)Mean and SD were calculated by using the data recorded during the study and using "software Instant graph pad" Researcher's Karl Pearson's Correlation Coefficient test was applied to obtain the result.

INTRODUCTION

"To feel good From Your Head to Your Feet Keep A Healthy Heart Beat."

The importance of hypertension in pediatric population has not been as well appreciated as in adults. Children with elevated blood pressure (BP) can develop target organ damage they are also at increased risk of cardiovascular disease in adulthood.[2] Consequently, detection and management of elevated BP at an early age may be an important means for limiting the disease burden due to hypertension.[3]

The prevalence of childhood obesity has increased markedly over the last 2 decades. This increase is

associated with an increase in hypertension rates which could lead to atherosclerotic disease in adulthood. Primary hypertension in children has become increasingly common in association with other cardiovascular risk factors that include being overweight, insulin resistance, and Dyslipidemia.

Hypertension is a silent threat to the health of people and its frequently undiagnosed in pediatric population.[1]In children, primary hypertension is important for several reasons. Firstly, because it determines damage to target organs. Left ventricular hypertrophy is the most important clinical evidence of this complication. Secondly, because there is trend over life of persistence of high blood pressure in childhood and adolescence which makes this one of the main markers of hypertension early in adult life.

Finally, because of the frequent association in the same individual of high blood pressure with other cardiovascular risk factors which triggers the early appearance and the rapid development of the atherosclerotic lesions which determines most frequent cause of death.[6,7]Recent studies emphasize the increased prevalence of childhood hypertension, which is predictor of adulthood hypertension, cardiovascular diseases and metabolic morbidities. Therefore, early detection and prevention for childhood hypertension, which is recommended.Abdominal obesity has been recognized as a better predictor for cardiovascular diseases and metabolic morbidities than body mass index. [9,10] Abdominal obesity is accumulation of excessive fat which leads to many disorders such as cardiovascular disease, diabetes, metabolic dysfunction, dyslipidemia etc. Central obesity may be symptom of Cushing's syndrome and is also common in patients with polycystic ovary syndrome. The link between obesity and hypertension may be mediated in part by sympathetic nervous system hyperactivity. This state of hyperactivity may include cardiovascular manifestation such as increased heart rate and blood pressure variability, neurohumeral manifestations such as increased levels of plasma catecholamines, and neural manifestations such as as increased peripheral sympathetic nerve traffic.[11,12]Studies on the association between WHtR and childhood elevated blood pressure (BP) are limited. Therefore, we examined the relationship of WHtR with elevated BP among children.[14]

METHODOLOGY

All the participants from Chavara Public school,was screen according to inclusion and exclusion criteria. Parents were briefed about the study and an informed written consent was obtained from the parents.Assessment was done once to observe the correlation of waist height ratio and elevated blood pressure.Girls and boys both were selected for study between 8 to 16 years old with informed concern. Anthropometric measures were taken in school clinics by a trained team. All measurements were performed twice. Height was measured without shoes to the nearest 0.1 cm using a portable Stadiometer. Waist Circumference was measured at the narrowest area above the umbilicus or mid way between the coastal margin and the iliac crest, in a horizontal plane at the end of normal expiration, with the tape measure snugly fitted. BP was measured using the standardized mercury sphygmomanometer with manually inflated cuff of suitable size and a stethoscope. It was measured on the right arm after the child was sitting quietly for 5 minutes to relieve anxiety, and seated with his or her back supported, feet on the floor, right arm supported, and Cubital fossa at heart level left arm. Two readings were obtained at a 1-min. interval, and the average was

recorded. The blood pressure was measured two times with zero device.

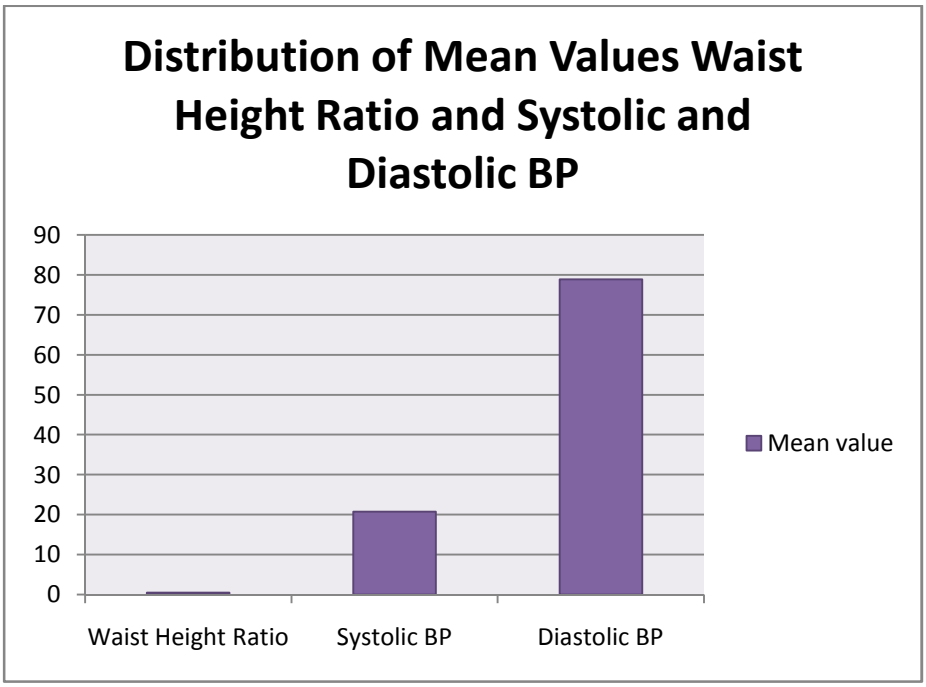
Waist height ratio is calculated by ,

Waist-Height Ratio = Waist circumference / Height

RESULTS:

Table no.1 Mean Value

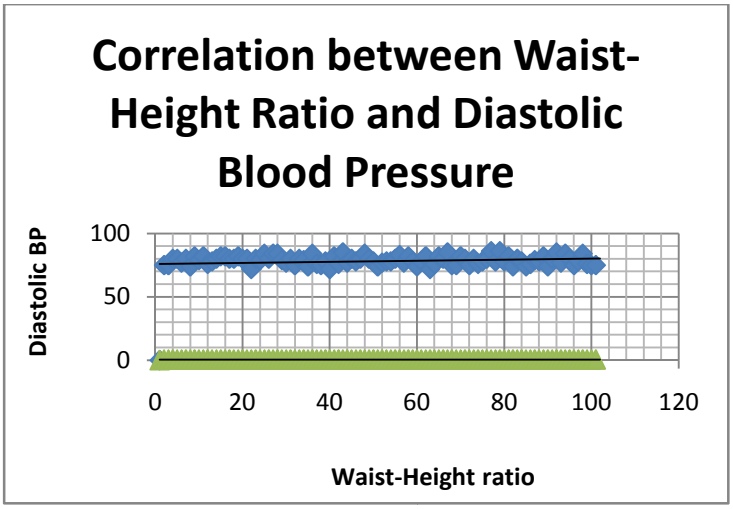
MEASURES	MEAN+_ SD
WAIST-HEIGHT RATIO	0.52604+_0.007810
SYSTOLIC BLOOD PRESSURE	120.72+_6.609
DIASTOLIC BLOOD PRESSURE	78.87+_3.347



Graph no.1 shows that the distribution of mean values of waist height ratio is 0.52604, systolic blood pressure is 120.72 and diastolic blood pressure is 78.87.

Table no.2

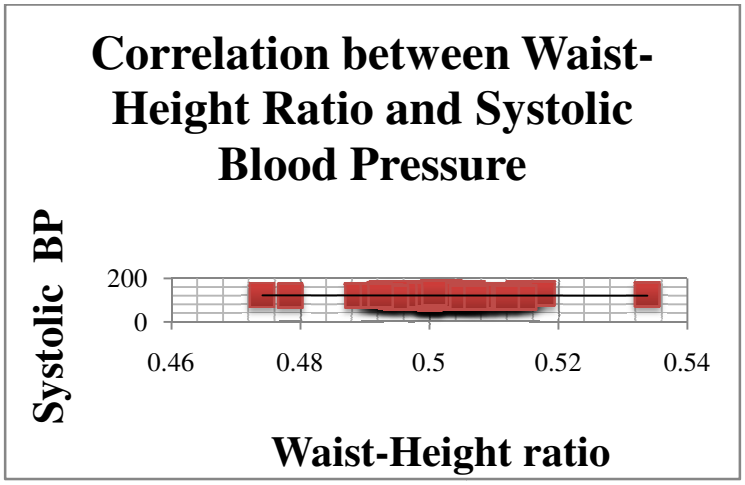
Correlation between	Karl Pearson's Correlation Coefficient (r)	P Value and significance
Waist height ratio V/s Diastolic	-0.1160	0.2503



Graph2. Shows that on correlation between Waist Height Ratio & Systolic Blood Pressure using Karl Pearson's correlation coefficient test in which r value is-0.1160and p value is 0.2503 , it indicated statistically not significant.

Table no.3

Correlation between	Karl Pearson's Correlation Coefficient (r)	P Value and significance
Waist height ratio V/s Systolic	-0.08087	0.4238



Graph3. Shows that on correlation between Waist Height Ratio & Systolic Blood Pressure using Karl Pearson's correlation coefficient test in which r value is -0.08087 and p value is 0.4238 ,it indicated statistically not significant.

Table no.4

Age of Children	No. of Children
8	14
9	5
10	9
11	16
12	15
13	5
14	14
15	4
16	18

Discussion:

Abdominal obesity is a major risk factor for chronic diseases. There is growing evidence that abdominalobesity is associated with increased risk for type 2 diabetes, hypertension, and cardiovascular disease in children and adults. In practice, Waist Circumference and related anthropometric indices, such as WHtR, have been recognized as useful to visceral fat measurement in epidemiological studies. To the best of our knowledge, this is the first study examining the association of WHtR with obesity and elevated BP among children and adolescents in a large population. My results suggest that Waist- height ratio may be the new useful indices for screening obesity and related health risks. This study meticulously investigated the relationship between Waist Circumference and elevated blood pressureamong children aged 8-16 years after adjustment for age, sex, operator, height, and body mass index. 100 children and adolescents were selected from Chavara public school, where the both girls and boys wa selected for Waist height ratio and measuring the blood pressure. Children with elevated blood pressure had higher mean Waist

Circumference than those with normal blood pressure Over a quarter of the children (%) in the highest Waist circumference quartile had elevated blood pressure, revealing that high Waist Circumference is a risk factor for elevated blood pressure in children aged 8-16 years. As the waist circumference increases the blood pressure also increases respectively.

Associations between elevated blood pressure and Waist circumference have been documented among children in Mexico, Greece and the United States, Stratification of Waist Circumference into quartiles may be useful in investigating elevated blood pressure. In our study, higher risk for elevated blood pressure was also found in children in the highest quartile than in children within the lower quartiles. A previous study found that with one cm incremental increase in Waist Circumference, the elevated blood pressure was 1.06 (95% CI = 1.01-1.11). However, we demonstrate a more significant in study (OR = 1.14, 95% CI = 1.10-1.18).

Simple anthropometric measurements are the most commonly used and practical tools for assessing body composition. Waist Circumference is a simple measure of abdominal obesity and predicts total fat content well in children. Compared with body mass index, abdominal obesity may be a better predictor than overall obesity of hypertension and metabolic abnormalities. It is much easier to measure than blood pressure in terms of training and access to equipment, especially in low-income settings. Blood pressure measurement requires greater operator skill, and blood pressure is liable to be falsely elevated unless measured with care and in stress-free situations. Because Waist Circumference is significantly correlated with blood pressure, we suggest measurement of Waist Circumference as a screening tool for elevated blood pressure in children. Our study's moderate sensitivity and specificity suggest that using Waist Circumference to screen for elevated blood pressure in children should be performed carefully. Some children with elevated blood pressure may not have large Waist Circumference, and vice versa.

In addition, waist-to-height ratio is another index to measure abdominal obesity. Much evidence suggests waist-to-height ratio is associated with elevated blood pressure. In our study, the association between Waist Circumference and elevated blood pressure is greater than the association between waist-to-height ratio and elevated blood pressure after adjustment for age, sex, operator, height, and body mass index.

Compared to Waist Circumference, the association between hip circumference and elevated blood pressure was poorly understood. Previous studies associated larger hip circumference with reduced risk of elevated blood pressure in adults, but studies investigating the association in children are lacking. Our study suggests an independent association between pediatric hip circumference and elevated blood pressure, and that hip circumference is as good as Waist Circumference in predicting elevated blood pressure in children.

CONCLUSION

As study showed that elevated blood pressure in children was associated with waist circumference, which is the both here to measure than blood pressure and provides important information on metabolic risk. We also found that hip circumference is as good as Waist Circumference in predicting elevated blood pressure in children. This suggests the need to monitor elevated blood pressure in childhood by taking regular Waist Circumference and blood pressure measurements during school health examinations. Further research is needed into the effectiveness of interventions to monitor waist circumference to reduce BP and metabolic risks in children.

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