Journal of Advanced Medical and Dental Sciences Research

@Society of Scientific Research and Studies

Journal home page: www.jamdsr.com doi: 10.21276/jamdsr ICV 2018= 82.06

(e) ISSN Online: 2321-9599; (p) ISSN Print: 2348-6805

Original Research

Assessment of waist circumference in school children

Gangadhar.S.Sansuddi

Assistant Professor,

Department of Anatomy, S.S.P.M. Medical College Padave, Sindhudurg, Maharashtra, India

***ABSTRACT*:**
Background: Central obesity is associated with clustering of cardiovascular risk factors. The present study was conducted to assess waist circumference in school children. **Materials & Methods:** The present study was conducted on 120 children age ranged 7- 12 years of both gender. WC-IC was measured in the horizontal plane at the superior border of the right iliac crest. WC-mid was measured in the horizontal plane midway between lowest rib and the iliac crest. **Results:** Out of 120 subjects, boys were 60 and girls were 60. A significant difference in waist circumference at WC-IC and WC- mid in both boys and girls at different age groups (P< 0.05). **Conclusion:** Authors found that there was significant difference in waist circumference in both boys and girls at different age groups.

Key words: Children, Rib, Waist circumference

Received: 22 July, 2019 Revised: 15 September, 2019 Accepted: 20 October, 2019

Corresponding author: Dr. Gangadhar.S.Sansuddi, Assistant Professor, Department of Anatomy, S.S.P.M. Medical College Padave, Sindhudurg, Maharashtra, India

This article may be cited as: Sansuddi GS. Assessment of waist circumference in school children. J Adv Med Dent Scie Res 2019;7(10):134-136.

INTRODUCTION

Central obesity is associated with clustering of cardiovascular risk factors. People with central obesity are known to be at higher risk of developing hypertension, diabetes, dyslipidemia, and metabolic syndrome (MS).[1] To measure central obesity, waist circumference (WC) appears to be a better indicator than BMI and waist-to-hip ratio. WC measurement is convenient, and it is more strongly correlated with intra-abdominal fat content and cardiovascular risk factors. However, the recommended locations for WC measurements vary.[2] The World Health Organization and the International Diabetes Federation (IDF) suggest measuring WC in the horizontal plane midway between the lowest ribs and the iliac crest (WC-mid). In contrast, the National Cholesterol Education Program Third Adult Treatment Panel (NCEP ATP III) recommends measuring in the horizontal plane of the superior border of the iliac crest (WC-IC).[3]

Body fat can be assessed with both tissue measurements and calculations from body dimensions. Body mass index (BMI) is a common calculation, although it does not measure body fat. Rohrer suggested using body mass divided by the cube of height to better account for differences in height, a measure he called the ponderal index (PI). Other indexes include the conicity index, the A body shape index (ABSI), the body roundness index (BRI), the body adiposity index (BAI) [8], and the visceral adiposity index (VAI).[4] In addition, measurements of waist circumference (WC), waist-to-hip ratio (WHR), and waist-to height ratio (WHtR) have also found their use. They all, in various ways, try to compensate for the shortcomings of BMI. Bioelectrical impedance analysis (BIA) has also become more popular in recent years as it makes it easy to measure body composition, including body fat.[5] The present study was conducted to assess waist circumference in school children.

MATERIALS & METHODS

The present study was conducted in the department of Anatomy. It comprised of 120 children age ranged 7- 12 years of both gender. Ethical clearance was obtained prior to the study. Consent was obtained from parents of all children before the procedure.

Information such as name, age, gender etc. was recorded. Body height was recorded to the nearest 0.5 cm and body weight to the nearest 0.1 kg. BMI was defined as body weight (kilograms) divided by the square of body height (meters). WC-IC was measured in the horizontal plane at the superior border of the right iliac crest. WC-mid was measured in the horizontal plane midway between lowest rib and the iliac crest. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Gender	Boys	Girls
Number	60	60

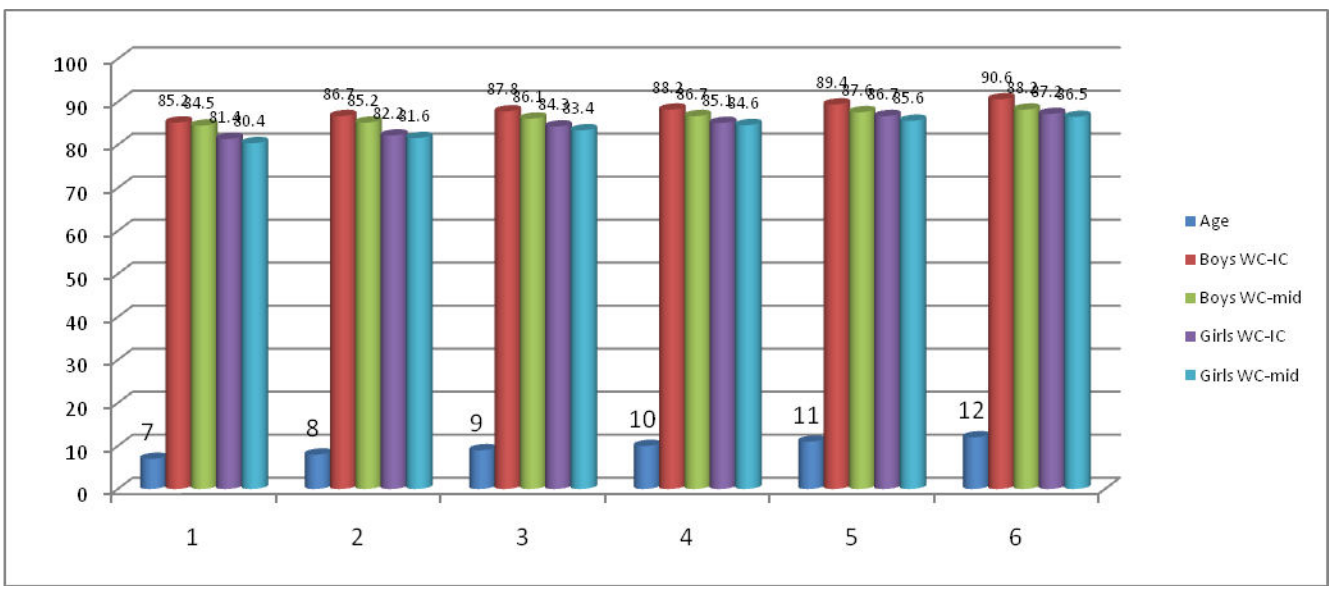
Table I shows that out of 120 subjects, boys were 60 and girls were 60.

Table II Assessment of Waist circumference in both genders

Age	Boys		Girls		P value
	WC-IC	WC-mid	WC-IC	WC-mid	
7	85.2	84.5	81.4	80.4	0.01
8	86.7	85.2	82.2	81.6	0.04
9	87.8	86.1	84.3	83.4	0.02
10	88.2	86.7	85.1	84.6	0.05
11	89.4	87.6	86.7	85.6	0.02
12	90.6	88.2	87.2	86.5	0.01

Table II, graph I shows that a significant difference in waist circumference at WC-IC and WC- mid in both boys and girls at different age groups (P< 0.05).

Graph I Assessment of Waist circumference in both genders



DISCUSSION

The recommended cutoff values of WC for central obesity vary among different ethnic groups. Asians tend to have more body fat per BMI than Caucasians, which indicates greater potential for Asians to develop hypertension, diabetes, and dyslipidemia at lower BMIs.[6] In 2000, the Asia-Pacific Perspective: Redefining Obesity and its Treatment Conference recommended cutoff values for central obesity for Asians of 90 cm WC-mid for males and 80 cm WC-mid for females. In 2004, Tan et al. tested these cutoffs in a cross sectional study in an Asian population and found that the prevalence of MS using these cutoffs was comparable with that in developed countries.[7] The present study was conducted to assess waist circumference in school children.

In present study, out of 120 subjects, boys were 60 and girls were 60. We found that that significant difference in waist circumference at WC-IC and WC- mid in both boys and girls at different age groups ($P< 0.05$). Mason et al[8] found that there was greater difference between WC-IC and WC-mid measurements in women than in men ($P<0.001$). Both WC-IC and WC-mid correlated significantly with BMI, VFA, and SFA ($P<0.001$). WC-mid was better correlated to VFA than WC-IC, particularly in women, and it correlated more strongly to blood pressure, plasma glucose, hemoglobin A1c, triglyceride levels, HDL cholesterol, and C-reactive protein ($P< 0.05$). The association of WC-mid with hypertension, diabetes, and metabolic syndrome was slightly better than that of WC-IC (area under the receiver operator curve 0.7 vs. 0.69, 0.71 vs. 0.68, and 0.75 vs. 0.7, respectively; all age-adjusted $P< 0.05$). With 90 cm (male)/80 cm (female) as criteria for central obesity, WC-mid, but not WC-IC, predicted the incidence of diabetes development.

Freidreksen et al[9] conducted a study in which 2271 children (boys, n = 1150) were measured for height, weight, and WC. Parental education level was used as a measure of socioeconomic status. A significant increase in WC with age was revealed for both sexes ($p < .0001$). Boys at 10 and 12 years had a larger WC than girls; otherwise no difference between sexes was found. The WHtR decreased with age for girls ($p < .0001$); 14% of the sample displayed a WHtR ≥ 0.50. Comparison with earlier studies showed a higher WC and WHtR despite no change in weight and body mass index. WC and WHtR are recommended as tools for identifying central obesity in children. The results indicate increased WC in 6–12-year-old children compared with earlier findings.

BMI is conventionally used in many clinical settings as a predictor of mortality and morbidity from chronic health issues related to being overweight or obese, such as stroke and cardiovascular disease in adults, and type 2 diabetes in children. There has been a rise in abdominal obesity, characterized by an excessive build-up of visceral and subcutaneous fat, among children between the ages of 5 and 15 years. Because abdominal obesity leads to increased metabolic and cardiovascular risks, WC may be used as both a simple predictor of adverse physical health and other metabolic complications and a tool for estimating the severity of visceral fat.[10]

CONCLUSION

Authors found that there was significant difference in waist circumference in both boys and girls at different age groups.

REFERENCES

1. Krakauer NY and Krakauer JC. A new body shape index predicts mortality hazard independently of body mass index. PloS One 2012; 7: e39504.
2. Thomas DM, Bredlau C, Bosy-Westphal A, et al. Relationships between body roundness with body fat and visceral adipose tissue emerging from a new geometrical model. Obes Silver Spring Md 2013; 21: 2264–2271.
3. Bergman RN, Stefanovski D, Buchanan TA, et al. A better index of body adiposity. Obes Silver Spring Md 2011; 19: 1083–1089.
4. Amato MC, Giordano C, Galia M, et al. Visceral Adiposity Index: a reliable indicator of visceral fat function associated with cardiometabolic risk. Diabetes Care 2010; 33: 920–922.
5. Jensen NSO, Camargo TFB and Bergamaschi DP. Comparison of methods to measure body fat in 7-to-10-year-old children: a systematic review. Public Health 2016; 133: 3–13.
6. Taylor RW, Jones IE, Williams SM, et al. Evaluation of waist circumference, waist-to-hip ratio, and the conicity index as screening tools for high trunk fat mass, as measured by dualenergy X-ray absorptiometry, in children aged 3–19 y. Am J Clin Nutr 2000; 72: 490-495.
7. Han TS, van Leer EM, Seidell JC, Lean ME. Waist circumference action levels in the identification of cardiovascular risk factors: prevalence study in a random sample. BMJ 1995;311:1401–1405.
8. Mason C, Katzmarzyk PT. Effect of the site of measurement of waist circumference on the prevalence of the metabolic syndrome. The American journal of cardiology. 2009 Jun 15;103(12):1716-20.
9. Fredriksen PM, Skår A, Mamen A. Waist circumference in 6–12-year-old children: The Health Oriented Pedagogical Project (HOPP). Scandinavian journal of public health. 2018 May;46(21_suppl):12-20.
10. Ma WY, Yang CY, Shih SR, Hsieh HJ, Hung CS, Chiu FC, Lin MS, Liu PH, Hua CH, Hsein YC, Chuang LM. Measurement of waist circumference: Midabdominal or iliac crest?. Diabetes care. 2013 Jun 1;36(6):1660-6.