



Measure Waist Circumference, Waist-To-Height Ratio, And Lifestyle To Determine Adolescent Central Obesity At Vocational High School

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Abstract

Poor lifestyle choices, such as poor eating habits and insufficient sleep significantly increase the occurrence of teenage central obesity. When assessing body composition, the value of visceral fat can be used to make a clear diagnosis of central obesity, although this examination is not regularly conducted for a variety of reasons. In a communal setting, particularly a school setting, an easy and efficient technique is to employ waist circumference and waist circumference to height ratio. The purpose of this study was to examine the lifestyle of teenagers with central obesity, as well as the association between waist circumference and waist circumference to height ratio. Around 65 youths were measured for waist circumference and height and given a lifestyle questionnaire about breakfast sweet drinks, afternoon and night munchies, and sleep duration. To examine central obesity, the waist circumference must be greater than 90 cm for men and greater than 80 cm for women, as well as greater than 0.5 waist-to-height ratio. There was a significant relationship between adolescent waist circumference and waist circumference to height ratio, with a significance value of $p = 0.008$ ($p < 0.05$) but lifestyle factors such as breakfast, sweet drinks, snacking in the afternoon and evening, and length of sleep were not different between adolescents with and without central obesity ($p > 0.05$). When evaluating central obesity in adolescents in this study, waist circumference and waist circumference to height ratio are associated, but there is no difference in lifestyle.

Keywords:

Central obesity; Adolescents; waist circumference; waist-to-height ratio, lifestyle

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Introduction

Obesity can be experienced by various age groups, including teenagers. Research data shows that the prevalence of obesity is 4.9%, with the prevalence in males being higher than in females (8.8% vs 3.1%) ($p < 0.001$) of the 1955 adolescents studied (Duan et al., 2020; Kelishadi, 2022). Based on 2018 Basic Health Research data from the Ministry of Health of the Republic of Indonesia, the prevalence of overweight and obesity in adolescents has increased significantly over the last 5 years. Data shows a prevalence of 16.0% in adolescents aged 13-15 years and 13.5% in adolescents aged 16-18 years, however these data do not specifically explain the prevalence of central obesity. (Kemenkes RI, 2018)

The incidence of central obesity in adolescents is increasing annually due to various factors, including lifestyle, unhealthy eating habits, and unhealthy sleep (Zabeen et al., 2015a). Central obesity can increase the risk of metabolic disease and includes central obesity as a prerequisite in diagnosing metabolic syndrome (MS), which is considered central obesity if the waist circumference is > 90 cm for Asian men and > 80 cm for Asian women (Al-Hamad & Raman, 2017). A definite diagnosis of central obesity can be determined based on the value of visceral fat when examining body composition, but this examination is not routinely performed for various reasons. In a community setting we can use waist circumference and waist circumference to height ratio to explore central obesity. Some studies show that A WC/HT ≥ 0.5 resulted in sensitivity:specificity of 99%:72% for detecting central obesity and WC/HT ≥ 0.55 yielded sensitivity:specificity of 80%:96% for detecting central obesity (Mehta, 2015). Study about WC showed yielded sensitivity:specificity of 96%:25% in men, and 100%:24,1% in women. This study aimed to examine the lifestyle of teenagers with central obesity, as well as the association between waist circumference (WC) and waist circumference to height ratio (HT).

Methods

A cross-sectional study involving 65 adolescents (16 males, 49 females), They were students at SMK Muhammadiyah 4 Surakarta, held on December 2022. The WC was measured by metline at the superior border of the iliac crest and midway between the lowest rib and the iliac crest for each students, using cut-offs of ≥ 90 cm in males and ≥ 80 cm in females. The Height was measured by microtoise. The way to measure were ; position the patient's head under the microtoise slider, looking straight ahead. At least three (back of head, shoulder blades, buttocks and heels) pressed against the wall, pull the microtoise head to the top of the head (vertex) then read the numbers while inhaling (inspiration). Cut off WC/HT was $\geq 0,5$, called central obesity. Some lifestyles such as breakfast, sweet drinks, snacking in the afternoon and evening, and length of sleep were examined by questionnaire (As'ad N, et al.). Chi square analysis was used to examine the association between central obesity with lifestyle of teenagers also the association between waist circumference and waist circumference to height ratio.

Results

The questionnaire about breakfast, sweet drinks, afternoon and night munchies, and sleep duration was administered to 65 subjects. Table 1 showed the result.

There was a significant relationship between adolescent waist circumference and waist circumference to height ratio, with a significance value of $p = 0.008$ ($p < 0.05$), but lifestyle factors such as breakfast, sweet drinks, snacking in the afternoon and evening, and length of sleep were not significant.

Table 1.

Chi Square Analysis about the association between Lifestyle and Central Obesity

	Lifestyle	Central Obesity	P Value
Always have breakfast	Yes	33	0.822
	No	32	
Skipped breakfast $> 2x/week$	Yes	37	0.751
	No	28	
Sweetened drink	Never	4	0.921

	>1-2x/week	61	
Eating or snacking at >17.00	Never	5	0.354
	>1-2x/week	60	
Eating or snacking at >20.00	Never	10	0.803
	>1-2x/week	55	
Sleep duration	6-8 h/day	36	0.442
	≤ 5 h/day or > 9h/day	29	

Discussion

Central obesity risks metabolic disease later in life. Although the incidence of obesity in adolescents is increasing, central obesity data has not been explored. Research showed that the prevalence of MS adolescents in lower middle economic countries was 3.98% (Bitew et al., 2020), other research showed that the overall prevalence of MS according to IDF criteria in adolescents aged 10-18 years was 7.6%, where the prevalence in 9.4% of boys and 6% of girls, of all teenagers, they had central obesity with a prevalence of 27.8% (Zabeen et al., 2015b). The International Diabetes Federation (IDF) includes central obesity as a prerequisite in diagnosing SM, a person is considered to have MS if they have central obesity (waist circumference 90 cm for South and East Asian men and 80 cm for South and East Asian women). Waist circumference measurements are often used in adults to diagnose central obesity in community settings, while in adolescents research shows that it is necessary to compare body height (Mehta, 2015)

Conclusion

There was a significant relationship between adolescent waist circumference and waist circumference to height ratio. Although in this study lifestyle was not related, explore the lifestyle with depth interview are required for future direction, in order to examine amount and quality of the lifestyle.

Patents

This section is not mandatory but may be added if there are patents resulting from the work reported in this manuscript.

Author Contributions

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Conflicts of Interest:

Declare conflicts of interest or state "The authors declare no conflict of interest."

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