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Association Between Balanced Nutrition Knowledge, Attitude, and Practice (KAP) with Obesity in Adolescents at SMA Negeri 5 Sawangan, Depok City

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Abstract: In 2018, the prevalence of obesity in adolescents in Depok is 4.86% at aged 13-15 years and 5.75% at aged 16-18 years. This high prevalence of obesity can be regarded as an indicator of a lack of nutritional knowledge. Nutritional knowledge needed to combine nutritional information with eating behavior, so that a good knowledge about nutrition and health can be developed. Besides that, important components that affects obesity is attitudes and behavior towards a healthy lifestyle. This study aims to determine the relationship between knowledge, attitudes, and behavior of balanced nutrition with obesity in adolescents at SMA Negeri 5 Depok City. This study used a cross sectional design among 110 respondents determined by simple random sampling technique. Data collected using a balanced nutrition knowledge, attitude, and behavior questionnaire. The results shows that 11.8% of adolescents were obese, 16.0% had good knowledge of obesity, 13.0% had positive attitudes towards obesity, and 15.3% had positive behavior towards obesity. Relationship analysis performed using Chi Square test showed that there was no relationship between knowledge of balanced nutrition (p = 0.215), balanced nutrition attitude (p = 0.715), and balanced nutrition behavior (p = 0.230) with obesity in adolescents at SMA Negeri 5 Depok City.

Keywords: Adolescent, Balanced Nutrition Knowledge, Balanced Nutrition Attitude, Balanced Nutrition Behavior, Obesity

1. INTRODUCTION

Adolescent obesity has become a major public health concern both globally and in Indonesia. According to the World Health Organization, adolescents are classified as obese when their body mass index-for-age (BMI-for-age) Z-score exceeds +2 standard deviations. National data from the Indonesian Basic Health Research (Riskesdas) indicate a consistent increase in obesity prevalence among adolescents. Between 2013 and 2018, obesity prevalence among adolescents aged 13–15 years rose from 2.5% to 4.8%, while among those aged 16–18 years it increased from 1.6% to 4.0%. In West Java Province, obesity prevalence reached 4.9% among adolescents aged 13–15 years and 4.5% among those aged 16–18 years, with even higher rates reported in Depok City (1). These findings indicate that adolescent obesity represents a growing and localized public health challenge requiring focused investigation.

Obesity during adolescence is particularly concerning due to its strong tendency to persist into adulthood. Adolescents with obesity are more likely to develop non-communicable diseases later in life, including cardiovascular disease, type 2 diabetes mellitus, musculoskeletal disorders, and certain cancers(2,3). Moreover, obesity in this age group is associated with immediate adverse health outcomes such as hypertension, insulin resistance, reduced physical fitness, and psychosocial problems. These short- and long-term consequences highlight the importance of identifying modifiable determinants of obesity during adolescence(4).

One of the key modifiable determinants of adolescent obesity is nutritional knowledge, which refers to an individual's ability to understand, recall, and apply information related to food, nutrients, and healthy eating principles. Adequate nutritional knowledge plays a crucial role in shaping dietary choices and supporting healthy eating behaviors(5). However, evidence from Indonesia suggests that nutritional knowledge among adolescents remains suboptimal. Previous studies have reported that a substantial proportion of high school students possess poor nutritional knowledge, which may contribute to unhealthy eating patterns and inappropriate weight gain. Several studies have also demonstrated a significant association between nutritional knowledge and nutritional status among adolescents(6).

In addition to knowledge, attitudes and practices related to diet and lifestyle are essential components influencing adolescents' nutritional status. Attitudes reflect adolescents' beliefs and perceptions toward healthy eating, while practices represent their actual dietary behaviors and lifestyle habits. Research has shown that many adolescents exhibit negative attitudes toward balanced nutrition and engage in unhealthy dietary practices, such as frequent consumption of energy-dense foods and low intake of fruits and vegetables(7). These findings suggest that knowledge alone may be insufficient to prevent obesity if it is not accompanied by positive attitudes and healthy practices.

Although previous studies have examined individual components of knowledge, attitude, or practice in relation to adolescent obesity, limited research has comprehensively assessed these components simultaneously using the Knowledge, Attitude, and Practice (KAP) framework, particularly at the local level. Moreover, most available data focus on prevalence rather than exploring the interrelationships between KAP and obesity within specific urban settings. This gap limits the development of targeted, evidence-based nutrition interventions tailored to adolescents' behavioral and contextual needs.

To address nutrition-related problems, the Indonesian government has implemented the Balanced Nutrition Guidelines (Pedoman Gizi Seimbang), which emphasize four core pillars: consumption of a diverse diet, clean and healthy living behaviors, regular physical activity, and routine monitoring of body weight(5). However, the effectiveness of these guidelines depends largely on adolescents' knowledge, attitudes, and practices. Therefore, examining the relationship between KAP and obesity among adolescents is essential to inform nutrition education strategies and obesity prevention programs. Accordingly, this study aimed to determine the relationship between knowledge, attitude, and practice related to balanced nutrition and obesity among adolescents using a cross-sectional study design.

2. METHODS

This study employed a descriptive analytical design with a cross-sectional approach. Data were collected through face-to-face (offline) surveys conducted from April to June 2022 at a public senior high school in Depok City, Indonesia, namely Senior High School 5 Sawangan. The study population comprised all students enrolled in Grade X and Grade XI at Senior High School 5 Sawangan during the study period. Students who met the predefined inclusion and exclusion criteria were eligible to participate. The inclusion criteria were students who: (1) were registered in Grade X or XI, (2) were present during data collection, and (3) provided informed consent. The exclusion criteria included students who were absent during the data collection period or who submitted incomplete questionnaires. A total of 110 students were included in the study.

Participants were selected using simple random sampling, ensuring that each eligible student had an equal probability of selection. The sampling frame was obtained from the official student list provided by the school administration. Data were collected using a structured, self-administered questionnaire designed to assess knowledge, attitudes, and practices (KAP) related to balanced nutrition. The questionnaire consisted of closed-ended questions and was administered in a classroom setting under the supervision of the researchers to ensure clarity and completeness.

The main variables assessed in this study were nutritional knowledge, attitudes toward balanced nutrition, and nutritional practices. Each variable was measured using a scoring system based on respondents' answers. Scores were categorized into predefined levels (e.g., good, moderate, and poor) according to established criteria. Data analysis was performed using descriptive statistical methods. The results were presented as frequencies, percentages, means, and standard deviations to describe the distribution of nutritional knowledge, attitudes, and practices among respondents. This study was conducted in accordance with the ethical principles for research involving human participants. Ethical approval was obtained from the Health Research Ethics Committee of Universitas Pembangunan Nasional "Veteran" Jakarta (UPNVJ). The study protocol was reviewed and approved under Ethical Approval Number: 300/VI/2022/KEPK, issued on 3 June 2022.

3. RESULTS AND DISCUSSION

From a total of 110 adolescents, the majority were classified as non-obese (88.2%), while 11.8% were categorized as obese. This prevalence indicates that obesity remains a public health concern among adolescents, although most respondents were within a normal nutritional status. Most respondents were aged 16 years, female, had parents with higher educational backgrounds, higher parental income, and higher daily allowance. Adolescents with non-obese status were predominantly found among those with higher parental education and income levels.

Table 1. Distribution of Obesity Status among Respondents

Obesity Status	n	%
Obese	13	11.8
Non-obese	97	88.2
Total	110	100.0

Table 2. Respondents Characteristics

Characteristics	Obesity Status				Total	
	Non-obese		Obese			
	n	%	n	%	n	%
Age						
15	15	93,8	1	6,3	16	100
16	59	85,5	10	14,5	69	100
17	23	92,0	2	8,0	25	100
Gender						
Male	42	80,8	10	19,2	52	100
Female	55	94,8	3	5,2	58	100
Father's Education						
Low	11	100	0	0	11	100
High	86	86,9	13	13,1	99	100
Mother's Education						
Low	16	94,1	1	5,9	17	100
High	81	87,1	12	12,9	93	100
Parent's Income						
Low	43	95,6	2	4,4	45	100
High	54	83,1	11	16,9	65	100
Allowance						
Low	41	87,2	6	12,8	47	100
High	56	88,9	7	11,1	63	100

The prevalence of obesity among adolescents in this study was 11.8%, indicating that nearly one in ten students was affected by obesity. This finding is consistent with recent national and regional data showing that adolescent obesity remains a persistent public health concern in urban areas of Indonesia(8). Although the prevalence observed in this study is slightly lower than figures reported in some metropolitan settings, it confirms that excess body weight continues to affect a substantial proportion of adolescents. In the current context, the persistence of obesity among adolescents can be partly explained by lifestyle changes following the COVID-19 pandemic, including reduced physical activity, increased sedentary behavior, and prolonged screen time. Studies conducted after the pandemic have reported sustained changes in adolescents' daily routines, which may contribute to positive energy balance and weight gain, even after the resumption of face-to-face schooling(9).

This study found that 54.5% of respondents had poor knowledge of balanced nutrition, yet no statistically significant association was observed between nutrition knowledge and obesity status. This finding suggests that knowledge alone is insufficient to prevent obesity among adolescents. Recent literature emphasizes that adolescents may possess basic nutritional knowledge but still fail to apply it in daily life due to environmental and social constraints, such as easy access to ultra-processed foods, peer influence, and aggressive

digital food marketing(10). In today's digital era, adolescents are continuously exposed to food-related content through social media platforms and online food delivery applications, which often promote high-calorie, low-nutrient foods. These factors may weaken the protective effect of nutritional knowledge and contribute to unhealthy dietary choices despite adequate awareness(11). This result is consistent with previous studies conducted among Indonesian adolescents, which reported inadequate nutrition knowledge ranging from 45% to 60% in senior high school students. Similar findings have been reported in other urban settings, suggesting that limited nutrition literacy among adolescents remains a persistent challenge(5,8). Despite ongoing nutrition education programs, insufficient knowledge may reflect gaps in the delivery and relevance of nutrition messages, particularly in translating theoretical concepts into practical daily food choices. In the current digital era, adolescents are increasingly exposed to nutrition information from social media and online platforms, which often present conflicting or misleading messages about diet and body image. This information overload may reduce the effectiveness of formal nutrition education delivered at school(12).

Table 3. Association between Balanced Nutrition Knowledge, Attitude, and Practice with Obesity Status

Knowledge Level	Obese n (%)	Non-obese n (%)	p-value
Poor	8 (14.5)	47 (85.5)	
Good	5 (9.1)	50 (90.9)	0.215
Total	13	97	
Attitude			
Negative	7 (12.5)	49 (87.5)	
Positive	6 (11.1)	48 (88.9)	0.715
Total	13	97	
Practice Level			
Poor	7 (13.7)	44 (86.3)	
Good	6 (10.2)	53 (89.8)	0.230
Total	13	97	

More than half of respondents (50.9%) demonstrated negative attitudes toward balanced nutrition. However, no significant relationship was found between nutritional attitudes and obesity status. This result indicates that positive attitudes toward healthy eating do not necessarily translate into healthier body weight outcomes(13). Attitudes represent a psychological predisposition but do not automatically lead to behavioral change, especially when adolescents face structural barriers, such as limited availability of healthy foods in school environments or greater affordability of unhealthy snacks. Contemporary behavioral models highlight that food choices are shaped not only by individual attitudes but also by social norms, family eating practices, and environmental cues, which may exert a stronger influence on adolescents' eating behaviors than personal beliefs alone(14,15). Previous studies have suggested that adolescents' attitudes are strongly influenced by peer norms, taste preferences, and social identity, which may outweigh health-related considerations(16). The lack of a significant relationship between attitudes and obesity status observed in this study is consistent with contemporary

behavioral research, which indicates that positive attitudes do not automatically translate into behavior change. In urban environments, adolescents often face practical barriers to implementing healthy attitudes, including limited healthy food options around schools and the higher cost of nutritious foods compared to snacks and fast foods(17).

Moreover, recent evidence highlights that adolescents' food-related attitudes are increasingly shaped by digital food marketing and social media influencers, who frequently promote convenience foods rather than balanced meals. These influences may weaken the impact of positive attitudes toward nutrition and contribute to the persistence of unhealthy eating patterns(18). Although 53.6% of respondents reported good balanced nutrition practices, no significant association was observed between nutritional practices and obesity status. This finding may be attributed to several factors. First, dietary behavior in this study was assessed using self-reported questionnaires, which are prone to social desirability bias, leading respondents to overreport healthy behaviors(19). Second, obesity is the result of long-term cumulative energy imbalance, whereas reported practices may only reflect short-term or perceived behaviors(20,21). Third, current evidence suggests that even adolescents who report healthy eating practices may still experience excess energy intake due to hidden calories from sugar-sweetened beverages, snacks, or frequent consumption of ultra-processed foods(22). Taken together, the KAP findings in this study reinforce the growing consensus in the literature that individual-level knowledge, attitudes, and practices alone are insufficient to explain or prevent adolescent obesity. These results align with socio-ecological models of health behavior, which emphasize the interaction between individual factors and broader environmental influences. Therefore, interventions aimed at improving adolescent nutrition should integrate nutrition education with supportive environments, including healthy school food policies, family involvement, promotion of physical activity, and regulation of unhealthy food marketing. Such comprehensive approaches are more likely to produce sustainable improvements in adolescent nutritional status than education-focused strategies alone.

4. CONCLUSION

This study demonstrates that adolescent obesity remains a relevant public health concern, with a prevalence of 11.8% among students at a public senior high school in Depok City. More than half of the adolescents exhibited inadequate knowledge and negative attitudes toward balanced nutrition, although slightly more than half reported good nutritional practices. No significant associations were found between knowledge, attitudes, or practices related to balanced nutrition and obesity status. These findings indicate that individual-level cognitive and behavioral factors alone are insufficient to explain obesity among adolescents. Instead, adolescent obesity should be understood as a multifactorial condition influenced by broader social, environmental, and lifestyle factors. In the current context, characterized by increased exposure to digital food marketing, easy access to ultra-processed foods, reduced physical activity, and post-pandemic lifestyle changes, nutrition education alone may have limited effectiveness. Therefore, obesity prevention strategies should adopt a comprehensive, multi-level approach that integrates nutrition education with supportive school environments, family involvement, promotion of physical activity, and policies that address the obesogenic food environment. Future research should incorporate objective measures of dietary intake and physical activity, explore

environmental and digital determinants of food choice, and employ longitudinal designs to better capture causal relationships in adolescent obesity.

CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest.

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