Nutrition Balanced Guideline: Irregular Weight Monitoring Is Associated with Overweight-Obesity in Adolescents (High School Students) at Bekasi

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Summary Adolescents are susceptible to nutritional problems. One of the problems in adolescents is the incompatibility of actions related to food selection. An unbalanced diet will affect nutritional status; hence a guide is needed in food selection by considering the principles of balanced nutrition. This study aims to determine the relationship of balanced nutrition practices with obesity in adolescents. This was a cross sectional study. The independent variables in this study were food diversity, hygiene behavior, physical activity and body weight monitoring while the dependent variable was obesity. The independent variables reflect the four principle of balanced nutritional guidance. The subjects of this study were 192 high school students. Data were collected by using Semi Quantitative-Food Frequency Questionnaire (SQ-FFQ) to assess food consumption, IPAQ short form to measured physical activities, and questionnaire to assess hygiene and weight monitoring behavior. Results showed that there were 19.8 percent overweight and obesity, 100 percent of dietary consumption was inconsistent with Balanced Nutritional Guidance, 53.6 percent had good hygiene behavior, 52.1 percent had medium physical activity and 63 percent had irregular weight monitoring. There was a relationship between weight monitoring and obesity (p<0.05) and no relationship with other principles. In conclusion adolescents have poor pattern of food consumption. Irregular weight monitoring was associated with overweight-obesity. It is suggested that adolescents have regular weight monitoring to control their nutritional status.

Key Words balanced nutrition, overweight, obesity, adolescent

Balanced nutrition guidelines are developed as a basis for achieving optimal nutritional status. In Indonesia a balanced nutrition guideline was established in 2014. Based on the existing guidelines, there are principles that must be done, namely diverse eating, clean living, physical activity and weight monitoring. This principle can also be applied to adolescents (1).

Adolescent are susceptible to nutritional problems, especially related to food, such as forgetting to eat, over-eating, habits of eating fast food and not paying attention to the adequacy of nutrition needed. This causes nutritional problems in adolescents (2). In 2013 there were 7.3% overweight and obese adolescents in Indonesia. This number is increasing to 16% in 2018 (3, 4). Both nutritional deficiencies and excess can happen among adolescents.

Practice of balanced nutrition among adolescents is poor. A study by Syam et al, in Makassar City showed that 56.6% of adolescents did not practice balanced nutrition guidelines. Nevertheless, 59% have good knowledge about balanced nutrition (6, 7). This showed that good knowledge does not guarantee appropriate practice and impacts (8, 9). This study aimed to assess practices of balanced nutrition guidelines in relation to obesity among adolescents in Bekasi.

MATERIALS AND METHODS

This study was a cross-sectional design. This study assessed 4 balanced nutrition principles, namely food diversity, clean and healthy life behavior, physical activity and body weight monitoring; and nutritional status. Food diversity consumption data was collected using semi-quantitative FFQ questionnaires. The practice of clean and healthy living behavior was assessed using a standard questionnaire from the Indonesian Ministry of Health with modifications. Physical activity data was collected using a simple Short IPAQ form instrument and body weight monitoring was assessed with a validated questionnaire. Sample has regularly weight monitoring at least last one month will categorized to “1 mo” and sampel with did not weight monitoring at last one month could be categorized “>1 mo”. Nutritional status was determined by measuring body weight and height according to age and gender. The study was conducted in Bekasi City, Indonesia involving 192 adolescents. The sample selection was done by non-probability sampling (non random sample) with a purposive sampling method. Sample was collected from one High

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School that previously selected by researcher based on amount of the student, school status and location. Adolescents with z-score $\leq -2SD$ were excluded from the analysis during data cleaning. Data analysis was carried out by univariate and bivariate. Chi square test is used to see the relationship between variables.

**RESULTS**

Majority of the adolescents were at the age of 16 y. There were 24% boys and 76% of girls. Based on BMI indicators, 19.8% of adolescents were overweight and obese. All students did not practice the principle of food diversity consumption and there were more students applied the principle of clean and healthy living (53.6%). With regard to physical activity, 47.9% had light physical activity (<600 MET-min/wk). Many adolescents (63%) did not monitor their body weight in the past month (Table 1).

There were no significant association between nutritional status and the three principles of balanced nutrition guidelines, namely, consumption of diverse foods, practices of clean living and physical activity. However, there was a significant association between nutritional status and weight monitoring practices ($p<0.05$) (Table 2).

**DISCUSSION**

*Food diversity and overweight-obesity*

Based on the results of the study, 100 percent of respondents had unbalanced consumption of diverse foods. Several other studies have also found high rates of consumption of monotoneous, unbalanced foods. In Natalia (10) study among adolescents of SMAN 1 Tarutung, 82.8 percent had no diverse consumption. In Dian’s (2013) study, 99 percent of MTs adolescents had consumption patterns that were not in accordance with the Balanced Nutrition Guidelines. In the study of Zakiah (12), 100 percent of students had eating habits that were not in accordance with the Balanced Nutrition Guidelines. In the Akman study (13), 98.1 percent of adolescents in Turkey who had consumption patterns did not comply with the food pyramid guidelines. In Naeeni’s (14) study, adolescents did not meet the nutritional needs and they had an unbalanced diet (10–14). In Ermonas’s study state that Imbalance food consumption cannot fulfill nutrient (15).

*Clean behavior and overweight-obesity*

This study showed that 53.6 percent of respondents had good hygiene and healthy behavior and 46.4 percent had poor hygiene and healthy behavior. Several other studies also found high rates of good hygiene and healthy living behavior. In Saputro’s (16) study in elementary school children 80.5 percent had good hygiene and healthy behavior. In Sari study (11) in adolescents, 56.3 percent of respondents having clean living behavior in accordance with the Balanced Nutrition Guidelines. In Zakiah’s (12) study on Jakarta UIN students 61.9 percent of students applied a good clean lifestyle. In Ermonas’s study state that Imbalance food consumption cannot fulfill nutrient (15).

There was no significant relationship between the behavior of clean living with overweight-obesity. There were 23.6% of respondents with bad behavior and being overweight. This is in line with Zakiah’s research (12) that there is no relationship between a clean lifestyle and nutritional status. Clean living behavior in adolescents such as washing hands before and after
meals, maintaining oral and dental hygiene, choosing safe foods and drinks. In addition to clean living behavior, it is necessary to pay attention to healthy life behaviors in adolescents such as not smoking, not using drugs and not consuming alcohol. Clean and healthy behavior that is not good will affect the body's weak resistance and susceptible to infectious diseases so that it can cause malnutrition. Clean and healthy behavior is closely related to undernutrition (1, 12). *Physical activity and overweight-obesity*

This study also showed that 47.9 percent of respondents had light physical activity and 52.1 percent had moderate physical activity. Other studies also found high rates of moderate physical activity. In the Sada (18) study of Jayapura health polytechnic students 71.1 percent had moderate activity. In a study conducted by Sari (11) in adolescents, 70.8 percent of respondents having moderate physical activity. In Zakiah's (12) study, 49 percent of students had moderate activities (11, 12, 18).

The research found that 23.9% of respondents with less physical activity were also overweight-obesity. There was no significant association between physical activity and overweight and obesity. This finding is in contrast to the existing theory and the results of other studies such as the results of Sada's research (18) which show that physical activity carried out routinely can maintain optimal nutritional status so that there is a relationship between physical activity and nutritional status. This is also in line with Amelia's (19) research that there is a relationship between physical activity and adolescent nutritional status which indicates that the more physically active the better nutritional status (18, 19). *Weight monitoring and overweight-obesity*

As many as 63 percent of respondents have their body weight measurement more than 1 mo ago. This indicates that adolescents did not routinely monitor body weight based on balanced nutrition guidelines. In the study of Zakiah (12), 80.6 percent of students weighed more than 1 wk ago. In the Pich study (20) the results showed that men did not try to lose weight while women monitored their weight. In Zainuddin's (21) study of Malaysian adolescents as many as 72.6 percent had weight control practices. Adolescents who tried to reduce or gain weight need to have a better understanding of desired behavioral changes.

It is known that more than 20% of respondents who do not monitor their weight regularly have an overweight-obesity nutritional status. The results of the study showed that there was a significant association between routine weight monitoring and overweight-obesity. Body weight is an easy indicator to be used as a reference for current nutritional status. **CONCLUSION**

Practices based on balanced nutrition guidelines should be carried out by adolescents. This study showed that there were many adolescents who do not apply the whole recommended by balanced nutrition guidelines. Of the four indicators of balanced nutrition guidelines, the least practiced was consumption of diverse food. However, body weight monitoring had significant association with overweight-obesity.

**Disclosure of state of COI**

No conflicts of interest to be declared.

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