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Lifestyle As a Factor for Overweight in Adolescents

Lifestyle sebagai Faktor Risiko Overweight Remaja

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ABSTRACT

Background: Overweight prevalence in Indonesia is 16.5% in late teens. Lifestyle is a risk factor for overweight teenagers, especially those who live in urban areas.
Objectives: To analyze the relationship between lifestyle and eating patterns on the incidence of overweight in teenagers living in urban areas.
Methods: This research was an observational study with a cross-sectional design. The population of teenagers in Jakarta aged 15 - 18 was 996, based on Ministry of Health Basic Health Research 2018 data. The sample number were 372 using the research criteria of simple random sampling. Research instruments include questionnaires, digital weight scales, and stadiometers. The statistical test used Chi Square to determine the risk factors for overweight.
Results: The number of overweight teenagers was 0.12%; the majority were in their late teens (55.6%), female (52.7%), rarely consumed sweet foods (62.9%), often consumed sweet drinks (58.9%), rarely consume fatty/fried foods (61.0%), often consume vegetables and fruit (65.1%), do not drink alcohol (98.4%), moderate sport activity (41.9%), and not smoking (77.7%). Overweight risk factors are consuming sweet drinks (p=0.044; OR=1.582; CI=1.010-2.477) and education (p=0.040; OR=1.847; CI=1.059 – 3.220). Adolescents with frequent sweet drinks consumption have a 1.58 risk of being overweight compared to those who do not consume sweet drinks. Adolescents with higher education are at risk of being overweight by 1.84 compared to those with lower education.
Conclusions: Risk factors for overweight Jakarta teenagers are frequent consumption of sweet drinks and advanced education.

INTRODUCTION

Overweight or being overweight is a Positive Energy Balance, which means there is an imbalance between energy intake and energy expenditure, where the energy received is greater than that expended to carry out activities. As a result, residual energy is stored as fat tissue in the body[1]. The incidence of overweight increases each year, especially in developing countries. Overweight prevalence in 2013 based on Ministry of Health Basic Health Research was 5.7%, increasing by 3.8% in 2018 to 9.5%[2]. Several surveys found that 1 in 7 teenagers are overweight. Overweight prevalence will continue to increase over time, and it is predicted that by 2025, it will reach 12%. WHO recommends that overweight prevalence return to 2010, namely 4.9%[2]. This excess weight epidemic is a health warning because the impact is the risk of experiencing metabolic disorders and a high risk of suffering from cardiovascular disease and degenerative diseases[3].

The causes of being overweight are complex, such as characteristics (age, gender, education), diet, and physical activity. Adolescents and children are more at risk of being overweight than older people[4]. On the other hand, Vanessa et al. found that the prevalence of age > 40 was at greater risk of being overweight[5]. In theory, in terms of age, women who are at risk of becoming overweight are those who have experienced menopause because there is a decrease in the hormone estrogen, which causes a decrease in BMR (Basal Metabolism Rate)[6]. The gender that is more likely to be overweight is women compared to men because, in terms of body proportions, women have superior fat content than men[5]. Research by Rachmi et al. found the opposite: men have a higher prevalence of being overweight than women[4]. The risk of obesity can occur from when the fetus is in the womb until old age. However, the trend is shifting; there is an increased tendency for adolescents to experience obesity[6].

The increase in teenagers' obesity is due to changes in current eating patterns. Teenagers tend to consume fatty foods high in salt and lacking in fiber[7]. Research on teenagers in Surabaya shows a relationship between consumption of fried snacks, and the consumption of saturated fat shows a significant relationship with obesity[8]. Likewise, with the recent trend of sugary drinks, fizzy drinks are also a determining factor in the occurrence of overweight among teenagers[9]. Ministry of Health Basic Health Research 2018 and several studies related to fiber consumption habits, namely eating fruit and vegetables in children or

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adolescents, are very low at consuming vegetables and fruits[2,4,5]. Fiber functions to inhibit the absorption of excess energy and fat from food. Therefore, consuming fiber that does not follow the RDA (Recommended Dietary Allowances) increases the risk of becoming overweight[2,10].

Lifestyle factors such as smoking, consuming alcohol, and exercise habits also contribute to increasing overweight. The research results show that individuals who smoke more than 20 cigarettes/day experience a higher risk than those who consume 1 - 10 cigarettes/day[11]. Alcohol consumption is a habit of certain communities related to culture. *Tuak* is a type of traditional alcoholic drink with a high sucrose sugar content, causing the risk of being overweight[12]. Technological developments have shifted physical activity and sports towards activities with low energy expenditure. Research in Surabaya and other cities illustrates a significant relationship between physical activity/exercise and being overweight at[9,13].

Based on this, it is critical to understand the impact of lifestyle and eating patterns on teenagers, especially in urban areas, and the detrimental effects on teenagers' survival. Being overweight is a chronic nutritional problem whose prevalence must be prevented because it contributes to increasing mortality rates, especially in the adolescent life cycle group. Current nutritional status is an epidemic that needs to be considered because it can have long-lasting effects, both from a health and social perspective. The research aims to determine the risk factors for overweight adolescents living in big cities.

METHODS

This was an observational study with a cross-sectional design. The population of adolescents aged 15 – 18 years based on 2018 Ministry of Health Basic Health Research data, Jakarta was 996. According to the research criteria, the number of samples was 372, consisting of cases (BMI 23-24.9) totaling 124 and controls (BMI 18.5-22.9) totaling 248 selected by random sampling. The variables studied include characteristics (age, gender, education), lifestyle (smoking, consuming alcohol, sports activities), and eating patterns (habits of consuming sweet, fatty/fried foods and drinks, fresh vegetables, and fruit). The research instrument used a structured questionnaire following the guidebook for filling out questionnaires, a Tanita brand digital scale, and a Seca brand stadiometer. Variable classification: Overweight = 1 (BMI 23 – 24.9), not overweight = 2 (18.5 – 22.9); Late adolescence = 1 (17-18 years old), middle adolescence = 2 (15-16 years old). Basic education level ≤ 9 years = 1, Further education > 9 years = 2. Alcohol consumption is categorized as yes = 1 if it was consumed in the last month and no = 2. Smoking was categorized as yes = 1 (daily/occasionally) and no = 2; sports activities rarely = 1 (1-2 times/week), often = 2 (more than 1 time/day and 3-6 times/month). Consumption of sweet foods and drinks, fatty/fried foods were categorized as frequent = 1 (more than once/day and 3-6 times/week), and rarely=2 (1-2 times/week and 3 times/month). Consumption of vegetables /fruit rarely = 1 (1-2 times/week and 3 times/month), and often = 2 (more than once/day and 3-6 times/week). The software used was SPSS with the chi Square statistical test to determine risk factors for overweight by taking into account the OR (Odds Ratio).

RESULTS AND DISCUSSION

Relationship of Characteristics with Overweight

Table 1 shows that the age distribution between late and middle teens is almost the same for both the overweight and non-overweight groups. This result is supported by the chi-square test with p=0.825, which identifies that age is not a risk factor for overweight. The adolescent age group (early, middle, and late) is in the growth phase. Therefore, they require a high nutritional intake to support their growth. Lack of understanding of the impact of consuming good and correct food without varying it, leads to vulnerability to becoming overweight[14].

Gender is a predictor of the incidence of overweight. Based on their body composition, women tend to store more fat than men due to the influence of the hormone estrogen, which functions to reduce the oxidation of postprandial essential fatty acids[15]. The Chi-Square test identified that gender is unrelated to obesity (Table 1) because the proportion of sex in the overweight group and not between men and women is almost the same. This research results contradict Ratu Ayu's research, which, with a cross-sectional design, found that the gender of children aged 5 - 15 years was associated with overweight and obesity because a greater proportion of boys were overweight than girls[16].

Table 1. Relationship between characteristics and overweight

Variable	Overweight		Not Overweight		OR (95% CI)	p-value
	n	%	n	%		
Age						
Late adolescence	68	54.8	139	56.0	0.952	0.825
Middle adolencece	54	45.2	109	44.0	(0.617-1.469)	
Sex						
Female	72	58.1	124	50.0	1.385	0.142
Male	52	41.9	124	50.0	(0.896-2.139)	
Education						
Further education Level	104	83.9	183	73.8	1.847	0.040
Basic education level	20	16.1	65	26.2	(1.059-3.2200	

Education contributes to an individual's knowledge, attitudes, and behavior in implementing a healthy lifestyle, especially when consuming food[17]. The higher the education, the better the knowledge about the

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quality and quantity of food consumed daily. Research in Pekanbaru City that people with education equivalent to basic education level are more obese than those with higher education levels[18]. Table 1 shows the Chi-Square Test showing that a high level of education is a risk factor for obesity (p=0.040; OR=1.847; CI= 1.059 – 3.220), which means that a high level of education has a 1.8 times risk of being overweight compared to those with low education. This result is also confirmed by subjects with higher education who are more likely to be overweight than not overweight. Education is not always directly proportional to knowledge because knowledge can be obtained based on experience and the influence of peer environment, especially lifestyle. This research does not follow other research, which states that a low level of education is a risk factor for obesity in adolescents[5,19].

Lifestyle Relationship with Overweight

The lifestyle of city teenagers differs from that of rural teenagers, especially in sports activities[4]. The Ministry of Health recommends doing physical activity or sports for at least 150 minutes/week, or 30 minutes/day. Adolescents in big cities tend to have a sedentary lifestyle; that is, they do not exercise enough or move with little energy.

The research results showed that in the overweight and non-overweight groups, the majority of sports activities were classified as frequent. The chi-square test found that sports activity was not a risk factor for overweight (Table 2). The results of this research are in contrast to research results from National Social-economic Survey and systematic review research, which states that sports activities are related to being overweight (p<0.05)[16,20]. The results of Ministry of Health Basic Health Research 2018 data categorized exercise based on habits (rarely, often), while other research < 15 minutes/day and > 15 minutes/day. The two main ways to lose weight are diet and exercise. Research on mice found positive effects of physical exercise by reducing food intake and weight gain. The combination of a protein diet and exercise training leads to weight loss. On the other hand, fat consumption disrupts carbohydrate and fat metabolism, thereby causing excess weight[21]. Physical activity has a different meaning from sport because physical activity involves carrying out daily activities. Meanwhile, sport is a physical activity that is carried out in a planned manner and expends a lot of energy[22]. Exercise positively affects children's development, obesity, and eating habits. Efforts to prevent obesity in children will be better if they are family and school-based. The orientation is based on implementing an interdisciplinary curriculum that aims to reduce the consumption of fatty foods, increase the habit of eating vegetables and fruit, promote the importance of regular exercise, and limit television viewing for two years to prevent overweight in school children[23]. Ratu Ayu's research results based on 2007 National Social-economic Survey data found that teenagers who exercise <15 minutes/day are associated with being overweight[16]. Jobs that require minimal energy expenditure, such as sitting a lot (programmers, writers, painters, administration staff, etc.)[24] and there is an increase in energy in shift workers' night, risk of becoming overweight[25]. This occurs because there is an imbalance between calorie intake and energy expenditure. Student adolescents without regular physical activity and exercise are also at risk of being overweight.

Table 2. Relationship between Lifestyle and overweight

Variable	Overweight		Not Overweight		OR (95 % CI)	p-value
	n	%	n	%		
Smoking						
Yes	25	20.2	58	23.4	0.827	0.481
No	99	79.8	190	76.6	(0.488-1.403)	
Alcohol consumption						
Yes	2	1.6	4	1.6	1.000	1.000
No	122	98.4	244	98.4	(0.181-5.536)	
Sports activities						
Rarely	4	3.2	3	1.2	2.722	0.177
Often	120	96.8	245	98.8	(0.600-12.357)	

Table 2 shows that smoking habits are unrelated to overweight in adolescents living in DKI (p>0.05), because in both the overweight and non-overweight groups, the proportion of smokers and non-smokers is almost equal. Indonesia is the highest cigarette-consuming country in Southeast Asia and ranks third in the world, although according to Ministry of Health Basic Health Research 2018 data, there has been a decline of 0.4%. In Indonesia, people start smoking at the age of under 20 years, mostly at the age of 17 – 19 years. The negative impacts of smoking cigarettes are obesity, hypertension, and obstructive lung disease[26]. Research in South Korea concluded that although cigarettes are not the cause of excess weight, they result in a more metabolically detrimental distribution of fat as the number of cigarettes smoked increases[27]. Even former smokers still have a chance of being overweight compared to smokers and non-smokers[28]. Other research states that smoking among teenagers and young adults has a negative relationship with body weight, meaning that smoking can suppress appetite[29]. Heavy smokers tend to have unhealthy lifestyles, namely lack of activity, weight or a diet that is not diverse. Smokers have lower plasma leptin levels than non-smokers. Low leptin levels cause increased appetite, resulting in a trigger for obesity[30].

The results found that alcohol consumption is not associated with overweight among adolescents in Jakarta (Table 2), as the proportion of those who consumed

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alcohol and those who did not was almost equal in the overweight and non-overweight groups. *Tuak,* or traditional alcohol, is widely consumed by people living in Bali. Alcohol can cause weight gain in four ways: it stops the body's fat-burning process, is high in calories, causes hunger, and stimulates individuals to consume salty and oily foods. A person who regularly consumes alcohol, which is classified as moderate and heavy consumer, is at risk of obesity compared to light drinkers[31]. This is evidenced by research in Korea, which proved that heavy alcohol drinkers are at risk of obesity and dyslipidemia[32]. The findings of a longitudinal study in China also identified high alcohol consumption as a risk to increase BMI (Basal Metabolic Index)[33].

Relationship between Eating Pattern and Overweight

These results showed that sugary drinks are a risk factor for obesity in adolescents (p=0.044) but not for consuming sweet/fried or fatty foods and consuming fruits and vegetables. Adolescents who frequently consumed sugary drinks are 1.58 times more likely to be overweight than those who rarely consumed them (Table 3). This is due to a shift in diet, especially among adolescents, from traditional foods or beverages towards current foods, which tend to be sweet, high in calories, low in fiber, and fast food. A study investigating the lack of vegetables, fried foods, and sweetened soft drinks found a correlation with overweight in adolescents and children. At the same time, the risk of obesity in adults was associated with increased intake of meat and dairy products[4,5]. Yurista's study also found frequent consumption of fried or fat-containing foods to be at risk for overweight[7]. Excessive eating patterns associated with external hunger cues (smell, taste of food) encourage a person to become overweight, which causes damage to the lateral hypothalamus[34]. Excessive consumption of simple carbohydrates and sugary drinks is a risk factor for obesity in adult women[9]. Research in Texas shows that consumption of drinks with high sugar content is associated with obesity; this is because sweet drinks tend to be high in saturated fat[35]. Conversely, research in Bogor found no relationship between consumption of sweet drinks and overweight[36].

Table 3. Relationship between Food Pattern and Overweight

Variable	Overweight		Not Overweight		OR (95% CI)	p-value
	n	%	n	%		
Fatty/fried foods					0.934	0.851
Often	47	37.9	98	39.5	(0.600-1.455)	
Rarely	77	62.1	150	60.5		
Sweet foods					1.109	0.733
Often	48	38.7	90	36.3	(0.711-1.729)	
Rarely	76	61.3	158	63.7		
Sweet drinks					1.582	0.044[a]
Often	82	66.1	137	55.2	(1.010-2.447)	
Rarely	42	33.9	111	48.8		
Vegetable dan Fruit					1.279	0.336
Rarely	76	61.3	166	66.9	(0.817-2.001)	
Often	48	38.7	82	33.1		

[a]Chi square p<0,05

Fruits and vegetables are a source of antioxidants and phytochemicals but are low in calories, which helps with weight loss and maintaining ideal body weight. Appetite will also be reduced by eating fruits and vegetables as recommended. The average recommended fiber consumption is 30 - 35 grams/day[37]. Water soluble fiber (soluble fiber) such as pectin and some hemicellulose can give a longer feeling of satiety due to the formation of thick liquid in the digestive tract when consumed.

Fiber also contains low fat and low glucose levels, making it excellent for preventing overweight. Consumption of vegetables and fruits > 4 servings/day can reduce the risk of obesity[38]. Mediterranean-style fruit and vegetable consumption can create a sense of happiness for individuals, reducing psychological dissatisfaction with body shape and resulting in a healthy diet to prevent weight gain[39]. Research in Padang City found that vegetable and fruit consumption habits were not associated with adolescent obesity. Still, the portion of vegetable and fruit consumption impacted obesity[10].

CONCLUSIONS

Risk factors that trigger the incidence of overweight in adolescents living in Jakarta City are education level and frequent consumption of sugary drinks. Fatty foods, sweet foods, vegetables and fruits, and lifestyle (smoking, alcohol, exercise) are not determinants of being overweight.

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Conflict of Interest and Funding Disclosure

There is no conflict of interest in this study because researchers only analyzed Ministry of Health Basic Health Research 2018 data related to lifestyles that impact overweight in urban adolescents. Thus, it is expected to provide recommendations for preventing the overweight pandemic. Research funding comes from the Faculty of Public Health, Diponegoro University, Semarang.

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