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Snacking behavior among school-aged children in urban area

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ABSTRAK

Latar Belakang: *Mengkonsumsi jajanan dalam sehari dapat memberikan kontribusi masukan energi selain mengonsumsi makanan utama. Namun perilaku jajanan pada anak sekolah di Indonesia menunjukkan beberapa kebiasaan yang tidak sehat seperti seringnya mengonsumsi jajanan berkalori tinggi dan minuman manis. Anak-anak di kota besar mempunyai risiko lebih tinggi mengalami obesitas karena tingginya konsumsi jajanan tidak sehat.*
Tujuan: *Penelitian ini bertujuan untuk melihat perilaku jajanan anak usia sekolah yang tinggal di perkotaan.*
Metode: *Jenis penelitian observasional dengan desain cross sectional study. Sampel penelitian merupakan anak usia sekolah dasar, berasal dari seluruh kelurahan di wilayah Bekasi sebagai salah satu kota megapolitan di Indonesia, meliputi kelurahan: Duren Jaya, Bekasi Jaya, Aren Jaya, dan Margahayu. Sebanyak 213 siswa mengikuti penelitian ini. Siswa diminta mengumpulkan data tentang karakteristik responden dan perilaku jajanan (menggunakan angket terstruktur dan angket frekuensi makanan).*
Hasil: *Hasil penelitian menunjukkan 50,2% anak sering makan jajanan; 79,8% membeli makanan ringan dari kombinasi kantin sekolah, pedagang kaki lima, dan warung makan tetap; 70,4% membeli makanan ringan pada jam istirahat, setelah, dan sebelum sekolah; dan 75,5% menggunakan bahan kemasan plastik. Tidak terdapat hubungan antara hubungan jenis kelamin, kebiasaan sarapan pagi, uang jajan, pendidikan ibu, pendidikan ayah dengan frekuensi jajan (chi-square test menunjukan p-value: 0.175, 0.302, 0.269, 0.104, 0.247).*
Kesimpulan: *Penelitian ini menunjukkan bahwa separuh anak usia sekolah dasar di Kota Bekasi sering mengonsumsi makanan jajanan, hanya 30% siswa yang tidak membeli makanan ringan di sekolah, dan 75% siswa terbiasa jajan makanan dengan kemasan plastik. Hampir 80% siswa terbiasa jajan di dua atau tiga tempat penyedia jajanan, seperti kantin sekolah, pedagang kaki lima, dan warung makan. Frekuensi jajan siswa tidak berhubungan dengan faktor yang berkaitan dengan karakteristik siswa dan pendidikan orang tua.*

KATA KUNCI*: anak usia sekolah; area perkotaan;faktor penentu; perilaku jajan*

ABSTRACT

Background: *During the day, snacks may contribute to energy input besides meals. However, snacking behavior among school children in Indonesia shows some unhealthy habits, such as frequent consumption of high-calorie snacks and sugary beverages. Children in big cities have a higher risk of obesity since they consume unhealthy snacks.*

Objectives: *This study aims to see the snacking behavior of school-age children living in urban populations in Indonesia.*

Methods: *The study is observational with a cross-sectional study design. Samples are school-age children taken from all urban villages in the Bekasi Area, a megapolitan city in Indonesia: Duren Jaya, Bekasi Jaya, Aren Jaya, and Margahayu. A total of 213 students joined the study. Students were asked to complete data about respondent characteristics and snacking behavior (using a structured questionnaire and food frequency questionnaire).*

Results: *The results show that 50.2% of children often eat snacks; 79.8% buy snacks from a combination of school canteen, street vendors, and permanent food stalls; 70.4% buy snacks during break time, after, and before school; and 75.5% use plastic packaging material. There is no association of sex, breakfast habits, pocket money, mother education, and father education with snacking frequency (p-value: 0.175, 0.302, 0.269, 0.104, 0.247).*

Conclusions: *This study shows that half of elementary school children in Bekasi City often consume snacks, only 30% of students do not buy snacks at school, and 75% of students are used to buying snacks in plastic packaging. Almost 80% of students were buying snacks at two or three food vendors, such as school canteens, street vendors, and food stalls. The frequency of snack consumption was not related to factors attributable to students' characteristics and parents' education.*

KEYWORD*: determinant factors; school-age children; snacking behavior; urban area*

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INTRODUCTION

During the day, snacks may contribute to energy input besides meals. Traditionally, people eat meals three times: breakfast, lunch, and dinner. In between their meals, they usually eat some snacks. A review article explains how snacking patterns can have potential implications on health. Snacking can help people keep their stomachs full; snacks can keep the satiety going from one meal to another at the next meal. However, snacking is also associated with several health outcomes, such as oral health, obesity, and risk of non-communicable diseases. Studies in children mention the link between excessive energy intake and weight gain. Snacking may cause higher energy density and lower nutrient consumption (1). School-age children in Indonesia consume unhealthy snacks such as fried foods, ice cream, and sweet beverages (2).

A systematic and meta-analysis study has already proven the consequences of sugar-sweetened beverages and fast food consumption to be the primary cause of overweight/obesity among children (3). Other studies also mention the habit of consuming sweets and high-fat snacks in elementary school students is proven to be related to the incidence of obesity in students (4,5). In Indonesia, the food environment near primary school should be responsible for children's snacking behavior during school. School-age children easily access deep-fried foods and sugar-sweetened beverages. Schools, especially public schools, allow street vendors to stay close to school areas, and children can buy food and drinks (6).

Indonesia already faced the problem of snacking behavior among school-age children for a long time, but there seems to be no difference from time to time. Even the overweight and obesity trend is still prevalent in the community. The number of people suffering from this overnutrition problem has doubled from 2007 to 2018 (10.5% to 21.8%) (7). This trend is almost similar to obesity

among children aged 5 – 12 years old. Although the prevalence of obesity decreased from 2018 to 2023 (9.2% to 7.8%), the prevalence of overweight increased during two national surveys (10.8% to 11.9%) (7,8). Children in big cities are often exposed to a sedentary lifestyle and high consumption of fatty food and sugar-sweetened beverages. The unhealthy food environment familiarizes children with high-calorie food, which causes energy to enter the body at a higher rate than energy used for their activity (9).

A preliminary study conducted by the research team found that in the school environment, there are snack sellers that are high in sugar and fat. Examples of snacks available at the school are cireng, cilok, papeda, noodles, martabak, basreng, and other elementary school snacks. The foods mentioned can be classified as empty foods or empty calorie foods. This food contains high energy per 100 g but is low in other nutrients, especially micronutrients (10). Most foods are based on carbohydrates and cooked using deep frying. This cooking method causes food to absorb a lot of fat, a nutritional element with the highest calories of 9 kcal. This method also risks losing other nutrients, such as vitamins and minerals, that are susceptible to damage due to heating (11). Apart from less nutritious foods, some drinks are high in sugar, such as heavily sweetened packaged drinks with various flavors.

This study aims to see the snacking behavior of school-age children living in urban populations in Indonesia. Snacking behavior is being focused, knowing its contribution to overnutrition. Also, the overnutrition rate among children in Indonesia keeps increasing. The difference between other studies and previous research is this study includes representatives of some schools from different urban villages. This study not only wants to see the snacking habit based on the frequency but also see the place to buy snacks, time to buy snacks, packaging materials, and its association with snacking frequency.

MATERIALS AND METHODS

The study is observational with a cross-sectional study design. Kemerdikbudristek funds the research from program named “Penelitian Dosen Pemula (PDP) 2024”. The study proposal arrangement started in April 2024 and continued with data collection from August- September 2024. Researchers conducted the study in an urban population in the Bekasi Area, specifically in East Bekasi. East Bekasi was chosen since it is classified as a sub-district with many primary schools and students in Bekasi. (12). Sampels are taken from all urban village in East Bekasi: Duren Jaya, Bekasi Jaya, Aren Jaya, and Margahayu. A total of 213 students aged 9-12 years joined the study. Students were asked to complete data about respondent characteristics and snacking behavior (using a structured questionnaire and food frequency questionnaire). The questionnaire used in the study was developed from the authors’ previous study (still under the process of publication) (13) And have already passed a questionnaire trial in a school with characteristics similar to the study sites.

Characteristics of the respondents

The variables about respondents’ characteristics consist of name, date of birth, parents' occupation, education, and pocket money. The students fill out structured questionnaires accompanied by an enumerator during data collection.

Snacking Behavior

Children filled out the questionnaire, which consisted of a time of snacking, a place to buy snacking, a snack package, and frequency of snack consumption during one month, using the food frequency questionnaire. Category of snack time: during the break, before school, after school, and a combination of two/three snacking times. Category of place to buy snacks: street vendors, canteen, food stall near school, and combination between two/three places. Category of snack package: plastic, styrofoam, paper, and others. To assess the materials of snack packaging, children are asked to write snacks they consumed on yesterday's intake and write down the packaging materials. Children also completed a food frequency questionnaire (FFQ) within a month. The researcher provides a list of snacks and beverages. The FFQ used in the study already passed the pre-testing instrument in the schools with similiar characteristics to children in the main data collection. In the data analysis, researchers scored the answers and categorized the total score. Category of snacking frequency: often (score of FFQ ≥ median) and rarely (score of FFQ

<median). Median score in the study was 53. The Ethics Health Commission assessed this study protocol from “Komisi Etik Penelitian Kesehatan STIKes Bani Saleh” No: EC. 143/KEPK/STKBS/VII/2024. The data is analyzed using statistical analysis software, SPSS. Univariate data are shown using descriptive analysis, and bivariate data is shown using the chi-square test.

RESULT AND DISCUSSION

Table 1 shows that half of respondents are 11 years old. The research team did not suddenly choose a combination of children who joined the study; teachers randomly picked children who joined the study. Two-thirds of respondents are girls, and they bring pocket money of around 10.000 – 19.999 IDR. Both mothers' and fathers' educational backgrounds are mostly secondary education. From the nutritional status, it is found that more than thirty percent of students belong to the overnutrition category.

Table 2 shows respondents' snacking behavior. This study found that half of school-age children often eat snacks, which aligns with previous studies in Indonesia (14,15). These two studies found that the proportion of children with frequent snacking consumption is almost similar but still higher in the reference group (often/bad snacking habit).

Table 1. Characteristics of the respondents

Characteristics	n (%)
Age	
9 years old	4 (1.9)
10 years old	43 (20.2)
11 years old	124 (58.2)
12 years old	42 (19.7)
Sex	
Boys	71 (33.3)
Girls	142 (66.7)
Maternal’s education/mother’s education?	
Primary education (elementary school)	14 (6.5)
Secondary education (high school)	88 (39.4)
Higher education (university)	33 (15.5)
Others (No answer, not sure about the answer)	82 (38)
Fathers education	
Primary education (elementary school)	13 (6.1)
Secondary education (high school)	67 (32.8)
Higher education (university)	34 (16.0)
Others (No answer, not sure about the answer)	96 (45.1)
Daily pocket money	
<10.000 IDR	45 (21.1)
10.000 – 19.999 IDR	135 (63.4)
20.000 – 29.999 IDR	30 (14.1)
≥30.000 IDR	2 (0.9)
No answer	1 (0.5)
Nutritional status	
Normal	144 (67.6)
Overweight	41 (19.2)
Obese	28 (13.1)

N = 213

Another study from Nuryani & Rahmawati (2018) also showed similar result, higher percentage on snacking habit at school (16). The observation during data collection supports this study's findings. Many children buy snacks, especially during school breaks. Our study shows that children buy snacks not only on school breaks but also before/after class activities. A higher frequency of snacking can contribute to more energy input to the body. A study conducted

among the population in Indonesia, similar to this study, found that snacks contribute to total energy about 21.7±10.1% or in average both urban and rural, about 26.7±12.8% (17). Meanwhile, a study in the United States also showed identical results: Around 28% of the children's total energy comes from snacks (18). Higher consumption of snacks is associated with obesity (4). However, not all research finds an association between snack consumption and obesity. Study form Njike et al., (2016) The recommendation of further research to determine the effects of healthy snacks on satiety and promote appetite control, which could reduce obesity, was made (19). **Table 2** also shows the places where snacks are bought. Students usually purchase snacks from the school canteen, street vendors, and permanent food stalls near the school called “warung”. Children mostly buy snacks not only from one seller but also from various types of food sellers. Typical school environments in Indonesian public schools have an internal school canteen and street vendors in front of the building. Foods sold in the school canteen are limited, so children want to buy other snacks outside of school from street vendors and permanent food stalls near the school. Street vendors are unofficially registered to school management. Most are small sellers selling fried foods such as caring, cool, color, martabak telur, telur gulung, and some sweets such as sugar-sweetened beverages and ice cream. Most policy guidance on healthy canteens at schools available in Indonesia does not mainly focus on nutrition (24).

Table 2. Snacking behavior

Characteristics	n (%)
Snacking frequency (N=213)	
Often	107 (50.2)
Rarely	106 (49.8)
Place of buying snacks (N=213)	
School Canteen	14 (6.6)
Street vendors	21 (9.9)
Permanent food stall near school	8 (3.8)
Combination of two/three places	170 (79.8)
Time of buying snacks (N=213)	
School break	59 (27.7)
After School	2 (0.9)
Before school	2 (0.9)
Combination of two/three occasions	150 (70.4)

Figure 1 explains that single-use plastic is the dominant food or drink packaging material. Most snacks and drinks are packaged in plastic, both cold and hot. This type of packaging has disadvantages. Negative impacts of single-use plastic packaging based on literature: First, plastic can increase health risks. Micro-plastics and nano-plastics can cause gene mutations and are carcinogenic, increasing the risk of various cancers (25). A comprehensive article mentioned that not all plastics used in public are safe. Some materials such as styrene, vinyl chloride, bisphenol A (BPA), and caprolactam may be dangerous to health. Examples of health effects include toxicity in the liver, kidney, and lungs, even cancers in some organs, and nervous system problems (26). Materials in the food package can be transferred to the food. The article also explains that plastic can migrate to food with several conditions, such as temperature during contact, contact period, and packaging material. In this case, the temperature of high-temperature snacks directly put on plastic may increase the possibility of plastic migration to the food. Second, continuous use of plastic can increase the amount of waste. Plastic waste is the second most common type of waste in Indonesia after food waste (27).

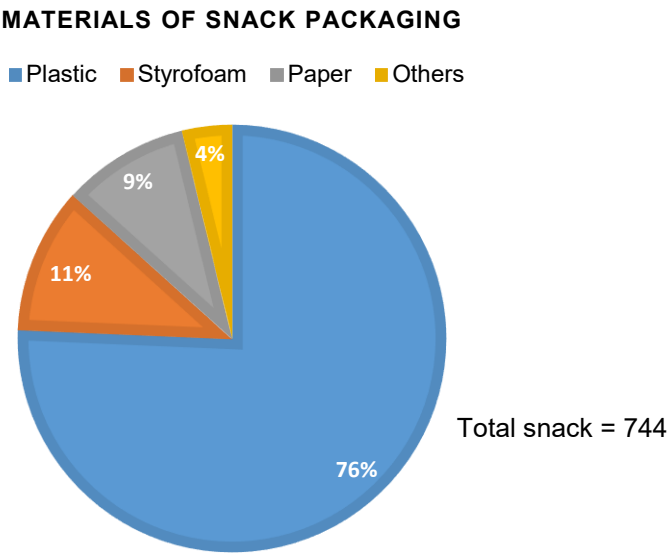

Figure 1. Materials of snack packaging

This study conducted a bivariate test (**Table 3**) to see the relationship between certain factors and school children's snack habits. There was no relationship between variables such as gender, breakfast habit, pocket money, and parent's education. This shows that consuming food is not explicitly influenced by gender, breakfast habits, pocket money, and parent's education. This study's results align with previous research, which stated no relationship exists between gender, breakfast habits, pocket money, and children's snack habits (20,21). Snacks in the school environment are sold at relatively cheap prices, with unit prices starting from 1.000 IDR, so students can easily buy them. There is no relationship between gender, showing that boys and girls are equally interested in snacking habits. Although, this is different from research in Western countries that girls show more snack consumption than boys (22). The absence of a relationship between breakfast habits and snack habits shows that children who eat breakfast and do not eat breakfast are equally likely to consume snacks often or rarely. In logical thinking, children who do not eat breakfast may eat more snacks than children who already eat breakfast, but the study shows similar behavior. Many snack sellers around the school area may attract children's attention to buy snacks. Parent's education also does not determine their snacking behavior. This is in contrast with another study that shows parents with a background in higher education had children who consumed more healthy snacks and less unhealthy snacks (23). However, this study emphasizes that parents may have higher education, but they may not know more about children's food recommendations. Therefore, their study level does not influence children's snacking behavior.

A qualitative study conducted in an elementary school in Jakarta, Indonesia, reported that school students have a tendency to consume unhealthy snacks without proper knowledge of their nutritional values or potential harm. Ease of access through food vendors at the school gate provides a variety of tasty and appealing snacks to be purchased by students. Students do not have sufficient knowledge regarding the ingredients in the snacks, which they obtain from traders who sell around the school. They do not know the potential harm, such as the chemical content often found in snacks, such as borax, formaldehyde, or rhodamine B (28). Moreover, there were several behavior factors that may lead to students' perceptions and choices to consume unhealthy snacks. Those behavioral factors consist of predisposing, enabling, and reinforcing factors. The predisposing factor towards snacking

Table 3. Factors associated with snacking behavior

Characteristics	Snacking Behavior		*P* value*
	Often	Rarely	
	n (%)		
Sex (N=213)			
Boys	31 (43.7)	40 (56.3)	0.175
Girls	76 (53.5)	66 (46.5)	
Breakfast habit N=213)			
Regularly	67 (53.2)	59 (46.8)	0.302
Not regularly	40 (46.0)	47 (54.0)	
Pocket money (N=212)			
≥ 10.000 IDR	81 (48.5)	86 (51.5)	0.269
< 10.000 IDR	26 (57.8)	19 (42.2)	
Mothers education (N = 132)			
Not going to university/college	46 (46.5)	53 (53.5)	0.104
Going to university/college	10 (30.3)	23 (69.7)	
Fathers education education (N = 117)			
Not going to university/college	39 (47.0)	44 (53.0)	0.247
Going to university/college	12 (35.3)	22 (64.7)	

*Chi-square test, significant if p<0.05

habits is the informant's lack of knowledge regarding healthy and unhealthy snacks. One enabling factor illustrated by Martondang & Yuliaty is that the informant has a habit of snacking because his parents always give him pocket money. The reinforcing factor was peers, who also influenced the informants to have snacks (28). One factor that influences elementary school children's snacking behavior is invitations from peers or following viral snack food trends. This is in line with research by Hateriah & Kusumawati in 2021, which conducted research on the factors that influence the habitual behavior of consuming snacks in elementary school children at the Banjar Regency Public Elementary School, where peer preferences can influence snacking behavior (p-value 0.03). According to the study, the parental knowledge level can also affect school children's snacking behavior. Generally, parents with a higher educational background also educate their children about choosing healthy types of snacks (20). However, this study finds no relationship between parents' education and snacking behavior.

CONCLUSIONS AND RECOMMENDATIONS

This study shows that half of elementary school children in Bekasi City often consume snacks, only 30% of students do not buy snacks at school, and 75% of students are used to buying snacks in plastic packaging. Almost 80% of students were buying snacks at two or three food vendors, such as school canteens, street vendors, and food stalls. The frequency of snack consumption was not related to factors attributable to students' characteristics and parents' education. This study shows how school-age children are close to food sellers who provide many snacks that can increase the risk of obesity. Promoting healthy snacking behavior should be strengthened among school-age children in urban areas, followed by strong policies from schools and governments. The regulation about food sellers near school can addressed. Schools can also improve the canteen inside the school area with nutritious snack options, such as limiting fried food and sugary beverages. Teachers regularly remind children to bring homemade snacks or buy food and beverages that are considered healthy snacks during school and to eat them in moderation portions.

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