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Understanding the Consumption, Expenditure, and Availability of Fruits and Vegetables among School-Age Children: A Study in Tasikmalaya City

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ABSTRACT

Fruits and vegetables are important for the growth and development of school-age children. Research indicates that low consumption of fruits and vegetables is linked with a higher probability of obesity and diet-related diseases. The purpose of this study was to determine the consumption, expenditure, and availability of vegetables and fruits among school-age children in Tasikmalaya City. This study employed a descriptive quantitative approach. The population includes school-age children and their parents. The sample size is approximately 60 families. Consumption was measured using a 2x24-hour non-consecutive recall questionnaire, while expenditure and the availability of fruit and vegetables were assessed using a structured questionnaire. The data were analyzed using statistical tools. The results showed that the children's average consumption of fruits and vegetables was still lower than the recommended levels of 24.5 ± 35.5 g/day and 27.9 ± 52.6 g/day. The average expenditure on fruits in the household was Rp. 94,283 per week, in addition to the amount for vegetables, which was Rp. 119,833/week. A total of 66.7% of mothers stated that they did not provide vegetables at home every day, as well as fruit, at 81.7%. The distance to the fruit and vegetable seller varied, ranging from far to close, and most fruit and vegetable sellers were not always close to the participant's home. The majority of them bought vegetables at a peddler and fruit at a stall.

1. INTRODUCTION

Fruits and vegetables are rich in key nutrients, including vitamins A, C, and E, dietary fiber, and water, which are vital for the physical and cognitive development of children (Behrendt & Krawinkel, 2014). A large number of children do not consume the recommended amounts of fruits and vegetables. For example, only 20% of the population meets the daily recommended intake, and 10% of children do not regularly consume any fruits or vegetables (Crawford et al., 2019). The average consumption of fruits and vegetables among the Indonesian population remains below the recommended range, including among schoolchildren. The WHO recommends consuming more than 400 grams of fruits and vegetables daily to enhance overall health. According to the Indonesian Health Survey data for 2023, the proportion of the population aged 5 years and above who consume fewer than five servings of fresh fruit and/or vegetables per day is 96.7% (Badan Kebijakan Pembangunan Kesehatan, 2023).

Reduced fruit and vegetable consumption has been related to poor health and an increased risk of NCDs, including cardiovascular diseases and certain types of cancer (WHO, 2023). Several factors influence fruit and vegetable eating among primary students, including individual factors, social environments, physical environments, combined factors, and policy-related factors. Individual factors include age, sex, and diet quality. Studies have shown a statistically significant association between age and fruit and vegetable consumption in elementary school children, with consumption increasing with

age in both genders. The home environment, which included parents' eating patterns as well as the availability of fruits and vegetables, had the most significant impact on children's consumption of these foods. The availability of fruits and vegetables at home has a substantial effect on children's consumption (Wolnicka et al., 2015). Household income has a significant impact on food consumption habits. Lower-income households spend a bigger proportion of their income on food, but their total expenditure is the lowest. Upper-income households spend more on fruits and vegetables (Baladina et al., 2024). In many urban areas, the distance to fresh produce vendors can be a significant barrier (Kutbi, 2021).

Food buying power is often defined as a household's economic ability to obtain food, which is calculated by considering the money set aside for food purchases, the cost of food consumed, and the number of family members. There is a correlation between purchasing power, fruit and vegetable consumption, and nutritional status among elementary school kids (Fallo et al., 2019). The objective of this study was to determine the consumption, expenditure, and availability of vegetables and fruits at the homes of school children in Tasikmalaya City.

2. METHODS

This research method was descriptive-quantitative. This study was conducted in August 2023. The subjects of this study were mothers and children from Cilolohan Elementary School in Tasikmalaya City, West Java, Indonesia. This study utilized 60 samples, which were selected using a quota sampling technique. The inclusion criteria used were: fifth-grade elementary school students from Cilolohan, aged 10-11 years, with no known allergies to fruits and vegetables, domiciled in the area near the school, and under the care of their mothers. The exclusion criteria used were students who were absent or dropped. The data collected included fruit and vegetable consumption variables, which were measured using a *2x24-hour recall* questionnaire. Expenditure and availability of fruit and vegetables were assessed using a structured questionnaire. Data collected were analyzed using univariate analyses. Ethical approval and clearance were obtained from the Health Research Ethics Committee of Politeknik Kesehatan Kementerian Kesehatan Bandung. This research has already received ethical clearance, as registered under registration number 05/KEPK/EC/VIII/2023.

3. RESULTS AND DISCUSSIONS

The results showed that 60 students and their mothers participated as respondents in this study. The characteristics of mothers and children from Cilolohan Elementary School are presented in Table 1. According to Table 1, the mothers' ages range from 19 to 64 years old. Most mothers' age are 30-49 years old. Mothers' education levels are as follows: Senior high school 25 people (41.7%), Primary school 13 mothers (21.7%), Junior high school 12 mothers (20 %), Bachelor degree 5 mothers (8.3%), Diploma degree 4 mothers (6.7%), and one mother did not school (1,7%). The subjects' characteristics indicate that the housewife category has the most significant percentage of participants, at 90 percent. The second-largest occupation could be found in midwife and self-employed. Most of the children were two people (48.3%) and three people (35%). Based on Table 1, the distribution of family members mainly was around 4-5 people.

Table 1. Characteristics of Participant (N = 60)

Characteristics	Frequency (n)	Percentage (%)
Mother's age		
19 - 29 years	4	6,7
30 - 49 years	53	88,3

Characteristics	Frequency (n)	Percentage (%)
50 - 64 years	3	5,0
Mother's education level		
No School	1	1,7
Primary School	13	21,7
Junior High School	12	20,0
Senior High School	25	41,7
Diploma Degree	4	6,7
Bachelor Degree	5	8,3
Mother's Occupation		
Housewife / Unemployed	54	90
Midwife	2	3,3
Laborer	1	1,7
Self-employed	2	3,3
Employee	1	1,7
Number of children		
1 person	3	5,0
2 people	29	48,3
3 people	21	35,0
4 people	6	10,0
5 people	1	1,7
Family members		
3 people	4	6,7
4 people	30	50,0
5 people	21	35,0
6 people	4	6,7
7 people	1	1,7

As shown in Table 2, the average fruit and vegetable expenditure of households was Rp. 94,283 and Rp. 119,833 per week, respectively. Some respondents did not spend any money on fruit each week, while the largest amount was Rp. 500,000 per week. The minimum expenditure on vegetables was IDR 15,000 per week, with a maximum of IDR 700,000 per week. The average weekly household expenditure on vegetables and fruits in this research is quite high when compared to data from Badan Pusat Statistik Indonesia, which shows that the average monthly per capita expenditure by commodity and area of residence in urban areas for vegetables amounts to Rp. 57,701, and fruits amounted to Rp. 37,045 (Badan Pusat Statistik, 2023). The average weekly household expenditure on vegetables and fruits in this research is quite high when compared to data from Badan Pusat Statistik Indonesia, which shows that the average monthly per capita expenditure by commodity and area of residence in urban areas for vegetables amounts to Rp. 57,701, and fruits amounted to Rp. 37,045 (Badan Pusat Statistik, 2023). Taiwan's vegetable spending peaked in early winter and fell in late summer. In the stratified study, the low-income group showed less seasonal variation, spent less on fresh vegetables, and spent more on canned and frozen foods than the high-income group. Measures

of socioeconomic level had a significant impact on overall vegetable consumption. Customers with high postsecondary education in the low-income category spent two percent more on veggies than those with limited education (Ma et al., 2021). Household income, education level, and food prices have a substantial impact on food consumption expenditure. Higher wealth and education levels are connected with increasing intake of fruits and vegetables (Zani et al., 2019).

Table 2. Household expenditure on fruits and vegetables

Variable	Mean	SD	Median	Minimum	Maximum
Expenditure on fruit (per week)	Rp.94,283,-	Rp.93,800,-	Rp. 60,000,-	Rp. 0,-	Rp. 500,000,-
Expenditure on vegetables (per week)	Rp.119,833,-	Rp.114,728,-	Rp. 95,000,-	Rp. 15,000,-	Rp. 700,000,-

Table 3 shows that the average fruit consumption of children was 27.9 g per day, with a standard deviation of 52.6 g, while the highest maximum portion of fruit consumption was 208 g per day. This study even found students who did not consume fruit at all. While the average vegetable consumption of children was 24.5 g per day, with a standard deviation of 35.5 g, the highest maximum portion of vegetable consumption reached 205 g per day. Similar to fruit consumption, there were still children who did not eat vegetables at all every day.

Table 3. Fruit and Vegetable Consumption among participant's children

Variable	Mean	SD	Median	Minimum	Maximum
Fruits Consumption (g per day)	27.9	52.6	0	0	208
Vegetable Consumption (g per day)	24.5	35.5	12.5	0	205

The findings revealed that children's average consumption of fruits and vegetables was still below the recommended level. This study is consistent with the findings of studies on public elementary school children in Bogor Regency, suggesting that the inadequate consumption of fruits and vegetables among schoolchildren contributes to malnutrition in some individuals. There remain students experiencing malnutrition, characterized by both underweight and overweight conditions. The intake of fruits and vegetables by students falls short of the recommended daily portion of 400 grams, which includes 250 grams of vegetables and 150 grams of fruit According to research Muthmainah et al. (2019) Students consume an average of 36.9 grams of vegetables and 203.2 grams of fruit per day, which is below the recommended recommendations. Furthermore, a significant correlation exists between the consumption behaviors of fruits and vegetables and factors such as gender, the availability of these foods, and the respondents' attitudes (Sofianita et al., 2020).

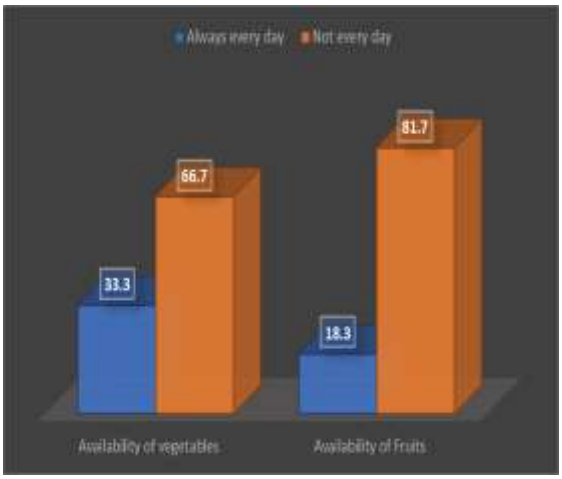

Figure 1. Availability of Fruits and Vegetables at Home

The figure below provides information about the percentage of fruits and vegetables available at home among participants. Overall, it can be seen that the highest percentage of all available fruits and vegetables was not in every everyday category, while only 33,3% of households provide vegetables every day. Moreover, the availability of fruit in the "everyday" category was the lowest, standing at approximately 18.3%. Knowledge, access, and family behavior all have a substantial impact on fruit and vegetable consumption. Families with better understanding and access to fruits and vegetables tend to consume them at higher rates (Sitepu et al., 2025). When more fruits and vegetables are readily available at home, children tend to consume more of them; therefore, the diet of children is influenced by the environment's food setting (Moffat et al., 2021).

Table 4. Availability of fruits and vegetables at home school children

Variable	Frequency (n)	Percentage (%)
Availability of vegetables		
Always every day	20	33.3
Almost every day	11	18.3
Sometimes	23	38.3
Seldom	6	10.0
Never	0	0.0
Availability of fruits		
Always every day	11	18.3
Almost every day	8	13.3
Sometimes	25	41.7
Seldom	16	26.7
Never	0	0.0
Seller / Vendor Vegetables Near at Home		
Always every day	24	40.0
Almost every day	8	13.3
Sometimes	14	23.3
Seldom	9	15.0

Variable	Frequency (n)	Percentage (%)
Never	5	8.3
Seller / Vendor Fruit Near at Home		
Always every day	24	40.0
Almost every day	6	10.0
Sometimes	14	23.3
Seldom	8	13.3
Never	8	13.3
Distance to Vegetables Seller		
Near	37	61.7
Far (by walking)	13	21.7
Far (by vehicle)	10	16.7
Distance to Fruits Seller		
Near	30	50.0
Far (by walking)	15	25.0
Far (by vehicle)	15	25.0
Place to buy Vegetables		
Peddler	40	66.7
Stall / Small shop	15	25.0
Supermarket	2	3.3
Traditional market	3	5.0
The place to buy Fruits		
Peddler	13	21.7
Stall / Small shop	42	70.0
Supermarket	2	3.3
Traditional market	3	5.0
Location of storing Vegetables at Home		
Dining Table	17	28.3
Refrigerator	22	36.7
Kitchen	18	30.0
Cupboard	3	5.0
Location of storing Fruits at Home		
Dining Table	20	33.3
Refrigerator	4	6.7
Kitchen	28	46.7
Cupboard	8	13.3

According to Table 4, most of the availability of fruit and vegetable sellers fell into the "always everyday" category, with approximately 40%. The mothers stated that 61.7% of the vegetable sellers are located near their homes, and 50% of the fruit sellers are also near their homes. Meanwhile, the majority of them, 66.7%, bought vegetables from a peddler, and 70% bought fruit at a stall. The storage

location of fruits before consumption was mostly in the kitchen (46.7%) and dining table (33.3%), while the storage of vegetables was in the refrigerator (36.7%) and kitchen (30%). Limited access to fruit and vegetable markets is believed to contribute to childhood obesity by hindering the development of healthy eating habits and promoting access to places that offer more unhealthy food options, leading to increased consumption of these choices (Yang et al., 2021). Nevertheless, the other study said that proximity to supermarkets may not be the primary factor influencing access to these retail environments, especially for individuals who own a vehicle. This research suggests that a range of factors, beyond mere geographic location, including personal elements such as financial constraints, individual food preferences, attitudes, and cultural influences, influence food purchasing decisions. For public policies aimed at strategically positioning supermarkets to be effective, it is essential to recognize these underlying determinants and to have access to data regarding actual food shopping behaviors (Aggarwal et al., 2014). This study findings that fruit and vegetable sellers are generally available on a daily basis. Most mothers reported that these sellers are located close to their homes. Vegetables are commonly purchased from mobile vendors, while fruits are typically bought at stalls. Before consumption, fruits are usually stored in the kitchen or on the dining table, whereas vegetables are mainly kept in the refrigerator or kitchen.

4. CONCLUSION

The average consumption of vegetables and fruits among children remained below the recommended levels of 24.5 ± 35.5 g/day and 27.9 ± 52.6 g/day. The average expenditure for fruits in the household was Rp. 94,283 per week, in addition to the amount for vegetables, which amounted to Rp. 119,833/week. A total of 66.7% of mothers stated that they did not provide vegetables at home every day, as well as fruit, at 81.7%. The distance to the fruit and vegetable seller varied, ranging from far to close, and Most fruit and vegetable sellers were not always close to the participant's home. The majority of them bought vegetables at a peddler and fruit at a stall. Further research is needed to promote increased vegetable and fruit consumption through home-based nutrition education intervention programs for mothers and children.

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