

# **Contribution of Nutrients in Snack Foods to the Nutritional Status of School Children at SD 1 Kukuh Kerambitan, Tabanan Regency, Bali Province**

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## **ABSTRACT**

Snacks contribute 10% to 20% of daily consumption. The school canteen is a place that students often visit to buy food and drinks. The aim of the research was to determine the contribution of snack foods to the nutritional status of schoolchildren at SD 1 Kukuh Kerambitan Tabanan. This type of observational research has a cross sectional research design. The sample was obtained using a saturated sampling technique, namely 79 students. Data was collected by recalling 2 x 24 consecutive hours and measuring height and weight. The type of snack food that is widely consumed is dry snacks such as wafers, nuts, chips, and packaged snacks, namely 70 samples (88.6%). The contribution of energy consumption in snacks has an average of 306.33 kcal. The contribution of protein consumption in snacks has an average of 7.35 grams. The Spearman test showed that there was a relationship between energy intake ( $p = 0.014 < 0.05$ ) and protein ( $p = 0.002 < 0.05$ ) from snack foods and the nutritional status of the sample. Therefore, it is hoped that the role of parents and teachers in schools is to provide education and examples of healthy snacks for schoolchildren

**Keywords:** nutrien intake, snacks, nutritional status of school children

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## **INTRODUCTION**

### **Background**

Based on data from the Indonesian Ministry of Health in 2020, the prevalence of stunting in children in Indonesia is still quite high at 27.7%, while children who are malnourished or underweight reach 19.6%. Based on data from WHO (World Health Organization), almost 600 million people experience illness after consuming contaminated food with the number of people who die each year reaching 420,000 people. In addition, around 29% of the 22 diseases are likely caused by contaminated food. Meanwhile, according to BPOM RI, there were 45 cases of KLB-KP (Extraordinary Events-Food Poisoning) which resulted in 1526 people becoming ill with 6 people dying (4). In Bali, the data shows that 13.6% of school children experience chronic energy deficiency, and 8.6% experience stunting. Meanwhile, in Tabanan, 15.1% of school children experience chronic energy deficiency, and 10.5% experience stunting. Snack foods contribute 10% to 20% of daily consumption.

## Objective

In general, this study aims to determine the contribution of snack foods to the nutritional status of school children at SD 1 Kuku Kerambitan Tabanan Bali. While the specific objectives of this study are to identify the characteristics and types of snack foods, determine the frequency of snack food consumption, determine the energy and protein content of snack foods, calculate the percentage of snack food contribution based on AKG, assess nutritional status, and analyze the relationship between snack food consumption contributions and nutritional status.

## METHOD

The type of research is observational with a cross-sectional design and involves 79 samples which are saturated samples. Data collection was carried out in January 2024, using the interview method to collect data on sample identity, type, frequency, level and consumption of snacks. While the anthropometric method for weight and height data. The relationship between snack consumption and nutritional status was analyzed using the Spearman correlation test.

## RESULTS

### Sample Characteristics

The gender of the sample is predominantly male, namely 46 samples (58.2%). The age distribution of the largest sample is 11 years old with a total of 33 samples (41.8%). Most samples consume snacks every day, namely 69 people (87.3%), the most snack supplies are obtained by buying them, namely 64 samples (81%), and most samples receive pocket money of Rp. 5,000.00-10,000.00 per day, namely 56 samples (70.9%). (see table 1)

Table 1  
Distribution of Sample Characteristics

Sample Characteristics	Category	f	%
Gender	Male	46	58.2
	Female	33	41.8
Age (years)	9-10	32	40.5
	11	33	41.8
	12	14	17.7
Consume snacks every day	Yes	69	87.3
	No	10	12.7
Obtaining snack supplies	Buy	64	81.0
	Processed at home	15	19.0
Pocket money (rupiah)	5000-10.000	56	70.9
	>10.000	23	29.1

## Types of Snacks

Types of snacks consist of a plate, wet snacks/snacks, dry snacks/snacks, packaged drinks, unpackaged drinks, and fruit. A total of 17 samples (21.5%) consumed one-plate snacks such as tipat cantok, chicken noodles, meatballs, and siomay. A total of 70 samples (88.6%) consumed dry snacks such as wafers, nuts, chips, packaged snacks, namely 70 samples (88.6%). A total of 33 samples (41.8%) consumed wet foods such as bread, jelly, and pudding. A total of 56 samples (70.9%) consumed packaged drinks such as fruit tea, fresh tea, boxed tea and glass tea. A total of 29 samples (36.7%) consumed unpackaged drinks such as iced tea. In addition, 39 samples (49.4%) consumed fruits such as bananas, oranges, watermelon, papaya and others. (see table 2).

Table 2  
Sample Distribution Based on Type of Snacks Consumed

Types of Snacks	Konsumsi	f	%
A plate	Ya	17	21.5
	Tidak	62	78.5
Dry Snacks	Ya	70	88.6
	Tidak	9	11.4
Wet Snacks	Ya	33	41.8
	Tidak	46	58.2
Packaged Drinks	Ya	56	70.9
	Tidak	23	29.1
Unpackaged Beverages	Ya	29	36.7
	Tidak	50	63.3
Fruit	Ya	39	49.4
	Tidak	40	50.6

## Frequency of Snack Consumption

The frequency of snack consumption is classified into 3 (three), namely, less (<2 times/day), appropriate (2-3 times/day), and excessive (>3 times/day). Most samples have appropriate snack consumption frequency, namely 54 samples (68.4%) and no samples were found with consumption frequency that was classified as less (<2 times/day). (see table 3)

Table 3  
Distribution of Snack Consumption Frequency in the Sample

Snack Frequency	f	%
Appropriate	54	68.4
Excessive	25	31.6
Amount	79	100.0

## Contribution of Snack Consumption

The contribution of energy consumption of snacks ranges from 47.4 kcal to 662.5 kcal with an average of 306.33 kcal. The contribution of protein consumption of snacks ranges from 7.0 grams to 24.7 grams with an average of 7.35 grams. The contribution of snack consumption to energy is mostly classified as sufficient, namely 61 samples (77.2%) and protein consumption is mostly classified as lacking, namely 39 samples (49.4%). (see table 4)

Table 4  
Distribution of Contribution of Snack Consumption to Energy and Protein

Contribution of Snack Consumption		f	%
Energy			
Less		15	19.0
Enough		61	77.2
More		3	3.8
Protein			
Less			
Enough		39	49.4
More		31	39.2
		9	11.4

## Nutritional status

Nutritional status assessment of the sample was carried out by weighing and measuring height, then calculating BMI/U based on PMK No. 2 of 2020 concerning anthropometric standards. Nutritional status is classified into 4 (four), namely malnutrition status (-3 SD to -2 SD), good nutrition (-2 SD to 1 SD), overnutrition (1 SD to 2 SD) and obesity (> 2 SD). Based on the data contained in Table 5, it can be seen that most of the samples have good nutritional status, namely 59 samples (74.7%). In addition, there were also 13 samples (16.5%) with overnutrition, 5 samples with obesity (6.3%) and 2 samples with undernutrition (2.5%). (see table 5)

Table 5  
Distribution of Nutritional Status in Samples

Nutritional status	f	%
Malnutrition	2	2.5
Good Nutrition	59	74.7
More Nutrition	13	16.5
Obesity	5	6.3
Amount	79	100.0

## Distribution of Nutritional Status Based on Energy Consumption in Samples

Samples that consume less energy have a nutritional status of less (13.3%), good (73.4%) and even overweight or obesity (13.3%). Meanwhile, samples that consume sufficient energy have a good

nutritional status (77.0%), but there are also those who have overweight or obesity (23.0%). (see table 6).

Table 6  
Distribution of Nutritional Status based on Energy Consumption in Samples

Energy Consumption	Nutritional Status						Total	<i>p</i>	<i>r</i>
	Malnutrition		Good		Over/Obesity				
	f	%	f	%	f	%			
Not enough	2	13.3	11	73.4	2	13.3	15	100.0	
Enough	0	0	47	77.0	15	23.0	61	100.0	0.014
More	0	0	1	33.3	2	66.7	3	100.0	

Spearman's correlation test showed a significance value of 0.014 ( $p < 0.05$ ) which means there is a relationship between energy intake from snacks and the nutritional status of the sample. The correlation coefficient value (*r*) showed a result of 0.274 which means a positive or unidirectional relationship with a degree of closeness that is classified as sufficient.

### Distribution of Nutritional Status Based on Sample Protein Consumption

Samples that consume protein with the category of less have nutritional status of less (5.1%), good (73.3%), and more or obesity (12.8%). While samples that consume sufficient protein have good nutritional status (74.2%), even more nutrition or obesity (32.5%). (see table 7)

Table 7  
Distribution of Nutritional Status based on Protein Consumption in Samples

Protein Consumption	Nutritional Status						Total	<i>p</i>	<i>r</i>
	Malnutrition		Good		Over/Obesity				
	n	%	n	%	n	%			
Not enough	2	5.1	32	73.3	5	12.8	39	100.0	
Enough	0	0	23	74.2	13	32.5	31	100.0	0.002
More	0	0	4	44.4	5	55.6	9	100.0	

After the Spearman correlation test was conducted, a significance value of 0.002 ( $p < 0.05$ ) was obtained, which means that there is a relationship between protein intake from snacks and the nutritional status of the sample. The correlation coefficient value (*r*) shows a result of 0.341, which means a positive or unidirectional relationship with a degree of closeness that is classified as sufficient.

## DISCUSSION

According to the Decree of the Minister of Health of the Republic of Indonesia Number 942/Menkes/SK/VII/2017, snack foods are foods and beverages processed by food vendors at the point of sale and served as ready-to-eat food for sale to the public in addition to being served by catering services, restaurants or restaurants and hotels. Snack foods play a very important role in providing additional contributions to nutritional adequacy, especially energy <sup>(13)</sup>. Data on the contribution of snacks including energy, protein, fat, and carbohydrate consumption were obtained using the 2x24-hour Recall method processed with the help of NutriSurvey, then compared with the 2019 AKG and classified into less (<20%), enough (20% -30%), and more (> 30%).

This study identified snack consumption including single-dish meals, dry snacks, wet snacks, packaged and unpackaged drinks, and fruits. Based on the analysis results, it was found that most samples consumed dry snacks, namely 70 samples (88.6%) and only 17 samples (21.5%) consumed single-dish meals as snacks. Dry snacks consumed by most samples include wafers, nuts, chips, and packaged snacks. Snacks such as packaged snacks are snacks that are high in MSG or monosodium glutamate which can have an impact on imbalanced nutritional status. This is because these foods are high in energy, but low in nutrition. Meanwhile, single-dish meals tend to be able to provide more adequate energy and protein intake, especially in single-dish meals that contain high-quality protein such as eggs, meat, and fish. In addition, nut products, tempeh, and tofu can also be food sources that meet protein intake <sup>(12)</sup>.

In addition, the results of this study also show that most of the samples received pocket money of Rp. 5,000.00-10,000.00 per day, namely 56 samples (70.9%). Meanwhile, the study conducted <sup>(3)</sup> showed that most of the samples had pocket money that was relatively low (<Rp. 5000.00) namely 44 samples (51.2%). The study also stated that there was a relationship between pocket money and the nutritional status of elementary school children with a relatively strong correlation level. Most of the samples with low pocket money chose to buy snacks in the form of snacks and drinks. This means that the more pocket money used, the more types of snacks they will buy.

The contribution of snack consumption to energy is mostly classified as sufficient (20%-30%), namely as many as 61 samples (77.2%). In addition, the contribution of energy consumption in snacks has an average of 306.33 kcal with the smallest value of 47.4 kcal and the largest value of 662.5 kcal. Snack foods provide a fairly large contribution to nutrient intake for all age groups, including school children. If consumed excessively, it will have an impact on the emergence of nutritional problems. The habit of consuming snacks has become an inseparable part of community life <sup>(12)</sup>.

The results of this study are similar to those expressed by <sup>(8)</sup> in his study which stated that the highest contribution of energy from snacks is 660 kcal. Children who have a relatively high energy consumption level are 19% of children. The results of the study conducted <sup>(7)</sup> also showed that the consumption of energy from snacks in students of Elementary School 156 Central Maluku was mostly classified as good, namely 31 samples (57.4%). According to <sup>(6)</sup>, the consumption of snack foods will be very important to pay attention to. Children who consume the right snacks are expected to contribute energy and other nutrients that are beneficial to their growth and development process. In addition, it was also stated that the contribution of energy from school children's snacks was 22.9%. This is similar to the results of the study conducted by researchers, namely that most of them were classified as sufficient (20% -30% of AKG).

The results of the data analysis showed that most protein consumption was classified as lacking, namely 39 samples (49.4%). In addition, the results obtained showed that the contribution of protein consumption in snacks had an average of 7.35 grams with a minimum value of 7 grams and a maximum value of 24.7 grams. In addition to contributing energy, snacks play a role in providing a very significant protein contribution. This is because school children tend to get protein

intake that is classified as lacking, so it is necessary to consume snacks that are rich in protein content <sup>(1)</sup>.

The results of this study are similar to the study conducted <sup>(7)</sup> which obtained the results of protein consumption of students at Elementary School 156 Central Maluku, most of which were classified as lacking, namely 33 samples (61.1%). Based on the opinion of <sup>(2)</sup>, school children's snacks (PJAS) contributed 27.44% of protein from daily consumption. In the growth phase, foods rich in protein are very useful as building substances. If the intake is classified as lacking, it will cause the child's growth to be hampered.

Based on the data analysis that has been done, it can be seen that most of the samples have good nutritional status, which is 59 samples (74.7%). In addition, it was also found that there were 13 samples (16.5%) with over-nutrition, 5 samples (6.3%) with obesity and 2 samples (2.5%) with under-nutrition. The results of this study are the same as the study conducted <sup>(7)</sup> which obtained the results that the majority of samples had good nutritional status, which was 37 samples (68.5%). The study conducted by <sup>(13)</sup> also showed that most of the samples had normal nutritional status, which was 132 samples (75.4%).

Nutritional status affects the growth and development process of children, one of which is intellectual ability which will have an impact on academic achievement at school <sup>(16)</sup>. This theory is also proven through research conducted <sup>(5)</sup> which obtained results that showed a significant relationship between nutritional status and academic achievement of school children. The nutritional status of school children who are classified as good will provide optimal health and a fairly good level of intelligence. However, conversely, children who have poor nutritional status tend to have poor health levels which make them susceptible to disease and their intelligence levels decrease. This is what causes a decline in children's academic achievement. Therefore, it is important to pay attention to the consumption of foods that have good and balanced nutrition in order to improve the quality of children's health and education.

Based on bivariate analysis with Spearman test, it was found that there was a relationship between energy and protein consumption of snacks with the nutritional status of school children with p-value –each of which was 0.014 ( $p < 0.05$ ) for energy consumption with nutritional status and 0.002 ( $p < 0.05$ ) for protein consumption with nutritional status. In addition, a correlation coefficient was obtained which was classified as a sufficient level of relationship. The results of this study are supported by research conducted <sup>(11)</sup> which states that there is a tendency for a relationship between nutritional value (energy and protein) in food with the nutritional status of elementary school children. This is because the snacks consumed contribute 20-31.1% to daily energy.

The results of the study are also supported by the theory that states that nutritional status is influenced by a number of factors, including energy and protein intake. In school-age children, children not only get intake at home, but also through snack consumption <sup>(10)</sup>. However, this is different from the results of research conducted by <sup>(7)</sup> which stated that there was no significant relationship between energy and protein consumption of snacks and nutritional status in the sample with a significance value of 0.174 ( $p > 0.05$ ). Food intake if not accompanied by sufficient physical

activity can result in fat accumulation which has an impact in the form of excess nutritional status or obesity <sup>(13)</sup>.

The availability of snacks for school children, whether they are healthy or not, influences children in choosing their snacks. The availability of snacks from the school environment that already have nutritious and harmless content, although there are still cases of incorrect snack choices among school children. This is likely because there are still snack sellers who cannot be controlled. In addition, according to <sup>(9)</sup> it states that the choice of snacks by students is also influenced by nutritional literacy. Students who have low nutritional literacy tend to buy foods that are high in fat and will affect their health and nutritional status. Meanwhile, research conducted <sup>(11)</sup> states that apart from daily consumption, nutritional status is also influenced by a person's physical activity. A person who balances consumption with regular physical activity can have a normal nutritional status. This proves that apart from snack foods, there are several factors that influence the nutritional status of school children.

## **CONCLUSION AND SUGGESTIONS**

The conclusion that can be drawn from the results of this study is that there is a significant relationship between energy and protein consumption of snacks with the nutritional status of elementary school students with a correlation level classified as sufficient at SD Negeri 1 Kuku. Therefore, to achieve optimal nutritional status and health, the role of parents and teachers at school is expected to provide education and examples of healthy snacks that are good for school children's nutrition.

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