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Impact of Online Eating Behavior Changes on Nutritional Status of Elementary School during Pandemic

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ABSTRACT

Introduction: COVID-19 pandemic has had a huge impact on education in Indonesia necessitating distance learning from home via online methods. Learning from home change people's daily life including eating behavior. Children's eating behavior plays an important role in their nutritional status.
Methods: We conducted an observational study with a cross-sectional design which included 48 subjects. Data were collected using an online structured questionnaire.
Results: The results of the relationship test show a p-value of (0.000) which is smaller than alpha (0.05). The comparison test results show a p-value of (0.000) which is smaller than (0.05).
Conclusion: There is an association of changed eating behavior during COVID-19 pandemic with children's nutritional status.

Keywords: COVID-19; eating behavior; nutritional status; online learning

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Introduction

Indonesia faces a dual burden of malnutrition, with high rates of undernutrition and rising obesity. WHO defines malnutrition as a medical condition caused by inadequate or imbalanced intake or supply of nutrition. Malnutrition is more often associated with insufficient nutrient intake and excessive nutrient intake.[1]

The prevalence of nutritional status (IMT/U) according to the 2018 National Riskesdas data report for children aged 5-12 years is as follows: Very thin cases 24%, thin 6.8%, normal 70.8%, overweight 10.8%, and obese 9.2%.[(2)] In South Sulawesi, the prevalence of nutritional status for children aged 5-12 years in urban areas is as follows: Very thin 3.89%, thin 8.61%, normal 69.40%, overweight 8.92%, and obese 9.18%. In rural areas, the prevalence is as follows: Very thin 2.32%, thin 8.67%, normal 77.30%, overweight 7.05%, and obese 4.66%. From these data, it can be seen that urban areas have a much higher risk of obesity than rural areas in South Sulawesi Province. The highest incidence of obesity in Makassar City ranks first with a prevalence of 11.82. The incidence of obesity in boys is higher than in girls with a prevalence of 7.74% and 5.27%, respectively.[3]

Eating behavior is the most important behavioral state that can influence nutritional quality. In general, the eating behavior of elementary school children is influenced by parents and schools, which will shape the eating behavior of children.[4] School-age children need good nutrition from their parents and from their environment. If the nutrients they receive are not complete, it will affect physical growth, structure, and decreased brain function, which will cause lack of attention and concentration in learning, and behavioral deviations.[5]

The COVID-19 pandemic was first identified in Wuhan, Hubei, China, on December 1, 2019. The virus spread rapidly to the rest of the world, including Indonesia. WHO declared a COVID-19. On March 3, 2020, Indonesia first reported a COVID-19 case. Indonesia's government issued a policy to maintain social distancing at the community level and avoid crowds, which also affected learning at the elementary and secondary school levels. As a result, schools in Indonesia, specifically in Makassar City, had to be closed and switched to online learning. This was done by the government as one of the anticipations of the impact of the pandemic to break the chain of distribution of COVID-19 in Indonesia.

During the COVID-19 pandemic, Indonesians experienced a change in eating habits by 62.5 %, an increase in food consumption diversity by 59 %, an increase in eating frequency by 54.5 %, an increase in the amount of food consumed by 51 %, and an increase in body weight by 54.5 %. [6] Several studies have shown that changes in eating behavior and physical activity occur when people spend more time at home. These changes include a decrease in physical activity (38.0 %) and an increase in sitting time (28.6 %), an increase in the frequency of eating and snacking, and consumption of unhealthy foods, compared

to before the COVID-19 pandemic.[7]

Based on the above, the researchers were interested in conducting a study to analyze the changes in eating behavior during online learning on the nutritional status of elementary school-aged children during the COVID-19 pandemic at SD. Inp. Todopuli 1 Kota Makassar.

Methods

The study design used in this study is an observational analytic with a cross-sectional research approach. This study was conducted to determine the relationship between eating behavior and nutritional status of elementary school-aged children during online learning during the COVID-19 pandemic. The study was conducted at SD. Inp. Todopuli 1 Makassar City from June to July on 2021. The population in this study was all grade 4 students and parents (mothers) who attended SD. Inp. Todopuli 1, a total of 92 students. The number of samples was 48 samples. This study was by using purposive sampling technique that had met the inclusion and exclusion criteria.

The data used in this study were primary data obtained from respondents. The questionnaire was distributed to respondents through *Google forms*, then the respondents filled out the *Google forms* with the assistance of the researchers. Data were processed using the SPSS (Statistical Package for the Social Sciences) program, using univariate analysis to determine the frequency distribution of the variables studied. Bivariate analysis using the Person *Chi-squar*e test to see the relationship between eating behavior and the nutritional status of children during online learning and using *the Man-Whitney-U* test to see the comparison of children's eating behavior before and during online learning during Covid- 19 pandemic.

Result

Univariate Analysis

1. Characteristics of respondents based on child gender

Table 1 Distribution of respondent characteristics based on the gender of class 4 elementary school children at SD Inp. Todopuli 1 Makassar City in 2021

Variable	Frequency	%
Gender		
Man	25	52,1
Women	23	47,9
Total	**48**	**100**

Source: Primary Data

The results of the study showed that the number of male respondents was 25 (52.1%), which was higher than the number of female respondents, which was 23 (47.9%)

2. Characteristics of respondents based on child nutritional status during online learning

Table 2. Distribution of respondent characteristics based on nutritional status of class 4 elementary school childrens at SD Inp. Todopuli 1 Makassar City in 2021

Variable	Frequency	%
Nutritional Status		
Malnutrition	4	8,3
Under nutrition	5	10,4
Good Nutrition	36	75
Over nutrition	3	6,3
Total	**48**	**100**

Source: Primary Data

Based on the results of the study, respondents with good nutritional status had the highest frequency of 36 respondents (75%), while the lowest frequency was in the overweight status of 3 respondents (6.3%).

3. Characteristics of respondents based on child eating behavior before online learning

Table 3. Distribution of respondent characteristic based on child eating behavior before online learning.

Variable	Frequency	%
Dietary Pattern		
Very Poor	3	6,25
Poor	5	10,42
Moderate	14	29,17
Good	14	29,17
Very Good	12	25,00
Total	**48**	**100**

Source: Primary Data

Based on the results of the study, moderate and good eating patterns were applied to 14 respondents (29.7%), 12 respondents (25%) with a very good eating pattern, 5 respondents (10.42%) with a bad eating pattern, while others there were 3 respondents (6.25%) with a very bad eating pattern.

4. Characteristics of respondents based on child eating behavior during online learning

Table 4. Distribution of respondent characteristics based on child eating behavior during online learning.

Variable	Frequency	%
Dietary Pattern		
Very Poor	1	2,1
Poor	4	8,3
Moderate	11	22,9
Good	23	47,9
Very Good	9	18,8
Total	**48**	**100**

Source: Primary Data

Based on the results of the study, it was found that a good eating pattern was applied to 23 respondents (47.9%), 11 respondents (22.9%) with a moderate eating pattern, 9 respondents (18.8%) with a very good eating pattern, 4 respondents (8.3%) with a bad eating pattern, while others there was 1 respondent (2.1%) with a very bad eating pattern.

5. Characteristic of respondent based on parents' education

Table 5. Distribution of respondent characteristics based on parents' education of class 4 elementary school children at SD Inp. Todopuli 1 Makassar City in 2021

Variable	Frequency	%
Education		
Diploma	6	12,5
bachelor	26	54,2
Senior high school	14	29,2
junior high school	2	4,2
Total	**48**	**100**

Source: Primary Data

The results of the study, the highest educational level of the respondents was with a S1 education of 26 respondents (54.2%), while the lowest frequency was at the SMP level of 2 respondents (4.2%).

6. Characteristics of respondents based on parents' occupation

Table 6 Distribution of respondent characteristics based on parents' occupation of class 4 elementary school children at SD Inp. Todopuli 1 Makassar City in 2021

Variable	Frequency	%
Occupation		
housewife	26	54,2

Other	1	2,1
Civil Servant	10	20,8
Private Employee	4	8,3
Student/University Student	1	2,1
Entrepreneur	6	12,5
Total	**48**	**100**

Source: Primary Data

The results of the study, the most dominant type of work for respondent is housewife as many as 26 people (54.2%), civil servants there are 10 respondents (20.8%), private employees 4 respondents (8.3%), entrepreneurs 6 respondents (12.5%), students/students 1 respondents (2.1%), and others as many as 1 respondents (2.1%).

Bivariate Analysis

1. Relationship between eating habits and child nutritional status before online learning

Table 7. Distribution of the Relationship Between Eating Habits Before Online Learning and the Nutritional Status of Class 4 Elementary School Children at SD Inp. Todopuli 1 Makassar City in 2021

Dietary pattern before pandemic	Nutritional Status								Total		p-value
	Very Poor		Poor		Good		Overweight				
	F	%	F	%	F	%	F	%	F	%	
Very Poor	0	0.00%	0	0.00%	2	4.17%	1	2.08%	3	6.25%	0.625
Poor	1	2.08%	0	0.00%	4	8.33%	0	0.00%	5	10.42%	
Moderate	0	0.00%	1	2.08%	12	25.00%	1	2.08%	14	29.17%	
Good	1	2.08%	2	4.17%	10	20.83%	1	2.08%	14	29.17%	
Very Good	2	4.17%	2	4.17%	8	16.67%	0	0.00%	12	25.00%	
Total	**4**	**8.33%**	**5**	**10.42%**	**36**	**75.00%**	**3**	**6.25%**	**48**	**100%**	

Source: Primary Data

The results of the relationship test showed a p-value of 0.625, which is greater than alpha 5 % or 0. 05, so H0 is accepted and H1 is rejected. This can be concluded that there is no significant relationship between eating habits before the pandemic and the nutritional status of the respondents.

2. Relationship between eating habits and child nutritional status during online learning

Table 8. Distribution of the relationship between eating habits during online learning and the nutritional status of class 4 elementary school children at SD inp. todopuli 1 Makassar city in 2021

Dietary pattern during pandemic	Nutritional Status								Total		p-value
	Very Poor		Poor		Good		Overweight				
	F	%	F	%	F	%	F	%	F	%	
Very Poor	0	0,00	0	0,00	0	0,00	1	2,08	1	2,08	0,000
Poor	1	2,08	2	4,17	1	2,08	0	0,00	4	8,33	
Moderate	3	6,25	2	4,17	6	12,50	0	0,00	11	22,92	
Good	0	0,00	1	2,08	21	43,75	1	2,08	23	47,92	
Very Good	0	0,00	0	0,00	8	16,67	1	2,08	9	18,75	
Total	**4**	**8,33**	**5**	**10,42**	**36**	**75,00**	**3**	**6,25**	**48**	**100,00**	

Source: Primary Data

Results of the relationship test showed a p-value of 0.000, which is less than alpha 5% or 0.05, so H0 is rejected and H1 is accepted. This can be concluded that there is a significant relationship between eating habits during the pandemic and the nutritional status of the respondents.

3. Comparison of eating behavior before and during online learning

Table 9. Distribution of the comparison of eating behavior before and during online learning for elementary school children in class 4 at sd inp. todopuli 1 makassar city in 2021

before pandemic - during online learning	Paired Differences					p-value
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		
				Lower	Upper	
	-28.125	20.851	3.010	-34.179	-22.071	0.000

Source: Primary Data

The results show that the average difference between before and during online learning is -28.125 with a standard deviation of 20.851, and the difference is between -34.179 and -22.071. The results of the comparison test showed a p-value of 0.000, which is less than 0.05, so it is concluded that there is a significant difference in the average between before and during online learning.

Discussion

Diet means a habit of eating about the consumption of food in the form of staple foods, protein sources, vegetables, fruits, and milk. The consumption pattern applied to children is high-energy food but low in fiber.[8] During the current pandemic, families tend to improve their nutritious eating patterns compared to before the pandemic. Several studies on eating behavior, show that there are changes in food consumption patterns during the COVID-19 pandemic, where people consume more processed grain, fruit, and milk products.[9]

Based on the research results in table4, it was found that based on a good eating pattern during online learning, there was 1 respondent with a nutritional status of less than normal, 21 respondents with a nutritional status of normal, and 1 respondent with a nutritional status at risk of overweight. This shows that the eating behavior and nutritional status of grade 4 students are mostly good. The research results obtained are in line with previous research by Aris et al., where it was found that the nutrition of children aged 3-5 years during the COVID-19 pandemic is within normal limits and parental knowledge about the nutrition of children aged 3-5 years during the COVID-19 pandemic is mostly in a good condition. [10]

Eating behavior is closely related to children's eating habit and how parents feed their children to meet their daily nutritional needs. Table 6 shows that the most dominant type of mother's occupation is housewife, with 26 people, and for civil servants or private employees, there are 14 people, including 10 civil servants, 4 private employees, and 6 entrepreneurs. This shows that most of the respondents are housewives, where mothers can monitor their children's eating behavior and accompany their children during online learning.

Based on the results of this research, the highest level of education for parents was a bachelor's degree for 26 people, while 2 respondents had a junior high school education. Determining the menu to provide and feed the family is influenced by education, employment and family income. Mothers who have high knowledge without being accompanied by knowledge about good nutrition will have an impact on their ability to provide food by the balanced nutritional guidelines required by the family.[11] Research conducted by Dody, 2017 shows that there is a significant relationship between maternal knowledge and parenting patterns and there is a significant relationship between parenting patterns and children's nutritional status. [12]

A study conducted by Katri Andini et al., 2021 to examine the factors that influence of the eating patterns of elementary school students found that the mother's factors, including age, education, knowledge, employment status, and feeding practices, had a significant impact on the eating patterns of elementary

school students. This is because mothers play a key role in providing menus, selecting food ingredients, choosing menus, processing food, and determining food consumption patterns, which ultimately shape the eating habits of families and children. As the key role-holder, mothers are advised to educate their children about the importance of healthy eating for the human body so that children can adopt the habit of eating foods that should be consumed and those that should not be consumed at school or play so that children do not consume unhealthy snacks. [11]

The results of the study showed that 36 students had a good nutritional status, while 3 students had a risk of being overweight. Based on the results above, it can be concluded that the 4th grade students at SDN Inp. Toddopuli 1 have a good nutritional status during the pandemic compared to their nutritional status before the COVID-19 pandemic. Good nutritional status will have a positive impact on the learning process, as malnutrition can disrupt concentration at school or at home, which can affect academic achievement.

Based on Table 10, the results of the study showed that there was a significant difference in the average behavior of children's eating before and during online learning. This is in line with previous studies that stated that there were changes in eating habits during the COVID-19 pandemic. Disruption of daily routines due to quarantine lead to boredom, which is then associated with increased energy intake. In addition to boredom, hearing or constantly reading COVID-19 news from the media can cause stress. Stress leads subjects to overeating, especially foods that contain sugar or are rich in carbohydrates, which can reduce stress by promoting the production of serotonin, which has a positive effect on mood. However, the effect of the desire to eat carbohydrate-rich foods is comparable to the glycemic index of foods, which is associated with an increased risk of obesity and cardiovascular disease, chronic inflammation, and an increased risk of more severe complications. This new condition can disrupt healthy and varied eating patterns, as well as regular physical activity. However, this is different from the study conducted by Fadliana (2021), which showed that there was no significant difference between eating patterns before and after the home learning policy.[13]

In Amaliyah's (2021) the eating patterns of adolescents during the COVID19 pandemic, it showed that there was awareness in the behavior of consuming food according to the three time divisions (morning, afternoon, and evening). Adolescents try to always enjoy the main meal on time with a balanced diet consisting of carbohydrates, protein, fat, vitamins, and minerals. This was done by most respondents because they fully understood the importance of maintaining body immunity during the pandemic. The types of main meals consumed daily are mostly from homemade dishes, although on some occasions it is not impossible to buy fast food. In addition to the main meal, the adolescents' eating patterns also consume

snacks or snacks during the COVID-19 pandemic to prevent boredom. While the types of snacks that are often consumed are salty snacks such as chips and fried foods.[14,15]

Conclusion

Based on the results of a study conducted to determine how changes in eating behavior before online learning was poor, such as frequent consumption of snacks sold at school and mothers who were not paying attention to the nutritional intake of their children because they tended to consume fast food or processed food. During online learning was good because mothers were more attentive to their children's food and mothers were more likely to cook their own food because of the Covid-19 pandemic to prevent the spread of Covid-19. The nutritional status during online learning had a higher percentage of good nutritional status. Then, there was a significant relationship between eating behavior before the pandemic and during online learning in students.

Conflicts of Interest

There is no conflict of interest

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