ISSN. 2338-7475
E-ISSN. 2620-7869
Hearty
Jurnal Kesehatan Masyarakat
Beriman, Tulus, Sepenuh Hati,Berbesar Hati, Jujur, Sehat dan Kuat
Vol. 12 No. 1, Februari 2024, Hal. 48-57

FACTORS INFLUENCING ADOLESCENT EATING HABITS DURING THE NEW NORMAL ERA OF THE COVID-19 PANDEMIC IN DENPASAR CITY

I Desak Ketut Dewi Satiawati Kurnianingsih [1,2], Ni Made Padma Batiari [1], Ni Kadek Rika Oktavianti [1]

[1] Program Studi D IV Promosi Kesehatan, Politeknik Kesehatan Kartini Bali
[2] Center for Public Health Innovation Faculty of Medicine, Universitas Udayana, Bali
E-mail: *dewi.satya21@gmail.com*

Abstract

The study aims to comprehend how the eating habits of school adolescents have changed during the adaptation period of the new normal of COVID-19, as well as to evaluate the relationship between adolescents' sociodemographic characteristics and learning methods in school with their eating habits. A cross-sectional quantitative study was conducted in Denpasar City with 352 adolescents aged 10-21 years, utilizing a questionnaire measuring eating habits based on the Adolescent Food Habits Checklist (AFHC). The research results indicate that factors such as age (OR=7.57; p<0.05), gender (OR=0.39; p<0.05), parental income (OR=1.83; p<0.05), and learning methods (OR=2.71; p<0.05) in school influence adolescent eating habits. Furthermore, the majority of adolescents (60%) exhibit poor eating habits, with a significant portion having suboptimal nutritional status, including 46.3% underweight, 11.1% at risk of overweight, and 3.4% classified as Obesity II. Therefore, collaboration among parents, schools, and health departments is essential to promote healthier eating patterns for adolescents.

Keywords: New Normal Era; eating habits; adolescents; nutritional status

Introduction

The adolescent age group, undergoing puberty, is a crucial phase marked by significant developments, particularly in food preferences and eating habits.1 The current situation of the Coronavirus Disease 2019 (COVID-19) pandemic, associated with lockdowns or large-scale social restrictions (PSBB), as indicated by various studies, is reported to contribute to changes in nutritional behavior, including food shopping behaviors among adolescents.2

A study found that social quarantine led to increased consumption of high-sugar, high-salt, and high-fat (SSH) foods, typically found in the snack food category, among adolescents.3 The rise in snack consumption and changes in dietary intake patterns are often linked to nutritional status.4 This issue should be regarded as a complex problem that potentially increases the risk of diet-related diseases, including overweight and obesity.5

The COVID-19 pandemic has posed challenges for urban communities worldwide, especially those with greater access to COVID-19-related information, in maintaining healthy and varied eating patterns. A noteworthy development in the current new normal era is that some schools in Denpasar City have begun to conduct 100% face-to-face learning, especially in areas with green zones for COVID-19 spread, while other schools continue with online learning or hybrid methods (online and offline). This may provide diverse insights into the eating habits of adolescents in schools during the adaptation to the new normal in the COVID-19 pandemic era.

Based on this background, there is still limited research on dietary behavior during the new normal adaptation period after the COVID-19 pandemic has been declared over, considering that this

transition is still relatively new. This motivates the researchers to analyze the eating habits of school adolescents during the COVID-19 pandemic transition in Denpasar City.

Methods

This study employed a quantitative research design with a cross-sectional study design. The use of an analytic survey method in this study was to examine and analyze the influence of several risk factors and learning methods on the eating habits of adolescents. The research was conducted in Denpasar City from May to July 2021. The population of this study was all adolescents in Denpasar City, with a sample of 352 adolescents obtained through proportionate estimation calculations. The proportion of adolescents in Denpasar City, according to BPS 2021 data, is 0.5%. The sampling method used was purposive sampling (nonprobability sampling) based on inclusion criteria: adolescents aged 10-21 years, enrolled students in Denpasar City, and actively using a cellphone since the questionnaire was filled online. Data collection in this study was conducted through a questionnaire using Google Forms. The data in this study were collected directly, obtaining primary data. The instrument in this study used a questionnaire that included questions about respondents' sociodemographic characteristics, 23 questions measuring adolescent eating habits using the Adolescent Food Habits Checklist (AFHC) questionnaire. Dietary habit data were scored with the provision that the subject received 1 point if considered to have a healthy eating habit response. After obtaining the scores, the categorization of healthy eating habits was done as good (≥mean) and less good (<mean).

The data analysis technique used in this study was univariate analysis, presenting data frequency distribution, and bivariate analysis with the chi-square test, displaying p-value and odds ratio (OR).

Results

Sociodemographic Characteristics of Respondents

A total of 352 respondents aged 10-21 years residing in Denpasar City were involved in this study (Table 1). The average age of the respondents in this study was 15.75 ± 3.44 years, with the majority being female (58.5%). Most respondents attended junior high school (62.8%) and came from private institutions (81.3%). The majority of respondents' parents worked in the private sector (53.7%) and had income in the range of Rp. 1,500,001-2,500,000, accounting for 40.1%. The majority of respondents identified as Hindu (88.4%) and resided in the East Denpasar region (36.1%). The predominant learning method during the COVID-19 pandemic transition for most respondents was offline/face-to-face learning (77.3%).

Adolescent Nutritional Status

Table 2 presents the distribution of nutritional status among adolescent respondents based on BMI categories. From the distribution of respondents' nutritional status, it is evident that the majority of respondents are classified as underweight, accounting for 46.3%. This is followed by normal nutritional status (39.2%), overweight (with a risk of being overweight) at 11.1%, and Obesity II at 3.4%. The average height of the respondents was 1.58 meters (±0.10), the average weight was 52.3 kg (±10.1), and the average BMI was 21.2 (±4.2), classified as normal nutritional status.

Adolescent Eating Habits

Moving on to Table 3, which outlines the eating habits of adolescents, it is known that the majority of respondents have a meal frequency of 2-3 times a day (64.8%) with snack consumption frequency of 1-3 times a day (71.0%). In terms of breakfast habits, most respondents sometimes have breakfast (58.5%), with the number of food variations per day being classified as varied, i.e., ≥ 5 types

of food (54.3%). Furthermore, the analysis using the AFHC scoring revealed that the majority of respondents have good eating habits (81.8%). However, when looking at each response regarding adolescent eating habits, quite a few respondents responded "yes" to questions depicting poor eating habits, such as frequently consuming sweet snacks, not avoiding fried foods, not choosing low-fat foods, and insufficient daily intake of fruits and vegetables (Graph 1).

The influence between sociodemographic characteristics and eating habits

Test the influence between social demographic characteristics (age, gender, and parental income) and eating habits using the chi-square test. From this research it is known that all sociodemographic variables are statistically significant (p value ≤0.05) influencing respondents' eating habits as shown in table 4. The results of bivariate analysis show that all independent variables influence teenagers' eating habits as seen from the p value ≤ 0, 05, namely age with a p value = 0.00, which means that there is an influence of the age variable on teenagers' eating habits. The results of the analysis also obtained an OR value of 7.57, meaning that adolescents aged ≥16 years had 7.57 times higher odds of having bad eating habits than adolescents aged <16 years.

The next variable is gender with a p value = 0.05, which means that there is an influence of the gender variable on teenagers' eating habits. The results of the analysis also obtained an OR value of 0.39, meaning that male teenagers have a 0.3 times higher chance of having bad eating habits than girls. Then the parental income variable has a value of p = 0.03, which means that there is an influence of the parental income variable on teenagers' eating habits. The results of the analysis also obtained an OR value of 1.83, meaning that teenagers whose parents' income was > IDR 2,500,000, - had 1.83 times higher odds of having bad eating habits compared to teenagers whose parents' income was ≤ IDR 2,500,000. ,-. The final variable is school method with a value of p = 0.02, which means that there is an influence of the school method variable on teenagers' eating habits. The results of the analysis also obtained an OR value of 2.71, meaning that teenagers with online or hybrid school methods had 2.71 times higher odds of having bad eating habits than teenagers with offline school methods.

Table 1. Sociodemographic Characteristics of Respondents

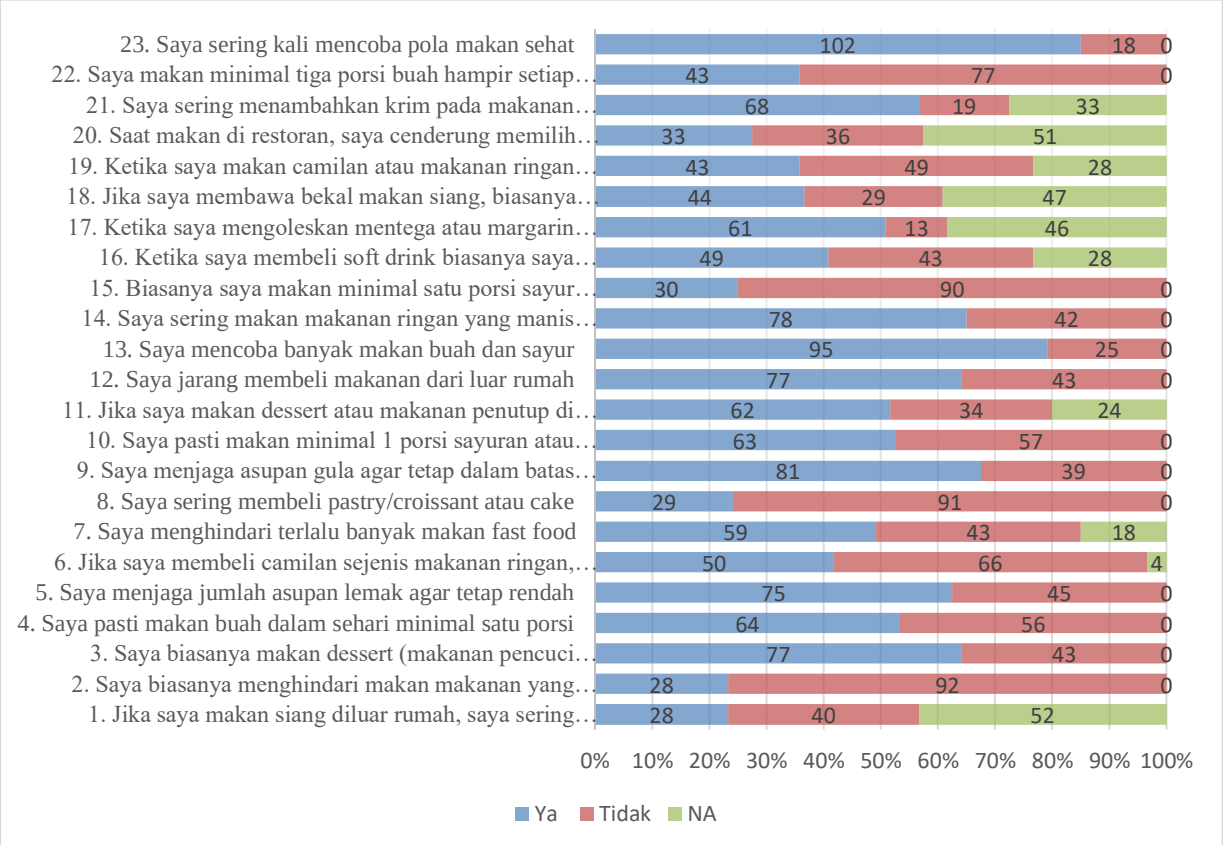
Category	Frequency (%)	Category	Frequency (%)
Age		**Parents' job**	
Average (SD)	15,75 (± 3,44)	Pegawai Swasta	189 (53,7)
Gender		Pedagang/Wirausaha	85 (24,1)
Woman	206 (58,5)	PNS	39 (11,1)
Man	146 (41,5)	Buruh/ Pekerja Harian Lepas	19 (5,39)
Education		Petani/Nelayan, dll	7 (1,98)
SD	13 (3,7)	Sopir, Ojek, dll	7 (1,98)
SMP	221 (62,8)	Pensiunan	4 (1,13)
SMA/SMK	38 (10,8)	Tidak bekerja	2 (0,05)
PT	80 (22,7)	**Area of Residence**	
Type of School/College		Denpasar Barat	54 (15,3)
Swasta	286 (81,3)	Denpasar Selatan	63 (17,9)
Negeri	66 (18,8)	Denpasar Timur	127 (36,1)
Religion		Denpasar Utara	108 (30,7)
Hindu	311 (88,4)	**Parents' Income**	
Islam	22 (6,3)	< Rp. 750.000	53 (15,1)
Katolik	17 (4,9)	Rp. 750.001-1.500.000	51 (14,5)
Protestan	2 (0,6)	Rp. 1.500.001-2.500.000	141 (40,1)
Study method		Rp. 2.500.001-3.500.000	31 (8,8)
Offline	272 (77,3)	Rp 3.500.001-Rp 4.500.000	27 (7,7)
Online	23 (6,5)	> Rp 4.500.001	49 (13,9)
Hybrid	57 (16,2)	**N= 352**	

Table 2. Nutritional Status of Adolescents based on IMT

Kategori	Frekuensi	(%)
Normal	138	39,2
Underweight	163	46,3
Overweight	39	11,1
Obesitas II	12	3,4
Average Body Height in meters (±SD)	1,58 (±0,10)	
Average Body Weight in kg (±SD)	52,3 (±10,1)	
Average IMT (±SD)	21,2 (±4,2)	

Table 3. Respondents' Eating Habits

Category	Frequency	(%)
Meal Frequency		
2-3 times	228	64,8
≥4 times	124	35,2
Snacking Frequency		
1-3 times	250	71,0
≥4 times	102	28,9
Breakfast habits		
Sometimes	206	58,5
Always	141	40,1
Never	5	1,4
Food variety		
< 5 type of food	161	45,7
≥ 5 type of food	191	54,3
Status of Eating Habits		
Good	288	81,8
Bad	64	18,2



Graph 1. Distribution of Responses to Questions on Teen Eating Habits

Tabel 4. Influence of Age, Gender, Parental Income, and School Method on Eating Habits

Variabel	Category	Eating habit				Total		OR	Mark P
		Good		Bad					
		n	%	n	%	n	%		
Age	<16 tahun	183	88,0	34	23,6	217	61,6	7,57	0,00*
	≥16 tahun	25	12,0	110	76,4	135	38,4		
Gender	Laki-laki	108	37,5	38	59,4	146	41,5	0,39	0,05*
	Perempuan	180	62,5	26	40,6	206	58,5		
Parental Income	>Rp 2.500.000,-	47	25,8	60	35,3	107	30,4	1,83	0,03*
	≥Rp 2.500.000,-	135	74,2	110	64,7	245	69,6		
School method	Online	6	2,1	17	26,5	23	6,5	2,71	0,02*
	Hybrid	27	9,4	30	46,9	57	16,2		
	Offline	255	88,5	17	26,6	272	77,3		

Discussion

Sociodemographic Characteristics of Respondents

This study included a total of 352 adolescents distributed across the city of Denpasar. The sample size met the minimum requirement based on the sample calculation, which indicated a need for only 116 respondents. Out of the 352 respondents sampled, there were no refusals to participate in the interviews, resulting in a 100% response rate. The sociodemographic profile of the participants revealed an average age of 15.75 years, with a standard deviation of ±3.44 years. This aligns with the defined age qualification for adolescents in the study, ranging from 10 to 21 years, and the obtained average age indirectly reflects the median age of the respondents.

Most of the participants were female (58.5%), residing in East Denpasar (36.1%), adhering to Hinduism (88.4%), and predominantly pursuing secondary education (junior high school or SMP) at 62.4%. The relatively high participation rate of females in junior high school (with a maximum age of 15 years) is consistent with findings from a study by Hafiza (2020), which suggested that adolescent females are more actively involved in health-related research. [7]

In terms of school types, most respondents attended private schools or colleges (81.3%), and the primary mode of learning was face-to-face (offline) classes, accounting for 77.3%. This was influenced by the transitional phase of COVID-19, where regulatory changes led most schools, especially public schools, which constituted most of the sample, to revert to offline learning. Meanwhile, some private schools and colleges continued with online or hybrid learning approaches.

Regarding parental occupation, a significant proportion of respondents' parents worked in the private sector (53.7%), with the majority earning a monthly income ranging from Rp 1,500,001 to Rp 2,500,000, constituting 40.1%. This aligns with the analysis of the tourism and creative economy industry profile, indicating that a substantial portion of the workforce in Bali Province relies on the private sector, particularly in tourism and related services.[8] This sector has been severely impacted by COVID-19, leading to a potential decrease in household income. This is evident in the characteristics of the respondents, where most parents have relatively low-income levels.

Nutritional Status of Adolescents

The findings of this study revealed that the distribution of nutritional status among respondents primarily classified a significant portion as underweight, accounting for 46.3%. This was followed by normal nutritional status (39.2%), overweight (with associated risk) at 11.1%, and Obesity II at 3.4%. These results align with a study conducted in Riau Province, where 54.5% of adolescents were identified as underweight based on Body Mass Index (BMI).[9] The adolescent phase is a critical period for nutritional vulnerability due to rapid physical development and changes. Additionally, adolescents

generally have higher nutritional needs, especially considering their increased physical activity compared to other age groups. The nutritional requirements are higher for males than females, and a balanced diet during this period significantly influences their future maturity.[10]

The issue of dual burden nutritional status in adolescents is also evident in the Denpasar City region, as indicated in this study, where some adolescents were identified with overweight status (with associated risk) at 11.1% and Obesity II at 3.4%. According to Riskesdas data for Bali Province, the prevalence of overweight in adolescents is 13.0%, and obesity is 10.6%.[11] The results of this study closely resemble the figures for overweight and obesity at the provincial level. However, other studies have reported higher percentages, with 29.8% of students identified with excess nutritional status (overweight and obesity).[12] Adolescence is a vulnerable period for weight gain, marked by critical changes in body composition, insulin sensitivity, eating behavior, daily activities, and psychological adjustments. Adolescent girls are at risk of obesity due to factors including lifestyle conditions that are challenging to alter, such as poor sleep patterns, high-fat diets, and low physical activity.[13]

Adolescent Eating Habits

Based on the eating habits of adolescents, it is noted that most respondents have a meal frequency of 2-3 times a day (64.8%), with snack consumption occurring 1-3 times a day (71.0%). This frequency is still considered normal, adhering to the recommended meal schedule that should be followed daily to meet the body's nutritional needs. The correct meal frequency is a pattern of eating five times a day (3 main meals and 2 snacks).[14]

In terms of breakfast habits, most respondents occasionally have breakfast (58.5%). Breakfast habits are categorized based on the frequency of breakfast, namely never, occasionally (1-3 times a week), and always (7 times a week). The findings of this study align with research conducted by Sari (2018), which identified that 48.5% of subjects fell into the category of infrequent breakfast eaters.[15] The two most common reasons for not having breakfast in this study were a lack of appetite (30.0%) and a lack of time (26.6%).

Regarding the variety of foods consumed, this study found that adolescent respondents have chosen a good variety of food, with ≥5 types of foods. This aligns with the results of a study conducted during the COVID-19 pandemic, where the community experienced changes in eating habits by 62.5%, an increase in dietary diversity by 59%, an increase in meal frequency by 54.5%, a 51% increase in food consumption, and a 54.5% increase in weight, particularly in the adolescent age group.[16]

Furthermore, an analysis using the AFHC scoring system revealed that most respondents have good eating habits (81.8%). This result contrasts with research in Pekanbaru, which showed that some adolescents have less favorable eating habits. Based on the percentage results of that study, 65 (85.5%) exhibited poor eating habits.[7] This difference may be attributed to respondents predominantly choosing normative answers rather than based on personal experiences. Despite the overall positive classification of adolescent eating habits in this study, when examining individual questionnaire items, a significant number of respondents answered "yes" to questions indicating poor eating habits, such as frequently consuming sweet snacks, not avoiding fried foods, not choosing low-fat foods, and insufficient consumption of fruits and vegetables daily. Similar findings were observed in the study by Hafiza et al. (2020), where most adolescents exhibited less favorable eating habits due to indiscriminate snacking and consuming high-fat foods.[7] Many adolescents prioritize eating solely for satiety and taste.

The Influence of Sociodemographic Characteristics on Eating Habits

This study reveals that all sociodemographic variables have a statistically significant impact ($p \leq 0.05$) on eating habits. The research identified that age, with an odds ratio (OR) of 7.57 ($p=0.001$), signifies that adolescents aged ≥16 years are 7.57 times more likely to have poor eating habits compared to those aged <16 years. This finding aligns with Anggraeni's (2015) research, which established a

significant relationship between age and dietary patterns among adolescents in South Jakarta, with a p-value of 0.002.[17] In that study, the consumption of snacks among adolescents under 13 years was lower than in older age groups. Eating habits, including consuming food outside the home, tend to increase with age, accompanied by the ability to make decisions about food choices.[18]

The gender variable also influences eating habits with a p-value of 0.05. The analysis yielded an OR of 0.39, indicating that male adolescents are 0.3 times more likely to have poor eating habits than females. Similar results were found in research conducted in Semarang, where statistical tests using the chi-square test yielded a p-value of $0.048 < \alpha$ (0.05), concluding a relationship between gender and eating patterns in adolescents.[19] Gender is a factor that can differentiate eating patterns due to differences in growth, development, and muscle mass between males and females. However, despite the statistical association, most respondents in this study expressed a desire (90%) to adopt a healthier lifestyle. This desire, if supported by family, peers, and the adolescent's environment, can lead to positive changes in their eating habits, particularly in reducing the consumption of high-salt, high-sugar, and high-fat foods while increasing fruit and vegetable intake.[20]

The parental income variable, with a p-value of 0.03, indicates that there is an influence of parental income on adolescent eating habits. The analysis also yielded an OR of 1.83, signifying that adolescents with parental income > Rp 2,500,000 have 1.83 times higher odds of having poor eating habits compared to those with parental income ≤ Rp 2,500,000. Other studies have shown varying relationships between family income and adolescent eating habits. For instance, a decrease in family income during the COVID-19 pandemic affected family purchasing power for staple foods.[21] However, this could also be due to other factors, such as improved financial situations without a corresponding improvement in knowledge about nutrition and health. The completeness or quality of meals depends on the family's ability to prepare food and provide the necessary ingredients.[22]

However, other studies also indicate that families with higher incomes tend to provide excess pocket money to adolescents, thus supporting their behavior of being more capable of purchasing food outside the home.[23] Higher family income is also associated with the family's ability to consume high-fat but low-nutrient foods, such as fast food and snacks high in salt, sugar, and fat, which are considered unhealthy eating habits among adolescents.[24] In this study, the percentage of adolescents with parental income ≥ Rp 2,500,000 who exhibit poor eating habits is higher (56.7%). In urban areas, where access to unhealthy food is widespread, the researcher assumes that, if supported by family purchasing power, poor eating habits (infrequent home-cooked meals, consumption of soft drinks and ready-made meals, infrequent intake of vegetables and fruits, and skipping breakfast) are more likely to be present among adolescents from economically affluent families, as it also correlates with the parents' occupations. The higher the parental income, the more time is likely allocated for work compared to preparing meals.[25]

Based on the school method variable, it was also found that there is an influence of the school method variable on adolescent eating habits (p=0.02). The analysis also yielded an odds ratio (OR) of 2.71, meaning that adolescents with hybrid and online learning methods are 2.71 times more likely to have poor eating habits compared to those with offline learning methods. This result aligns with research conducted in Surabaya, which indicated an increased percentage of snack consumption habits among respondents during the COVID-19 pandemic compared to respondents who did not consume snacks (89%).[26] This change is attributed to the availability of leisure time and reduced activities at home during the pandemic, combined with the absence of a regular schedule for starting or stopping learning. These conditions lead individuals to overeat, especially on snacks, as a diversion after consuming main meals or as a substitute for mealtime. This also strengthens the theory that boredom is closely related to low dopamine levels in the body, prompting many people to try to enhance pleasure through food, making them feel happy and alleviating boredom.[27] This is in line with Puspitasari et al.'s (2020) research, which revealed that Indonesians consume an average of three snacks per day,

exceeding the global average (28%). Furthermore, consuming sweet foods is considered highly important during the pandemic (64%).

Conclusion

Based on the analysis and discussion conducted in this study, it can be concluded that all examined independent variables significantly influence the eating habits of adolescents, with a significance level of $p \leq 0.05$. This is evident from the obtained odds ratio (OR) values: age of respondents with an OR of 7.57 ($p = 0.00$), gender with an OR of 0.39 ($p = 0.05$), parental income with an OR of 1.83 ($p = 0.03$), and school method with an OR of 2.71 ($p = 0.02$). Therefore, collaboration is essential between parents and other stakeholders, such as schools and health departments, to create healthier eating patterns for adolescents, especially in the current new normal era, where some schools have resumed 100% face-to-face learning, while others still use online or hybrid methods. This situation may lead to varying eating habits. Joint efforts from various parties are expected to help optimize the eating habits of adolescents, aiming for a healthy nutritional status and positive impacts on their health and future quality of life.

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