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Original Article

Association Between Coffee Drinking Frequency and Sugar Intake with Adolescents Nutritional Status

Hubungan Frekuensi Konsumsi Kopi Dan Asupan Gula Terhadap Status Gizi Remaja

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Abstract: *The nutritional status, especially overnutrition in adolescents, is a multifactorial problem, including the influence of peers, lifestyle, and the amount of pocket money that affects diet. The frequency of coffee consumption with high sugar content is a habit that many adolescents have, which can affect their nutritional status. This study aims to analyze the relationship between the frequency of coffee consumption and sugar intake on the nutritional status of students at SMAN 50 Jakarta. This study was observational in nature using a cross-sectional research design. A total of 97 respondents were obtained using the purposive sampling technique. Data were collected using questionnaires related to respondent characteristics, frequency of coffee consumption, sugar intake, and nutritional status. The relationship between dietary coffee consumption and sugar intake on nutritional status was tested using the Spearman test. The results of this study indicate that the majority of respondents (55.68%) frequently consume coffee, and 80.41% of respondents consume excess sugar as a result of their coffee consumption. Nutritional status is mostly distributed into the normal category (46.3%). Respondents who experienced undernutrition status amounted to 15.4%, overnutrition amounted to 20.6%, and obesity amounted to 17.5%. There is a significant relationship between the frequency of coffee consumption ($p<0.001$) and sugar intake from coffee ($p<0.001$) on the nutritional status of adolescents.*

Key word: nutritional status, adolescents, coffee consumption, sugar intake

1. INTRODUCTION

Adolescence is a transformative period involving considerable growth and development in an individual's physical, mental, social, and emotional well-being[1]. The World Health Organization (WHO) characterizes adolescence as a stage of development spanning the ages of 10 to 19, marked by the emergence of secondary sexual characteristics (puberty) and progress toward sexual maturity and reproductive capacity. WHO further divides this period into early adolescence (10-14 years), middle adolescence (15-17 years), and late adolescence (18-19 years)[2]. The age range of adolescents, according to the World Health Organization (WHO), is 12 to 24 years, while according to the Indonesian Minister of Health in 2010, the age range of adolescents is between 10 to 19 years and unmarried. At this age, several physical and cognitive transformations occur, marking a critical period for individuals as it will determine their development in the next stages[3]. Adolescent nutrition problems occur because of incorrect nutritional behavior, such as an imbalance between nutrition and the recommended nutritional adequacy. Adolescent nutrition problems can be caused by two factors, namely direct causal factors and indirect causal factors. Direct causal

factors, such as unhealthy food, misunderstanding of nutrition, and infectious diseases that may be suffered. Indirect factors include parents' income patterns, excessive preference for food, products from other countries that are more attractive, and poor food habits, and frequent consumption of drinks containing caffeine and high sugar. Adolescents frequently make poor food and beverage choices, often consuming products impulsively without awareness of their nutritional needs for optimal health[4].

Nutritional status is the balance between the consumption, absorption, and utilization of nutrients[5]. The nutritional status of adolescents is very important, as adolescence is a crucial period of growth and development. Poor nutritional status will impact overall health, including the risk of anemia and gastritis. Factors such as diet, nutrient intake, and lifestyle can affect the nutritional status of adolescents[5]. Indonesia showed a national prevalence of wasting in adolescents aged 16-18 years of 9.4% (1.9% very thin and 7.5% thin) and the prevalence of overweight in adolescents aged 16-18 years of 7.3%, consisting of 5.7% fat and 1.6% obesity[6]. The province with the highest prevalence of obesity was DKI Jakarta (4.2%), and the lowest was West Sulawesi (0.6%). North Sulawesi ranks among the 15 provinces having an exceedingly high prevalence of obesity.

Coffee is a beverage favored by individuals of all ages and demographics. Currently, coffee intake is regarded as a lifestyle choice[7]. In 2017, coffee consumption in Indonesia increased by 10.54% and is expected to increase by 8.22% in 2021, according to the Ministry of Agriculture. Research in 2021 stated that 40% of coffee drink buyers are teenagers, especially the type of coffee that contains milk with the addition of various types of sugar or syrup, which is also widely practiced by teenagers who drink with frequency and in large volume[8]. The habit of consuming coffee is a burgeoning lifestyle trend, particularly due to the proliferation of coffee shops in various regions, facilitating easy access to coffee. Consequently, individuals tend to favor coffee as a companion for their activities, with coffee shops and fast-food supermarkets offering a variety of coffee types, typically containing milk and high sugar content[9]. This habit is carried out by adolescents to stay awake while doing assignments because the caffeine content in coffee can increase alertness, increase concentration, and reduce drowsiness, which will affect the individual's sleep characteristics. The habit of consuming with high milk and sugar content and drinking in large quantities can affect the contribution of sleep characteristics of the individual[10].

Previous studies have shown that coffee consumption in adolescence is associated with obesity and metabolic syndrome[11]. Previous research stated that there was an association between coffee intake and high body nutritional status based on BMI-for-age in the adolescent age group <18 years[12]. In both males and females, BMI-for-age changed significantly as coffee consumption increased. A study examining the daily consumption of coffee and its impact on the metabolic systems of adolescents indicated that larger quantities of coffee consumed corresponded with an increase in BMI values[13]. Despite the popularity and prevalence of consumption, many studies conducted on coffee consumption have been presented. Related to the use of excessive coffee consumption as well as excessive sugar intake from coffee drinks, it is important to investigate the prevalence of coffee consumption in the youth population in Indonesia, especially in Jakarta as an urban area with access to highly diverse sources of coffee drinks[14–16]. Based on this background, which indicates the risk of overnutrition, the researcher aims to identify the relationship between the frequency of coffee consumption and high sugar intake on the nutritional status of adolescent students at SMAN 50 Jakarta.

2. METHODS

The research design used in this study was an analytical quantitative method using a cross-sectional study design at SMAN 50 Jakarta in May-June 2024. This research has received ethical approval under the number 023/KEPK/UNPRI/V/2024. The population in this study was students of SMAN 50 Jakarta aged 15-18 years, totaling 747 people. Based on the sample size calculation, 97 subjects were selected and agreed to sign the informed consent. The dependent variable is nutritional status, and the independent variable is the frequency of coffee consumption and sugar intake in students of SMAN 50 Jakarta. The study utilized digital scales from the GEA brand with capacity of 150 kg and 0.1 kg accuracy to collect body weight data and a microtoise from GEA brand with 200 cm maximum and 0.1 cm accuracy to measure height data, which were then used to calculate the nutritional status of the students. A research questionnaire was used to collect data on respondents' characteristics, including age, gender, pocket money, and class. We collected data on coffee drinking patterns, including frequency, volume and sugar intake, through direct interviews and the Semi-Food Frequency Questionnaire (SQ-FFQ). The types of coffee drinks asked in the questionnaire were divided into 4 types, namely ready to drink (packaged coffee), powdered instant coffee, ground coffee, and coffee shop. In our study, the Spearman correlation coefficient revealed moderate to high correlation ($P < 0.001$) and the coffee drinking pattern demonstrated strong reliability (Cronbach's Alpha = 0.848). We utilized the Statistical Program for Social Science (SPSS) version 25.0 for Windows to process and analyze the data. The frequency distribution of the following variables was determined using univariate analysis: subject characteristics (age, gender, grade, pocket money, and class), frequency of coffee consumption, sugar intake, and the nutritional status of students. Using the Spearman test, bivariate analysis was used to determine the relationship between the two variables studied, namely the frequency of coffee consumption and sugar intake with nutritional status using the Spearman test.

3. RESULTS

We classified the respondents' age characteristics as late adolescents, ranging from 15 to 18 years. The majority of responders, totaling 43 individuals, were 16 years old, representing 44.3% of the sample. The results showed that the proportion of females (63.9%) who participated in the study was more than males, with a distribution of students with pocket money of more than Rp20,000 as much as 75.2%. Subject characteristics, including age, gender, class, and pocket money, are shown in Table 1.

Table 1. Respondent characteristics distribution

Variable	n	%
Ages (Years)		
15	16	16,5
16	43	44,3
17	26	26,8
18	12	12,4
Total	97	100,0
Gender		
Male	62	63,9
Female	35	36,1
Total	97	100,0
Pocket money		
< Rp20.000	24	24,7
Rp20.000 – Rp29.000	32	33,0
Rp30.000 – Rp39.000	20	20,6
>Rp40.000	21	21,6
Total	97	100,0
Grade		
X	53	54,6
XI	44	45.4
Total	97	100,0

Table 2. Distribution of types of coffee consumption patterns

Coffee Type	Frequency of Coffee Consumption												Total	
	>3x/day		1x/day		3-6x/week		1-2x/week		2x/month		Not ever			
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Ready-to-drink coffee														
Good Day coffee drink cappuccino	0	0	14	14,4	22	22,7	18	18,6	13	13,4	30	30,9	97	100,0
Nescafe Coffee Drink Cappuccino	2	2,0	18	18,6	20	20,6	15	15,5	11	11,3	31	32,0	97	100,0
Kopi Kenangan hanya untukmu Coffee Drink Black Aren	0	0	14	14,4	28	28,9	16	16,5	4	4,1	35	36,1	97	100,0
Nescafe Coffee Drink Caramel Macchiato	1	1,0	32	33,0	23	23,7	7	7,2	6	6,2	28	28,9	97	100,0
Kopi Kenangan Hanya untukmu Coffee Drink Mantancin	1	1,0	24	24,7	13	13,4	12	12,4	23	23,7	24	24,7	97	100,0

Coffee Type	Frequency of Coffee Consumption											Total	
	>3x/day		1x/day		3-6x/week		1-2x/week		2x/month		Not ever		
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Powdered Coffee														
Robusta Gold Excelso	3	3,1	25	25,8	15	15,5	11	11,3	6	6,2	37	38,1	97	100,0
Kopi Fresco														
Kopi Torabika	25	25,8	16	16,5	6	6,2	2	2,1	8	8,2	40	41,2	97	100,0
Kopi Kapal Api	1	1,0	30	30,9	16	16,5	1	1,0	4	4,1	45	46,4	97	100,0
Kopi Gadjah	4	4,1	17	17,5	26	26,8	1	1,0	7	7,2	42	43,3	97	100,0
	1	1,0	5	5,2	24	24,7	13	13,4	5	5,2	49	50,5	97	100,0
Instant Coffe														
ABC Kopi susu	0	0	7	7,2	12	12,4	26	26,8	10	10,3	42	43,3	97	100,0
Good day cappuccino	0	0	4	4,1	29	29,9	22	22,7	12	12,4	30	30,9	97	100,0
Indocafe cappuccino	3	3,1	0	0	33	34,0	20	20,6	4	4,2	37	38,1	97	100,0
Caffino latte coconut	2	2,1	0	0	25	25,8	27	27,8	2	2,1	39	40,2	97	100,0
Luwak white	0	0	1	1,0	12	12,4	41	42,3	4	4,1	39	40,2	97	100,0
Coffe Shop														
Starbucks vietnamese iced coffee	0	0	2	2,1	26	26,8	12	12,4	8	8,2	49	50,5	97	100,0
Starbucks iced caramel	0	0	5	5,2	40	41,2	1	1,0	7	7,2	44	45,4	97	100,0
Fore cappucino	1	1,0	3	3,1	30	30,9	14	14,4	5	5,2	44	45,4	97	100,0
Fore iced latte	3	3,1	1	1,0	30	30,9	11	11,3	12	12,4	40	41,2	97	100,0
Kopi tuku latte	5	5,2	4	4,1	35	36,1	3	3,1	6	6,2	44	45,4	97	100,0
Kopi tuku cappucino	7	7,2	1	1,0	4	4,1	38	39,2	4	4,1	43	44,3	97	100,0

According to Table 2, for the most consumed ready-to-drink coffee group in frequencies> 3x/day is Nescafe Coffee Drink Cappuccino coffee, with as many as 2 students (2.0%). For consumption at 1x/day, Nescafe Coffee Drink Caramel Macchiato is preferred by 32 students (33.0%), while 3-6x/week coffee consumption is Kopi Kenangan only for you Coffee Drink Black Aren, with as many as 28 (28.9%) students.

1-2 times per week, 18 students (18.6%) choose cappuccino from Good Day coffee, while 23 students (23.7%) consume Coffee Memories Only for You Mantancin twice a month. Among the most frequently consumed powdered coffees, those consumed more than three times daily include Fresco Coffee, favored by 25 students (25.8%), for a daily basis, Torabika Coffee is preferred by 30 students (30.9%). On a weekly basis, Fire Ship Coffee is the most popular, consumed 3-6x/week by 26 students (26.8%), while Gadjah Coffee is consumed 1-2x/week by 13 students (13.4%). Monthly, Fresco Coffee is consumed 2x/week by 8 students (8.2%). Within the instant coffee group, the most frequently consumed variant on a daily basis is Indocafe cappuccino, with 3 students (3.0%) consuming it 3x/day. ABC milk coffee is consumed by 7 students (7.2%) at a frequency of 1x/day. On a weekly basis, Indocafe cappuccino is the most popular, with 33 students (34.0%) consuming it 3-6x/week, while Luwak white coffee is consumed by 41 students (42.3%) at a frequency of 1-2x/week. Monthly consumption reveals 12 students (12.4%) favor the Good Day cappuccino, consuming it 2x/month. Within the coffee shop coffee type group, the most frequently consumed coffee on a daily basis is the Kopi Tuku cappuccino, with 7 students (7.2%) consuming it more than 3x/day. The Starbucks iced caramel is consumed 1x/day by 5 students (5.2%). On a weekly basis, the most popular coffee is the Starbucks iced caramel, consumed by 40 students (41.2%) 3-6x/week, while the Tuku cappuccino is consumed by 38 students (39.2%) 1-2x/week. Monthly consumption reveals that the Fore iced latte is consumed by 12 students (12.4%) 2x/month.

Table 3. Daily sugar intake in coffee consumption patterns

Sugar Intake Sources (gram/day)	Gender		Total
	Male	Female	
	Median (min-max)	Median (min-max)	Median (min-max)
Ready to drink coffee	32,00 (1,00 -123,00)	32,00 (00,00-76,00)	32,00 (00,00-123,00)
Powdered coffee	22,00 (00,00-143,00)	26,00 (00,00-90,00)	26,00 (00,00 -143,00)
Instant coffee	28,00 (00,00 -69,00)	29,50 (00,00 -95,00)	29,00 (00,00-95,00)
Coffee Shop	40,00 (00,00 -233,00)	59,00 (00,00-197,00)	51,00 (00,00-233,00)
Total	**129,00 (13,00-250,00)**	**168,50 (14,00-67,00)**	**156,00 (13,00-267,00)**

Based on Table 3, the lowest sugar intake in males was 22 g/day (min 0, max 143 g/day) and the highest was 40 g/day (min 0, max 233 g/day). In females, the lowest sugar intake was 26 g/day (min 0, max 90 g/day) and the highest was 59 g/day (min 0, max 197 g/day).

This study performed a bivariate analysis using the Spearman test to explore the relationship between coffee consumption and nutritional status among students at SMAN 50 Jakarta which includes frequency of drinking, coffee volume, sugar intake and caffeine intake in coffee. Based on the analysis of the relationship test in Table 4 shows that there is a significant relationship between the frequency of coffee consumption and sugar intake on nutritional status in adolescents ($p<0.001$).

Table 4. The correlation between coffee drinking frequency and sugar intake on nutritional status

Variable	Nutritional status								Total		r	p-value
	Underweight		Healthy weight		Overweight		Obese					
Frequency	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**		

Rare: Semi-FFQ score < mean value	10	66,7	25	55,6	6	30,0	2	11,76	43	44,33	**0,376**	**<0,001**
Often: FFQ score > mean value	5	33,3	20	44,4	14	70,0	15	88,24	54	55,67		
Total	**15**	**100,0**	**45**	**100,0**	**20**	**100,0**	**17**	**100,0**	**97**	**100,0**		
Sugar intake	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**		
Moderate (≤ 50 g)	7	46,7	12	31,11	0	00,0	0	00,0	19	22,68	**0,414**	**<0,001**
High (≥ 50 g)	8	53,3	33	68,89	20	100,0	17	100,0	78	77,32		
Total	**15**	**100,0**	**45**	**100,0**	**20**	**100,0**	**17**	**100**	**97**	**100,0**		

Statistic: Spearman rank correlation test, significant <0.05, strength: if Correlation coefficient 0.00-0.25 = very weak correlation, 0.26-0.5 = moderate correlation, 0.51-0.75 = strong correlation, 0.76-0.99 = very strong correlation, 1.00 = correlation.

4. DISCUSSION

The characteristics data from the observation results provide an overview of the characteristics of respondents, including age, gender, pocket money and class at the senior high school level. The data collected from 97 respondents indicated that the majority group was 16 years old (44.3%) followed by 17 years old (26.8%) and 15 years old (16.5%), with the smallest proportion at the age of 18 years (12.4%) placing them within the late adolescence category of 16-19 years[17]. The analysis revealed a predominance of females at 63.9%, in contrast to males at 36.1%. The distribution of respondents' pocket money tended to be centered in the Rp20,000 - Rp29,000 category (33.0%), followed by groups with pocket money less than Rp20,000 (24.7%) and those on more than Rp40,000 (21.6%). The least represented group was in the Rp30,000-Rp40,000 category, comprising 20.6% of the respondents. The term of "pocket money" in this study refers to daily amount of money that respondents get every day. Pocket money is a temporary income and also a determinant in spending on food consumption for respondents[17]. The amount of daily pocket money can influence the food and beverage selections of adolescents, subsequently impacting their weight management efforts. A greater allowance enables adolescents to make more independent choices regarding their consumption[18].

The amount of pocket money influences the purchasing power of adolescents', particularly regarding their consumption of beverages such as coffee. Coffee is a beverage that is in great demand by various groups. Coffee consumption can release drowsiness, increase mental awareness, thoughts, and focus, making it a valuable companion for many individuals in their daily activities. For some urban communities, the act of consuming coffee transcends mere convenience and evolves into a significant aspect of the lifestyle[19]. Coffee consumption patterns are various kinds of information that provide an overview of the type, amount, and frequency of coffee beverage ingredients consumed daily by adolescent groups[20]. Coffee drinking patterns in respondents were analyzed based on frequency, volume, caffeine intake, and sugar intake. The type of coffee drink in this study is the specific type consumed by the respondents. The classification of coffee beverages can be categorized into four distinct types: ready-to-drink (packaged coffee), instant coffee powder, powdered coffee, and coffee shop. Ready to drink coffee is coffee that has been sold in special packaging so it

can be consumed immediately such as coffee in tetra packs, cans and bottles. Instant coffee powder or ground coffee is coffee that is consumed by brewing with hot water. Coffee shop is a place (shop) that serves processed espresso coffee and small snacks. An espresso-based drink consist of espresso combined with hot milk (steam milk), milk foam (milk foam), and optional sugar / syrup flavoring. Then manual brew refers to coffee that is served without using an espresso machine, resulting in a black coffee without pulp. This method produces a distinct flavor profile compared to espresso, and it is served without any added sugar or sweetener syrup. More than half of the total respondents (male and female), specifically 54.68%, stated that they often consume coffee, while 80.41% reported consume a high sugar intake. This is due to the fact that the more coffee a person consumes, the more energy it provides throughout the day, particularly when it contains a lot of sugar. Consequently, an individual who consumes coffee daily, particularly varieties that include sugar, faces a higher risk of overnutrition compared to someone who takes in coffee on a weekly or monthly basis. Based on the SQ-FQQ data, it shows that the sugar content in coffee shops is the type of coffee that is often consumed by students at SMAN 50 Jakarta. It can be concluded that 97 respondents exceeded the maximum limit in consuming sugar in coffee drinks. Consuming too much sugar in a single day can lead to health issues, such as elevated sugar levels or potentially diabetes[21]. In this study, the number of samples that consumed sugar surpassed the limit by 78 (80.41%), as participants' frequently added sugar to their coffee. This coffee drink contains various types of sugar, including corn sugar, white sugar, brown sugar, syrup, and honey[22]. When compared with PERMENKES RI No. 30 of 2013 which states that the recommended sugar consumption is 50gram or equivalent to 4 tablespoons, the sugar consumption among respondents falls into the higher category.

Gender-oriented coffee is synonymous with male, as female tend to dislike the taste of coffee more than male[23]. Nevertheless, men show greater flexibility in their coffee choices, in contrast to women who take calorie considerations into account prior to selecting a product[24]. A study by Tifferet et al. stated that coffee brands are important to males, because brands are perceived to provide a view of high-class status in society[25]. This aspect may be one of the reasons why gendered male is more dominant as an identity for liking coffee than female. The distinction lies in the fact that, in addition to considering calories and flavor, women tend to favor consuming coffee in coffee shops. This suggests that they may lack the time to prepare or blend their own coffee, leading many women who visit these places to appreciate the ambiance and social environment alongside their peers. The results of this study show otherwise, the frequency of consuming coffee in women is slightly higher (56.45%) compared to the male respondents. This is because the population of female students at SMAN 50 Jakarta is more than male students, and most of the respondents who fit the inclusion criteria of this study are female. The time often used to consume coffee is in the morning, during the afternoon or afternoon after school, and at night[26].

Nutritional status is an important part in the formation of health status, nutritional status is a condition caused by the balance between the intake of nutrients that come from food and also the need for nutrient intake needed by the body[10]. This study shows that many students have good nutritional status with a total of 45 students (46.39%) classified within the good nutritional status category. Good or normal nutritional status also indicates that the individual's daily nutritional needs are met or in other words, their nutritional intake aligns with their body's needs[5]. The nutritional status reflects

the adequacy of nutrient intake for individuals, as evidenced by their body weight and height.

The Spearman correlation test obtained a correlation coefficient of 0.376 with a p-value <0.001, which shows that there is a relationship between the frequency of coffee consumption and the nutritional status of students in classes X and IX at SMAN 50 Jakarta. The results of this study are in line with the results of previous research, indicating a positive correlation between the frequency of coffee consumption and nutritional status, meaning that the greater the frequency of coffee consumption, the greater the BMI-for-age, with p-value = 0.003[27]. Another study showed that there was a significant correlation between caffeine consumption and the incidence of obesity, with the percentage of students who consumed caffeine ≥3 times/week greater than the control group[9]. The findings indicate that participants typically consumed coffee between one to three times per week. The coffee consumed by the subjects in this study includes added sugar levels varying from 11 to 24 grams per serving. An increase in the frequency of coffee consumption correlates with a heightened chance of experiencing an increase in BMI-for-age. This is because the sugar content in coffee contributes to an increase in daily energy consumption. The more often a person drinks instant coffee, the more energy they gain. The more coffee one drinks, the more energy one consumes. Therefore, the additional calories contained in the coffee blend contribute to the subject's weight gain[9]. Based on this, frequent consumption of instant coffee can have an impact on a person's nutritional status[9]. The results on sugar intake in coffee consumption on the nutritional status of students obtained a p-value <0.001, meaning that there is a significant relationship between sugar intake in coffee and the nutritional status among the students. Consistent with earlier findings, a correlation test revealed a significant relationship between sugar intake in the consumption of sweetened coffee drinks and nutritional status in students (p=0.026)[28]. The findings of this study align with findings from 2020, indicating a significant and positive correlation between the frequency of consuming sweetened coffee drinks and the nutritional status of students at IPB University[29].

Based on the results of this study and previous research, it shows that the higher the frequency and volume of sweetened coffee drinks consumption, the higher the sugar intake in coffee drinks, leading to a greater energy influx into the body. This is supported by research conducted on students in Jordan that sweetened coffee beverages contribute significantly to caloric intake, averaging 500 kcal per day, which may lead to an enhanced energy balance and greater adiposity. In addition, the results of this Jordanian study state that sweetened coffee beverages may lead to an increase in fat accumulation (1.3 ± 0.5 kg) and a rise in body weight (1.6 ± 0.4 kg)[30]. Sweet coffee beverages fall into the category of simple carbohydrates, which are then processed in the body converted into energy. Excessive consumption of coffee drinks that are high in sugar leads to storage in the liver as glycogen, which can subsequently be converted into fat, resulting in weight gain in individuals[30]. Therefore, a national regulation was established by the government, recommending a daily sugar consumption limit of 50 grams or the equivalent of 4 tablespoons per day[31]. The WHO also recommends that both adults and children should limit their sugar consumption to ≤ 10% of daily calorie intake to prevent obesity[32]. Our study's cross-sectional design limits the ability of making causal conclusions. Suggestions for further research can compare other risk factors that potentially have an influence on nutritional status in adolescents, such as physical activity and the consumption of various nutrients.

5. CONCLUSION

The participants in this study consisted of late adolescents aged between 15 and 18 years, with a predominant 63.9% identifying as female. More than half of the total respondents (male and female), around 54.68% stated that they often consume coffee and 80.41% of it consume high sugar intake. The distribution of nutritional status was mostly distributed into the normal category (46.39%). The percentage of respondents categorized as obese was 17.53%, while those identified as undernourished accounted for 15.46%, and overnourished respondents represented were 20.62%. Based on the results of the relationship test, there is a significant relationship between the frequency of coffee consumption and high sugar intake with nutritional status in adolescents. Future studies may explore additional risk factors that could impact the nutritional status of adolescents, including physical activity levels and the consumption of various nutrients.

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REFERENCES

1. Agarwal, S., Srivastava, R., Jindal, M., & Rastogi, P. (2020). Study of adolescent stage and its impacts on adolescents. *European Journal of Molecular and Clinical Medicine*, *7*(6), 1369–1375. https://ejmcm.com/pdf_3680_8b703531d48c7f0cf5d1cd2a097225de.html%0Ahttp://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=emed21&NEWS=N&AN=2010507799
2. WHO. (2018). *Handout for Module A Introduction*. Department of Child and Adolescent Health and Development.
3. Pritasari, et al., 2017. (2017). *Bahan ajar gizi, gizi dalam daur kehidupan*. 7823–7830.
4. Winarsih. (2018). Winarsih: Pustaka Baru Press.inarsih. 2018. Pengantar Ilmu Gizi dalam Kebidanan. Yogyakarta. In *Pengantar Ilmu Gizi dalam Kebidanan*. : Pustaka Baru Press.
5. Kemenkes RI. (2017). *Penilaian Status Gizi*. 2017th ed.
6. Riskesdas Kementrian Kesehatan RI. (2018). Laporan Riskesdas 2018 Nasional.pdf. In *Lembaga Penerbit Balitbangkes*.
7. Meliala, R. R. A. S. D. (2017). Tingkat konsumsi kopi berdasarkan pendapatan, usia, dan harga di kota depok. *Skripsi*, 1–159.
8. Winarno, S. tjondro winarno, Cahyono Suminar, A., & Nurhadi, E. (2021). Pengaruh Strategi Inovasi Startup (Futuristik, Ramah Lingkungan, Dan Keunggulan Kualitas) Fore Coffee Terhadap Kepuasan Konsumen. *Journal of Food System and Agribusiness*, *5*(1), 48–53. https://doi.org/10.25181/jofsa.v5i1.1962
9. Putri, P. A. (2021). Hubungan Pola Konsumsi Makanan Tinggi Kalori dan Kopi, Durasi Tidur, dan Tingkat Stress dengan Status Gizi Pada Mahasiswa Tingkat Akhir. *Media Gizi Kesmas*, *11*(02), 464–474.
10. Kadita, F., & Wijayanti, H. S. (2017). Hubungan Konsumsi Kopi Dan Screen-Time Dengan Lama Tidur Dan Status Gizi Pada Dewasa. *Journal of Nutrition College*, *6*(4), 301. https://doi.org/10.14710/jnc.v6i4.18665
11. Kim, J.-H., & Park, Y. S. (2017). Light coffee consumption is protective against sarcopenia, but frequent coffee consumption is associated with obesity in Korean adults. *Nutrition Research*, *41*. https://doi.org/10.1016/j.nutres.2017.04.004

12. Lee, J., Kim, H. Y., & Kim, J. (2017). Coffee consumption and the risk of obesity in Korean women. *Nutrients*, *9*(12), 1–12. https://doi.org/10.3390/nu9121340
13. Bitty, F., Asrifuddin, A., & Nelwan, J. E. (2018). Stres dengan Status Gizi Remaja di Sekolah Menengah Pertama Negeri 2 Manado. *Jurnal KESMAS*, *7*(5), 1–6.
14. Ashardiono, F., & Trihartono, A. (2024). Optimizing the potential of Indonesian coffee: a dual market approach. *Cogent Social Sciences*, *10*(1). https://doi.org/10.1080/23311886.2024.2340206
15. Widyaningsih, A., Kusumawardhani, P., & Zerlina, D. (2022). Coffee Culture and Urban Settings: Locating Third Place in the Digital Era. The Cases of About Life Coffee Brewers in Tokyo and Kopi Tuku in Jakarta. *Proceedings of the ARTEPOLIS 8 - the 8th Biannual International Conference (ARTEPOLIS 2020)*, *602*(Artepolis 2020), 119–130. https://doi.org/10.2991/assehr.k.211126.014
16. Nisa, A., Widhiasti, M. R., & Dewi, E. P. (2022). Indoor to outdoor: Transformation of Coffee Shops in Jakarta. *International Journal of Built Environment and Scientific Research*, *6*(1), 17. https://doi.org/10.24853/ijbesr.6.1.17-32
17. Tamm, A., Tõugu, P., & Tulviste, T. (2024). Self-concept at different stages of life: How do early and late adolescents and young, middle-aged, and older adults describe themselves? *International Journal of Behavioral Development*, *48*(5), 434–441. https://doi.org/10.1177/01650254241254103
18. Rahman, J., Fatmawati, I., Syah, M. N. H., & Sufyan, D. L. (2021). Hubungan peer group support, uang saku dan pola konsumsi pangan dengan status gizi lebih pada remaja. *AcTion: Aceh Nutrition Journal*, *6*(1), 65. https://doi.org/10.30867/action.v6i1.391
19. Solikatun, S., Kartono, D. T., & Demartoto, A. (2018). Perilaku Kons. *Jurnal Analisa Sosiologi*, *4*(1). https://doi.org/10.20961/jas.v4i1.17410
20. damayanti ayu pratiwi. (2021). *HUBUNGAN POLA KONSUMSI KOPI DENGAN RISIKO KEJADIAN GASTRITIS PADA WARGA DI PERUMAHAN KARTIKA WANASARI 2 RT 004 RW 036 KECAMATAN CIBITUNG KABUPATEN BEKASI TAHUN 2021*. 1–149.
21. Liu, Y., Cheng, J., Wan, L., & Chen, W. (2023). Associations between Total and Added Sugar Intake and Diabetes among Chinese Adults: The Role of Body Mass Index. *Nutrients*, *15*(14). https://doi.org/10.3390/nu15143274
22. Akhriani, M., Fadhilah, E., & Kurniasari, F. N. (2016). Hubungan Konsumsi Minuman Berpemanis dengan Kejadian Kegemukan pada Remaja di SMP Negeri 1 Bandung. *Indonesian Journal of Human Nutrition*, *3*(1), 29–40.
23. Demura, S., Aoki, H., Mizusawa, T., Soukura, K., Noda, M., & Sato, T. (2013). Gender Differences in Coffee Consumption and Its Effects in Young People. *Food and Nutrition Sciences*, *04*(07), 748–757. https://doi.org/10.4236/fns.2013.47096
24. Allafi, A. R., Saleh, A., Aldughpassi, A., Al-Haifi, A. R., Hersi, A., Ahmad, F., & Aljluwi, S. (2020). Culture, gender and coffee drinking in Kuwait. *Progress in Nutrition*, *22*(2), 479–484. https://doi.org/10.23751/pn.v22i2.8325
25. Tifferet, S., Shani, N., & Cohen, H. (2013). Gender Differences in the Status Consumption of Coffee. *Human Ethology*, *28*(3), 5–10. https://doi.org/10.22330/001c.89842
26. Putri, K. S. R. (2020). Perilaku Gaya Hidup Konsumtif Perempuan Penikmat Kpi di Cliq Coffee Jakarta. In *Fisip UIN Jakarta* (Vol. 93, Issue 3).
27. Diah setia astuti, N. (2024). *Frekuensi Konsumsi Kopi Instan Sebagai Determinan Indeks Massa Tubuh Mahasiswa Kesehatan*. *15*(8), 167–170. https://doi.org/DOI: http://dx.doi.org/10.33846/sf15134
28. Iqbal, M., & Ngizan, F. N. (2023). Hubungan Gaya Hidup "Nongkrong", Aktivitas Sedentary, dan Konsumsi Minuman Manis dengan Status Gizi pada Mahasiswa. *Jurnal Nutrisia*, *25*(1), 1–11. https://doi.org/10.29238/jnutri.v25i1.315
29. H. H. Ihsan. (2020). Pengetahuan Gizi, Kebiasaan Makan, Konsumsi Minuman Manis,Tingkat Kecukupan Gizi, dan Status Gizi Mahasiswa IPB Univerity. *Institut Pertanian Bogor*.

30. Bawadi, H., Khataybeh, T., Obeidat, B., Kerkadi, A., Tayyem, R., Banks, A. D., & Subih, H. (2019). Sugar-sweetened beverages contribute significantly to college students' daily caloric intake in jordan: Soft drinks are not the major contributor. *Nutrients*, *11*(5). https://doi.org/10.3390/nu11051058
31. Permenkes. (2014). *Pedoman Gizi Seimbang*.
32. World Health Organization (WHO). (2017). Taxes on sugary drinks: Why do it? *Together Let's Beat NCDs Info Brochure*, 2–5.