

## Analysis of Current Drink Consumption Behavior on Blood Sugar Levels in Adolescents

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### Abstract

*Adolescents are becoming increasingly familiar with drinks that are currently popular. Things that are "current" at a certain time are things that are trending or popular. Teenagers are increasingly consuming modern drinks for various reasons. Drinking modern beverages has raised some concerns, primarily due to their potentially excessive levels of sugar, caffeine, and calories. Numerous studies have revealed that excessive consumption of sugary drinks is associated with several health problems, including type 2 diabetes, obesity, and other problems. This research contributes to understanding current drink consumption behavior among teenagers and its impact on blood sugar levels. The research method used was quantitative with a cross-sectional approach. The sample size was 182 respondents. The sampling technique is simple random sampling. Research instrument with a questionnaire. Bivariate analysis results: age with current drinking frequency 0.85 ( $>0.05$ ), amount of pocket money with current drinking frequency 0.01 ( $<0.05$ ), central obesity with current drinking frequency 0.78 ( $>0.05$ ), transportation with current drinking frequency 0.03 ( $<0.05$ ), taste and brand with current drinking frequency 0.00 ( $<0.05$ ), Blood Sugar Levels with drinking frequency current drink  $p$  Value 0.47 ( $>0.05$ ). Conclusions that influence current drink consumption by students: the amount of pocket money, type of transportation, interest in the taste and brand of current drinks and there is no relationship between current blood sugar levels and the frequency of drinking current drinks.*

**Keywords:** Adolescent; Consumption; Contemporary Drinks

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### 1. Introduction

Modern drinks have permeated people's lifestyles in the modern digital era, especially among students. The word "contemporary drinks" refers to beverages that have certain attributes, including those that are popular and in high demand right now among consumers. Contemporary drinks are quickly winning over customers, particularly students, thanks to their wide range of tastes, Instagram-able appearance, and cozy cafe environment (Adiba et al., 2020).

Numerous factors may have an impact on students' great interest in modern drinks. First, social aspects. According to students, drinking modern drinks might elevate their standing among peers. Second, social media's influence has a significant impact on the promotion of this beverage trend. The third is the requirement to find a relaxing environment in which to study or interact with peers (Adiba et al., 2020; Malmir et al., 2023).

Even though this modern beverage appears alluring and irresistible, there are

questions about its nutritional value, particularly given its high sugar content, which could be harmful to one's health. To effectively educate students about healthy consumption patterns, it is crucial to identify the factors influencing their current drink intake (Sylvetsky et al., 2020).

Young people are interested in buying because of several elements, including the inviting atmosphere, the welcoming staff, the mouthwatering flavor with a variety of options, the distinctive name of the restaurant, and the menu's name. In addition, the price is rather reasonable, and the box has a unique and attractive appearance. Additionally, it was discovered that young people's interest in purchasing modern coffee drinks was influenced by personal, social, and psychological variables (Pinchevsky et al., 2020).

The preliminary analysis was carried out between December 13, 2022, and February 6, 2023, 13 persons, including 2 men and 11 women, Respati University Yogyakarta undergraduate nursing students, were measured

and had direct interview data collected in 2023. Thirteen respondents—all of whom enjoyed drinking modern alcohol - provided the results. The following contemporary beverage brands are popular with students. These drinks can be found around campus: Choice, Boba Time, and Find Me. Ten students reported consuming modern drinks daily or twice per week, two reported doing so three times per week, and one reported doing so once every two weeks. Six out of the 13 respondents reported having central obesity. Results from testing blood sugar levels showed that 6 kids had levels between 77 and 88 mg/dl and 7 pupils had levels above 114 mg/dl.

This research contributes to finding out more about the factors that influence the consumption of modern drinks in teenagers, and their influence on blood sugar levels over time. This research can be a reference for further research, as an effort to reduce the risk of non-communicable diseases such as type 2 diabetes mellitus, obesity and metabolic syndrome (Bendor et al., 2020; Hu et al., 2023; Kumar et al., 2021).

## 2. Method

This type of quantitative research, with a cross-sectional approach. The population was 333, the sample size was 182 respondents, calculated using the Slovin formula.

$$n = \frac{334}{1+N(e^2)}$$

Information:

n = number of samples

N = total population

e = significant level (5%)

$$\begin{aligned} n &= \frac{334}{1+334(5\%)^2} \\ &= \frac{334}{1+334(0,05)^2} \\ &= \frac{334}{1+334(0,0025)} \\ &= \frac{334}{1+0,835} \\ &= \frac{334}{1,835} \end{aligned}$$

= 182.01 rounded to 182 people.

The sampling technique uses simple random sampling, by randomly taking the names of students who are used as research samples until the sample size is met. The sample in this study were students with inclusion and exclusion criteria. Inclusion Criteria is 1) aged 18-25 years, 2) Willing to be a respondent and sign informed consent, 3) Likes to consume

contemporary drinks. Exclusion Criteria is 1) sick or refusing at the time of the study. The tool used was the Food Frequency Questionnaire (FFQ) (Sam et al., 2020). used to collect data on the frequency, type and number of current drinks consumed by respondents. Blood sugar data using an easy touch glucometer using capillary blood. Data collection was carried out with the assistance of researchers and enumerators, so that if there were instruments that were not understood, respondents could immediately ask the researchers and enumerators. The data analysis techniques used are the Sommer test and the Mann-Witney test

## 3. Results and Discussion

### Respondent Characteristics

Characteristics of respondents based on gender (Table 1), the majority were female, 151 respondents (83%), based on the amount of pocket money, most of the respondents had pocket money <Rp. 1,000,000, namely 88 respondents (48.4%). Based on abdominal circumference, the majority of respondents were in the normal category, namely 112 respondents (61.5%). Based on transportation to campus, the majority of respondents used private transportation, namely 130 respondents (71.4%).

**Table 1.** Frequency distribution of respondent characteristics based on gender, pocket money, distance traveled by students (n=182)

Characteristics	Frequency (f)	Percentage (%)
<b>Gender</b>		
Man	13	17.0
Woman	151	83.0
<b>Monthly Pocket Money</b>		
<Rp. 1.000.000	88	48.4
Rp.1.000.000-Rp.2.000.000	71	39.0
≥ Rp. 2.000.000	23	12.6
<b>Obesity</b>		
Central obesity	70	38.5
Normal	112	61.5
<b>Transportation To Campus</b>		
Walk	43	23.6
Public transport	9	4.9
Private Vehicle	130	71.4
<b>Total</b>	<b>182</b>	<b>100</b>

Characteristics based on age, the youngest age is 18 years, the oldest is 24 years and the median age of respondents is 20 years (Table 2)

**Table 2.** Frequency distribution of respondent characteristics based on student age (n=182)

Characteristics	Min-Max	Median	SD
<b>Age</b>	18-24	20	1.503

Based on the current frequency of drinking in Table 3, the majority of respondents' drinking frequency was in the frequent category, namely 149 respondents (81.9%). Based on drink volume, the majority consumed small-volume drinks, namely 138 respondents (75.8%). Based on the time of consumption, the majority consumed modern drinks after breakfast, namely 45 respondents (24.7%). Based on the type of drink, most of the respondents consumed milk drinks, namely 45 respondents (24.72%), while the least were energy drinks, namely 10 respondents (5.49%).

**Table 3.** Frequency Distribution Of Current Drink Consumption (n=182)

	Frequency (f)	Percentage (%)
<b>Current drink consumption</b>		
Often	149	81.9
Seldom	33	18.1
<b>Drink volume</b>		
Small	138	75.8
Big	44	24.2
<b>Consumption time</b>		
After Breakfast	45	24.7
After Lunch	32	17.5
After Dinner	39	21.4
After Exercise	43	23.6
Anytime	23	12.6
<b>Type of drinks</b>		
Energy Drink	10	5.49
Isotonic Drink	13	7.14
Juice	15	8.24
Fruit Flavored Drink	11	6.04
Tea	30	16.48
Coffee	18	9.89
Milk	45	24.72
Chocolate	19	10.43
Boba	21	11.53
<b>Total</b>	<b>182</b>	<b>100</b>

Based on the age characteristics of the respondents in Table 4, the youngest age was 18 years, the oldest was 24 years, and the average age was 20.38 years. Based on the bivariate analysis test using Mann Whitney, there was no relationship between age and the frequency of drinking current drinks.

**Table 4.** Analysis Of Factors Influencing Contemporary Beverage Consumption

Characteristics	Min-Max	Mean	SD	P value
Age	18-24	20.38	1.503	0.63

Based on Table 5, mean blood sugar levels 99.01. Based on the bivariate analysis test using Mann Whitney p Value 0.47 (>0.05), there was no

relationship between Temporary Blood Sugar Levels and the frequency of drinking current drinks.

**Table 5.** Frequency Distribution of Temporary Blood Sugar Levels

Characteristics	Min-Max	Mean	SD	P Value
Temporary Blood Sugar Levels	32-188	99.01	24.44	0.47

Based on Table 6, gender characteristics and the frequency of consuming contemporary drinks, respondents who frequently drink contemporary drinks are female, although statistically there is no relationship between gender and the frequency of drinking contemporary drinks with a P value of 0.85 (> 0.05).

**Table 6.** Analysis Of Factors Influencing Contemporary Beverage Consumption

Characteristics	consumption of contemporary drinks				P Value
	Often		Seldom		
	f	%	f	%	
<b>Gender</b>					
Man	25	16.8	6	18.2	<b>0.85</b>
Woman	124	83.2	27	81.8	
<b>Monthly Pocket Money</b>					
<Rp. 1.000.000	67	45	21	63.6	<b>0.01</b>
Rp.1.000.000- Rp.2.000.000	60	40.3	11	33.3	
≥ Rp. 2.000.000	22	14.8	1	3.0	
<b>Obesity</b>					
Central obesity	58	38.9	12	36.4	<b>0.78</b>
Normal	91	61.1	21	63.6	
<b>Transporta tion To Campus</b>					
Walk	30	20.1	13	39.4	<b>0.03</b>
Public transport	7	4.7	2	6.1	
Private Vehicle	112	75.2	18	54.5	
<b>Based on taste and Brand</b>					
Yes	149	100	18	54.5	<b>0.00</b>
No	0	0	15	45.5	

Based on the amount of pocket money, the respondents who often drink the most modern drinks with pocket money < Rp. 1,000,000, namely 67 respondents (45%) based on the Sommers bivariate test, there is a relationship between the amount of pocket money and the frequency of drinking modern drinks with the P value 0.01(<0.05). Based on the type of transportation,

the majority of respondents who often drink contemporary drinks have private vehicles, namely 112 respondents (75.2%), the type of vehicle is related to the frequency of drinking contemporary drinks with a p-value of 0.03 ( $<0.05$ ). Based on purchasing current drinks based on taste and brand, respondents who often drink current drinks all buy drinks based on taste and brand. There is a relationship between the choice of flavor and brand and the frequency of drinking current drinks with a P value of 0.00 ( $<0.05$ ).

Based on the current frequency of drinking, the majority of respondents' drinking frequency was in the frequent category, namely 149 respondents (81.9%). This research supports research on the majority of student respondents who like to consume contemporary drinks, namely 89.4% or a total of 483 respondents answered that they like to consume contemporary drinks and 10.6% answered that they do not like to consume them contemporary drink. The behavior of consuming high-calorie drinks in students showed that 64% of the total 86 respondents like to consume high-calorie drinks with frequent frequency.

Based on drink volume, the majority consumed small-volume drinks, namely 138 respondents (75.8%), different from research where respondents chose large or large when consuming more modern drinks than those who chose regular size. Contemporary drinks are usually available in 3 sizes, small (400 ml), regular (500 ml), and large (650 ml). Drinks with sugar content for the small size (400 ml) contain 59.68 g of sucrose, 4.92 g of reduced sugar, and 63.6 g of total sugar. A regular-size drink (500 ml) has a total calorie of 290.67 kcal. The addition of toppings adds a total of 60.72 kcal of calories and a total of 2.47 g of sugar. Dietary Guidelines Advisory Committee (DGAC) recommends that sugar be added to no more than 10% of total energy intake of 2000 kcal per day or the equivalent of 200 kcal per day (Betaditya et al., 2022; Cooper, 2021; Hu et al., 2023).

Based on the type of drink, the majority of respondents consumed milk drinks, namely 45 respondents (24.72%), while the least were energy drinks, namely 10 respondents (5.49%). In previous research, the majority of teenagers often consumed the modern drink type Chocolate hazelnut flavored milk tea, namely 86 people (15%). The results of this study are different from research which stated that the majority of respondents consumed more boba drinks, namely 66.7%. Suggested that they had been exposed to soda, fruit drinks, sports drinks, and energy drink advertisements the most (Adiba et al., 2020; Nicolucci & Maffeis, 2022). Likewise, in research, the majority of respondents consumed energy drinks, pocari sweat, juice and tea. The American Heart Association (AHA)

ultimately decided that there is significant proof linking added sugars to a higher risk of cardiovascular disease due to increased calorie consumption, increased adiposity, and dyslipidemia. Children two years of age and up should take no more than 8 ounces of sugary drinks per week and no more than 25 g (6.25 teaspoons) of added sugar per day, according to the AHA (Cooper, 2021; Hannon & Arslanian, 2023; Kumar et al., 2021; Lin et al., 2021).

The WHO suggests against consuming more added sugar than 10% of total calories, with even greater advantages when intake is kept to less than 5% of calories (Della Corte et al., 2021). It is also advised by the 2020–2025 Dietary Guidelines for Americans that less than 10% of calories come from added sugars (Phillips, 2021). US children and adolescents report eating 17% of their calories from added sugars, with nearly half coming from sugary drinks, despite these recommendations. Individuals in the top quintile report ingesting 620 kcal per day from added sugars, with roughly 300 kcal (or 75 g, or 18.75 teaspoons) coming from sugar-filled beverages (Muth et al., 2019).

Explanations for kids' and teens' sugary drink consumption, claiming it's a significant part of their everyday lives. They Youngsters and teenagers claim that sugar-filled beverages provide them more energy for activities and enhance their performance (e.g., running, thinking). They also mentioned that after consuming sweets, they felt more focused and awake. Consuming sugary drinks is mostly motivated by the "sugar rush" experience (Zupo et al., 2021). They claim that drinking sugary drinks makes you feel happier and less angry. Drinking sugary beverages is also motivated by a preference for their flavor, fizziness, and refreshment. Youngsters and teenagers claim that they would rather drink sugary beverages than mineral water. Soft drinks and carbonated beverages provide the enjoyable bubbling and belching sensation. Drink sugary beverages to help you cool down after exercising or in certain situations. Another strategy to stay hydrated in hot weather is to drink (Sallehuddin et al., 2021). The primary source of sweet drink consumption is external factors, such as witnessing others consuming the beverage. Sweet drinks are available both at home and at school. Because there were no better drinks available, some individuals admitted to drinking sugary drink (Chatelan et al., 2022; Malmir et al., 2023; Sylvestsky et al., 2020; Tahmassebi & BaniHani, 2020).

In this study there was no relationship between the frequency of current drink consumption and current blood sugar levels, youngsters and adolescents who are overweight or obese but do not exhibit any symptoms after reaching puberty or who are older than 10 years old



and have one or more of the following risk factors: (1) a first- or second-degree relative with a family history of type 2 diabetes; (2) membership in a minority race or ethnic group (Native American, African American, Hispanic, Asian American, or Pacific Islander); (3) a mother who had diabetes or gestational diabetes during the child's gestation; and/or (4) conditions or indicators of insulin resistance (e.g., hypertension, dyslipidemia, acanthosis nigricans, PCOS, small-for-gestational age status at birth). youngsters and adolescents who are overweight or obese but do not exhibit any symptoms after reaching puberty or who are older than 10 years old and have one or more of the following risk factors: (1) a first- or second-degree relative with a family history of type 2 diabetes; (2) membership in a minority race or ethnic group (Native American, African American, Hispanic, Asian American, or Pacific Islander); (3) a mother who had diabetes or gestational diabetes during the child's gestation; and/or (4) conditions or indicators of insulin resistance (e.g., hypertension, dyslipidemia, acanthosis nigricans, PCOS, small-for-gestational age status at birth) (Bendor et al., 2020; Hannon & Arslanian, 2023; Serbis et al., 2021).

Type 2 diabetes in teenagers is caused by the same factors that produce the disease in adults: insulin resistance, failure of pancreatic  $\alpha$  and  $\beta$  cells, incretin production, renal glucose filtration, and lipolysis. It has been suggested that weight loss and lifestyle changes be combined with biguanides (metformin) and/or insulin to manage hyperglycemia in teenagers (Kumar et al., 2021; Nicolucci & Maffei, 2022; Pinchevsky et al., 2020; Serbis et al., 2021).

#### 4. Conclusions

Most of the frequency of consumption of modern drinks among teenagers is in the frequent category, most teenagers consume modern drinks in small sizes, most teenagers consume modern drinks in the morning after breakfast. Most of the respondents consumed modern drinks of the milk type. Factors that influence the consumption of modern drinks among teenagers are the amount of pocket money, type of transportation and interest in the taste and brand of modern drinks. There is no relationship between blood sugar levels and the frequency of consuming current drinks.

#### 5. Suggestions

For teenagers who often consume modern drinks, it is recommended to limit excessive sugar consumption. The recommendation for consuming sugar is according to Minister of Health Regulation Number 30 of 2013, namely that per person per day is 10% of total energy (200kcal). This consumption

is equivalent to 4 tablespoons of sugar per person per day or 50 grams per person per day.

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