



# CONSUMPTION OF SOFT DRINKS IS ASSOCIATED WITH DIABETES MELLITUS IN TEENAGERS

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## Abstract

Consumption of drinks containing high sugar causes diabetes mellitus. Diabetes causes insulin resistance, defined as where normal or increased insulin levels result in a weakened biological response. Classically, this refers to impaired sensitivity to insulin-mediated glucose disposal. Research with a cross-sectional model using adolescents as research subjects Regarding soft drinks. The population in this study were adolescents aged 12-24 years according to WHO criteria. The sample used in this study was 118 respondents. The sampling technique used quota sampling. Soft drinks increase the incidence of diabetes mellitus compared to those who do not consume soft drinks, such as Tingling or numbness in the hands and feet, as many as 61.9% of teenager feel these symptoms. Furthermore, teenager also often feel wounds that do not heal as many as 59.3% and Constant fatigue as many as 57.6%. For further researchers, it is hoped that they will examine the eating patterns of adolescents associated with the consumption of carbonated drinks and diabetes mellitus.

Keywords: Diabetes Mellitus, Soft Drinks, Teenagers

# Introduction

On social media, a 21-year-old man whose leg was amputated due to diabetes is being widely discussed. After further investigation, it turns out that the young man had a habit of drinking soda almost every day since he was little [1]. The variety of packaged sweetened drinks in Indonesia has become a concern in relation to the increasing incidence of non-communicable diseases such as diabetes mellitus (DM), obesity, heart disease and cancer [2]. The increasing incidence of diabetes is increasingly prevalent, and occurs in all age groups [3]. Recent research shows that millions of new cases of type 2 diabetes and cardiovascular disease occur every year globally because the current trend of increasing consumption of sweetened drinks in teenagers is still occurring [4].

Consumption of drinks containing high sugar causes diabetes mellitus. Diabetes causes insulin resistance, defined as where normal or increased insulin levels result in a weakened biological response. Classically, this refers to impaired sensitivity to insulin-mediated glucose disposal [5]. Consumption of soft drinks is a factor in the occurrence of type 2 DM in adolescents, because frequent consumption of soft drinks can cause insulin resistance [6]. The composition of soft drinks consists of carbonated soft drinks (containing carbon dioxide) and sugar [7].

Previous studies have stated that the pattern of soft drink consumption is not good so that the elderly experience type 2 diabetes mellitus, meaning there is a correlation between soft drinks and diabetes mellitus [8]. The novelty of this study compared to previous studies is that the subjects in this study used adolescents. The purpose of this study is to determine the relationship between soft drink consumption and diabetes mellitus in adolescents.

## Method

Research with a cross-sectional model using adolescents as research subjects Regarding soft drinks. The population in this study were adolescents aged 12-24 years according to WHO criteria. The sample used in this study was 118 respondents. The sampling technique used quota sampling. The questionnaire was distributed through social media and then the data was processed using univariate tests and Spearman tests which aimed to determine the distribution of data and correlation between coronary heart disease and soft drink consumption.

# Results

	Table 1. Descriptive Based On Soft Drink Consumption Answers / Week				
Criteria	Amount (n)	Percentage (%)	-		
1x	50	42.4			
2-3x	68	57.6			
Total	118	100.0	_		

Source: Processed data

In table 1, 42.4% of teenagers consume soft drinks once a week and 203x more consume soft drinks per week with a total of 57.6%. This shows that teenagers consume soft drinks much more often in 1 month.

Qu	estionnaire	Criteria	Number (n)	Percentage (%)
1.	Urinate more frequently	No	55	46.6
		Yes	63	53.4
2.	Excessive thirst	No	53	44.9
		Yes	65	55.1
3.	Weight loss without cause	No	52	44.1
		Yes	66	55.9
4.	Excessive hunger	No	58	49.2
		Yes	60	50.8
5.	Constant fatigue	No	50	42.4
		Yes	68	57.6
6.	Wounds that don't heal	No	48	40.7
		Yes	70	59.3
7.	Visual disturbances	No	50	42.4
		Yes	68	57.6
8.	Tingling or numbness in the hands and feet	No	45	38.1
		Yes	73	61.9
9.	Mood changes	No	57	48.3
		Yes	61	51.7
10.	Urine is cloudy and smells sweet like fruit	No	55	46.6
		Yes	63	53.4
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Table 2. Descriptive Based on Answers to the Diabetes Incidence Questionnaire

Source: Processed data

In table 2, the most common symptoms experienced by teenager are Tingling or numbress in the hands and feet, as many as 61.9% of teenager feel these symptoms. Furthermore, teenager also often

feel wounds that do not heal as many as 59.3% and Constant fatigue as many as 57.6%. These three are the symptoms that dominate when teenager often consume soft drinks.

		-	-					
Dependent	Independent	Correlation	Sig. (2-	Criteria	Information			
		coefficient	tailed)					
Diabetes Mellitus	Soft Drink Consumption	0.477**	0.000	Medium	Significant			
Source: Processed data								

Tabel 3. Spearman Rank Correlation of Soft Drink Consumption Against Diabetes Mellitus

In table 3 based on the results of the Spearman Rank correlation test in the table above, the following information was obtained: The relationship between SOFT DRINK CONSUMPTION and DIABETES MELLITUS has a correlation coefficient value of r count of 0.477 which is classified as Medium, and a significance of 0.000 is less than 0.05. Based on these results, it can be decided that there is a Positive correlation or significant relationship. So Ha is Accepted and H0 is Rejected. The correlation coefficient value of r count of 0.477 shows a positive value. The higher the SOFT DRINK CONSUMPTION, the higher the DIABETES MELLITUS.

# Discussion

Prediabetes is increasingly becoming a health problem in Indonesia, especially among adolescents. The American Diabetes Association (ADA) defines prediabetes as a fasting plasma glucose level between 100-125 mg/dL but does not increase to a more severe form of the disease. If this condition is not treated properly, it can increase the risk of developing diabetes mellitus [9]. Consumption of soda is associated with an increased risk of developing diabetes, even worsening the condition. This is because soda usually contains large amounts of added sweeteners, which can trigger blood sugar levels to rise rapidly [10]. In 1 can or 350 ml of soft drinks, there is an average of 39 grams of sugar or the equivalent of 10 teaspoons of sugar [11].

Today's teenagers live busy and dynamic lifestyles, so their eating and drinking habits have changed drastically. The increasing popularity of artificially sweetened beverages, including soda, energy drinks, and other packaged sweets, is one surprising trend. These beverages may pose major health problems despite their easy access and good taste, especially for growing teenagers [12]. However, it should be noted that behind the freshness offered by these carbonated drinks, there are bad effects on the body, one of which is causing stomach acid to rise. When viewed from its nutritional content, carbonated drinks have low nutritional levels but very high sugar levels. Other contents in carbonated drinks are caffeine and artificial sweeteners [13].

Consuming soda with high sugar content can increase blood sugar levels quickly. In addition, it is also associated with insulin resistance, a condition where the insulin hormone is not effective in converting blood sugar into energy[14]. Teenagers like to drink soda because it tastes sweet and fresh, and its color is attractive. In addition, teenagers also have the characteristic of wanting to try something new[15]. A study in the journal Injury Prevention proves that aggressive behavior in teenagers is closely related to the habit of drinking soda. There is no confirmed cause and effect relationship, but this finding strengthens the suspicion that nutrition can influence behavior[16]. Teenagers may enjoy drinking carbonated drinks because of the refreshing taste and different sensation on the tongue. However, this habit can have negative impacts on health[17].

Addiction to soda is classified as a food addiction. In this condition, a person can drink excessively without being able to stop or reduce their intake. A study in the journal Cureus in 2018 stated that soda, especially those containing caffeine, can cause the brain to release dopamine. Increased levels of the dopamine hormone can create a sense of pleasure and motivate to repeat certain behaviors.

As a result, the effect of addiction arises [19]. Soda can suppress appetite. If your little one has a low appetite, it is feared that it will have an impact on not fulfilling the various nutrients needed for their growth [20].

The soda drink that you thought could be consumed as a drink to prevent weight gain, is actually just a myth. The reason is, the sugar-free soda actually contains 200-600 times more sugar. There is an association between the prevalence of diabetes and the use of artificial sweeteners in beverages, according to empirical findings. This may require urgent attention and inquiry into the possible adverse clinical effects of drinking artificially sweetened beverages and risk factors associated with diabetes-related diseases.

### Solutions for diabetes in teenagers

If you are used to drinking several cans of soda per day, you may experience caffeine withdrawal symptoms, since most popular soda brands contain caffeine. Caffeine withdrawal symptoms include headaches, fatigue, anxiety, irritability, and low energy. So, to reduce soda consumption, you can do it gradually.

Conducting health promotion in schools and campuses in order to increase vegetable and fruit consumption needs to be done to teenagers. Knowledge needs to be provided regarding the nutritional functions contained in vegetables and fruits, so that by increasing vegetable and fruit consumption, it can reduce the consumption of sweetened drinks in the school environment.

#### Conclusion

Teenagers who drink artificially sweetened beverages have a higher chance of developing diabetes. Therefore, it is important to monitor diet and choose balanced beverages. To reduce the risk factors for diabetes, teenagers should also maintain a healthy nutritional status and engage in physical activity. Soft drinks increase the incidence of diabetes mellitus compared to those who do not consume soft drinks, such as Tingling or numbness in the hands and feet, as many as 61.9% of teenager feel these symptoms. Furthermore, teenager also often feel wounds that do not heal as many as 59.3% and Constant fatigue as many as 57.6%. For further researchers, it is hoped that they will examine the eating patterns of adolescents associated with the consumption of carbonated drinks and diabetes mellitus.

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