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The Effect of Nutrition Literacy on Sugar Consumption Sweetened Drinks and Body Mass Index For High School Students in Bandung

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ABSTRACT

According to RISKESDAS in 2018, the prevalence of diabetes in Indonesia has increased significantly compared to 2013. ON the other hand, the consumption of Sugar Sweetened Beverages (SSB) and obesity are important risk factors for Diabetes Mellitus. Hence, this study determined to analyze whether nutritional literacy in adolescents has an influence towards SSB intake and Body Mass Index among the adolescents in The City of Bandung. This is a cross-sectional study with 200 respondents with a stratified random sampling technique whereby respondents are taken from eight high schools in Bandung, randomly selected. Standardized questionnaire was used to obtained necessary data and also Kara Scan was utilized to measure BMI. There was a significant relationship between nutritional literacy and SSB consumption (p=<0.05) while there was no relationship between nutritional literacy and BMI (p=>0.05). On the other hand, nutrition literacy was a significant predictor towards SSB consumption (β = 0,085; p = <0,05) but it was not a significant predictor towards BMI (β = 0,468; p = >0,05). This study emphasized the need of an intervention to improve nutritional literacy among adolescents in Bandung to reduce SSB consumption. Hence, it will reduce the risk of developing chronic diseases as well in the future

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1. INTRODUCTION

Adolescence is a period marked by increased autonomy and independent decision-making in which a person can determine health-related behavior, namely in terms of intake of food choices [1]. During adolescence, nutrition-related behaviors develop due to changing situations and responsibilities that social pressures and norms can shape. Things like this can affect the knowledge and skills of nutrition. Adolescence is crucial because healthy and unhealthy behaviors carried out during this period can last into adulthood [2]. Eating patterns during adolescence usually have typical habits such as not eating, frequent snacking, consumption of fast food, processed foods, and sugar-sweetened beverages [3]. This diet has health implications that can increase the risk of obesity, cardiovascular disease, diabetes mellitus, cancer, and disturbances in the quality of life. Nutritional problems and poor food consumption behavior in this period relate to nutritional literacy, especially in the adolescent period [4].

Nutritional literacy is the ability to acquire, process, understand, and adequately use nutritional information and knowledge to make healthy food choices; this relates to a balanced and quality diet [5]. Nutritional literacy is also under Health literacy, where it has been concluded that low health literacy in adolescents has a relationship with obesity and unhealthy behavior [6]. Low nutritional literacy can lead to low nutritional knowledge and skills, increasing the risk of being overweight and causing health complications.

One example of bad eating habits in adolescents is the consumption of sugar-sweetened beverages (SSB) or sweet drinks with sugar content. These drinks include a wide variety of soft, fruit, energy, and famous vitamin water. In recent years there has been a rapid increase in the amount of SSB consumed in Asian countries such as India, China, and Indonesia [7]. Most teenagers in Bandung prefer drinking water without the message, but in Jakarta, they prefer bottled water [8]. Several meta-analyses have concluded that people with high consumption of SSB have a high risk of developing

type 2 diabetes [9]. This result was found not only in soft drinks or soft drinks but all types of SSB, including fruit juice which is often considered a healthier choice [10].

Nutritional literacy also affects body mass index in terms of obesity and overweight [11]. There is a significant correlation between nutritional literacy and overweight in adolescents in America, but no research has been conducted in Indonesia, especially in Bandung. This is an important issue because data on the prevalence of obesity in the population aged .18 years and over in urban areas continues to increase from 30.7% (in 2013) to 38.5% (in 2016) and 39.7% (in 2013). 2018). This increasing trend shows the importance of taking action to prevent this number from continuing to increase [12]. West Java is ranked 14th out of 34 provinces in Indonesia, where in 2013, the prevalence of obesity was 15.2% and increased to 23% (in 2018).

The lack of data on nutritional literacy in relation to SSB consumption and body mass index in adolescents indicates the need to answer this question. Therefore, this study aims to examine the effect of nutritional literacy on SSB consumption and body mass index in adolescents in Bandung City.

2. METHOD

The type of research used is cross-sectional, with 200 respondents. The sampling technique used is stratified random sampling, where respondents are taken from Class XI in ten high schools in the city of Bandung, which are selected randomly. The research instrument used was a standardized questionnaire such as nutritional literacy, SSB consumption, and measuring Body Mass Index using Karada Scan. The results of the data obtained were analyzed using the chi-square test and regression analysis to see the relationship between nutritional literacy with SSB consumption and the nutritional status of the respondents and the effect of nutritional literacy on SSB consumption and respondents' nutritional status.

3. RESULTS AND DISCUSSION

Based on the data obtained from 200 samples from 10 high schools in the city of Bandung, the existing demographics can be seen.

Table 1. Frequency Distribution of Respondent Gender

Gender	f	%
Man	95	56,2
Woman	74	43,8
Total	169	100. 0

Table 2. Frequency Distribution of Respondent's Parents' Income

Parents' Income	f	%
<Rp. 3.774.860	46	27,2
Rp. 3.774.860-Rp. 4.999.999	88	52,1
Rp. 5.000.000 –Rp. 9.999.999	25	14,8
>Rp. 10.000.000	10	5,9
Total	169	100.0

Table 1 shows that more than half are men, and less than half of the respondents are women. On the other hand, in terms of parental income, it can be seen that more than most have parents with middle and upper income. But on the other hand, a quarter of respondents have parental income less than the Bandung City Minimum Wage.

One thing that is important to note is the diet of the respondents. Table 3 below shows the existing eating patterns of the respondents.

Table 3. Respondent's Dietary Habit

Dietary habit	f	%
Consumption of staple foods		
Often	83	49,1
Seldom	83	50,9
Breakfast Consumption		
Yes	139	82,2
No	30	17,8
Lunch Consumption		
Yes	147	87,0
No	22	13,0
Snacking Habits		
Yes	130	76,9
No	39	23,1
Consumption of Sugar Sweetened Beverages		
Yes	103	60,9
No	66	39,1
Consumption of Fruits		
Yes	145	85,8
No	24	14,2
Consumption of Vegetables		
Yes	149	88,2
No	20	11,8

In the respondent's diet, it can be seen that the majority have a habit of snacking. On the other hand, more than half of the respondents consume Sugar-Sweetened Beverages. This study also shows that the respondents have good habits in consuming vegetables and fruits; more than half of the respondents said they consume both foods.

In terms of Body Mass Index (BMI), the mean result obtained is 21,8150 kg/m2. This shows that the average weight of the students is still included in the normal category.

Table 4. Nutrition Literacy and SSB Consumption

			SSB Consumption		
			Yes	No	Total
Nutrition Literacy	Low	Count	69	30	99
		% of Total	34.5%	15.0%	49.5%
	High	Count	53	48	101
		% of Total	26.5%	24.0%	50.5%
Total		Count	122	78	200
		% of Total	61.0%	39.0%	100.0%

Based on the table above, out of 200 respondents, 99 respondents, or 49.5%, had low nutritional literacy, and as many as 101 respondents, or 50.5%, were known to have high nutritional literacy. In terms of SSB consumption, it was also found that 61% consumed SSB, and 39% did not consume SSB. The p-value of the chi-square test results was found to be 0.013, indicating a relationship between nutritional literacy and SSB consumption.

The results of this study also show that the value of the Odds Ratio for nutritional literacy on SSB consumption is 2,083. This means that respondents with low nutrition tend to consume SSB by 2,083 or 2 times greater than respondents with high nutritional literacy.

In terms of Nutrition Literacy and BMI, it was found that 23% had a low BMI, 42.5% had a normal BMI, 27.5% had an obese BMI, and as many as 7% of respondents had a BMI in the Obesity category.

Table 5. Nutrition Literacy and BMI

			SSB Consumption				
			Skinny	Normal	Fat	Obesity	Total
Nutrition Literacy	Low	Count	25	42	23	9	99
		%	12.5%	21.0%	11.5%	4.5%	49.5%
	High	Count	21	43	32	5	101
		%	10.5%	21.5%	16.0%	2.5%	50.5%
Total		Count	46	85	55	14	200
		%	23.0%	42.5%	27.5%	7.0%	100.0%

The p-value of the chi-square test results was found to be 0.399 ($p > 0.05$). So it can be concluded that there is no relationship between nutritional literacy and BMI.

A logistic regression test was then carried out to see the effect of nutritional literacy on SSB consumption. The results of these tests can be seen in table 6 below.

Table 6. Nutrition Literacy Logistics Regression Test and SSB Consumption

					Sig.	**Exp(B)**	**95% C.I.for EXP(B)**	
		B	S.E.	Wald			Lower	Upper
Step 1a	Nutrition Literacy	0.85	0.41	4.246	.039	1.089	1.004	1.180
	Constant	-1.784	0.0669	7.103	.008	.168		

This study's results indicate an effect of nutritional literacy on KSSB where the p-value is 0.039 ($p < 0.05$). This study also shows that the value of Exp(B) in the nutrition iteration variable is 0.089, which means that the value of respondents with low nutritional literacy has a one-times higher risk of consuming SSB than respondents with high nutritional literacy.

In terms of the influence of Nutrition Literacy on Body Mass Index, it can be seen in Table 7 below. These results indicate that the p-value is 0.200 with sig (0.05). With this, it can be concluded that nutritional literacy does not significantly affect BMI.

Table 7. Nutrition Literacy Logistics Regression Test and SSB Consumption

					Sig.	**Exp(B)**
		B	**S.E.**	**Wald**		
Step 1a	(Constant)	16.253	5.838		2.784	0.006
	Nutrition Literacy	0.468	0.364	0.91	1.285	0.200

Discussion

This study shows that nutritional literacy is a prevalent problem in adolescents in Bandung City because almost half of the respondents have a low level of nutritional literacy. This also happened in

the Tangerang area, where 52.7% had a low level of nutritional literacy (Syafei & Badriyah) [13]. Therefore, this shows a trend of low nutritional literacy in big cities such as Tangerang and Bandung. A good level of nutritional literacy will increase the perception of health in adolescents and reduce misinformation about nutrition in adolescents [14].

On the other hand, if you look at the measurement of Body Mass Index or BMI, it can also be seen that a third of the respondents have a BMI above normal. This should be considered because obesity is a severe risk for adolescents' physical and psychological health [15].

In terms of SSB consumption, this study shows that more than half of the respondents have a habit of consuming SSB. This is a lousy habit, considering SSB consumption can significantly affect type 2 Diabetes Mellitus [16]. This shows the importance of nutritional literacy in diabetes prevention, especially if you look at the number of cases that continue to increase yearly.

This study shows a significant relationship between nutritional literacy and SSB consumption in adolescents in Bandung. This follows the research conducted by Masri, Nasutiona, and Ahriyasna [17]. However, the study was conducted on adolescents in the city of Padang because no one assessed nutritional literacy in adolescents in Bandung. Even so, this shows a similarity in the phenomenon between adolescents living in different urban areas.

If you look at the relationship between nutritional literacy and BMI, this study did not find a significant relationship between the two. This result is contrary to the research conducted by Syafei and Badriyah (2019) [13], which found a relationship between nutritional literacy and BMI in this study. Several things can cause this difference, where one of them may be the higher number of BMIs in the survey conducted by Syafei and Badriyah.

Nutritional literacy was also found to affect increasing the consumption of sugar-sweetened beverages. This is supported by research conducted by Zoelner, et al. (2011) [18], where every 1 point of nutritional literacy value can reduce 34 calories from SSB consumption per day. On the other hand, the level of nutritional literacy also influences unhealthy eating patterns. Low nutritional literacy levels tend to consume foods related to the Western Diet more often, such as high sugar, high fat, red meat, and processed foods [19].

This study also shows that nutritional literacy does not have a significant effect on BMI. These results show a conclusion in line with research conducted by Zardiny, Abazari, Zakeri, Dastras, & Farokhzadian[20]. One of the factors that may cause this is that stronger factor that can affect BMI is the lack of sufficient physical activity in adolescents[21].

4. CONCLUSION

Half of the youth in the city of Bandung already have a level of nutritional literacy, while the other half are still at a low level. Regarding body mass index, it can be concluded that more than half of the respondents have a normal weight. On the other hand, nutritional literacy has a significant relationship with SSB consumption, but there is no significant relationship with BMI. This study also concluded that nutritional literacy affects SSB consumption but has no impact on Body Mass Index. Therefore it is necessary to intervene for adolescents in the city of Bandung to improve nutritional literacy. This needs to be done because many teenagers have the habit of consuming SSB regularly. Reducing SSB consumption will also reduce the risk of developing chronic diseases in the future.

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