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Analysis of Beverages Sugar Measure, and Consumption Intensity on BMI and Public Consumption Interest at Surabaya

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Abstract: *Indonesia ranks third in sweetened drinks in Southeast Asia, with a total consumption of 20.23 liters/person/year. Most of these drinks contain high amounts of sugar and fat. Each glass contains at least 6 to 20 tablespoons of sugar, which equals 84 grams or about 300 calories. Consuming modern drinks with a high enough calorie content with frequent intensity will undoubtedly have a harmful impact on the body. Therefore, we researched the Effect of Beverage Consumption Intensity on Consumption Interests and BMI of the General Public. With this research, it is hoped that it can provide information to the public about the impact of consuming modern drinks and provide solutions on how to consume modern drinks so that health is maintained.*

Keywords— BMI; drink consumption; sugar measure; surabaya

1. INTRODUCTION

Indonesia ranks third among sweetened drinks in Southeast Asia, with a total of consumption 20.23 liters/per person/per year. Based on the Big Indonesian Dictionary (KBBI), a drink is a liquid intended for human consumption, and contemporary means the current or current situation, as a conclusion, contemporary drinks can be interpreted as a beverage that is hyping up nowadays. Contemporary drink is a term used for innovative and popular drinks, both because of their unique taste and characteristics. Several types of modern drinks include boba drinks, cheese tea, milk coffee with brown sugar, thai tea, etc. (Veronica and Ilmi, 2020)

According to Samuelson and Nordhaus, consumption is an expenditure that is used to discover the need for goods and services to obtain satisfaction for itself. Consumption is something that humans cannot leave in our daily lives. Almost every day, we consume, such as lunch, breakfast, dinner, drinks, and many more. One thing that must be included nowadays is consuming modern drinks. Now, consuming modern drinks is not a rare and strange thing because almost all people consume modern drinks. So, the activity of consuming contemporary drinks is one of the current trends.

Many contemporary drink shops generally offer a wide variety of drinks, ranging from drink sizes, toppings, choices of sugar levels, and the number of ice cubes that consumers can choose from. Most of these drinks have high amounts of sugar and fat. Each glass contains at least 6 to 20 tablespoons of sugar, which means the equivalent of 84 grams or around 300 calories. Not to mention if the drink is added with various toppings such as milk foam which has 203 calories. Cheese, around 180 calories, and boba, around 156 calories per 60 grams. This means that in one consumption of modern drinks, the calories that enter the body are around 600-700 calories, maybe even more. Even though the average adult calorie requirement is around 2000-2500 kcal. (Sitoayu, 2021)

Body Mass Index (BMI) is a parameter set by the WHO (World Health Organization) as a ratio of body weight to the square of height. BMI is determined by measuring weight and height (Situmorang, 2015). BMI values relate to many things about health and disease risk, as many studies have found recently. Among the classifications of Body Mass Index, what is seen as a problem is overnutrition which includes overweight and obesity, where the overweight is categorized in the BMI of the 85th-95th percentile, while BMI of >95th percentile is included in the obesity category (Oktaviani, 2012). Changes in BMI can occur in various age groups and gender, which are influenced by diet (Habut, Nurmawan, and Wiryanthini, 2016).

Consuming modern drinks that have a high enough calorie content with frequent intensity will certainly have an unhealthy impact on the body. Therefore we researched the Effect of Beverage Consumption Intensity on Consumption Interests and BMI of the General Public. With this research, it is hoped that it can provide information to the public about the impact of consuming modern drinks and provide solutions on how to consume modern drinks so that health is maintained.

2. LITERATURE REVIEW

2.1 Beverage

The beverage is any kind of liquid that can quench the thirst, except medicine. Beverages for human life have functioned as thirst quenchers, appetite stimulants, energy boosters, and a means to help digest food (Perangin-Angin, 2019). In general, beverages are divided into three main categories, namely soft drinks, bottled mineral water, and

alcoholic drinks. Soft drinks are a type of non-alcoholic drink that contains natural sweeteners or artificial sweeteners. In reality, soft drinks are a type of drink that is loved by the public because they can increase energy in the body quickly because of the sugar content in them. As for this era, soft drinks are very diverse, so there is a contemporary drink term. Contemporary drink is a term used for innovative and popular drinks, both because of their distinctive taste and characteristics.

2.2 Sugar

The type of sugar commonly used in contemporary drinks is brown sugar or white sugar, corn sugar, syrup, honey, and molasses. 300-500 ml serving units of sweetened drinks circulating in Indonesia contain 37-54 grams of sugar. This amount of sugar content exceeds 4 times the recommendation for adding safe sugar to drinks, namely 6-12 grams (Akhriani, and Kurniasari, 2016). The high sugar content in sweetened drinks might have a major impact on a person's daily calorie intake. If sweetened drinks are consumed in excess, it can increase the risk of developing non-communicable diseases such as obesity, and type II diabetes mellitus (Sari, Utari, and Sudiarti, 2016).

Several options for measuring sugar in contemporary drinks are no sugar, less sugar, normal sugar, and extra sugar. No sugar means that each product is not added any amount of sugar during the production process. The addition of sugar in question is in the form of adding sugar that still has caloric value, such as sucrose, glucose, honey, corn syrup, and sugar alcohols/polyols. Even though there is no added calorie sugar, it is possible for products with this claim to replace their sugar with low-calorie sweeteners. Examples of some of its products are granola, peanut butter, and jelly. Less sugar means they have a lower sugar content. Less sugar usually contains 25% less sugar than the original amount of sugar in the drink. Less sugar products usually have a taste that is not too sweet but also not bland, so products with this measure of sugar are in great demand by the public in the hope that they can consume sweet drinks without fear of consuming excessive sugar (Mindy, 2020). Extra sugar is a drink with added sugar that is added during the processing to enhance the taste or form the texture of the product. Examples include granulated sugar, brown sugar, honey, fruit juice concentrate, and corn syrup (Jafar, 2020).

2.3 Buyer's Interest

Buyer's interest (purchase intention) is the desire that arises in consumers towards a product as a result of a process of observing and learning consumers about a product. Consumers who have an interest in buying a product show attention and pleasure towards the product, which is then followed by realization in the form of buying behavior. (Ramdani, nd)

Various drinks such as boba, coffee, and tea are currently popular with the public. Many factors attract people to buy these drinks, such as brand, packaging, taste, and price. In addition, several things that also convince someone to buy and consume contemporary drinks are preferences, the influence of friends, access, and exposure to mass media. (Sitoayu, 2021)

2.4 Body Mass Index (BMI)

BMI is a simple way to monitor the nutritional status of adults, especially those related to excess and underweight (Supariasa, 2016). BMI is a systematic formula of body weight (in kilograms) divided by the square of height (in meters). This formula is only used for someone between the ages of 19 and 70, has a normal spinal structure, is not a pregnant or breastfeeding woman, and is not an athlete or bodybuilder (Arisman, 2007).

The formula for calculating BMI is:

$$BMI = \frac{Weight\ (kg)}{\left(Height(m)\right)^2}$$

With a BMI value, a person can be declared thin, normal, or fat. The threshold for BMI calculation has been determined by WHO, but due to the importance of monitoring the level of obesity and calorie deficiency, WHO recommends that the threshold be adjusted again. The following is a table of national BMI thresholds:

Classification		BMI
Underweight	Severe	<17,0
	Mild	17,0 – 18,4
Healthy		18,5 – 25,0
Overweight	Mild	25,1 – 27,0
	Severe	>27

Source: P2PTM Ministry of Health Republic of Indonesia

The relation between nutritional status in measurement through BMI is very influential for people with diabetes mellitus because it can influence the degree of achievement of physiological needs. In diabetics, body weight will increase and can cause the level of sensitivity to insulin to increase (Hasanah, 2018). In a study conducted by (Nur Khalish & Hansen, 2021) it is known that there is a relation between BMI and blood sugar levels in people with diabetes mellitus. Diabetes mellitus occurs in someone who is overweight so the pancreas is unable to function in producing insulin to neutralize glucose levels in the blood.

2.5 Diabetes

According to WHO, diabetes is a disease that is classified as a chronic disease that occurs because the pancreas cannot produce insulin (a hormone that regulates blood glucose) or the body cannot use the insulin that has been produced. Diabetes can damage nerves, blood vessels, eyes, kidneys, and the heart over time. There are several types of diabetes, including type 1 diabetes, type 2 diabetes, gestational diabetes, secondary diabetes, hereditary diabetes, and diabetes insipidus.

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- Type 1 diabetes is characterized by a lack of insulin, so additional insulin is needed every day. Type 2 diabetes is characterized by the body's ineffective use of insulin. About 95% of sufferers suffer from this type of diabetes, ranging from children to adults. Gestational diabetes is characterized by blood glucose values above normal but under diagnostic diabetes. Secondary diabetes is caused as a consequence of other medical conditions, such as Polycystic Ovarian Syndrome (PCOS), pancreatic cancer, pancreatectomy, glucagonoma, and others. Hereditary diabetes occurs if a family has a history of diabetes, so they have a high risk of getting hereditary diabetes. Diabetes insipidus occurs because Disruption of antidiuretic hormone, which is a hormone that regulates some of the fluids in the body.
- In preventing and delaying diabetes, everyone must have a healthy lifestyle, do regular physical activity, avoid smoking, and much more. If this disease has been identified, then people should control their blood glucose and blood pressure, and also carry out routine foot care and examination.

2.6 Chi-Square Test

The Chi-Square test is a test used to test the independence of two categorical variables. The hypotheses used in this test are:

H_0: The two variables are independent (independent)

H_1: The two variables are not mutually independent (dependent)

or

H_0: The first variable does not depend on the second variable

H_1: The first variable depends on the second variable

To calculate this test statistic, the manual method can be used, which is as follows:

$$X^2 = \sum_{i=1}^{b}\sum_{j=1}^{k} \frac{(n_{ij} - e_{ij})^2}{e_{ij}} \sim X^2(v); v = (b-1)(k-1)$$

$n_{ij} = frequency\ of\ observation\ at\ r_i\ and\ c_i$

$e_{ij} = expectation\ of\ frequency\ at\ r_i\ and\ c_i$

$$e_{ij} = \frac{(n_i . n_{.j})}{n_{..}}$$

Critical region:

$$X^2 > X^2_{\alpha;v}\ ; v = (b-1)(k-1)$$

3. Methods

After the text edit has been completed, the paper is ready This research is via online in the form of a google form for questionnaires (data collection), the zoom meeting application, and whatsapp for discussions about ongoing research, while the guidance and consultation process related to research is carried out offline at the Faculty of Science and Technology, Airlangga University. This research is approximately 1 (one) month with 1 (one) week of preparation (Collection of ideas and fixation of topics), 2 (two) weeks of data processing consisting of the distribution of questionnaires/data collection and presentation in the form of papers, and 1 (one) week of completion and revision of the paper.

The data sources we use are primary data and secondary data. The primary data we use is obtained from respondents who have filled out a questionnaire through the Google Form that we have distributed. The secondary data we use is obtained through the internet, such as articles and journals. The population in this study is all people in the city of Surabaya who have aged between 12-45 years, while the sample in this study is 100 people who live in the city of Surabaya and are aged 12-45 years.

The technique used for data collection in this study was to spread questionnaires. This questionnaire was created through Google Forms and disseminated to respondents. This questionnaire is divided into 3 parts. In the first part, there is the identity of the respondent, which contains the nickname, gender, weight, height, and history of diabetes. The second section contains interest in buying contemporary beverage products that contain types of drinks (coffee, non-coffee, tea) with different sugar level options so that respondents can choose the sugar level according to their interests. The third section contains the intensity of beverage consumption per month, which is in the form of intervals in how often they consume drinks in one month.

The data analysis technique used in this study is qualitative descriptive analysis, where researchers in addition to processing and presenting data, also carry out qualitative data analysis. This is intended to be able to synergize between some of the data that has been obtained with various literature and other data that has been prepared.

The data analysis process carried out in this study uses three steps. (1) Data Reduction, in this study, the data that has been obtained regarding the intensity of beverage consumption and the amount of sugar in beverages to BMI, and consumer interest in the community in the city of Surabaya. (2) Display Data, to make it easier for researchers to understand the data obtained in the field. Thus, it can be seen the intensity of beverage consumption and the amount of sugar in beverages towards BMI and consumer interest in the people in the city of Surabaya. (3) Conclusion Drawing Verification, can answer the formulation of the problem formulated from the beginning and conclusions in the form of a description or description of the object under study.

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Buyer's Interest	Type of Drink (Tea)				Total
	No Sugar	Less Sugar	Normal Sugar	Extra sugar	
Do	5	12	19	4	**40**
Do not	4	18	36	6	**64**
Total	**9**	**30**	**55**	**10**	**104**

To analyze whether there is a relationship between the buyer's interest and the amount of sugar dose in the intensity of drinking tea drinks or whether the two variables are mutually free or not.

Buyer's Interest	Type of Drink (Coffee)				Total
	No Sugar	Less Sugar	Normal Sugar	Extra sugar	
Do	18	26	23	4	**71**
Do not	3	4	10	16	**33**
Total	**21**	**30**	**33**	**20**	**104**

To analyze whether there is a relationship between buyer interest and the amount of sugar in the intensity of drinking coffee drinks or whether the two variables are mutually free or not.

Buyer Interest	Types of Drinks (Non-caffeine)				Total
	No Sugar	Less Sugar	Normal Sugar	Extra sugar	
Do	3	14	35	5	**57**
Do not	3	19	20	5	**47**
Total	**6**	**33**	**55**	**10**	**104**

To analyze whether there is a relationship between buyer interest and the amount of sugar in the intensity of drinking non-caffeine drinks or whether the two variables are mutually free or not.

Body Mass Index (BMI)	Type of Drink (Coffee)				Total
	1-5 times	6-10 times	11-15 times	>15 times	
Underweight	6	1	1	1	**9**
Healthy	42	5	1	3	**51**
Overweight	16	11	8	9	**44**
Total	**64**	**17**	**10**	**13**	**104**

To analyze whether there is a relationship between BMI and the amount of sugar dose in the intensity of drinking coffee drinks or whether the two variables are free or not.

Body Mass Index (BMI)	1-5 times	6-10 times	11-15 times	>15 times	Types of Drinks (Tea) Total
Underweight	5	4	1	3	**13**
Healthy	27	6	6	8	**47**
Overweight	19	6	10	9	**44**
Total	**51**	**16**	**17**	**20**	**104**

To analyze whether there is a relationship between BMI and the amount of sugar dose in the intensity of drinking tea drinks or whether the two variables are mutually free or not.

Body Mass Index (BMI)	Types of Drinks *(Non-caffeine)*				Total
	1-5 times	6-10 times	11-15 times	>15 times	
Underweight	3	4	3	2	12
Healthy	26	11	7	4	48
Overweight	15	13	9	7	44
Total	**44**	**28**	**19**	**13**	**104**

To analyze whether there is a relationship between BMI and the amount of sugar dose in the intensity of drinking non-caffeine drinks or whether the two variables are mutually free or not.

Diabetics	Intensity of Drink per Month				Total
	1-5 times	6-10 times	11-15 times	>15 times	
Do	10	8	10	10	38
Do not	43	11	6	6	66
Total	53	19	16	16	104

To analyze whether there is a relationship between diabetes sufferers and the amount of sugar dose in the intensity of drinking drinks or whether the two variables are free or not.

Diabetics	Type of Drink (Coffee)				Total
	No Sugar	Less Sugar	Normal Sugar	Extra sugar	
Do	2	6	19	10	**37**
Do not	8	19	35	5	**67**
Total	**10**	**25**	**54**	**15**	**104**

To analyze whether there is a relationship between diabetics and the amount of sugar in the purchase of coffee drinks or whether the two variables are mutually free or not.

Diabetics	Types of Drinks (Tea)				Total
	No Sugar	Less Sugar	Normal Sugar	Extra sugar	
Do	4	12	13	9	**38**
Do not	5	18	42	1	**66**
Total	**9**	**30**	**55**	**10**	**104**

To analyze whether there is an association of diabetics with the amount of sugar in the purchase of tea drinks or whether the two variables are mutually free or not.

Diabetics	Types of Drinks *(Non-caffeine)*				Total
	No Sugar	Less Sugar	Normal Sugar	Extra sugar	
Do	2	9	25	4	**40**
Do not	4	24	35	1	**64**
Total	**6**	**33**	**60**	**5**	**104**

To analyze whether there is a relationship between diabetics and the amount of sugar in the purchase of non-caffeine drinks or whether the two variables are mutually free or not.

4. RESULT AND DISCUSSION

4.1 Validity Test and Reliability Test

A validity test is a test that serves to see whether a measuring instrument is valid or not. In this case, the measuring instrument is the questions on the questionnaire. A questionnaire is said to be valid if the contents of the questions contained in the questionnaire are highly related. However, if the questions contained in the questionnaire have a low correlation, they are declared invalid. Based on the results of the validity test that we have carried out, a significant p-value is calculated, which is less than the significance value (α) of 0.05. Or it can also be declared valid if the value of R is calculated > R of the table. Here are the validity test results for eachvariable.

Correlations

			VAR00001	VAR00002	VAR00003	total
Spearman's rho	VAR00001	Correlation Coefficient	1.000	.399**	.373**	.752**
		Sig. (2-tailed)		.000	.000	.000
		N	104	104	104	104
	VAR00002	Correlation Coefficient	.399**	1.000	.595**	.804**
		Sig. (2-tailed)	.000		.000	.000
		N	104	104	104	104
	VAR00003	Correlation Coefficient	.373**	.595**	1.000	.803**
		Sig. (2-tailed)	.000	.000		.000
		N	104	104	104	104
	total	Correlation Coefficient	.752**	.804**	.803**	1.000
		Sig. (2-tailed)	.000	.000	.000	
		N	104	104	104	104

Correlations

			VAR00004	VAR00005	VAR00006	total_1
Spearman's rho	VAR00004	Correlation Coefficient	1.000	.324**	.275**	.688**
		Sig. (2-tailed)		.001	.005	.000
		N	104	104	104	104
	VAR00005	Correlation Coefficient	.324**	1.000	.376**	.724**
		Sig. (2-tailed)	.001		.000	.000
		N	104	104	104	104
	VAR00006	Correlation Coefficient	.275**	.376**	1.000	.753**
		Sig. (2-tailed)	.005	.000		.000
		N	104	104	104	104
	total_1	Correlation Coefficient	.688**	.724**	.753**	1.000
		Sig. (2-tailed)	.000	.000	.000	
		N	104	104	104	104

Based on **Table** above, it can be concluded that the decision obtained is valid. Since each question is significant to the total that is worth 0.000 < α = 0.05 so the measuring instrument used (the questions in the questionnaire) is valid.

Reliability is an index that shows the extent to which a measuring device can be trusted. The reliability test serves to determine the consistency of the measuring instrument when the measurement is repeated. In this case, the measuring instrument is the questions contained in the questionnaire. It will be said to be reliable if it produces the same result even if repeated measurements are taken.

Reliability Statistics

Cronbach's Alpha	N of Items
.714	3

Reliability Statistics

Cronbach's Alpha	N of Items
.598	3

Based on **Table** above it is obtained that all questions contained in the questionnaire are reliable. Because the statistical value of *Cronbach's Alpha* > the limit value on the *Chi-square* Test so it is said to be reliable.

4.2 Descriptive Statistics

From the results of the research that has been carried out, it can be seen the characteristics of the distribution of respondents recorded in the google form. In addition, there is an overview of the relationship between buyer interest and the type of drink based on sugar content, the relationship of BMI with the type of drink based on sugar content, whether there is a relationship between diabetics and the amount of sugar in the purchase of drinks or whether the two variables are mutually free or not, and whether there is a relationship between a history of diabetes and you. nut or whether the two variables are free of each other or not.

	Category	Total	Persentation
Gender	Male	33	31,70%
	Female	71	68,30%
Diabetes	Yes	38	36,50%
	No	66	63,50%

Based on the distribution of respondents on **Table** above information was obtained that the most respondents were female, namely 71 respondents (68.3%) and those with male were 33 respondents (31.7%). Of the 104 respondents, 38 respondents (36.5%) had diabetes, while 66 respondents (63.5%) did not have diabetes.

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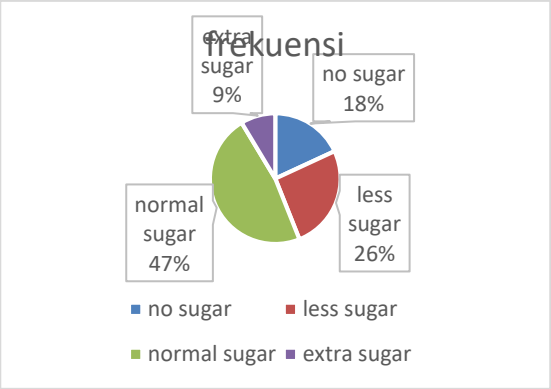
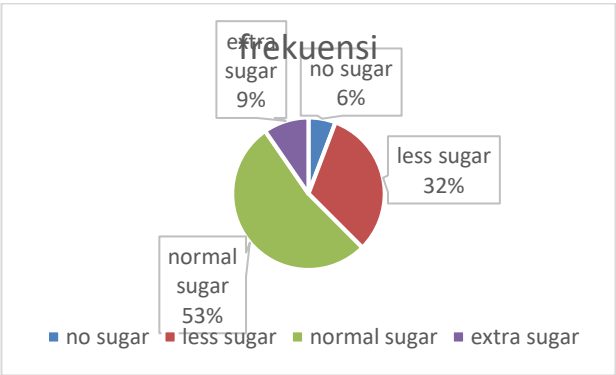
Coffee Drinks	No Sugar	Less Sugar	Normal Sugar	Extra Sugar
Frequency	21	30	55	10



Picture 4.1 Diagram of The Level Interest in Sugar Consumption in Coffee Drinks.

Based on **Picture 4.1** regarding the respondents interest, it can be seen that 21 respondents are interested in buying no sugar coffee drinks, 30 respondents are interested in buying less sugar coffee drinks, 33 respondents are interested in buying normal sugar coffee drinks, and 20 respondents are interested in buying extra sugar coffee drinks. It can be concluded, that respondents are most interested in buying normal sugar coffee drinks.

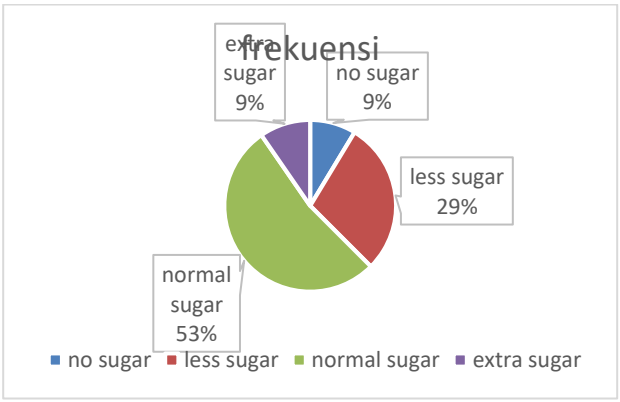
Non-coffee Drinks	No Sugar	Less Sugar	Normal Sugar	Extra Sugar
Frequency	6	33	55	10



Picture 4.2 Diagram of The Level Interest in Sugar Consumption in Non-coffee Drinks

Based on **Picture 4.2** regarding the respondents interest, it was seen that 6 respondents were interested in buying non-coffee drink no sugar, 33 respondents were interested in buying non-coffee less sugar drink, 55 respondents were interested in buying non-coffee drink normal sugar, and 10 respondents were interested in buying non-coffee drink extra sugar. It can be concluded, that respondents are most interested in buying non-coffee drinks normal sugar.

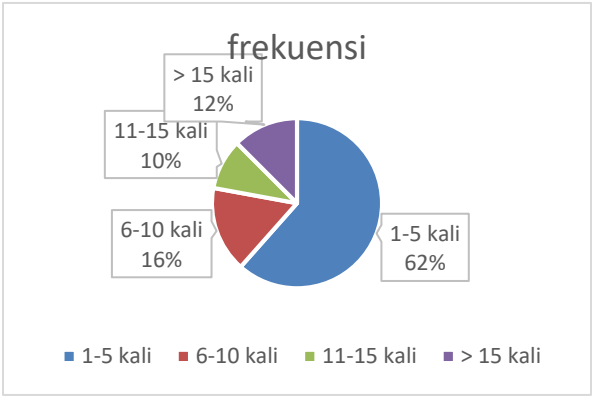
Tea Drinks	No Sugar	Less Sugar	Normal Sugar	Extra Sugar
Frequency	9	30	55	10



Picture 4.3 Diagram of the Level Interest in Sugar Consumption in Tea Drinks

Based on **Picture 4.3** regarding the respondents interest, it was seen that 9 respondents were interested in buying no sugar tea drinks, 30 respondents were interested in buying less sugar tea drinks, 55 respondents were interested in buying normal sugar tea drinks, and 10 respondents were interested in buying extra sugar tea drinks. It can be concluded, that respondents are most interested in buying normal tea drinks.

Coffee Drinks	1-5 Times	6-10 Times	11-15 Times	>15 Times
Frequency	64	17	10	13



Picture 4.4 Diagram of The Intensity Level of Coffee Drinks Consumption Per Month

Based on **Picture 4.4** regarding the intensity level of coffee drink consumption of respondents, it was seen that 62% or 64 respondents consumed coffee drinks one to five times in one month, 16% or 17 respondents consumed coffee drinks six to ten times in one month, 12% or 13 respondents consumed

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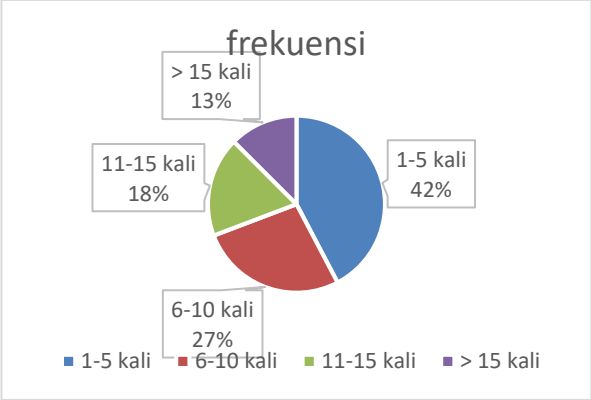
coffee drinks more than 15 times in one month and 10% or 10 respondents consumed coffee drinks 11 to 15 times a month. It can be concluded, that respondents consume the most coffee drinks one to five times in one month.

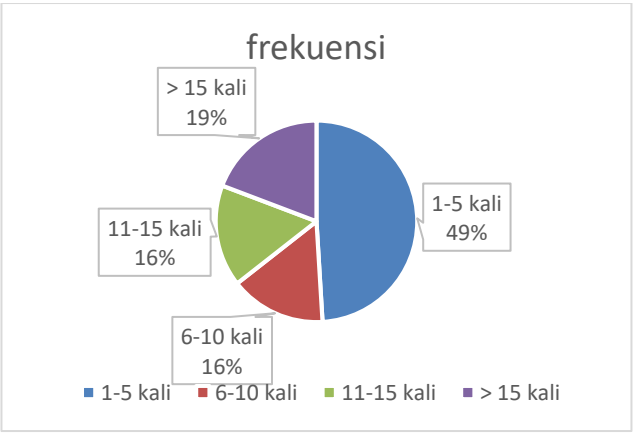
Non-Coffee Drinks	1-5 Times	6-10 Times	11-15 Times	>15 Times
Frequency	44	28	19	13



Picture 4.5 Diagram of The Intensity Level of Non-Coffee Drinks Consumption Per Month

Based on **Picture 4.5** regarding the intensity level of non-coffee drink consumption of respondents, it was seen that 42% or 44 respondents consumed non-coffee drinks one to five times in one month, 27% or 28 respondents consumed non-coffee drinks six to ten times in one month, 18% or 19 respondents consumed non-coffee drinks 11 to 15 times in one month and 13% or 13 respondents consumed non-coffee drinks more than 15 times in one month. It can be concluded, that respondents consume the most non-coffee drinks one to five times in one month.

Tea Drinks	1-5 Times	6-10 Times	11-15 Times	>15 Times
Frequency	51	16	17	20



Picture 4.6 Diagram of The Intensity Level of Tea Drinks Consumption Per Month

Based on **Picture 4.6** regarding the intensity level of tea drink consumption of respondents, it can be seen that 49% or 51 respondents consume tea drinks one to five times in one month, 19% or 20 respondents consume tea drinks more than 15 times in one month, 16% or 17 respondents consumed tea drinks six to ten times in one month and 16% or 16 respondents consumed tea drinks 11 to 15 times in one month. It can be concluded, that respondents consume the most tea drinks one to five times in one month.

4.3 Data Analysis

This sub-chapter will analyze whether or not in relationship between the two variables, namely the relationship between the amount of sugar in drinks and the intensity of consumption of drinks on consumption intention and BMI in people in Surabaya using the Chi-square test statistic.

a. The relationship between consumer interest and sugar dosage in tea drinks

The results of the questionnaire obtained and summarized in the 4x2 contingency table are as follows:

Table 4.12 Contingency Table Buyer interest and tea drinks

Buyer interest	Type of Drinks (Tea)				Total
	No Sugar	Less Sugar	Normal Sugar	Extra Sugar	
Do	**5**	**12**	**19**	**4**	**40**
Do not	**4**	**18**	**36**	**6**	**64**
Total	**9**	**30**	**55**	**10**	**104**

How to test chi-square with SPSS:

1) Data input in SPSS
2) Click Data → Weight Cases → Select Weight Cases By → Enter the results in Frequency Variable → Click OK
3) Select Analysis → Descriptive Statistics → Crosstab
4) Enter the variable of interest in the row and the variable in the column
5) Click Statistics → Check Chi Square → Click Continue
6) Click Cells → Check Observed and Expected → Click Continue → Click OK

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Output :

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	1.507[a]	3	.681
Likelihood Ratio	1.475	3	.688
Linear-by-Linear Association	.772	1	.380
N of Valid Cases	104		

a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is 3.46.

Picture 4.7 The output of the relationship between consumer interest and sugar dosage in tea drinks

b. The relationship between consumer interest and sugar dosage in coffee drinks

The results of the questionnaire obtained and summarized in the 4x2 contingency table are as follows:

Table 4.13 Contingency Table Buyer's interest and coffee drinks

Buyer interest	Type of Drink (Coffee)				Total
	No Sugar	**Less Sugar**	**Normal Sugar**	**Extra Sugar**	
Do	**18**	**26**	**23**	**4**	**71**
Do not	**3**	**4**	**10**	**16**	**33**
Total	**21**	**30**	**33**	**20**	**104**

Output :

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	29.180[a]	3	.000
Likelihood Ratio	28.677	3	.000
Linear-by-Linear Association	21.431	1	.000
N of Valid Cases	104		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 6.35.

Picture 4.8 The output of the relationship between consumer interest and sugar dosage in coffee drinks

c. The relationship between consumer interest and sugar dosage in non-caffein drinks

The results of the questionnaire obtained and summarized in the 4x2 contingency table are as follows:

Table 4.14 Contingency Table Buyer's interest and non-caffein drinks

Buyer interest	Types of Drinks (Non-caffeine)				Total
	No Sugar	**Less Sugar**	**Normal Sugar**	**Extra Sugar**	
Do	**3**	**14**	**35**	**5**	**57**
Do not	**3**	**19**	**20**	**5**	**47**
Total	**6**	**33**	**55**	**10**	**104**

Output :

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	3.923[a]	3	.270
Likelihood Ratio	3.941	3	.268
Linear-by-Linear Association	1.267	1	.260
N of Valid Cases	104		

a. 3 cells (37.5%) have expected count less than 5. The minimum expected count is 2.71.

Picture 4.9 The output of the relationship between consumer interest and sugar dosage in non-caffeine drinks

d. The relationship between BMI and the intensity of consumption of coffee drinks

The results of the questionnaire obtained and summarized in the 4x3 contingency table are as follows:

Table 4.15 Contingency Table BMI interest and consumption of coffee drinks

Body Mass Index (BMI)	**Type of Drink (Coffee)**				**Total**
	1-5 times	**6-10 times**	**11-15 times**	**>15 times**	
Do	6	1	1	1	**9**
Usual	42	5	1	3	**51**
Fat	16	11	8	9	**44**
Total	**64**	**17**	**10**	**13**	**104**

Output :

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	22.177[a]	6	.001
Likelihood Ratio	23.471	6	.001
Linear-by-Linear Association	10.605	1	.001
N of Valid Cases	104		

a. 5 cells (41.7%) have expected count less than 5. The minimum expected count is .87.

Picture 4.10 The output of the relationship between BMI and the intensity of consumption of coffee drinks

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e. The relationship between BMI and the intensity of consumption of tea drinks

The results of the questionnaire obtained and summarized in the 4x3 contingency table are as follows:

Table 4.16 Contingency Table BMI interest and consumption of tea drinks

Body Mass Index (BMI)	Types of Drinks (Tea)				Total
	1-5 times	6-10 times	11-15 times	>15 times	
Do	5	4	1	3	**13**
Usual	27	6	6	8	**47**
Fat	19	6	10	9	**44**
Total	**51**	**16**	**17**	**20**	**104**

Output :

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	5.893[a]	6	.435
Likelihood Ratio	5.511	6	.480
Linear-by-Linear Association	.397	1	.529
N of Valid Cases	104		

a. 3 cells (25.0%) have expected count less than 5. The minimum expected count is 2.00.

Picture 4.11 The output of the relationship between BMI and the intensity of consumption of tea drinks

f. **The relationship between BMI and the intensity of consumption of non-caffeine drinks**The results of the questionnaire obtained and summarized in the 4x3 contingency table are as follows :

Table 4.17 Contingency Table BMI interest and consumption of non-caffeine drinks

Body Mass Index (BMI)	Types of Drinks *(Non-caffeine)*				Total
	1-5 times	6-10 times	11-15 times	>15 times	
Do	3	4	3	2	12
Usual	26	11	7	4	48
Fat	15	13	9	7	44
Total	**44**	**28**	**19**	**13**	**104**

Output :

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	5.741[a]	6	.453
Likelihood Ratio	5.839	6	.441
Linear-by-Linear Association	.265	1	.607
N of Valid Cases	104		

a. 3 cells (25.0%) have expected count less than 5. The minimum expected count is 1.50.

Picture 4.12 The output of the relationship between BMI and the intensity of consumption of non-caffeine drinks

g. The relationship between Diabetes sufferers and the intensity of Drink per Month

The results of the questionnaire obtained and summarized in the 4x2 contingency table are as follows:

Table 4.18 Contingency Table Diabetes sufferers and the intensity of Drink per Month

Diabetics	Intensity of Drink per Month				Total
	1-5 times	6-10 times	11-15 times	>15 times	
Do	10	8	10	10	38
Do not	43	11	6	6	66
Total	53	19	16	16	104

Output :

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	16.692[a]	3	.001
Likelihood Ratio	17.002	3	.001
Linear-by-Linear Association	15.327	1	.000
N of Valid Cases	104		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 5.85.

Picture 4.13 The output of the relationship between diabetes sufferers and the intensity of Drink per Month

h. The relationship between Diabetes sufferers and sugar dosage in coffee drinks

The results of the questionnaire obtained and summarized in the 4x2 contingency table are as follows:

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Table 4.19 Contingency Table Diabetes sufferers and sugar dosage in coffee drinks

Diabetics	Type of Drink (Coffee)				Total
	No Sugar	Less Sugar	Normal Sugar	Extra sugar	
Do	2	6	19	10	**37**
Do not	8	19	35	5	**67**
Total	**10**	**25**	**54**	**15**	**104**

Output :

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	8.850[a]	3	.031
Likelihood Ratio	8.692	3	.034
Linear-by-Linear Association	6.899	1	.009
N of Valid Cases	104		

a. 1 cells (12.5%) have expected count less than 5. The minimum expected count is 3.56.

Picture 4.14 The output of the relationship between diabetes sufferers and sugar dosage in coffee drinks

i. The relationship between Diabetes sufferers and sugar dosage in tea drinks

The results of the questionnaire obtained and summarized in the 4x2 contingency table are as follows:

Table 4.20 Contingency Table Diabetes sufferers and sugar dosage in tea drinks

Diabetics	Types of Drinks (Tea)				Total
	No Sugar	Less Sugar	Normal Sugar	Extra sugar	
Do	4	12	13	9	**38**
Do not	5	18	42	1	**66**
Total	**9**	**30**	**55**	**10**	**104**

Output :

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	312.000[a]	9	.000
Likelihood Ratio	235.553	9	.000
Linear-by-Linear Association	103.000	1	.000
N of Valid Cases	104		

a. 10 cells (62.5%) have expected count less than 5. The minimum expected count is .78

Picture 4.15 The output of the relationship between diabetes sufferers and sugar dosage in tea drinks

j. The relationship between Diabetes sufferers and sugar dosage in non-caffein drinks

The results of the questionnaire obtained and summarized in the 4x2 contingency table are as follows:

Table 4.21 Contingency Table Diabetes sufferers and sugar dosage in non-caffeine drinks

Diabetics	Types of Drinks *(Non-caffeine)*				Total
	No Sugar	Less Sugar	Normal Sugar	Extra sugar	
Do	2	9	25	4	**40**
Do not	4	24	35	1	**64**
Total	**6**	**33**	**60**	**5**	**104**

Output :

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	5.718[a]	3	.126
Likelihood Ratio	5.768	3	.123
Linear-by-Linear Association	3.659	1	.056
N of Valid Cases	104		

a. 4 cells (50.0%) have expected count less than 5. The minimum expected count is 1.92.

Picture 4.16 The output of the relationship between diabetes sufferers and sugar dosage in non-caffeine drinks

4.4 Koefisien Cramer's V

To measure the association between indicators, need Cramer's V coefficient analysis with the formula:

$$V = \sqrt{\frac{\chi^2}{n \min(b,k)}}$$

Table 4.3 Summary of Results of the Chi-Square Test and Cramer's V Coefficient for each Indicator

Contingency Table	Chi-Square Test Results	*Cramer's V Coefficient*
Table 1	H_0 accepted (0.681)	0.120
Table 2	H_0 rejected (0.000)	0.530
Table 3	H_0 accepted (0.270)	0.194
Table 4	H_0 rejected (0,001)	0.327
Table 5	H_0 accepted (0.435)	0.168
Table 6	H_0 accepted (0.453)	0.166
Table 7	H_0 rejected (0,001)	0.401
Table 8	H_0 rejected (0,031)	0.292
Table 9	H_0 rejected (0,000)	1.00
Table 10	H_0 accepted (0,126)	0.234

With the hypothesis :

H_0 = There is no association between Variable 1 and Variable 2

H_1 = There is an association between Variable 1 and Variable 2

- In **Table 4.17**, especially table 1, using a significance level of α = 5%, a P-Value > α is obtained, which is equal to 0.681, so it can decide that H_0 will accepted. Based on the decision, it can conclude that there is no association between consumer interest and sugar dosage in tea drinks
- In **Table 4.17**, especially table 2, using a significance level of α = 5%, a P-Value < α is obtained, which is equal to 0.000, so it can decide that H_0 will rejected. Based on the decision, it can conclude that there is an association between consumer interest and sugar dosage in coffee drinks and the large of association between the two is 0.530
- In **Table 4.17**, especially table 1, using a significance level of α = 5%, a P-Value > α is obtained, which is equal to 0.270, so it can decide that H_0 will accepted. Based on the decision, it can conclude that there is no association between consumer interest and sugar dosage in non-caffeine drinks
- In **Table 4.17**, especially table 4, using a significance level of α = 5%, a P-Value < α is obtained, which is equal to 0.001, so it can decide that H_0 will rejected. Based on the decision, it can conclude that there is an association between BMI and the intensity of consumption of coffee drinks and the large of association between the two is 0.327
- In **Table 4.17**, especially table 5, using a significance level of α = 5%, a P-Value > α is obtained, which is equal to 0.435, so it can decide that H_0 will accepted. Based on the decision, it can conclude that there is no association between between BMI and the intensity of consumption of tea drinks
- In **Table 4.17**, especially table 6, using a significance level of α = 5%, a P-Value > α is obtained, which is equal to 0.453, so it can decide that H_0 will accepted. Based on the decision, it can conclude that there is no association between between BMI and the intensity of consumption of non-caffeine drinks
- In **Table 4.17**, especially table 7, using a significance level of α = 5%, a P-Value < α is obtained, which is equal to 0.001, so it can decide that H_0 will rejected. Based on the decision, it can conclude that there is an association between Diabetes sufferers and the intensity of Drink per Month and the large of association between the two is 0.401
- In **Table 4.17**, especially table 8, using a significance level of α = 5%, a P-Value < α is obtained, which is equal to 0.031, so it can decide that H_0 will rejected. Based on the decision, it can conclude that there is an association between Diabetes sufferers and sugar dosage in coffee drinks and the large of association between the two is 0.292
- In **Table 4.17**, especially table 9, using a significance level of α = 5%, a P-Value < α is obtained, which is equal to 0.000, so it can decide that H_0 will rejected. Based on the decision, it can conclude that there is an association between Diabetes sufferers and sugar dosage in tea drinks and the large of association between the two is 1.000
- In **Table 4.17**, especially table 10, using a significance level of α = 5%, a P-Value > α is obtained, which is equal to 0.126, so it can decide that H_0 will accepted. Based on the decision, it can conclude that there is no association between Diabetes sufferers and sugar dosage in non-caffein drinks.

4. CONCLUSION

5.1 Conclusion

Based on research on the intensity of drinks consumption and the amount of sugar to BMI and consumption interest in the people of Surabaya, the following results were obtained.

1. Based on the results of the chi-square test analysis, it can be concluded that there is not relationship between consumption interest and sugar level in tea drinks.

2. Based on the results of the chi-square test analysis, it can be concluded that there is a relationship between consumption interest and sugar level in coffee drinks.

3. Based on the results of the chi-square test analysis, it can be concluded that there is not relationship between consumption interest and sugar level in non-coffee drinks.

4. Based on the results of the chi-square test analysis, it can be concluded that there is a relationship between BMI and coffee drinks consumption.

5. Based on the results of the chi-square test analysis, it can be concluded that there is not relationship between BMI and tea drinks consumption.

6. Based on the results of the chi-square test analysis, it can be concluded that there is a relationship between BMI and the consumption of non-coffee drinks.

7. Based on the results of the chi-square test analysis, it can be concluded that there is a relationship between diabetes and the intensity of drinks consumption.

8. Based on the results of the chi-square test analysis, it can be concluded that there is a relationship between diabetes and sugar level of coffee drinks.

9. Based on the results of the chi-square test analysis, it can be concluded that there is a relationship between diabetes and sugar level of tea drinks.

10. Based on the results of the chi-square test analysis, it can be concluded that there is not relationship between diabetes and sugar level of non-coffee drinks.

5.2 Suggestions

Based on the research results and conclusions, the following suggestions are :

• For Diabetics

For people with diabetes, they must reduce the consumption of drinks that contain too much sugar and must control the sugar level in each drinks they consume.

• For Beverage Business Owners

For beverage business owners, they must reconsider the sugar content in the drinks to be sold, so that they do not only pay attention to business profits, but also the health of buyers.

• For Further Research

For further research, it is hope that it will be able to find a more and wider range of respondents to be able to analyze the effect of sugar levels on buyer interest, BMI, and diabetes with a variety of samples.

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