



EFFECT OF SELECTION OF ADDITIONAL FOOD OF BLACK STICKY RICE AND ITS PROCESSED PRODUCTS BASED ON THE MARKETING MIX ON BLOOD SUGAR IN DM PATIENTS AT PUSKESMAS CITY OF BANDUNG

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Abstract, Background: Diabetes Mellitus (DM) is a disease caused by the inability of the body to produce enough insulin or the body unable to use the insulin it produces effectively. High blood sugar levels can lead to serious damage to the liver, blood vessels, eyes, kidneys and nerves. It is estimated that there are 629 million diabetes patients in the world in 2045. In Indonesia, the number of diabetics over the age of 15 in 2018 reached 10.9% of the total population and there are no alternative food choices for DM patients which made from black sticky rice. The purpose of this study was to determine whether there is an effect of selecting additional black sticky rice and its processed products based on the marketing mix on blood sugar in DM patients at the Bandung City Public Health Center.

Method: The research method used was a Quasi-Experiment without a control group, the data collection technique was non-randomized, the sample of DM patients who followed prolanis at the Bandung City Health Center was 43 patients.

Result: The results showed that the most preferred type of food was Snackbar, the most influential aspect of the marketing mix was promotion and it was found that there was no relationship between the selection of additional food before and after the intervention from the video.

Conclusion: The results of the study recommend to increase the number of additional food alternatives made from black sticky rice tape

Keywords: Black Sticky Rice, Diabetes Mellitus Patient

Background

Tapai or Tape is a product produced from a fermentation process in the form of a process of overhauling materials that are not simple. The starch in food is converted into a simple form, namely sugar, with the help of a microorganism called yeast or yeast. Fermentation is a method that has been known and used since ancient times. Fermentation is a way to change the substrate into a certain desired product using the help of microbes. Fermentation-based biotechnology is mostly a process of producing goods and services by applying fermentation technology or using microorganisms to produce food and beverages such as: cheese, yogurt, alcoholic beverages, vinegar, sirkol, pickles, sausages, soy sauce, etc. [1].

The marketing mix must be dynamic and adaptable to the external and internal environment. External factors are factors beyond the reach of the company consisting of competitors, technology, government regulations, economic conditions, and socio-cultural environment. In addition to external factors, there are also internal factors in the form of variables contained in the marketing mix, namely Product (Product), Price (Price), Promotion (Promotion), and Place (Place or Distribution Channel). After looking at the product, price and promotion side, consumers also pay attention to the place or distribution of the product. According to Swastha (2002:24) Location or Place is where a business or business activity is carried out. An important factor in the development of a business is the location of the location in urban areas, the

way to achieve it and the travel time from the location to the destination [2]. According to Schiffman and Kanuk (2008:485) purchase decision is a process in which consumers make an assessment of various options and choose one or more that are needed based on certain considerations in purchasing [3].

Diabetes mellitus (DM) is a disorder caused by the body's inability to produce enough insulin or the body cannot use the insulin it produces effectively. Therefore, the level of glucose (blood sugar) becomes above normal or hyperglycemia. Insulin is a hormone needed to regulate the balance of blood sugar levels. High blood sugar can lead to serious damage to the liver, blood vessels, eyes, kidneys and nerves. It is estimated that there will be 629 million people with diabetes in the world in 2045. In Indonesia, the number of people with diabetes aged more than 15 years in 2018 is estimated to reach 10.9% of the entire population.

Understanding what types of food are allowed and not allowed for patients with diabetes mellitus is one way that can be done to avoid wrong eating patterns. A healthy diet for diabetics is also very important, because it is the main key to successful control of the disease. Without a good diet, diabetes tends to get out of control, get worse, and can lead to various complications. Black sticky rice and its processed products are an alternative for DM patients in meeting their daily carbohydrate and other needs. To become the main choice for DM patients, black sticky rice and its processed products must be based on the marketing mix. Until now there has been no choice given by black sticky rice and its processed products to provide additional food alternatives in the form of Snackbars, Cheaps, Brownis, Yogurt, Ice Cream, sponge or dry food. Therefore, this research is about the effect of choice of black sticky rice and its processed products on the blood sugar of DM patients in the city of Bandung. Aims to find out whether there is an effect of choosing Black Sticky Supplementary Food and its Processed Products based on the Marketing Mix on Blood Sugar in DM Patients at the Bandung City Health Center.

Method

The method used in this research is descriptive verification method with ex post facto approach and survey. Descriptive method is a research that aims to make a description, picture or painting in a systematic, factual and accurate, regarding the facts, properties and relationships between the phenomena investigated [4]. Furthermore, this study was conducted intervention/experiment (Quasi Experiment) on the

factors that greatly contributed to the patient's choice.

The population in this study were patients with diabetes mellitus who participated in the Prolanis program at the Bandung City Health Center. The sampling technique in this study was non-probability sampling. Non-probability sampling is a sampling technique that does not provide equal opportunities or opportunities for each element or member of the population to be selected as a sample [5]. Thus, the minimum sample size in this study was 43 people. The sample criteria used are patients who join the Prolanis Program conducted by the Bandung City Health Center.

Ethical considerations follow the ethical clearance that applies at the Bandung Health Polytechnic (Politeknik Kesehatan Bandung). The questionnaire was used as a standard data collection tool for DM patients who participated in the Prolanis program at the Bandung City Health Center. Data Type (Secondary to Blood Sugar). Data collection method:

- Contacting the Prolanis Program Manager
- Selecting patients with DM (by PJ Prolanis) and informed consent
- Choose a mobile number that has Whatsapp
- Do informed consent
- Asking the value of blood sugar last month
- Sending videos (DM Patient healthy snacks) via youtube
- Asking the choice of snacks from 3 snacks and the reasons
- Asking the current month's blood sugar value
- Closing

Table 1. Distribution of locations and research subjects at the Bandung City Health Center in 2020

No	Health Center	Total
1	Pasirkaliki	9
2	Puter	9
3	Ibrahim Adjie	9
4	Garuda	8
5	Panyileukan	8
Total		43

Processing and analyzing data for univariate using frequency distribution, while for the effect using linear regression and dependent t-test.

Result

Frequency Distribution of Selection of Additional Snacks for Prolanis DM Patients at Pukesmas Bandung City

Table 2. Distribution of Snack Frequency selected by Prolanis DM Patients at the Bandung City Health Center in 2020 (Snack bars, Brownies, and Chips)

No	Snack	F	%
1	Snack bars	16	37.2
2	Brownies	15	34.8
3	Chips	12	28
TOTAL		43	100%

Based on table 2 we can see that DM patients prefer additional food from black sticky rice choosing Snackbar (37.2%).

Frequency Distribution of Prolanis DM Patients at the Bandung City Health Center who choose Snackbars based on reasons based on the Marketing Mix

Table 3. Frequency Distribution of Reasons for Selection of Snack Bars selected by Prolanis DM Patients at the Bandung City Health Center in 2020

Aspect	Component	F	%
Promotion	Attractive	8	50
	Not Attractive	8	50
Location	Easy	10	62.5
	Hard	6	37.5
Price	Affordable	10	62.5
	Unaffordable	6	37.5
Product	Attractive	11	68.75
	Not Attractive	5	31.25

Based on Marketing Mix n=16

Based on table 3, it can be concluded that the reasons DM patients choose snack bars based on the marketing mix are aspects of promotion (attractive 50%), location (easy 62.5%), price (affordable 62.5%) and product (attractive 68.75%)

Frequency Distribution of Prolanis DM Patients at the Bandung City Health Center who choose Brownies based on Reasons based on the Marketing Mix

Table 4. Frequency Distribution of Reasons for Choosing Brownies selected by Prolanis DM Patients at the Bandung City Health Center in 2020

Aspect	Component	F	%
Promotion	Attractive	10	66.7
	Not Attractive	5	33.3
Location	Easy	10	66.7
	Hard	5	33.3
Price	Affordable	10	66.7
	Unaffordable	5	33.3
Product	Attractive	11	73.3
	Not Attractive	4	26.7

Based on Marketing Mix; n=15

Based on table 4, it can be concluded that the reason DM patients choose Snackbars is based on the Promotional aspect of the Marketing Mix (Attractive 66.7%), Location (easy 66.7%), Price (Affordable 66.7%) and Product (Attractive 73.3%)

Frequency Distribution of Prolanis DM Patients at the Bandung City Health Center who choose Brownies based on Reasons based on the Marketing Mix

Table 5. Frequency Distribution of Reasons for Choosing Chips selected by Prolanis DM Patients at the Bandung City Health Center in 2020

ASPECT	COMPONENT	F	%
Promotion	Attractive	7	58.3
	Not Attractive	5	41.7
Location	Easy	7	58.3
	Hard	5	41.7
Price	Affordable	10	83.3
	Unaffordable	2	16.7
Product	Attractive	11	91.7
	Not Attractive	1	8.3

Based on Marketing Mix; n=12

Based on table 5. above, it can be concluded that the reasons DM patients choose Chips are based on the Marketing Mix of Promotional aspects (Attractive 58.3%), Location (easy 58.3%), Price (Affordable 83.3%) and Product (Attractive 91.7%).

Aspects of the marketing mix Promotion, Location, Price and Product that most influence the choice of additional food for DM patients at the Bandung City Health Center.

Table 6. Significance of Marketing Mix Aspects on the Selection of Black Sticky Additives and Their Processed Products for DM Patients at the Bandung City Health Center in 2020

Aspects of The Marketing Mix	p Value
Promotion	0.012
Price	0.210
Location	0.276
Product	-

Note : Annova Test; n=43

Based on table 4.5, it can be seen that the promotion marketing mix aspect (0.012) has the most influence on the choice of additional food by DM patients

Distribution of Effects of Selection of Black Sticky Rice Supplementary Food and Their Processed Products based on the Marketing Mix on Blood Sugar of DM Patients at the Bandung City Health Center.

Table 6. Distribution of Effect of Selection of Black Sticky Supplementary Food and its Processed Products based on Marketing Mix on Blood Sugar in DM Patients at Bandung City Health Center (Before and After Intervention)

Paired Differences						
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		p Value
				Lower	Upper	
Paired Sample 1: Pre-test - Post-test	.159	2.458	.371	-.588	.907	.670

Note : *t*-test dependent; n=43

Based on table 6, it can be seen that before and after the intervention of choosing additional food by DM patients, it turned out that there was no effect on the blood sugar of DM patients who took Prolanis at PKM Bandung City, alpha 0.05 obtained p Value = 0.670.

Discussion

Selection of Supplementary Snacks for Prolanis DM Patients at the Bandung City Public Health Center

Based on the results of data collection, it was found that DM patients who took part in the Prolanis Program at the Bandung City Health Center 37.2% chose black sticky rice and their products were Snackbars, while other types of food additives included Brownies (34.8%) and Chips (28%).

The selection of Snackbars as additional food by DM patients who take part in the Prolanis Program at PKM Bandung City, is based on reasons from various aspects of the marketing mix as follows, namely from the promotion aspect: attractive (50%), Location: easy to reach (62.5%), price : affordable (62.5%), Product : Attractive (68.75%).

Based on the analysis of the Manova test (Model test) it was found that the marketing mix aspect turned out to be only the Promotion aspect which was significant (p Value = 0.012), while the Location, Product and price aspects were not significant (p value > 0.05).

The Effect of Selection of Black Sticky Supplementary Food and Its Processed Products based on the Marketing Mix on Blood Sugar in DM Patients in Bandung City.

Based on data analysis conducted using a dependent t-test with 95% confidence in the blood sugar value of DM patients who participated in the Prolanis program at PKM Bandung City, the p value = 0.670 was higher than alpha 0.05, which means that the choice of additional food for black sticky rice and the processed product has no effect on the patient's blood sugar condition.

Black sticky rice tape is a food that contains anthocyanins and has antioxidant activity and fiber [6]. Black sticky rice tape containing fiber and flavonoid phenolic components and anthocyanins is thought to help insulin resistance that occurs in metabolic syndrome conditions. Anthocyanins are a class of phenolic compounds that have antioxidants [7]. Anthocyanins have been shown to reduce levels of pro-inflammatory cytokines such as Tumor Necrosis Factor -alpha- and IL-1beta.

Selection of black sticky rice tape snackbars is effective in improving blood glucose levels in prediabetic patients The selection of local crispy (Chips) derived from black sticky rice can also be an effective alternative to increase hemoglobin. [8].

Selection of additional food in DM patients must pay attention to amount, type, and shchedule.

a. Exact Amount of Calorie Needs

The appropriate calorie requirement in achieving and maintaining an ideal body weight is based on body weight according to height. There are several ways to determine the number of calories needed by people with diabetes, among others, by taking into account the basal caloric needs of 25-30 cal/kgBW ideally. The number of these needs is increased or decreased depending on several factors: gender, age, activity, weight, and others.

b. Exact Type

DM patients are advised to choose foods that do not quickly increase blood glucose levels. Foodstuffs or foods that quickly increase blood glucose levels have a high glycemic index (GI). The concept of the glycemic index was developed to rank foods based on their ability to increase blood glucose levels after comparison with standard foods.

c. Exact Schedule

Eating in small portion but high frequency can help lower blood glucose levels. Regular meals (breakfast, lunch and dinner as well as interludes between meals) will allow blood glucose to drop before the next meal.

The impact on patients who do not pay attention to additional food in DM patients can increase blood sugar levels which can be fatal to the patient's organs and conditions such as blindness, wounds, impotence, CKD and liver damage.

Conclusion

The type of additional food that comes from black sticky rice and its processed products is the type of snack that is most chosen by DM patients. The aspect of the marketing mix that affects DM patients in choosing additional food from black sticky rice and its processed products is the promotion aspect and there is no effect on choosing additional food from black sticky rice and its by-products on the blood sugar of DM patients.

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