

## Nutrition Knowledge and Food Frequency among People with Diabetes Mellitus

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**Abstract:** *Diabetes Mellitus is one of the chronic diseases that causes the highest death in Indonesia. In fact, the number of cases of pain continues to increase. Riskesdas 2018 data shows that the total number of diabetes cases in Indonesia is 8.5%. Complications include heart attacks and strokes, severe leg infections (causing gangrene, which may result in amputation), end-stage renal failure, and sexual dysfunction. After 10-15 years from the time of diagnosis, the prevalence of all complications of diabetes increases markedly. Efforts that can be made to prevent diabetes mellitus are managing lifestyle, regular physical activity, maintaining diet, and conducting early examinations. The purpose of this study was to determine the relationship between nutrition knowledge and food frequency with the incidence of diabetes mellitus. This was an observational analytic study with a cross-sectional study design conducted in Malang. A sample of 54 people was selected by purposive sampling technique. The dependent variable is the incidence of diabetes mellitus. Independent variables include nutrition knowledge and food frequency. The data were collected by questionnaire and analyzed using Pearson correlation. Nutrition knowledge ( $r = 0.40$ ;  $p = 0.003$ ) and food frequency ( $r = 0.33$ ;  $p = 0.017$ ) related to diabetes mellitus and statistically significant. Good nutritional knowledge and regular food frequency can prevent diabetes mellitus.*

**Keywords:** *nutrition knowledge, food frequency, diabetes mellitus*

### INTRODUCTION

One of the non-communicable diseases with a high prevalence is diabetes mellitus. Diabetes mellitus is a chronic disease that occurs either when the pancreas does not produce enough insulin or when the body cannot effectively use the insulin it produces. The International Diabetes Federation (IDF) estimates that the number of people with diabetes in Indonesia could reach 28.57 million by 2045. This number is 47% higher than the 19.47 million in 2021.

The number of people with diabetes in 2021 has increased rapidly over the last ten years. Diabetics recorded a skyrocketing 167% compared to the number of diabetics in 2011, which reached 7.29 million. This increase is much higher than the increase between 2000 and 2011.

During that period, the number of people with diabetes increased by 29% from 5.65 million in 2000. The global diabetes prevalence in 2019 is estimated to be 9.3% (463 million people), rising to 10.2% (578 million) by 2030 and 10.9% (700 million) by 2045.

The prevalence is higher in urban (10.8%) than rural (7.2%) areas and in high-income (10.4%) than low-income countries (4.0%). One in two (50.1%) people living with diabetes do not know that they have diabetes. The global prevalence of impaired glucose tolerance is estimated to be 7.5% (374 million) in 2019 and projected to reach 8.0% (454 million) by 2030 and 8.6% (548 million) by 2045 (Saeedi et al., 2019) (Rawal L et al., 2017).

In general, diabetes mellitus (DM) occurs as a result of an unhealthy lifestyle that causes the accumulation of accumulated sugar levels in the blood and is above the normal threshold, which is chronic and long-term. Under normal conditions, glucose is the main source of energy for cells in the body that make up muscles and tissues, including the brain. However, if the glucose level is excessive, it can be dangerous because it triggers blood sugar or diabetes. Diabetes, like other internal diseases, is a deadly disease that cannot be cured and can only be controlled. Incorrect handling will make the patient's condition worse and put them at risk of death (Tsalamandris *et al.*, 2019).

Eating a lot increases the risk of diabetes. Eating at the same time triggers a lot of insulin and receptors for work harder, so that glucose receptors undergo damage. People who like to live leisurely without doing anything turns out to have a greater risk of developing diabetes. People who often relax are people who get used to the striated muscles not working, so the striated muscles are not active. If the striated cells are inactive, the receptors that receive glucose are inactive. As a result, glucose levels will be high in the blood (Schwingshackl *et al.*, 2017).

A diet high in carbohydrates and fat can increase blood sugar levels. Foods that have a high glycemic index can quickly raise blood sugar levels. High fat levels can reduce the effectiveness of the hormone insulin. The hormone insulin is one of the hormones responsible for maintaining the balance of blood sugar levels. Dietary regulation is important in maintaining blood sugar levels within the normal range (Bonsembiante, Targher, & Maffeis, 2021).

**METHODS**

This was an observational analytic study with a cross-sectional study design conducted in Malang. A sample of 54 people was selected by purposive sampling technique. The dependent variable is the incidence of diabetes mellitus. Independent variables include nutrition knowledge and food frequency. The data were collected by questionnaire and analyzed using Pearson correlation.

**RESULTS AND DISCUSSION**

The research results presented that nutrition knowledge ( $r = 0.40$ ;  $p = 0.003$ ) and food frequency ( $r = 0.33$ ;  $p = 0.017$ ) related to diabetes mellitus and statistically significant.

Table 1. Respondent characteristics

Characteristic	Criteria	n	%
Age (years)	26-35	9	17
	36-45	12	22
	46-55	11	20
	56-65	22	41
Education	Elementary School	5	9
	Junior High School	19	35
	Senior High School	16	30
Occupation	College	14	26
	Civil servant	8	15
	Private	17	31
	Self-employed	16	30
Income	Housewife	13	24
	<regional minimum wage	29	54
	≥regional minimum wage	25	46

Table 2. Bivariate Analysis

Independent variable	Diabetes Mellitus		p
	n	r	
Nutrition Knowledge	54	0.40	0.003
Food Frequency	54	0.33	0.017

Lifestyle changes are influenced by behavior (Trovato, 2012). Several factors, including knowledge of nutrition and attitudes, influence this behavior. Knowledge is an important factor in shaping a person's attitudes and actions. If the knowledge is good, then the attitude will be positive, resulting in improved health, and vice versa. Lack of knowledge can lead to a

negative attitude, which in turn can worsen health conditions and trigger various diseases. Success in dealing with problems in patients with DM is a behavior that leads to control of blood glucose levels. Understanding how to control diabetes mellitus (DM) through nutritional knowledge is crucial for controlling blood glucose levels. Patients with diabetes mellitus who have sufficient knowledge about nutrition will change their mindset when responding to the decisions made. Next, they will process and digest the information, leading to positive behavior. Behavior plays an important role in controlling blood glucose levels. Behaviour refers to someone carrying out an action consciously, universally, and only for themselves. Good behavior can control the levels of glucose in the blood. (Spruijt-Metz, O'Reilly, Cook, Page, & Quinn, 2014).

A person with a bad diet can increase blood sugar levels in the body due to irregular eating frequency in patients with diabetes mellitus (Sami, Ansari, Butt, Rashid, & Hamid, 2017). People with diabetes usually tend to have uncontrolled blood sugar levels. Blood sugar levels will increase drastically after consuming foods that contain lots of carbohydrates and/or sugar, so people with diabetes need to maintain a proper regulation diet in order to control blood sugar levels. Adults with a history of diabetes mellitus should prioritize nutritional therapy for managing and controlling the disease. A diet is a way of regulating the amount and type of food intake with the goal of maintaining health, nutritional status, and preventing and/or helping the healing process. DM sufferers should understand the importance of a good diet when planning their daily diet (Cena & Calder, 2020) (Campbell, 2017).

Diet is very influential on human life, especially for people with diabetes mellitus, both to maintain a healthy body, as well as to treatment and cure of disease. It has been known since hundreds of years ago dietary regulation to cure disease is an integral part can be separated from the overall treatment effort to cure the disease suffered by DM patients. People with DM often do not carry out a healthy diet or diet, with the excuse of being lazy and bored, even though a healthy diet can control blood sugar levels in DM patients.

Uncontrolled blood sugar levels in DM patients can lead to various disease complications, including stroke, heart disease and stroke nerve damage (Tun Nyo Nyo, Arunagirinathan Ganesan, Munshi K Sunil, & Pappachan M Joseph, 2017)(Leon, 2015).

Frequency of eating is to obtain data about frequency of consumption of a number of foodstuffs or prepared foods during a certain period such as, weekly, monthly, or yearly. Foods that contain good sources of carbohydrates is a staple food, fast food, sweet drinks containing sugar, and foods that are oily or coconut milk. The risk for the occurrence of Diabetes Mellitus is not only seen from the criteria of consuming or not consuming the type risky foods but also influenced by frequency consumption, and how much consumption of the type of food risk in influencing the occurrence of Diabetes Mellitus. Consume carbohydrates too much of this will cause the hormone insulin quickly produced and make blood sugar enter muscle cells or liver cells. If the sugar storage area is full, namely muscle or liver, sugar will be stored in fat cells and in fat cells sugar will be converted into fat (Ludwig et al., 2021) (Macdonald, 2016).

## CONCLUSIONS

Good nutritional knowledge and regular food frequency can prevent diabetes mellitus. Diabetics must really know the type, amount, and schedule of food.

## CONFLICT OF INTEREST STATEMENT

We have no conflicts of interest to disclose.

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