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RESEARCH

THE CORRELATION BETWEEN COMMUNITY KNOWLEDGE LEVEL ON NUTRITIONAL INTAKE AND THE INCIDENCE OF TYPE 2 DIABETES MELLITUS IN THE WORKING AREA OF SUKODONO PUBLIC HEALTH CENTER

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ABSTRACT

Type 2 diabetes mellitus (DM) is a chronic disease whose incidence is constantly increasing, often caused by a lack of knowledge about proper nutritional intake. The goal is to investigate the relationship between public knowledge about nutritional intake and the emergence of type 2 diabetes mellitus in the Sukodono Health Center area. Observation of correlation analysis using a cross-sectional approach. A total of 55 patients were collected using the simple random sampling method to be used as a sample. Nutritional intake knowledge questionnaires as well as blood sugar checks during fasting were used for data collection. Data analysis in this study used the chi-square test. While patients with low knowledge had fasting glucose levels showing unmanaged spikes, reaching a figure of about 63.6%, those who understood the condition of diabetes well were generally better able to maintain the stability of glucose levels in their bodies. Knowledge of nutrient intake and the incidence of type 2 diabetes showed a relevant and significant correlation (p=0.019). Health education related to nutritional intake has proven to be important in the management and prevention of complications of diabetes mellitus. Improving education and health interventions is a crucial step to reduce the incidence of type 2 DM.

Keywords: Diabetes Mellitus, Knowledge Level, Nutritional Intake, Blood Sugar Levels.

INTRODUCTION

Type 2 diabetes mellitus is a metabolic disorder that appears when the body has trouble maintaining blood sugar balance, so that glucose levels rise above normal limits. In addition, this condition also causes disruption of the metabolism of carbohydrates, proteins, and fats in the body. It is generally caused by reduced insulin synthesis from cells β pancreas, or by resistance to insulin that has been produced. Diabetes mellitus is classified as a degenerative disease, and it continues to reach more and more populations around the world as lifestyle and environment change. Among all these classifications, the most common type found is type 2 (Mulmuliana & Rachmawati, 2022)

The increase in people with type 2 diabetes mellitus is often caused by a lack of understanding of proper nutritional intake. Research shows that the low level of nutrition education in the community contributes to the high incidence of type 2 diabetes mellitus. The lack of public understanding of dietary regulation and the glycemic index value of food is one of the main factors such as eating too much instant food, low fiber consumption, and high consumption of foods that contain a lot of sugar and saturated fat (Mulmuliana & Rachmawati, 2022).

Diabetes mellitus is a global health problem with an increasing incidence rate. It is known that in 2021, the number of people suffering from diabetes is estimated to be 536 million people globally (WHO, 2024). The region with the highest number of cases was recorded in the Western Pacific with 159 million patients, followed by Southeast Asia with 82 million patients. China is the country with the highest number of cases globally, reaching more than 140 million sufferers. After that, India occupies the second position with 74.2 million patients, followed by Pakistan with 33 million patients, the United States with 32.2 million patients, and Indonesia in sixth place with 19.5 million patients (IDF, 2022).

Based on data from the IDF, in recent years the country of Indonesia with cases of type 2 diabetes mellitus has shown a substantial increase. In 2021, it was recorded at around 11.3% of the total adult population. In 2022, this figure decreased slightly to around 10.8%. However, in 2023, the proportion of sufferers in the population aged >15 years increased again to 11.7% (IDF, 2023).

It is estimated that around 2.6% of East Java residents over the age of 15 live with diabetes mellitus. Throughout 2021, services for them have been provided at health centers and basic health facilities in 38 districts/cities throughout East Java have served 867,257 cases, the number of cases decreased to a total of 842,004 in 2022, then grew by 859,187 in 2023 (Provincial Health Office. East Java, 2022). Sidoarjo Regency reached the 2nd rank with the most people with diabetes mellitus in East Java after the city of Surabaya. The burden of diabetes mellitus experienced by the people of Sidoarjo Regency continues to increase, with data in 2021 showing a figure of 78.46% with a total of 75,909 sufferers. It increased to 95.62% with a total of 77,136 sufferers in 2022. It has increased again to 98.6% with the number of patients 84,865 in 2023 (Sidoarjo Regency Health Office, 2023).

This condition can also pose various serious health risks, especially those involving damage to blood vessels and the nervous system. These complications include both macrovascular and microvascular disorders. Generally, macrovascular complications impact important organ systems such as the cardiovascular system, central nervous system, and peripheral circulation. Along with that, the appearance of serious side effects caused by small blood vessels often affect eye and kidney function and can also cause a disturbed nervous system known as neuropathy (PERKENI, 2021).

The management of diabetes mellitus based on management strategies consists of four core components, namely counseling, physical activity, nutritional counseling, and drug administration. One of the important aspects in handling it is in the form of a structured meal management strategy, and it is necessary to pay attention to nutritional intake, especially carbohydrates and fiber. Fiber has an important role in slowing down the absorption of glucose and fat. On the other hand, excessive consumption of fast food, uncontrolled eating portions, lack of attention to nutritional balance, and lack of exercise can put a person at risk of developing diabetes mellitus (PERKENI, 2021).

Based on the description above, the author is interested in examining the extent to which the individual's level of understanding of nutritional intake affects the prevalence of type 2 diabetes mellitus in the service environment of the Sukodono Health Center

To get an initial picture, interviews were conducted with 10 residents who underwent type 2 diabetes mellitus treatment under the auspices of the Sukodono Health Center. The results showed that as many as 7 out of 10 interviewees had unwise consumption patterns, such as excessive consumption of white rice, lack of fiber intake, frequent consumption of fast food, and lack of understanding of the importance of low glycemic index. Most patients do not understand the impact of consumption with high glucose levels, saturated fat, and a passive lifestyle.

RESEARCH METHODS

This study uses an analytical observational design with a cross sectional approach. The study population was all type 2 diabetes mellitus patients in the working area of the Sukodono Health Center, with a sample of 55 respondents selected using a simple random sampling technique. The independent variable is the level of knowledge regarding nutritional

intake, while the dependent variable is the incidence of type 2 diabetes mellitus. The research instruments were in the form of nutritional knowledge questionnaires and fasting blood glucose levels checks. Data collection was carried out through structured interviews and laboratory examinations. The data was analyzed using the Chi-Square test to find out the relationship between variables. This research was carried out in the work area of the Sukodono Health Center in February-March 2025 by paying attention to the ethical aspects of the research, namely respondent consent, confidentiality, and anonymity.

RESEARCH RESULTS

Table 1. Distribution of Age Characteristics of Type 2 DM Patients at Sukodono Health Center in February 2025

Yes	Category Usia	Frequency	Percent (%)
1.	Intermediate Adult Age (35-44 years old)	2	3,6%
2.	Adult Age (45-54 years)	9	16,4%
3.	Retirement Age (55-64 years)	44	80,0%
	Total	55	100,0%

From the data presented, it can be seen that the majority of diabetic patients are in the category of retirement adult age with a proportion of 80%, followed by the elderly age category with 16.4%, and the middle adult age category with the smallest proportion of 3.6%.

Table 2. Distribution of Gender Characteristics of Type 2 DM Patients at Sukodono Health Center in February 2025

No.	Gender	Frequency	Percent (%)
1.	Man	13	23,6%
2.	Woman	42	76,4%
	Total	55	100,0%

The data in the table above indicates that women dominated the respondents in this study, with a percentage of 76.4%, while men only 23.6%. The data showed the influence of gender on the prevalence of type 2 diabetes mellitus.

Table 3. Distribution of Knowledge Level Characteristics of Nutritional Intake in Type 2 DM Patients at Sukodono Health Center in February 2025

No.	Level Knowledge	Frequency	Percent (%)
1.	Good	27	49,1%
2.	Enough	23	41,8%
3.	Less	5	9,1%
	Total	55	100,0%

From the tabulation results, it can be seen that patients with knowledge are quite dominant (41.8%), exceeding the number of patients with good knowledge (49.1%) while patients with less knowledge level (9.1%).

Table 4. Distribution of Fasting Blood Sugar Levels Characteristics in Type 2 DM Patients at Sukodono Health Center in February 2025

No.	Status DM	Frequency	Percent (%)
1.	Controlled	20	36,4%
2.	Uncontrolled	35	63,6%
	Total	55	100,0%

The table above explains that patients with uncontrolled diabetes mellitus status are more with a percentage of 63.6% and those with controlled diabetes mellitus as much as 36.4%.

Table 5. Cross-Tabulation of the Relationship between Knowledge Level of Nutrition Intake and the Incidence of Type 2 DM at the Sukodono Health Center in February 2025

Knowledge Level	Fasting Blood Sugar				Total		P Value
	Sweat-control		Uncontrolled				
	N	%	N	%	N	%	
Less	14	25,5%	13	23,6%	27	49,1%	P: 0.035
Good	6	10,9%	17	30,9%	23	41,8%	
Total	0	0,0%	5	9,1%	5	9,1%	

From the results of statistical data processing, it shows that *Asymptomatic significance* with a value of 0.035 means that the value is statistically significant because it is less than 0.05. However, *chi-square analysis* showed that there were two cells that did not

meet the criteria because their expected value was less than 5.

Table 6. Cross-Tabulation of the Relationship between Knowledge Level of Nutrition Intake and the Incidence of Type 2 DM at the Sukodono Health Center in February 2025

Knowledge Level	Fasting Blood Sugar				Total		P Value
	Sweat-control		Uncontrolled				
	N	%	N	%	N	%	
Less	6	10.9%	22	40.0%	28	50.9%	P: 0.019
Good	14	25.5%	13	23.6%	27	49.1%	
Total	20	36.4%	35	63.6%	55	100.0%	

Based on the analysis of the 2x2 contingency table, *an asymptomatic significance* was obtained with a value of 0.019 which is less than 0.05. No values less than 5 are found in the table, so the entire cell meets the conditions of *chi-square analysis*. Based on the results of the analysis, the zero hypothesis (H_0) which states that there is no link between knowledge and the incidence of type 2 diabetes mellitus is unacceptable. Thus, an alternative hypothesis (H_1) that indicates the relationship between knowledge and the incidence of type 2 diabetes mellitus is supported by the results of the analysis.

DISCUSSION

The results showed that most of the respondents were 46–55 years old and were female. Midlife is known to be a risk factor for the increased incidence of type 2 diabetes mellitus due to decreased cell function β pancreas and increased insulin resistance with age. Women are also more vulnerable due to hormonal changes, lower activity patterns, and a tendency to unbalanced nutritional intake.

Most respondents had a low level of knowledge regarding nutritional intake. Knowledge is an important factor that influences health behavior. Lack of understanding related to glycemic index, fiber needs, and the impact of high sugar and saturated fat food consumption contributes to poor blood sugar control. This finding is in line with Mulmuliana & Rachmawati (2022) who stated that low nutrition education is related to an increase in the prevalence of type 2 DM.

The fasting blood glucose levels of the majority of respondents were above normal. This condition shows that there is still a lack of compliance in regulating healthy diets and lifestyles. According to PERKENI (2021), proper nutrition management, including limiting the consumption of simple carbohydrates as well as increasing fiber intake, can help stabilize blood sugar levels.

The analysis of the Chi-Square test showed a significant relationship between nutritional intake knowledge and the incidence of type 2 diabetes mellitus ($p = 0.019$). Respondents with low knowledge had more high blood glucose levels than respondents with good knowledge. This strengthens the theory of Notoatmodjo (2012) that knowledge influences health attitudes and behaviors. Nutritional health education is an important intervention to increase public understanding and prevent complications of DM.

Overall, the results of this study confirm that the low level of public knowledge about nutrition contributes to the increase in blood sugar levels and the incidence of type 2 diabetes mellitus. Therefore, a continuous education program is needed at the health center level to increase public knowledge and awareness related to healthy eating.

CONCLUSIONS AND SUGGESTIONS

Conclusion

1. The majority of patients with type 2 diabetes mellitus in the work area of the Sukodono Health Center are 55 to 64 years old and are female.
2. The majority of patients with type 2 diabetes mellitus in the work area of the Sukodono Health Center have a low level of knowledge.
3. The majority of patients with type 2 diabetes mellitus in the work area of the Sukodono Health Center have uncontrolled fasting blood sugar levels.
4. There is a relationship between the level of public knowledge about nutritional intake and the incidence of type 2 diabetes mellitus.

Suggestion

1. For the Community

The public needs to be more proactive in seeking information or participating in health counseling about diabetes mellitus management through trusted sources, such as health agencies or community education programs. And it is hoped that people can implement a healthy diet, regularly do physical activity, and have regular health checks to prevent complications.

2. For Health Workers

Health education programs need to be improved, especially for patients with low levels of knowledge, to increase their understanding of the importance of good diabetes management. In addition, medical personnel can work with local communities to provide counseling and practical information, such as healthy eating and the importance of physical activity.

3. For Researchers

For future studies, consider *pre-testing* small groups of questionnaires before the main study, to help ensure that the questions are easy to understand for all people, and the need for simpler and clearer language is needed, appropriate to the patient's educational background or demographics. Also, if possible, change the format of the questionnaire to be larger and easier to read.

Expectations for follow-up studies should consider additional variables and a larger sample, such as family support or access to health care to get a more holistic picture.

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