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# THE RELATIONSHIP OF DIETARY KNOWLEDGE LEVEL AND BLOOD SUGAR LEVELS IN TYPE 2 DIABETES MELLITUS PATIENTS

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**ABSTRACT**
Type 2 diabetes mellitus patients often do not understand a balanced diet. This lack of knowledge has an impact on the high blood sugar of patients with type 2 diabetes mellitus. This study aims to analyze the relationship between dietary knowledge and blood sugar levels in patients with type 2 diabetes mellitus. This study used a quantitative approach with a cross-sectional design and applied the total sampling method, involving 40 respondents who were patients with type 2 diabetes mellitus at the Kartasura Health Center. This study was conducted in December 2024-January 2025. Data collection was carried out by distributing questionnaires to respondents who conducted examinations at the Kartasura Health Center Prolanis Clinic. Pearson test was used for data analysis because the data distribution was normal. The results of the Pearson statistical test on type 2 diabetes mellitus patients at the Kartasura Health Center showed a p-value = 0.001. The results revealed a relationship between dietary knowledge and blood sugar levels in patients with type 2 diabetes mellitus at the Kartasura Community Health Center. Researchers suggest exploring other variables that affect blood sugar levels, such as physical activity, and diet. Qualitative research methods can also be used to investigate patients taking routine medication and the influence of the surrounding environment, allowing for more generalized findings.

Keywords: blood sugar level; dietary knowledge level; type 2 diabetes mellitus

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## INTRODUCTION

Non-communicable diseases (NCDs) are important medical conditions in Indonesia. Diabetes mellitus chronically alters metabolism causing an increase in blood sugar (hyperglycemia), so that glucose enters cells more easily but cannot be utilized effectively for metabolic processes and cell growth. (Wirda Faswita, 2023). It must be done by people with diabetes mellitus to maintain a balanced diet intake because it can affect several aspects, namely in the form of special needs such as the treatment of diseases that are being suffered so that there is no risk of symptoms when the instability of blood sugar status, as well as other risks that can lead to complications of diabetes mellitus (Sanjaya et al., 2024).

The International Diabetes Federation (IDF) notes that by 2021, more than 500 million people worldwide will suffer from diabetes mellitus (DM), with a total of 537 million people. This number is predicted to potentially increase to 643 million by 2030 and reach 783 million by 2045. Indonesia is ranked fifth globally as the country with the highest number of people with DM, with 1,098 cases in 2022 (Frisilia, 2024). This major epidemic is expected to hit several developing countries such as Indonesia, India, and China. With a population of 8.6% of the world's population, Indonesia ranks as the fourth country with the highest prevalence of diabetes, after India, China and the United States. In 1995, about 4.5 million people in Indonesia had diabetes mellitus (DM), and this number is expected to increase to 12.4 million by 2025 (Pipit Muliyah et al., 2020).

Knowledge plays an important role in the formation of a person's character, in other words, human behavior and attitudes are positively related to knowledge and attitudes by the diet consumed to minimize its impact. (Chandra et al., 2020). Knowing the right diet for diabetic patients has the greatest impact on accelerating the healing of the disease (Fikar et al., 2024). A balanced diet is often necessary as our bodies produce energy and perform vital functions. Overeating prevents the pancreas from fulfilling its role in insulin secretion. If the amount of insulin increases, blood sugar levels can rise (Hasnidar et al., 2024).

Food selection and preparation for diabetics includes carbohydrates, fats, proteins, fruits, and vegetables and can make the consumption of undesirable foods such as sweets, fats, and coconut milk a habit (Khasanah et al., 2021). Therefore, it is important to ensure that the sugar content of the food consumed by the body remains low to help the healing process of diabetes (Anoto et al., 2024). There are many consequences caused if people with diabetes mellitus lack the level of dietary knowledge. Because of this, the researcher decided to conduct a more in-depth study on this topic through a study entitled "The Relationship between the Level of Dietary Knowledge and Blood Sugar Levels in Patients with Type 2 Diabetes Mellitus in the Kartasura Health Center Working Area." This study aims to analyze the relationship between the level of understanding of nutrition and blood glucose levels in patients with type 2 diabetes mellitus.

## METHOD

This quantitative study uses a descriptive correlative method with a cross-sectional design. Data collection was conducted from December 2024 to January 2025. This study involved nutritional understanding and blood sugar level as variables. The inclusion criteria set by the researcher included: Type 2 diabetes mellitus patients aged 40 to 80 years with a disease duration of more than 2 months. Respondents involved in the study signed informed consent after being explained participation in the study. Respondents who were not willing to sign the informed consent and had never controlled/not controlled regularly according to the specified schedule were not involved in the study. In this study, samples were taken using the total sampling method, involving 40 respondents. Univariate data analysis was used to describe the characteristics of respondents. Bivariate analysis was run after testing the normality of the data. The normality test results showed that the data were normally distributed, so the Pearson test was used to analyze the correlation between variables. The research process begins with collecting literature, followed by preparing a research proposal, then collecting data and continuing with data processing. This research has passed the ethical test with ethical eligibility number 5502/B.1/KEPK-UMS/I/2025.

## RESULT

The characteristics of respondents who participated in the research that was carried out included age, gender, education, and occupation totaling 40 respondents. Diabetes mellitus patients who underwent examination at the Kartasura Health Center Prolanis Poly were mostly aged 61-80 years with a total of 30 people (75.0%). In the gender category, most were female as many as 22 people (55.0%). The last education was found with the highest number of 22 people (55.0%) with elementary education. For work, most patients work as self-employed as many as 13 people (32.5%). In families who suffer from most of them, there are no families who have diabetes mellitus, namely 34 people (85.0%). For the length of time suffering from the disease, most patients are <5 years as many as 21 people (52.5%).

Table 1.
Respondent characteristics (n= 40)

| Respondent characteristics | f | % |
|---|---|---|
| Age | | |
| 40-60 years | 10 | 25.0 |
| 61-80 years | 30 | 75.0 |
| Gender | | |
| Male | 18 | 45.0 |
| Female | 22 | 55.0 |
| Education | | |
| SD | 22 | 55.0 |
| SMP | 8 | 20.0 |
| SMA | 8 | 20.0 |
| Bachelor | 2 | 5.0 |
| Occupation | | |
| Housewife | 11 | 27.5 |
| Self-employed | 13 | 32.5 |
| Farmer | 4 | 10.0 |
| Laborer | 9 | 22.5 |
| PNS | 3 | 7.5 |
| Family with diabetes mellitus | | |
| None | 34 | 85.0 |
| Parents | 6 | 15.0 |
| Duration of Suffering | | |
| <5 years | 21 | 52.5 |
| >5 years | 19 | 47.5 |

Table 2.
Distribution Analysis of Dietary Knowledge Level and Blood Sugar Level (n=40)

| Variable | f | % |
|---|---|---|
| Dietary Knowledge Level | | |
| Poor | 21 | 52.5 |
| Good | 19 | 47.5 |
| Blood Sugar Levels | | |
| Controlled | 29 | 72.5 |
| Not Controlled | 11 | 27.5 |

The results showed that the majority of respondents rated poor based on their dietary knowledge 21 people (52.5%) did not control their blood glucose levels, and 29 people (72.5%) controlled their blood glucose levels.

Table 2.
Relationship between Dietary Levels and Blood Sugar Levels in Patients with Type 2 Diabetes Mellitus (n=40)

| Variable | p-value | Correlation Coefficient |
|---|---|---|
| The relationship between the level of dietary knowledge and blood sugar levels in patients with type 2 diabetes mellitus in the Kartasura Health Center working area | 0,001 | 0,664 |

This result confirms the rejection of H0 and acceptance of Ha. Thus, it can be concluded that there is a relationship between the level of knowledge about nutrition and blood glucose levels in patients with diabetes mellitus at the Kartasura Health Center Prolanis Clinic. In patients with diabetes mellitus who underwent treatment at the Kartasura Health Center Prolanis Clinic, the Pearson statistical test showed a p-value of 0.001 (p = 0.05).

## DISCUSSION

### Demographic Characteristics of Respondents

The results showed that the majority of respondents based on age distribution were in the range of 61-80 years, with 40 respondents (75%). This age factor is one aspect that influences the incidence of type 2 diabetes mellitus. This explanation follows the study conducted by

Komariah & Rahayu, (2020) explained that the incidence of diabetes mellitus increases in older people, as glucose intolerance increases with age due to the aging process and cell development. The aging process also affects the decline in function throughout the body, including the endocrine system. As people age, insulin resistance may occur, leading to irregular blood sugar levels and increasing the risk of developing diabetes mellitus (Mirna et al., 2020). To identify and prevent cases of type 2 diabetes early, everyone over the age of 45 is advised to get tested for diabetes mellitus (Gunawan & Rahmawati, 2021).

This study revealed that the majority of respondents by gender were female, with a total of 22 respondents (55%). This finding is in line with research conducted by Kurniawati & Suryawati (2019), explained that women have a higher risk of type 2 diabetes mellitus than men, which is due to their greater body fat percentage. Another study run by Purwanti et al., (2021) stated that the majority of female respondents had hormonal causes, such as premenstrual syndrome and postmenopausal conditions, which caused body fat to be easily distributed. Gender indicates the differences determined at birth, which are divided into male and female. The risk of developing DM can affect both men and women. Women have a greater risk of developing diabetes mellitus due to their higher body mass index than men (Setiawaty et al., 2022). The high risk of increasing BMI in women is triggered by the monthly cycle syndrome. Hormonal changes can lead to the accumulation of small amounts of body fat, which increases a woman's risk of developing type 2 diabetes. However, the recovery rate of women with type 2 diabetes mellitus tends to be greater than that of men (Purwanti et al., 2020).

This study showed that the majority of respondents had a primary education level, with 22 respondents (55%) having a primary school education. A low level of education can affect a person's understanding of health, in contrast to highly educated individuals who tend to have better health knowledge. In addition, those with low education often exhibit behaviors that are less supportive of health. Highly educated individuals generally understand the importance of maintaining health better, hence their awareness of health maintenance and care is stronger. The ability to read, access, analyze, and use health information is also influenced by education level, which contributes to health literacy. In contrast, people with low education are less likely to understand the importance of maintaining health and have less interest in improving their well-being (Silvia Nora Anggreini, 2021).

The results showed that the majority of people with type 2 diabetes mellitus were experienced by self-employed workers, 13 respondents (32.5%). Occupational factors have an impact on the significant risk of diabetes mellitus. Activities that involve a low physical load mean that the body does not process enough energy, which leads to the storage of excess energy in the form of body fat - a circumstance that favors obesity and the associated diabetes mellitus (Adri et al., 2020). Similar to the research conducted by Sakinah et al., (2022), stated that occupation has an impact on a person's physical activity, which suggests that a person with a small job performs light physical activity. This condition can also have an impact on the blood sugar levels of people with diabetes.

Based on the results of the study, the majority of respondents with a total of 34 people (85%) with type 2 diabetes mellitus, did not have a family history of the same condition. This finding is different from the study run by (Nuraisyah et al.,2021), which explains that individuals with a family history of diabetes have a higher risk of experiencing elevated blood glucose levels compared to those without such a history. Further research reveals that children tend to mimic their parents' poor eating habits (Isnaini & Ratnasari, 2018). Therefore, it is difficult to distinguish the influence of eating habits in the family environment from inherited

genetic factors (Nuraisyah et al., 2021). The risk of developing type 2 diabetes mellitus (DM2) is estimated to be 2 to 6 times higher in individuals with a family history of DM2 than in those without such a history (Nababan et al., 2020). The results showed that the majority of patients with type 2 diabetes mellitus had suffered from this disease for less than 5 years, as many as 21 respondents (52.5%). High blood glucose levels that persist over a long period can affect blood vessel walls, causing thickening and impacting blood pressure (Nuriyah, 2019). This process slowly causes damage to blood capillaries and nerve fibers. The risk of progressive nerve cell damage increases with the length of time a person has DM. (Amelia et al., 2019).

**Dietary Knowledge Level**

The results of the research carried out explained that the majority of respondents had a poor level of dietary knowledge, namely a total of 21 respondents (52.5%). According to a study conducted by Isnaini & Ratnasari, (2018), revealed a link between diet and the onset of type 2 diabetes mellitus. Another study showed that there is a higher risk in people who do not eat breakfast out of habit than those who eat breakfast regularly. Lack of knowledge causes people with diabetes mellitus to not realize the consequences and impacts of diabetes mellitus such as the emergence of complications (Purwanti et al., 2023). This condition occurs due to the activation of the Brd2 gene, which triggers increased blood sugar levels and insulin resistance (Ritonga & Annum, 2019). Other research conducted by Masi & Mulyadi, (2017), revealed that a high intake of carbohydrates and protein can almost triple the risk of type 2 diabetes mellitus. At the same time, a good diet can help prevent diabetes mellitus, as this is the most important treatment step for those who are already affected (Erida Silalahi et al., 2021).

**Blood Sugar Levels**

The results showed that the majority of respondents had controlled blood sugar levels, as many as 29 respondents (72.5%). In this case, diet is defined as individual behavior in meeting food needs, which is influenced by beliefs, attitudes, and food availability (Chandra et al., 2020). Knowledge about nutrition and diet is very important because it will have an impact on the behavior of people with diabetes mellitus in managing, choosing, and determining intervention steps to maintain their health. In particular, an understanding of diabetes management related to nutrition or diet management plays a role in controlling blood glucose levels (T et al., 2023). In addition, according to research conducted by stating that diabetes mellitus patients with unstable blood sugar levels can be improved by group support, so that people with DM will improve their health (Ismail & Yulian, 2019).

**The Relationship between Dietary Knowledge Level and Blood Sugar Levels in Type 2 Diabetes Mellitus Patients**

The results of this study showed a strong correlation between the level of dietary knowledge and blood glucose levels in patients with type 2 diabetes mellitus, with a p-value of 0.001. This finding is in line with previous research which revealed that consumption of sweet, fatty, and salty foods without being balanced with physical activity and a healthy diet is significantly associated with the risk of type 2 diabetes mellitus (Nur et al., 2017). In addition, other studies also state that there is a relationship between diet, heredity, and exercise habits on the condition of patients with type 2 diabetes mellitus (Sudaryanto et al., 2014).

The basis of an action is knowledge. Based on this, every behavior that patients undergo is generally based on knowledge and initiative to act based on the information they have. Behavior that is supported by good understanding tends to be more effective in contrast to behavior that is not driven by understanding (M.Blackburn & Hawks Hokanson, 2019). So

health education plays an important role in improving the health of patients, especially those with DM. There should be a push to increase the frequency of health education, especially about meal planning, so that they can make positive changes to their diet (Nurmawati et al., 2018). With the increase in health education through various media, prevention strategies for diabetes mellitus can be implemented (Ludowici, 2023).

## CONCLUSION

Characteristics of respondents based on the age of the majority in 61-80 years, based on gender the majority is female, based on education the majority is in elementary school, based on employment the majority is self-employed, based on a family suffering the majority is no member suffering, based on the length of suffering the majority is <5 years. The level of knowledge on the diet of respondents with type 2 diabetes mellitus at the Kartasura Health Center Prolanis Poly is poor and blood sugar levels with the majority are controlled. The results of the Pearson statistical test prove that there is a significant correlation between the level of knowledge about diet and blood sugar levels at the Kartasura Health Center Prolanis Poly.

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