


# The Relationship Between Diet Compliance And Blood Sugar Levels In Diabetes Mellitus Patients At The Internal Medicine Poly RSUD Ploso Jombang

Eddy Puspita<sup>1</sup>, Roni Setyawan<sup>2</sup>, Moh. Syamsul Maarif<sup>3</sup>

<sup>1,2</sup>Dosen Keperawatan STIKES Husada Jombang, <sup>3</sup>Perawat RSUD Ploso Jombang

| Article Info   | ABSTRACT  |
|--|---|
| <p><b>Keywords:</b><br/>Diet compliance,<br/>blood sugar levels,<br/>diabetes mellitus sufferers</p>   | <p>Increased blood sugar levels in diabetes mellitus sufferers can be caused by several factors, including lack of blood sugar control, unbalanced diet, lack of physical activity, and insulin resistance. This study aims to determine the relationship between dietary compliance and blood sugar levels in diabetes mellitus sufferers at the Internal Medicine Clinic, Ploso Hospital, Jombang. This research used a correlational analytical design with an average population of 201 people per month using a purposive sampling technique to obtain a sample of 32 people with research measuring tools using questionnaires and GCU. The results of this study showed that the majority of diabetes mellitus patients did not adhere to their diet, 20 people (62.5%), and almost half of diabetes mellitus patients had abnormal blood sugar levels, 22 people (68.8%). The results of the Spearman rank test showed a value of 0.000 (&lt;0.05), meaning that there was a relationship between diet compliance and blood sugar levels in diabetes mellitus sufferers at the Internal Medicine Clinic, Ploso Hospital, Jombang Regency. Sufferers who adhere to the diet plan recommended by the medical team tend to have better blood sugar control. Adherence to a diabetes diet, which includes choosing foods that are low in sugar and carbohydrates, and controlled portions, plays a crucial role in the management of diabetes mellitus.</p> |
| <p>This is an open access article under the <a href="https://creativecommons.org/licenses/by-nc/4.0/">CC BY-NC</a> license</p>  | <p><b>Corresponding Author:</b><br/>Eddy Puspita<br/>Dosen Keperawatan STIKES Husada Jombang<br/><a href="mailto:puspitaenny872@gmail.com">puspitaenny872@gmail.com</a></p>   |

## INTRODUCTION

Non-compliance with the recommended diet can be the main cause of increased blood sugar levels in people with diabetes mellitus. Diabetics need to maintain a controlled diet to avoid blood glucose spikes that have the potential to be detrimental to health. Failure to follow a diet that is low in sugar and carbohydrates can increase the risk of hyperglycemia, which can cause various health complications, such as heart problems, kidney problems, and nerve damage. In addition, consumption of foods high in sugar and carbohydrates tends to put an extra burden on the insulin system, which can worsen insulin resistance in diabetes sufferers (Liawati et al., 2022) .

According to WHO (World Health Organization) (2021), there are currently 246 million diabetes sufferers throughout the world, and this number is expected to increase to 380 million by 2025. Diabetes causes other diseases or complications which annually result in the

death of 3.8 million people. Other complications that are more common and deadly due to diabetes are heart attacks and strokes. Most deaths occur due to continuous increases in glucose levels, resulting in damage to blood vessels, nerves and other internal structures. It is estimated that in 2030 Indonesia will rank 4th in terms of DM cases in the world. DM in Indonesia in 2030 will reach 21.3 million. When compared with 2013, the prevalence of DM based on doctor's diagnosis in residents  $\geq 15$  years old increased to 2%. This increase in prevalence also occurred in North Maluku Province, namely increasing from 1.1% to 1.5% in 2018 (Indonesian Ministry of Health, 2019).

Based on the results of Basic Health Research (Riskesdas), it shows a significant increase in the prevalence rate of Diabetes, namely from 6.9% in 2013 to 8.5% in 2018. The prevalence of Diabetes Mellitus in Jombang Regency is 34,466 sufferers. At Ploso Regional Hospital, visits by DM patients to the Internal Medicine Clinic always increase every year. In 2020, the number of DM sufferers was 1,660 people, and from January to October 2021, the number of DM patient visits to the Internal Medicine Clinic was 2,011, so the average monthly visit was 201 patients. (Ploso Regional Hospital Medical Records).

Non-adherence to diet in diabetes mellitus sufferers can be caused by various factors, including a lack of understanding about the importance of maintaining a controlled diet, the temptation of foods high in sugar and carbohydrates, and difficulties in managing daily diet. This non-compliance can result in uncontrolled increases in blood sugar levels (Sari & Sofiana, 2022) . Foods high in sugar and carbohydrates can immediately increase blood glucose, while irregular eating patterns can disrupt blood sugar balance in the longer term. The impact of uncontrolled increases in blood sugar levels can include the risk of health complications, such as blood vessel damage, heart problems, kidney problems, and nerve damage (Ramadhina, 2022). Therefore, it is important for diabetes sufferers to understand the consequences of non-compliance with diet and commit to following a diet that is in accordance with medical recommendations in order to manage their condition well.

## METHOD

This research uses a correlational analytical design with a *cross sectional approach*. The average population size is 201 people per month using *purposive sampling techniques* to obtain a sample of 32 people with research measuring tools using questionnaires and GCU. Data analysis used the *Spearman rank test*.

## RESULTS AND DISCUSSION

The results of the characteristics of respondents can be seen in Table 1 below:

**Table 1** Data on Respondent Characteristics

| No | Gender | Frequency | Percentage % |
|----|--------|-----------|--------------|
| 1  | Man    | 15        | 46.9         |
| 2  | Woman  | 17        | 53.1         |
|    | Total  | 32        | 100.0        |

| No | Age | Frequency | Percentage % |
|----|-----|-----------|--------------|
|----|-----|-----------|--------------|

| 1  | 30-40 years                 | 2         | 6.2          |
|----|-----------------------------|-----------|--------------|
| 2  | 41-50 years old             | 17        | 53.1         |
| 3  | 51-60 years old             | 9         | 28.1         |
| 4  | >60 years                   | 4         | 12.5         |
|    | Total                       | 32        | 100.0        |
| No | Education                   | Frequency | Percentage % |
| 1  | elementary school           | 4         | 12.5         |
| 2  | JUNIOR HIGH SCHOOL          | 9         | 28.1         |
| 3  | SENIOR HIGH SCHOOL          | 13        | 40.6         |
| 4  | College                     | 6         | 18.8         |
|    | Total                       | 32        | 100.0        |
| No | Work                        | Frequency | Percentage % |
| 1  | IRT                         | 7         | 21.9         |
| 2  | Private employees/employees | 9         | 28.1         |
| 3  | civil servants              | 5         | 15.6         |
| 4  | Farmer                      | 8         | 25.0         |
| 5  | Laborer                     | 3         | 9.4          |
|    | Total                       | 32        | 100.0        |
| No | Long suffering              | Frequency | Percentage % |
| 1  | <5 years                    | 18        | 56.2         |
| 2  | 5-10 years                  | 11        | 34.4         |
| 3  | >10 years                   | 3         | 9.4          |
|    | Total                       | 32        | 100.0        |

Source: primary data

Based on the table above, it can be seen that the distribution of respondents based on gender shows that the majority of respondents were female, 17 people (53.1%). The distribution of respondents based on age shows that the majority of respondents were 41-50 years old, 17 people (53.1%). The distribution of respondents based on education level shows that almost half have a high school education, 13 people (40.6%). The distribution of respondents based on employment level shows that almost half of the respondents work as private employees/employees, 9 people (28.1%). The distribution of respondents based on length of suffering showed that the majority of respondents had suffered from diabetes mellitus for <5 years, as many as 18 people (56.2%).

The results of the description of diet compliance can be seen in Table 2 below:

**Table 2 . Overview of Dietary Adherence**

| No | Dietary compliance | Frequency | Percentage % |
|----|--------------------|-----------|--------------|
| 1  | Obedient           | 12        | 37.5         |
| 2  | Not obey           | 20        | 62.5         |
|    | Total              | 32        | 100.0        |

Source: primary data

Based on the table above, it can be seen that the distribution of respondents' dietary compliance shows that the majority of diabetes mellitus patients do not adhere to their diet, 20 people (62.5%). And almost half of them adhere to the diet, 12 people (37.5%).

The results of the description of blood sugar levels can be seen in Table 3 below:

**Table 3 . Overview of Blood Sugar Levels**

| No | Blood sugar levels | Frequency | Percentage % |
|----|--------------------|-----------|--------------|
| 1  | Normal             | 22        | 68.8         |
| 2  | Abnormal           | 10        | 31.2         |
|    | Total              | 32        | 100.0        |

Source: primary data

Based on the table above, it can be seen that the distribution of respondents' blood sugar levels shows that the majority of diabetes mellitus patients have normal blood sugar levels, 22 people (68.8%). And almost half of them were abnormal as many as 10 people (31.2%).

The results of the analysis of the relationship between diet adherence and blood sugar levels in diabetes mellitus sufferers can be seen in Table 4 below:

**Table 4 . Analysis of the Relationship between Diet Compliance and Blood Sugar Levels in Diabetes Mellitus Sufferers**

| Dietary compliance       | Blood Sugar Levels |      |                    |      | Total          |      |
|--------------------------|--------------------|------|--------------------|------|----------------|------|
|                          | Abnormal           |      | Normal             |      |                |      |
|                          | N                  | %    | N                  | %    | N              | %    |
| Obedient                 | 4                  | 12.5 | 8                  | 25.0 | 12             | 37.5 |
| Not obey                 | 6                  | 18.8 | 14                 | 43.8 | 20             | 62.5 |
| Total                    | 10                 | 31.2 | 22                 | 68.8 | 32             | 100  |
| <i>Sparman Rank Test</i> |                    |      | <i>Alpha value</i> |      | <i>P value</i> |      |
|                          |                    |      | = <0.05            |      | = 0.000        |      |

Source: primary data

Based on the cross tabulation above, it shows that 12 people (37.5%) adhered to the diet, 8 people (25.0%) had normal blood sugar levels, and 4 people (12.5%) had abnormal blood sugar levels. Meanwhile, 20 people (62.5%) did not adhere to their diet, 6 people (18.8%) had abnormal blood sugar levels, and 14 people (43.8%) had normal blood sugar levels. The results of statistical tests using Rank Sparman showed p value = 0.000 (<0.05), so H1 was accepted, meaning that there was a relationship between diet compliance and blood sugar levels in diabetes mellitus sufferers at the Internal Medicine Clinic, Ploso Hospital, Jombang Regency.

## Discussion

### Diet Compliance in Diabetes Mellitus Patients

Based on the results of this study, it was found that the distribution of respondents' diet compliance showed that the majority of diabetes mellitus patients did not adhere to their diet, as many as 20 people (62.5%). And almost half of them adhere to the diet, 12 people (37.5%).

From the facts of this study it can be concluded that the majority of diabetes mellitus patients show a level of non-compliance with the recommended diet. A significant percentage of respondents, more precisely half, seemed to comply with the established dietary rules. These findings reflect variations in the level of dietary compliance among people with diabetes mellitus. Even though there are some patients who comply, further attention is still needed to increase patient awareness and understanding regarding the importance of an appropriate diet in managing diabetes mellitus. Thus, additional educational and support efforts can be directed at improving patient dietary compliance, thereby improving the quality of disease management and overall patient well-being.

Adherence to diet plays a crucial role in the management of diabetes mellitus. Diabetes mellitus patients have sensitivity to food intake, and a strictly controlled diet can help control blood sugar levels (Siregar et al., 2022) . Regular eating patterns that comply with established guidelines can help prevent excessive blood sugar fluctuations, reduce the risk of complications, and improve the patient's general health. A proper diet also supports the management of body weight, blood pressure and lipid levels in the body (Manurung et al., 2020) . Therefore, adherence to diet is one of the main pillars in diabetes mellitus management strategies, which can improve patient quality of life, prevent complications, and ensure long-term health continuity. Ongoing patient education and support is key in increasing their understanding of the importance of dietary compliance, and helping them integrate healthy dietary changes into their daily lifestyle.

This is in line with research conducted by Nursihhah (2021), it was found that respondents who adhered to the diet and controlled blood sugar (77.3%), while respondents who did not adhere to the diet and had uncontrolled blood sugar (92.9%), test results statistics using the Chisquare test obtained a p value of  $(0.000) < \alpha (0.05)$ , meaning that there is a significant relationship between diet compliance and controlling blood sugar levels. Apart from that, the OR value of 44.686 shows that respondents who do not adhere to the diet have a 44.686 times greater risk of uncontrolled blood sugar compared to respondents who adhere to the diet.

According to the researcher's perspective, the results of this study highlight the urgency of the need for more attention to the understanding and implementation of an appropriate diet in diabetes mellitus sufferers. The high proportion of patients who do not adhere to the diet indicates that there are challenges that need to be overcome in efforts to manage this disease. The researchers' opinion implies the need for a holistic approach that involves not only medical practice, but also education and ongoing support to patients. Increasing awareness and understanding of the positive impact of dietary compliance on the well-being of people with diabetes mellitus is key to achieving better outcomes in the management of this disease. Therefore, researchers believe that the implementation of effective educational strategies and ongoing support are crucial steps in increasing dietary compliance and, in turn, improving the quality of life and prognosis of diabetes mellitus sufferers.

#### **Blood Sugar Levels in Diabetes Mellitus Patients**

Based on the results of this study, it was found that the distribution of respondents' blood sugar levels showed that the majority of diabetes mellitus patients had normal blood

sugar levels, 22 people (68.8%). And almost half of them were abnormal as many as 10 people (31.2%). From the facts of this research, it can be concluded that the distribution of blood sugar levels in respondents with diabetes mellitus shows significant variations. Most of the patients, or rather the majority of them, show blood sugar levels within the normal range. However, a striking finding was that almost half of the respondents showed blood sugar levels that were outside normal limits. These results indicate that there are challenges in achieving optimal blood sugar control in some diabetes mellitus sufferers.

Blood sugar levels in diabetes mellitus sufferers are a critical parameter that reflects their glycemic control and metabolic health. The results showed that there was significant variation in the distribution of blood sugar levels in diabetes mellitus respondents. Although the majority of patients showed blood sugar levels within the normal range, the finding that almost half of the respondents had abnormal blood sugar levels highlights the challenges in managing this disease. Uncontrolled blood sugar levels can increase the risk of long-term health complications, such as heart disease, nervous disorders and vascular problems (Jayanti, 2020) .

This is in line with research conducted by Ekasari et al (2021), it was found that around 49.1% of subjects showed controlled blood glucose levels, while the rest had blood glucose levels outside the limits considered controlled. The average blood glucose level in respondents was recorded at 218.8 mg/dl, with a range of values between 111 mg/dl to 500 mg/dl. These findings indicate significant variations in blood sugar management in the population with diabetes mellitus. Although most subjects may have achieved the desired blood sugar control, there were still a number of respondents who showed blood sugar values above the normal threshold. This conclusion emphasizes the need for a more intensive approach in the management of diabetes mellitus, with an emphasis on tighter blood sugar control, implementation of lifestyle changes, and more individualized treatment strategies to increase the percentage of patients with controlled blood glucose levels.

According to the researcher's perspective, the research results showed variations in the blood sugar levels of respondents, with the majority of diabetes mellitus patients showing blood sugar levels that were still within normal limits. Nonetheless, the fact that almost half of the respondents showed abnormal blood sugar levels indicates that diabetes mellitus is still a significant health problem. This raises questions about factors that might influence blood sugar control in diabetes patients, be they genetic factors, lifestyle, or environmental factors. Therefore, further research is needed to understand in more depth the role of these variables in managing diabetes mellitus and develop more effective intervention strategies. This research provides a strong foundation for expanding our knowledge of the complexities of diabetes mellitus and spurs efforts to develop holistic approaches to the management of this disease.

#### **Relationship between diet adherence and blood sugar levels in diabetes mellitus sufferers**

Based on the results of this study, it was found that 12 people (37.5%) adhered to the diet, 8 people (25.0%) had normal blood sugar levels, and 4 people (12.5%) had abnormal blood sugar levels. Meanwhile, 20 people (62.5%) did not adhere to their diet, 6 people (18.8%) had abnormal blood sugar levels, and 14 people (43.8%) had normal blood sugar

levels. The results of statistical tests using Rank Sparman showed that  $p$  value = 0.000 ( $<0.05$ ), so  $H_1$  was accepted, meaning that there was a relationship between diet compliance and blood sugar levels in diabetes mellitus sufferers at the Internal Medicine Clinic, Ploso Hospital, Jombang Regency.

Compliance with diet is very important for diabetes mellitus sufferers in order to maintain blood sugar levels within safe limits. Living a balanced diet by limiting consumption of sugar, simple carbohydrates and saturated fat can help control blood glucose levels. Diabetics are advised to consume foods high in fiber, such as fruit, vegetables and whole grains, and pay attention to portion sizes. Additionally, maintaining regular meal times and avoiding fast foods that are high in sugar can help prevent drastic blood sugar fluctuations. With discipline in living a healthy lifestyle, diabetes sufferers can improve control over their blood sugar levels and reduce the risk of long-term complications (Ismansyah, 2020) .

This is in accordance with research conducted by Hartati & Hidayat (2021), it was found that diet is one of the five pillars of controlling diabetes mellitus. Compliance with diet is one factor in stabilizing blood sugar levels to normal and preventing complications. The factors that make someone not adhere to a diabetes mellitus diet are a lack of knowledge about diabetes mellitus, confidence and trust in diabetes mellitus.

According to the researcher's perspective, the results of research conducted at the Internal Medicine Clinic, Ploso Hospital, Jombang Regency, show that there is a significant positive correlation between diet compliance and blood sugar levels in diabetes mellitus sufferers. These findings confirm that diabetes sufferers who adhere to a healthy diet tend to have better blood sugar control. A regular diet, low in sugar and rich in fiber has a positive impact on diabetes management. Therefore, this research provides further understanding regarding the important role of dietary compliance in controlling blood sugar levels in diabetes sufferers, as well as providing a basis for developing further interventions in an effort to improve the quality of life and health of patients at the Internal Medicine Clinic, Ploso Hospital, Jombang Regency.

## CONCLUSION

This research shows that there is a significant relationship between dietary compliance and blood sugar levels in diabetes mellitus sufferers at the Internal Medicine Clinic, Ploso Hospital, Jombang Regency. Diabetics who adhere to a healthy diet, by limiting their consumption of sugar and simple carbohydrates, tend to have better blood sugar control. These findings emphasize the important role of dietary compliance in diabetes management, as a preventive measure to reduce the risk of long-term complications. Therefore, this research makes an important contribution to the understanding of health practitioners and patients in improving quality of life and managing diabetes mellitus more effectively. By maintaining adherence to diet, it is hoped that it can provide practical guidance in efforts to prevent and manage diabetes mellitus at the clinical level, especially at the Internal Medicine Clinic, Ploso Hospital, Jombang Regency .

## REFERENCES

- [1] Ekasari, E., & Dhanny, D. R. (2022). Faktor Yang Mempengaruhi Kadar Glukosa Darah Penderita Diabetes Melitus Tipe II Usia 46-65 Tahun Di Kabupaten Wakatobi. *Journal Of Nutrition College*, 11(2), 154-162.
- [2] Hartati, H., & Hidayat, N. N. (2021). Studi Literatur Hubungan Kepatuhan Diet Dengan Kadar Gula Darah Pada Pasien Diabetes Mellitus Tipe 2. *Media Keperawatan: Politeknik Kesehatan Makassar*, 12(1), 117-120.
- [3] Ismansyah, I. (2020). Hubungan Kepatuhan Kontrol Dengan Kadar Gula Darah Sewaktu Pada Pasien Dm Tipe 2. *MNJ (Mahakam Nursing Journal)*, 2(8), 363-372.
- [4] Jayanti, D. P., Kamsiah, K., Okfrianti, Y., Siregar, A., & Rizal, A. (2020). *Hubungan Kepatuhan Diet terhadap Kadar Gula Darah Penderita Diabetes Melitus di POSBINDU Wilayah Kerja Puskesmas Sukamerindu Kota Bengkulu* (Doctoral dissertation, Poltekkes Kemenkes Bengkulu).
- [5] Liawati, N., Arsyah, S. N., & Patimah, I. (2022). Hubungan Kepatuhan Diet Dengan Kualitas Hidup Diabetes Mellitus Tipe 2. *Journal Medika Cendikia*, 9(02), 163-173.
- [6] Manurung, T., Manalu, R. M., & Manurung, Y. (2020). Hubungan Motivasi Dengan Kepatuhan Pelaksanaan Diet Pada Penderita Diabetes Melitus. *Jurnal Keperawatan Priority*, 3(2), 53-61.
- [7] Nursihhah, M. (2021). Hubungan Kepatuhan Diet Terhadap Pengendalian Kadar Gula Darah Pada Pasien Diabetes Melitus Tipe 2. *Jurnal Medika Utama*, 2(03 April), 1002-1010.
- [8] Ramadhina, A. (2022). *Hubungan Kepatuhan Diet Diabetes Melitus (DM) Dengan Kadar Glukosa Darah Pada Pasien DM di RS Islam Sultan Agung Semarang* (Doctoral dissertation, Universitas Islam Sultan Agung Semarang).
- [9] Sari, N. A., & Soviana, E. (2022). Kepatuhan Diet Dengan Kadar Glukosa Darah Pada Lansia Diabetes Mellitus Di Puskesmas Sangkrah Kota Surakarta. *Indonesian Journal of Nutrition Science and Food*, 1(1), 9-16.
- [10] Siregar, L. M., Hutajulu, J., Syapitri, H., & Sikutiro, H. (2022). Hubungan Kepatuhan Diet Dengan Kualitas Hidup Pada Penderita Diabetes Melitus Di Puskesmas Lut Tawar Kecamatan Lut Tawar Kabupaten Aceh Tengah. *Jurnal Kesehatan Masyarakat Dan Lingkungan Hidup*, 7(2), 153-157.