

# Examining the Connection Between Diabetes Mellitus Patients' Random Blood Glucose Levels and Mood Swings

Sri Wulandari

Puskesmas Rejoso

\*Email: [sriwulandari@gmail.com](mailto:sriwulandari@gmail.com)

## ABSTRACT

Diabetes mellitus (DM) remains one of the leading causes of death worldwide, with prevalence increasing significantly each year. Mood swings, characterized by anxiety, tension, irritability, and frustration, may influence blood glucose levels through cortisol secretion, which induces insulin resistance. This study aimed to analyze the relationship between mood swings and random blood glucose levels in patients with diabetes mellitus. This research employed a correlational design with a cross-sectional approach. The population consisted of 40 patients with DM participating in the Prolanis program, with 36 selected as samples using stratified random sampling. The independent variable was mood swings measured using a questionnaire, while the dependent variable was random blood glucose levels measured with a glucometer. Data were analyzed using Spearman's rank test with a significance level of  $\alpha = 0.05$ . Most respondents experienced mood swings in the "poor" category (23 respondents; 64%). Random blood glucose levels showed that 25 respondents (69%) had hyperglycemia ( $>200$  mg/dl). Statistical analysis revealed a significant negative correlation between mood swings and random blood glucose levels ( $p = 0.002$ ,  $r = -0.506$ ). Mood swings significantly affect random blood glucose levels in patients with diabetes mellitus. Increased mood instability is associated with higher cortisol secretion, leading to insulin resistance and elevated glucose levels.

**Keywords:** Blood glucose levels, Diabetes mellitus, Mood swings

## BACKGROUND

Diabetes mellitus (DM) is a chronic metabolic disorder and one of the leading global health problems, with prevalence increasing annually (Suryati, 2021). The main risk factors include lifestyle behaviors such as diet, physical activity, and treatment adherence (Irwansyah & Kasim, 2021). In addition to physiological factors, mood swings in patients with DM can affect blood glucose levels. Mood swings manifested as anxiety, irritability, and tension stimulate cortisol production, a hormone that antagonizes insulin action, thereby increasing blood glucose levels (Wisnujono & Machfoed, 2022).

Globally, type 1 DM accounts for 5–10% of cases, while type 2 DM constitutes 90–95% (IDF, 2021). In Indonesia, the 2018 Basic Health Research (Riskesdas) reported a DM prevalence of 2% among individuals over 15 years old, with East Java alone recording 151,878 cases (Dinas Kesehatan Provinsi Jawa Timur, 2020).

Cortisol overproduction triggered by mood instability reduces insulin sensitivity, hindering glucose uptake into cells and resulting in hyperglycemia (Hikmat, 2017). Uncontrolled hyperglycemia can lead to both macrovascular (e.g., cardiovascular disease, stroke) and

microvascular complications (e.g., nephropathy, retinopathy), which are the main causes of morbidity and mortality among DM patients (Kazi & Blonde, 2019).

Given this background, it is crucial to understand how mood swings contribute to fluctuations in random blood glucose levels among DM patients.

## **METHODS**

This study employed an analytic observational design with a cross-sectional approach. This approach was chosen because it allows researchers to observe the relationship between variables at a single point in time, thereby providing a comprehensive overview of the respondents' condition. With this method, the analysis of the relationship between mood swings and random blood glucose levels could be conducted efficiently without requiring long-term observation.

The study population consisted of 40 patients with diabetes mellitus (DM) enrolled in the Prolanis program. From this population, 36 respondents were selected as the study sample using stratified random sampling. This technique was chosen to ensure that the selected sample was more representative of the population characteristics, so that the research findings could be generalized more accurately to DM patients participating in the program.

The study variables were divided into independent and dependent variables. The independent variable was mood swings, while the dependent variable was random blood glucose levels. The relationship between these two variables was analyzed to determine the extent to which psychological conditions can affect the physiological condition of DM patients, particularly regarding the stability of blood glucose levels.

The research instruments used consisted of two types. Mood swings were assessed using a standardized 20-item validated questionnaire. Meanwhile, random blood glucose levels were measured using a glucometer. The results of the measurements were then categorized into three groups: hyperglycemia (>200 mg/dl), normoglycemia (120–190 mg/dl), and hypoglycemia (<80 mg/dl). This categorization helped the researchers classify respondents' blood glucose levels objectively.

The research procedure was carried out with attention to ethical considerations. After obtaining informed consent from the respondents, they first completed the mood swing questionnaire. Subsequently, anthropometric measurements and random blood glucose testing were conducted using a glucometer. This sequence of procedures was intended to ensure smooth data collection and minimize potential bias.

Data analysis was performed using the Spearman rank correlation test through SPSS for Windows. This test was chosen as it is appropriate for analyzing the relationship between ordinal and interval variables. A significance level of  $\alpha = 0.05$  was used, so the results of the analysis would indicate a statistically significant relationship if the p-value was less than this threshold. Thus, this study can provide scientific contributions regarding the relationship between psychological aspects and the clinical condition of DM patients.

## **RESULTS**

The characteristics of the respondents in this study showed that all participants were aged over 50 years. The majority of respondents were female, accounting for 58.3% of the total sample. In terms of nutritional status, most respondents had a normal body mass index (BMI), reaching 72%. Furthermore, physical activity levels indicated that 86% of respondents engaged in light physical activity, reflecting lifestyle patterns commonly found among older adults with diabetes mellitus. Findings related to mood swings revealed that out of the 36 respondents, 23 individuals (64%) reported poor mood swings, while the remaining 13 respondents (36%) reported good mood

swings. This suggests that a considerable proportion of patients with diabetes mellitus in the study experienced emotional instability, which may have implications for their overall health and disease management.

Regarding blood glucose levels, the study found that 25 respondents (69%) experienced hyperglycemia, indicating that their random blood glucose levels exceeded 200 mg/dl. Meanwhile, 11 respondents (31%) were in the normoglycemia category, with random blood glucose levels ranging from 120–190 mg/dl. Notably, none of the respondents experienced hypoglycemia, highlighting hyperglycemia as the predominant condition among the sample.

The results of the statistical analysis using the Spearman rank correlation test demonstrated a significant negative relationship between mood swings and random blood glucose levels. The correlation coefficient obtained was  $r = -0.506$ , with a p-value of 0.002, which is below the significance threshold of 0.05. This indicates that the association found was statistically meaningful.

The negative correlation implies that poorer mood stability was associated with higher random blood glucose levels among the respondents. In other words, individuals with more unstable moods tended to have less controlled blood glucose, which underscores the potential role of psychological factors in influencing glycemic status in diabetes mellitus patients.

These findings suggest that management of diabetes mellitus should not only focus on dietary regulation, physical activity, and pharmacological therapy but also consider psychological aspects, particularly mood stability. Addressing mood swings in patients may serve as an important complementary strategy in achieving better glycemic control and improving overall quality of life.

**Table 1.** Respondent Characteristics (n = 36)

Characteristics	Frequency (n)	Percentage (%)
Age > 50 years	36	100
Gender		
- Male	15	41.7
- Female	21	58.3
Body Mass Index (BMI)		
- Normal	26	72.0
- Not Normal	10	28.0
Physical Activity		
- Light	31	86.0
- Moderate/Heavy	5	14.0

Based on Table 1, all respondents were over 50 years of age, with the majority being female (58.3%). Most respondents had a normal nutritional status (72%) and tended to engage in light physical activity (86%). This indicates that advanced age and low physical activity were dominant characteristics among diabetes mellitus patients in this study.

**Table 2.** Distribution of Respondents by Mood Swings (n = 36)

Mood Swings Category	Frequency (n)	Percentage (%)
Poor	23	64.0
Good	13	36.0

Table 2 shows that most respondents experienced poor mood swings, totaling 23 people (64%), while 13 respondents (36%) reported good mood swings. This finding suggests that the majority of DM patients in the study tended to experience emotional instability.

**Table 3.** Distribution of Respondents by Random Blood Glucose Levels (n = 36)

<b>Blood Glucose Category</b>	<b>Frequency (n)</b>	<b>Percentage (%)</b>
Hyperglycemia (>200 mg/dl)	25	69.0
Normoglycemia (120–190 mg/dl)	11	31.0

According to Table 3, most respondents experienced hyperglycemia (69%), while 31% were in the normoglycemia category. None of the respondents experienced hypoglycemia. These results indicate that blood glucose control among DM patients in this study was still relatively poor.

**Table 4.** Correlation Analysis of Mood Swings and Random Blood Glucose Levels

<b>Variables</b>	<b>r</b>	<b>p-value</b>
Mood Swings vs Random Blood Glucose	-0.506	0.002

Table 4 presents the results of the Spearman rank correlation analysis between mood swings and random blood glucose levels. The correlation coefficient (r) was  $-0.506$  with a p-value of 0.002 ( $<0.05$ ), indicating a statistically significant negative relationship. In other words, poorer mood stability was associated with higher random blood glucose levels among respondents.

## DISCUSSION

The findings of this study demonstrate a strong association between mood swings and blood glucose fluctuations in DM patients. Elevated cortisol secretion during mood instability increases insulin resistance, thereby contributing to hyperglycemia. This is consistent with Wisnujono & Machfoed (2022), who explained that cortisol impairs glucose uptake into cells.

The high prevalence of hyperglycemia in this study aligns with national and global data showing increasing rates of uncontrolled DM (IDF, 2021; Dinas Kesehatan Provinsi Jawa Timur, 2020). Moreover, psychological stress and poor emotional regulation exacerbate metabolic dysregulation, supporting evidence from previous research linking mood status with glycemic control (Khaledisardashti et al., 2018; Rifani & Rahadi, 2021).

These results emphasize the importance of comprehensive DM management, not only through pharmacological treatment and lifestyle modification but also through psychological interventions to improve emotional well-being and reduce cortisol-mediated insulin resistance.

## CONCLUSION

Mood swings significantly correlate with random blood glucose levels in patients with diabetes mellitus in Dahu Hamlet, Kediri Regency. Poor mood regulation increases cortisol production, reduces insulin sensitivity, and elevates glucose levels. Interventions that target emotional stability may be effective in improving glycemic control and preventing complications among DM patients.

**REFERENCES**

- Dinas Kesehatan Provinsi Jawa Timur (2020). *Profil Kesehatan Provinsi Jawa Timur 2019*. Surabaya: Dinkes Jatim.
- Hikmat, P. (2017). *Komplikasi kronik dan penyakit penyerta pada diabetes*. *Medical Care*, 1–5.
- IDF (2021). *IDF Diabetes Atlas* (10th ed.). International Diabetes Federation.
- Irwansyah, I., & Kasim, I. S. (2021). Identification of lifestyle factors associated with diabetes mellitus risk. *Jurnal Ilmiah Kesehatan Sandi Husada*, 10(1), 62–69. <https://doi.org/10.35816/jiskh.v10i1.511>.
- Kazi, A. A., & Blonde, L. (2019). Classification of diabetes mellitus. *Clinics in Laboratory Medicine*, 21(1). [https://doi.org/10.5005/jp/books/12855\\_84](https://doi.org/10.5005/jp/books/12855_84).
- Khaledisardashti, F., Ghazavi, Z., Keshani, F., & Smaeilzadeh, M. (2018). Effect of hope therapy on mood status in patients with diabetes. *Iranian Journal of Nursing and Midwifery Research*, 23(4), 281–286. [https://doi.org/10.4103/ijnmr.IJNMR\\_36\\_16](https://doi.org/10.4103/ijnmr.IJNMR_36_16).
- Rifani, D. A., & Rahadi, D. R. (2021). Emotional instability and mood fluctuations during the COVID-19 pandemic. *Jurnal Manajemen Bisnis*, 18(1), 22–34. <https://doi.org/10.38043/jmb.v18i1.2747>.
- Suryati, I. (2021). *Buku keperawatan: Latihan efektif untuk pasien diabetes mellitus berbasis penelitian*. Deepublish.
- Wisnujono, D. A., & Machfoed, M. H. (2022). Relationship between headache intensity, psychological stress, and serum cortisol levels in tension-type headache patients. *Aksana*, 1(1), 24–28.