

Original Article

Patient adherence and diabetes distress on glycemic outcomes: a crosssectional study

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ABSTRACT

Background: Diabetes Mellitus (DM) is a chronic disease that requires high compliance with therapy and lifestyle changes. However, compliance often causes emotional stress that can affect the effectiveness of treatment. This study is important to understand the impact of medication compliance and diabetes distress on glycemic control in DM patients.

Purpose: This study aims to determine the impact of adherence and distress on glycemic control.

Methods: This cross-sectional study was conducted at the Kebumen II Health Center from April to July 2024 with a sample of 87 respondents. The Diabetes Distress Scale (DDS) was used to measure patient stress levels, and the Medication Adherence Report Scale (MARS-5) was used to assess patient compliance levels. while glycemic control was evaluated with random blood glucose (RBG) and fasting blood glucose (FBG). Data were analyzed using the Pearson correlation test.

Results: His study was dominated by female participants (75%) and those over 60 years of age (51%). A total of 64% of patients showed low adherence to antidiabetic medication, and 78% had uncontrolled random blood glucose (RBG) levels. Moderate diabetes distress was observed in 36% of patients, while 46% experienced low distress. There was a significant relationship between medication adherence and RBG levels (r=-0.283; p<-0.05), but no significant relationship with FBG. There was no significant relationship between diabetes distress and blood glucose levels (RBG and FBG).

Conclusion: Low adherence levels will significantly increase RBG levels but not significantly increase FBG levels. Likewise, high stress has the potential to increase blood glucose levels, although not statistically significant.

INTRODUCTION

Diabetes mellitus (DM) is a metabolic disorder characterized by insulin deficiency and hyperglycemia.¹ The global prevalence of DM has significantly increased and is projected to reach 783 million cases by 2045, with Indonesia ranking fifth, showing a prevalence of 8.5%.² Effective management through medication adherence, physical activity, diet, and education is crucial in preventing complications.³ Several studies have shown that adherence to antidiabetic treatment is associated with better glycemic control, reflected in decreased fasting blood glucose (FBG) and HbA1c levels.⁴ Diabetes patients often experience

emotional stress, leading to non-adherence to a healthy lifestyle, irritability, frustration, and fear of complications or death. They may also feel tired of taking medication or become depressed.⁵

Previous research indicates that around 50% of type 2 diabetes patients experience mild distress, 45% moderate distress, and 4.5% high distress.³ Another study found that 42.4% of respondents experienced mild distress, while 57.6% experienced high distress.⁶ Distress in patients diabetes mellitus can be associated with poor clinical outcomes, including medication non-adherence and poor blood glucose control.^{7–9} Research shows that stress levels affect medication adherence, and continuing to decrease.

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¹⁰ Another study found that 44.7% of patients experienced high diabetes-related stress, and 66.5% had poor medication adherence. Patients with high distress were 68% more likely to be non-adherent to their medication compared to those without distress (OR: 0.32, 95% CI: 0.15-0.65).⁹ Identifying signs of anxiety that may trigger diabetes distress is crucial.

Although several previous studies have discussed the relationship between diabetes distress and medication adherence, this research offers a significant update by focusing on a specific population, namely T2DM patients in Kebumen, who may not have been adequately represented in the existing literature. This study aims to determine the impact of adherence and distress on glycemic control.

METHOD

Study Design

This study is a cross-sectional study design.¹¹

Setting and Respondent

This study conducted at Kebumen II Health Center from April to July 2024. The study population consisted of patients diagnosed with T2DM. The sample used was 87 respondents. The inclusion criteria were patients diagnosed with T2DM for over three months, aged over 18, using single or combination oral antidiabetic medications, and willing to participate in the study. The exclusion criteria included pregnant patients and those with severe diabetes complications.

Variable, Instrument, and Measurement

The variables studied in this study were adherence, diabetes distress as an independent variable, and blood glucose levels (Random Blood Glucose (RBG) and Fasting Blood Glucose (FBG)) as a dependent variable. The level of medication adherence was measured using the Medication Adherence Report Scale (MARS-5) questionnaire. The level of diabetes distress was measured using the Diabetes Distress Scale (DDS-17) questionnaire, which has been tested for validity and reliability.¹²

Data Analysis

Data was analyzed using the Pearson correlation test to determine the relationship between adherence and psychological distress with glycemic control.

Ethical Considerations

This study has received ethical approval from the Research Ethics Committee of General Achmad Yani University Yogyakarta with the number SKep/86/KEP/IV/2024.

RESULTS

Characteristic of respondent predominantly female (75%) and aged over 60 years (51%). Most participants had a low educational background, with 36% completing only elementary school. The majority had a disease duration of

five years or less (60%) and were undergoing combination therapy (60%).

The RBG levels were uncontrolled in 78% of participants, while the FBG levels were uncontrolled in 64%. Medication adherence was low in most participants (64%), and psychological distress was notably present, with 36% experiencing moderate distress and 18% reporting high distress (Table 1). Table 2 shows a significant negative relationship between medication adherence and RBG control (r=-0.283; p=0.008) but no significant relationship with FBG control. Stress shows a non-significant positive relationship with both RBG and FBG control. These findings underscore the need for a comprehensive approach that integrates clinical management, medication adherence strategies, and psychological support.

Fable 1. Characteristic of Respondent (n = 8	7
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Characteristic	Result
Sex	
Male	22 (25%)
Female	65 (75%)
Age (years)	
≤ 60	43 (49%)
> 60	44 (51%)
Education	
Illiterate	13 (15%)
Elementary School	31 (36%)
Junior High School	22 (25%)
Senior High School	21 (24%)
Marriage Status	× ,
Married	67 (77%)
Single	20 (23%)
Disease Duration (years)	
≤ 5	52 (60%)
> 5	35 (40%)
Type of treatment	
Monotherapy	35 (40%)
Combination therapy	52 (60%)
Outcome Therapy	
RBG	
Controlled	19 (22%)
Uncontrolled	68 (78%)
FBG	
Controlled	31 (36%)
Uncontrolled	56 (64%)
Adherence	
Low	56 (64%)
High	31 (36%)
Distress	
Low	40 (46%)
Moderat	31 (36%)
High	16 (18%)
Exp: Random Blood Glucose (RBG), Fasting Blood

Glucose (FBG)

Table 2. Relationship between adherence and distress with glycemic control

Variable	r	p-value
Adherence-RBG	-0.283	0.008
Adherence-FBG	-0.040	0.715
Distress-RBG	0.78	0.473
Distress-FBG	0.104	0.340

DISCUSSION

This study showed a relationship between adherence and RBG levels (r=-0.283; p<0.05) but not significant in FBG levels (r=-0.040; p>0.05). the negatif direction indicates that low adherence levels will increase RBG levels. Non-adherence to diabetes medication can lead to an increase in blood glucose levels when patients fail to take their medication as scheduled or at the recommended doses.^{13,14} This condition disrupts glycemic control and triggers a negative cycle of poor blood sugar management, which ultimately raises the risk of complications such as retinopathy, kidney disease, and skin infections. ¹⁵ This is in line with previous studies, which reported a relationship between adherence and blood sugar levels in patients with diabetes mellitus.¹⁶ However, other studies reported different results (p>0.05).¹⁷

This study also found a positive relationship between diabetes distress and blood glucose levels, although it was not statistically significant (p>0.05). Physical and psychological stress emerges as an organism's response to environmental threats.¹⁸ Prolonged activation of stress mechanisms can have detrimental effects on the body, which may trigger unhealthy behaviors and, ultimately, worsen glycemic control. ^{19,20} This is consistent with previous studies that reported no relationship between depressive symptoms or diabetes distress and blood glucose levels or clinical outcomes.²¹ However, other studies reported different results (p<0.05).^{22,23}

The underlying theory states that stress hormones, such as cortisol and norepinephrine, can increase glucose production in the liver, reduce insulin sensitivity, and inhibit glucose absorption by body tissues, ultimately increasing blood glucose levels.²⁴ However, the findings of this study suggest that distress may not have a direct significant impact on blood glucose levels. This difference may be due to varying population characteristics, such as age, duration of diabetes, severity of distress, or different methods of measuring blood glucose and distress. The timing of data collection and sample size may also affect the study results.^{21,25}

CONCLUSIONS AND RECOMMENDATION

This study concluded that the majority of DM patients at Kebumen II Health Center showed low compliance with the treatment regimen and experienced moderate diabetes distress. Non-compliance and high stress levels can have an impact on uncontrolled blood sugar levels. Future research should consider exploring the underlying factors contributing to non-adherence to medication and diabetes distress, with a primary focus on psychological aspects and social support systems.

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