



Nursing Skills Impact Patient Anxiety Levels in Emergency Unit

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ABSTRACT

Diabetes mellitus is a complex metabolic disorder characterized by hyperglycemia (elevated blood glucose levels). Hyperglycemia results from anomalies in insulin secretion or insulin action or both as a dysfunction of carbohydrate, fat, and protein metabolism. Based on the report data at Panti Nugroho Purbalingga Regional Hospital, it was found that in October 2023 to December 2023 the incidence of DM was 76 patients. The study aims to determine the relationship between stress levels and sleep quality with blood sugar levels in Diabetes Mellitus patients at Panti Nugroho Purbalingga Hospital. This research method is a correlation design with a cross sectional data collection time approach with a sample of 63 respondents at Panti Nugroho Purbalingga Hospital using accidental sampling. Measurement of stress levels using the Perceive Stress Scale (PSS) questionnaire and sleep quality using the Pittsburgh Sleep Quality Index (PSQI) questionnaire. SPSS results with spearman rank test obtained p value stress levels = 0.000 (<0.005) and p value sleep quality = 0.000 (<0.005). The conclusion of this study is that there is a relationship between stress levels and sleep quality with current blood sugar levels in DM patients.

Keywords: Stress Level, Sleep Quality, Blood Sugar Level at Time, Diabetes Mellitus

1. INTRODUCTION

Blood sugar levels that exceed normal limits are influenced by physical activity, dietary intake, obesity, age, gender, hypertension, stress levels, and sleep quality (Silviani & Sibriani, 2023). Diabetes patients experience very short sleep periods due to frequent nighttime urination and sometimes experience pain or tingling in the hands and feet, resulting in poor sleep quality (Sumah, 2019).

Setianingsih's research (2022), there were 81 respondents, 30 respondents who experienced DM, showing that 35 respondents (43.2%) with poor sleep quality had high blood sugar levels and 18 respondents (22.2%) with good sleep quality had normal blood sugar levels.

Blood sugar levels are influenced by several factors, including the use of steroid medications, which can cause DNA mutations, obesity, stress (high pressure), uncontrolled emotions, frequent eating, and poor sleep quality, which can lead to more serious complications. These complications can be prevented by controlling blood sugar levels, including reducing stress, improving sleep quality, and regularly checking blood sugar levels (Triandhini et al., 2022).

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Based on data from Panti Nugroho Regional General Hospital (RSUD) Purbalingga, 76 patients with diabetes were diagnosed between October 2023 and December 2023. Initial examinations of new patients with diabetes in the emergency room and internal medicine outpatient clinic revealed unstable random blood sugar levels.

The purpose of this study was to determine the relationship between stress levels and sleep quality and random blood sugar levels in patients with diabetes mellitus at Panti Nugroho Regional General Hospital (RSUD) Purbalingga.

2. METHODS

This study used a correlation design with a cross-sectional data collection time approach; researchers observed the total stress level and sleep quality with random blood sugar levels in diabetes mellitus patients. The study was conducted in the Emergency Room and Internal Medicine Polyclinic of Panti Nugroho Purbalingga Regional Hospital. This study was conducted from May 2024 to June 2024 with data collection time from May 6, 2024 to June 28, 2024. The sample used in this study were patients with Diabetes Mellitus in the Emergency Room and Internal Medicine Polyclinic of Panti Nugroho Regional Hospital. Data collection techniques used in this study were: interviews and measurement of random blood sugar levels. Interviews conducted by researchers consisted of questionnaires on age, gender, duration of DM, MMAS-08 questionnaire to measure medication adherence, PSS questionnaire to measure stress levels and PSQI questionnaire to measure sleep quality. Blood sugar level measurements were carried out when patients came to the polyclinic, and the results of blood sugar level measurements were recorded using a master table.

3. RESULT AND DISCUSSION

RESULTS

Table 1. Average age of DM respondents at Panti Nugroho Regional Hospital, 2024

	N	Mean	Std.deviasi	Min	Max
Age	63	58,52	10,803	32	90

Based on [Table 1](#), it is explained that respondents with type 2 DM at Panti Nugroho Regional Hospital had an average age of 58.51 years, a standard deviation of 10.803, the lowest age was 32 years and the highest was 90 years.

Table 2. Description of respondent characteristics including gender, duration of DM and medication adherence at Panti Nugroho Purbalingga Regional Hospital, 2024

Respondent Characteristics	Frequency	Percentage (%)
Gender		
Male	21	33,3
Female	42	66,7
Duration of DM Suffering		
1-5 years	45	71,4
>5 years	18	28,6
Medication Compliance		
High	49	77,8
Moderate	14	22,2

Based on [Table 2](#), it is explained that of the number of respondents with DM at Panti Nugroho Purbalingga Regional Hospital, there were 63 respondents consisting of men and women. The results of the study obtained 21 male respondents and 42 female respondents. The percentage of female respondents was 42 respondents (66.7%) and male respondents was 21 respondents (33.3%). The

number of respondents who had suffered from DM for >5 years was 45 respondents with a presentation of 71.4%. Respondents with high medication adherence were 49 respondents (77.8%).

Table 3. Frequency distribution of stress levels of respondents with DM at Panti Nugroho Purbalingga Regional Hospital, 2024

Stress Level	Frequency	Percentage (%)
Mild	12	19,1
Moderate	11	17,5
Severe	50	79,4
Total	63	100

Table 3. shows that respondents suffering from DM at Panti Nugroho Purbalingga Regional Hospital mostly experienced severe stress levels with a total of 50 respondents (79.4%).

Table 4. Frequency distribution of sleep quality of respondents with DM at Panti Nugroho Purbalingga Regional Hospital, 2024

Sleep Quality	Frequency	Percentage (%)
Good	21	33,3
Poor	42	66,7
Total	63	100

Table 4. illustrates that respondents with diabetes at Panti Nugroho Purbalingga Regional Hospital had good sleep quality (21 respondents (33.3%) and poor sleep quality (42 respondents (66.7%).

Table 5 Frequency distribution of blood sugar levels of respondents with diabetes at Panti Nugroho Purbalingga Regional Hospital, 2024

Blood Sugar Level	Frequency	Percentage (%)
Low	2	3,2
Normal	11	17,5
High	50	79,4
Total	63	100

Table 5 shows that respondents suffering from DM at Panti Nugroho Regional Hospital had high blood sugar levels, amounting to 40 respondents with a percentage of 79.4%.

The Relationship Between Stress Levels and Blood Sugar Levels

Table 6. Relationship between stress levels and blood sugar levels in respondents with diabetes at Panti Nugroho Regional Hospital, Purbalingga, 2024.

Stress Level	Blood Sugar Level						Total		p value	cc
	Low		Normal		High					
	n	%	n	%	n	%	n	%		
Mild	0	0	11	17,5	1	1,6	12	19	0,00	0,614
Moderate	0	0	0	0	11	17,5	11	17,5		
Severe	2	3,2	0	0	38	60,3	40	63,5		
Total	2	3,2	11	17,5	50	79,4	63	100		

Based on the results of the Spearman rank test with $\alpha = 0.05$, the p value was $0.000 < 0.05$, so H_a was accepted and H_0 was rejected, which means there is a relationship between stress levels and random blood sugar levels in DM patients at Panti Nugroho Purbalingga Regional General Hospital. The Spearman rank correlation coefficient value of 0.614 indicates a relationship between these two variables in the moderate category.

The Relationship Between Sleep Quality and Blood Sugar Levels

Table 4.7 Relationship between sleep quality and blood sugar levels in respondents with DM at Panti Nugroho Purbalingga Regional Hospital, 2024

Sleep Quality	Blood Sugar Level						Total		p value	cc
	Low		Normal		High					
	n	%	n	%	n	%	N	%		
Good	0	0	11	17,5	10	15,9	21	33,3	0,000	0,524
Poor	2	3,2	0	0	40	63,5	42	66,7		
Total	2	3,2	11	17,5	50	79,4	63	100		

Based on the results of the Spearman rank test with $\alpha = 0.05$, the p value was $0.000 < 0.05$, so H_a was accepted and H_0 was rejected, which means there is a relationship between sleep quality and random blood sugar levels in DM patients at Panti Nugroho Purbalingga Regional General Hospital. The Spearman rank correlation coefficient value of 0.524 indicates a relationship between these two variables in the moderate category.

DISCUSSION

Respondent Characteristics

Table 1 shows that the average age of 63 respondents with diabetes was 58.52 years. The lowest age of those with diabetes was 32, while the highest age was 90. Diabetes is a degenerative disease, particularly a disorder of the pancreas' ability to produce insulin. Therefore, the incidence of diabetes increases with age. Those over 45 are at high risk for diabetes (Park & Griffin, 2019, cited in Silviani and Sibriani, 2023).

Table 2 shows that 21 male respondents (33.3%) had diabetes, while 42 female respondents (66.7%) had diabetes. Diabetes mellitus (DM) in Indonesia is more prevalent in women, at 61.6%. This is triggered by hormonal fluctuations that facilitate fat accumulation in the body, leading to an increase in Body Mass Index (BMI) with a higher percentage of fat (Triandhini *et al.*, 2022).

Table 2 shows that 45 respondents (71.4%) had diabetes for 1-5 years, and 18 respondents (28.6%) had diabetes for more than 5 years. According to Choi *et al.*, (2018) in Setianto (2023), patients with poor blood sugar levels who have been diagnosed with diabetes for longer and receive combination diabetes therapy are at greater risk of blood sugar instability than patients with diabetes. The longer a person suffers from diabetes, the more resistant their body is to insulin. This is because long-term treatment requires patience and continuity. The medication dosage will inevitably increase if blood sugar levels are uncontrolled (Lima *et al.*, in Setianto (2023)).

Medication adherence was measured using the Morisky Medication Adherence Scale (MMAS-08) questionnaire developed by Morisky. Medication adherence has two options or two codes (0: yes and 1: no) with a total score of 8. The combined score of all questions is categorized into three compliance levels: low compliance if the total score is below 6; moderate compliance if the total score is 6-7; and high compliance if the total score is 8 (Morisky *et al.*, 2008 in Silviani and Sibriani, 2023).

Table 2 shows that 49 respondents with diabetes had high medication adherence (77.8%) and 14 respondents had low medication adherence (14%). 22.2%. According to Munshi *et al.*, (2019) in Setianto (2023), the more a person adheres to drug therapy, the more controlled their blood sugar levels will be.

Stress Levels in DM Patients

Respondents' stress levels were measured using the Perceived Stress Scale (PSS) questionnaire. This questionnaire contains ten questions about their feelings and thoughts about life over the past month.

The stress level measurement has five options or five codes (0: never, 1: almost never, 2: sometimes, 3: almost often, 4: very often) with a total score of 40. The combined score of all questions is categorized into three compliance levels: mild stress if the total score is 0-15, moderate stress if the total score is 16-30, and severe stress if the total score is 31-40.

Based on the results of the study, it can be seen that the majority of respondents with diabetes mellitus at Panti Nugroho Purbalingga Regional Hospital experienced severe stress, with a total of 40 respondents (60.3%). This is in line with the opinion of [Padilla and Sibriani, \(2022\)](#), who stated that stress is a factor influencing diabetes mellitus sufferers and that increased levels of stress hormones can lead to higher blood glucose levels.

The results of this study align with those of [Padilla and Sibriani, \(2022\)](#), who found that 11 respondents (85%) with moderate stress levels had high random blood sugar levels. This study used the same measuring tool, the Perceived Stress Scale (PSS), and categorized stress levels into three categories: mild stress if the total score was 0-15, moderate stress if the total score was 16-30, and severe stress if the total score was 31-40. Research by [Mishra *et al.*, \(2020\)](#) and [Purnami & Sawitri, \(2019\)](#) showed similar results, namely a significant relationship between stress and blood sugar levels.

According to [Petinger \(2002\) in Swarjana \(2022\)](#), stress is anything that is given special emphasis or significance, especially if this leads to or involves psychological, emotional, and physical tension. From a physiological perspective, stress reactions are regulated by the rapidly operating sympathetic nervous system and are regulated by the neuroendocrine axis (HPA). The HPA axis functions in the opposite way, starting from the prehypothalamic hypothalamus which releases Corticotropin-Releasing Hormone (CRH) and Arginine Vasopressin (AVP). These substances stimulate the pituitary gland to produce AdrenoCorticoTropic Hormone (ACTH) which is released into the bloodstream and induces the adrenal cortex to secrete cortisol ([Padilla and Sibriani, \(2022\)](#)).

Sleep Quality in Diabetes Patients

Respondents' sleep quality was measured using the Pittsburgh Sleep Quality Index (PSQI) questionnaire. This questionnaire assesses sleep quality, including subjective sleep quality, sleep latency, sleep duration, daily sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction. Scores for the seven sleep quality components are summed to form an overall score ranging from 0 to 21. The combined score for all questions is categorized into two sleep quality categories: good sleep quality if the score is ≤ 5 and poor sleep quality if the score is > 5 . The study found that 21 respondents (33.3%) with diabetes mellitus at Panti Nugroho Regional Hospital had good sleep quality and 42 respondents (66.7%) had poor sleep quality.

These results align with research by [Setianingsih \(2022\)](#), who found that 35 respondents (43.2%) with poor sleep quality had high blood sugar levels. This study used the same measurement tool, the Pittsburgh Sleep Quality Index (PSQI), and categorized sleep quality into two categories: good sleep quality if the score is ≤ 5 and poor sleep quality if the score is > 5 . Similar research conducted by [Sumah \(2019\)](#) and [Lispin *et al.*, \(2021\)](#) showed similar results to the previous study, namely a relationship between sleep quality and blood sugar levels in diabetes patients.

Sleep quality is an individual's satisfaction with their sleep, which can be seen when waking up feeling refreshed and fit, not feeling weak or lethargic, not having dark circles under the eyes, not yawning frequently, and being focused. According to [Taub and Redeker \(2012\) in Sumah \(2019\)](#), hormonal changes associated with sleep disturbances can be caused by activity of the Hypothalamus-Pituitary-Adrenal (HPA) and the sympathetic nervous system, which causes impaired glucose tolerance and insulin resistance, ultimately leading to diabetes mellitus. Patients with diabetes mellitus who experience sleep disturbances may be at risk of elevated blood sugar levels.

Blood Sugar Level Overview

Respondents' blood sugar levels were measured using a glucometer. This device is used to measure blood sugar levels ([Nursing SOP Guidelines Working Group Team, DPP PPNI, 2021](#)). According to PERKENI (2021), random blood sugar levels in DM patients are categorized into three categories: low if <70 , normal if $71-180$, and high if >180 . The study found that 2 respondents with DM at Panti Nugroho Regional Hospital had low blood sugar levels (3.2%), 11 respondents (17.5%), and 50 respondents (79.4%) had normal blood sugar levels.

According to Laune and Ladner (2012), blood glucose is a component of carbohydrates such as glucose, fructose, and galactose found in the blood and is measured in mg per 100 ml of blood. The GDS control criteria for DM patients are low, <70 mg/dl, normal, and >180 mg/dl ([PERKENI, 2021](#)). Factors influencing blood sugar levels include obesity, hypertension, physical activity, unhealthy diet, age, gender, family history (genetic factors), smoking, occupation, length of DM diagnosis, medication adherence, stress, and sleep quality ([Silviani and Sibriani, 2023](#)).

The study found that respondents with DM had an average age of 58.51 years. Those over 45 years of age are at risk for developing DM ([Park and Griffin, 2019 in Silviani and Sibriani, 2023](#)). The majority of respondents with DM were female, with 42 respondents (66.7%). A study conducted by [Soewondo & Pramono \(2011\)](#) showed that diabetes mellitus (DM) is more prevalent in women in Indonesia (61.6%) ([Triandhini et al., 2022](#)).

45 respondents (71.4%) had suffered from diabetes for more than 5 years. The longer a person suffers from diabetes, the more resistant their body is to insulin. Long-term treatment requires patience and continuity. The medication dosage will inevitably increase if blood sugar levels are uncontrolled ([Lima et al., in Setianto \(2023\)](#)). Respondents with high medication adherence were 49 (77.8%). According to [Munshi et al., \(2019\) in Setianto \(2023\)](#), the more compliant a person is with medication therapy, the more controlled their blood sugar levels are.

Respondents with moderate stress levels were 41 (65.1%). Stress can cause chemical changes through neuroendocrine and neural pathways. The sympathetic nervous system responds to stress accompanied by sympathetic-adrenal-medullary stimulation. If stress persists for a long time, hypothalamic-pituitary system activity can occur ([Smeltzer and Bare, 2014](#)). Respondents with poor sleep quality were 42 (66.7%). Hormonal changes associated with sleep disturbances can be caused by hypothalamic-pituitary-adrenal activity. (HPA) and the sympathetic nervous system ([Taub and Redeker, 2012 in Sumah, 2019](#)).

Relationship between stress levels and blood sugar levels

Based on the Spearman rank test, a p-value of $0.000 < 0.05$ was obtained, indicating a relationship between stress levels and random blood sugar levels. The Spearman rank correlation coefficient of 0.533 indicates a moderate relationship between the two variables. These results align with previous research, including [Akbar et al., \(2022\)](#), which showed a relationship between stress and hyperglycemia, and [Purnami & Sawitri, \(2019\)](#) which showed that stress negatively impacts blood sugar control.

Respondents experienced stress due to ongoing marital discord, prolonged financial difficulties due to lack of improvement, separation from family, moving, chronic illness, and physical and psychological changes in old age. These factors can affect random blood sugar levels, which are regulated by the sympathetic nervous system. Whether mild, moderate, or severe stress affects the central nervous system, leading to unstable blood sugar levels. In respondents experiencing stress, the neuroendocrine axis (HPA) is stimulated to release Corticotropin-Releasing Hormone (CRH) and Arginine Vasopressin (AVP), which can stimulate the pituitary gland to produce Adrenocorticotrophic Hormone (ACTH). Adrenocorticotrophic Hormone (ACTH) is released into the bloodstream to induce the adrenal cortex to secrete cortisol, which can affect blood sugar levels.

Relationship between sleep quality and blood sugar levels

Based on the results of the Spearman rank test with $\alpha = 0.05$, a P-value of $0.000 < 0.05$ was obtained, indicating a relationship between sleep quality and random blood sugar levels. The Spearman rank

correlation coefficient value of 0.524 indicates a moderate relationship between the two variables. These results align with previous research by Sumah (2019), which demonstrated a relationship between sleep quality and blood sugar levels in patients with diabetes mellitus. Analysis using the chi-square test yielded a p-value of 0.000, statistically significant ($p < 0.05$). Similar research conducted by LISPIN *et al.*, (2021) and Setianingsih (2022) also demonstrated a relationship between sleep quality and blood sugar levels in patients with diabetes mellitus.

Patients with diabetes experience various sleep disturbances, such as frequent urination at night and pain or tingling in the hands and feet. This can affect sleep quality in diabetes patients, leading to unstable blood sugar levels, which are regulated by the central nervous system and the HPA. The central nervous system and the HPA stimulate the release of cortisol and catecholamines. Cortisol and catecholamines contribute to glucose tolerance and insulin sensitivity, which can affect random blood sugar levels.

CONCLUSION

There is a relationship between stress levels and sleep quality and random blood sugar levels in DM patients, with a p-value of 0.00. Respondents with mild stress levels numbered 12 (19.1%), moderate stress 11 (17.5%), and severe stress 40 (79.4%). Respondents with good sleep quality numbered 21 (33.3%), and poor sleep quality 42 (66.7%). Respondents with low blood sugar levels numbered 2 (3.2%), moderate blood sugar levels 11 (17.5%), and high blood sugar levels 50 (79.4%).

SUGGESTION

This study is expected to provide insight into the relationship between stress levels and sleep quality and random blood sugar levels in diabetes mellitus patients at Panti Nugroho Regional Hospital, Purbalingga. As a nurse, the author will be able to act professionally in cases of diabetes mellitus at Panti Nugroho Regional Hospital, Purbalingga. The results of this study can serve as a basis for further research on factors that influence random blood sugar levels, including obesity, hypertension, physical activity, unhealthy diet, family history (genetic factors), smoking, and occupation.

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