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Exploring factors predicting Diabetes Distress in patients with type 2 diabetes

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Abstract

Background: Diabetes mellitus, a chronic disease resulting from an impaired endocrine system, disrupts glucose regulation and leads to elevated blood glucose levels. Individuals with diabetes may develop complications such as hyperglycemia. Persistent hyperglycemia can negatively affect mental well-being, potentially causing depression, anxiety, and diabetes distress. While numerous studies have explored predictors of diabetes distress, their findings have been inconsistent, and a comprehensive understanding of the contributing risk factors remains elusive.
Purpose: To identify the dominant factors influencing the occurrence of diabetes distress.
Method: This quantitative descriptive study involved a sample of 150 respondents. Participants were included if they had a diagnosis of type 2 diabetes mellitus, were male or female, and were over 20 years of age, regardless of whether they had diabetes-related complications. Patients with unstable hemodynamic status or those unable to communicate effectively were excluded. The study took place at the Surakarta Islamic Hospital between July and September 2024. Data collection utilized demographic questionnaires, the Diabetes Distress Scale, the Hensarling Diabetes Family Support Scale, and the Medication Adherence Rating Scale. Pearson's test and multiple linear regression were used for data analysis.
Results: The study found that the majority of respondents had a mean age of 56 years and were male. The analysis revealed four factors influencing diabetes distress in patients with Type 2 Diabetes Mellitus including treatment regimen (p-value = 0.001, B = -10.792), education level (p-value = 0.042, B = -3.779), age (p-value = 0.015, B = -0.404), and family support (p-value = 0.034, B = -0.333).
Conclusion: The treatment regimen emerged as the most significant factor influencing diabetes distress; consistent adherence to the prescribed treatment plan was associated with lower levels of distress among individuals with type 2 diabetes mellitus. Furthermore, education level, age, and family support were identified as additional factors contributing to diabetes distress.

Keywords: Diabetes Distress; Diabetes Mellitus; Dominant Factors.

INTRODUCTION

Diabetes mellitus is a global health problem with a projected increase in new cases each year. According to the American Diabetic Association the prevalence in 2021 was 29.7 million adults out of 38.4 million diagnosed with diabetes, while around 304.000 sufferers were children and adolescents. The number of diabetes sufferers in the western pacific region according to International Diabetes Federation which is around 153 million people (Hiasat, Salih, Jaber, Abubaker, Qandeel, Saleem, & Hyassat, 2023). Indonesia is part of the country with the number of diabetes cases around 90 million people. Diabetes is a chronic disease caused by endocrine disruption that results in glucose regulation which can cause high

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levels of glucose in the blood or hyperglycemia (Rabrinan, & Wahyuin, 2024).

Diabetes Mellitus (DM) is one of the most important metabolic diseases with characteristic hyperglycemia that results from abnormalities in insulin secretion or insulin action insulin. A chronic disease characterized by elevated blood sugar levels caused by the body's inability to produce and use insulin effectively (Guo, Wong, Koh, & Tan, 2023).

Diabetes mellitus patients with chronic hyperglycemia without proper treatment can have fatal conseguences which can cause complications such as macrovascular and microvascular disorders and even death. Macrovascular and microvascular complications often occur in organs including the brain, blood vessels, heart, kidneys and eyes. In the heart organ it can cause heart disease which can cause depression and anxiety. Diabetes can have a significant impact on mental health, causing a range of symptoms and conditions to change (Anggraeni, Widayati, & Sutawardana, 2020). Changes in blood sugar levels can lead to rapid mood swings and other mental symptoms such as fatigue, difficulty thinking and anxiety. Some mental symptoms that appear in diabetes patients include depression, anxiety and diabetes stress. Depression is characterized by feelings of sadness, loss of interest in doing activities, overeating or loss of appetite and difficulty in managing diabetes, anxiety is a feeling of worry, fear, stress and sadness (Farm, Perwitasari, Thobari, Cao, Krabbe, & Postma, 2017).

Diabetes distress is a form of anxiety, worry, fear and threats related to the struggle of suffering from diabetes mellitus. Diabetic distress is a form of emotional stress especially experienced by diabetics. Several factors that predict the occurrence of diabetic distress include physical symptoms, quality of life, depression and anxiety. According to research conducted at the diabetes clinic of several predictive factors for the occurrence of distress are physical symptoms, quality of life, depression and anxiety and diabetes pressure was caused by self-efficacy, spirituality, unsupportive family behavior and blood sugar levels, but the strongest predictor was self-efficacy. (Sayed Ahmed, Fouad, Elotla, Joudeh, Mostafa, Shah, & Mohammed, 2022).

Based on data from medical records at the Surakarta Islamic Hospital, the population of diabetes mellitus patients undergoing treatment at the Internal Medicine Polyclinic of the Surakarta Islamic Hospital in 2022 was 1498 patients and in 2023 was 592 patients. Based on previous research, many have studied factors that influence diabetes distress, including relatively younger age, smokers, patients with a history of kidney disease, and patients with a history of depression are at risk of developing diabetes distress, poor blood sugar control, the most significant predictor influencing distress is increased HbA1c levels, having many comorbidities, long duration of suffering from diabetes mellitus, a history of anxiety and depression, and low-quality of life (Asshiddiqi, Yodchai, & Taniwattananon, 2021; Batais, Alfaraiji, Alyahya, Aloofi, Almashoug, Alshehri, & Alosaimi, 2021; Guo et al., 2023). Research on the most important elements influencing diabetes distress using a multifaceted approach is still lacking, nevertheless. Understanding the primary elements that contribute to diabetes distress is crucial for this study since it will help medical professionals create more effective intervention plans for patients with type 2 diabetes mellitus.

Blood sugar control is one of the important factors and has been proven to reduce blood sugar levels in patients with type 1 and type 2 DM. Independent blood sugar control is part of Diabetes Self-Management Education (DSME) which is a comprehensive management and is intended as a guideline for doctors, nurses, nutritionists and educators in preparing diabetes mellitus patients in carrying out blood sugar control according to their condition (German, Kobe, Lewinski, Jeffreys, Coffman, Edelman, & Crowley, 2023).

Families can be given education in the form of health education by health workers to be able to implement healthy lifestyle practices, remain motivated to regularly test their glycemic status, and be aware of diabetes complications. As a result of receiving health education, diabetes patients' knowledge, attitudes, and behaviors must change to attain glycemic control and stop the onset of complications from their condition (Hasanah, Yulia, & Edison, 2023). Families may not know how to prevent or minimize these risk factors if they are unaware of the diabetes risk factors. Knowledge is key to stop the spread of diabetes mellitus. Knowledge-based behavior will be simpler to implement than ignorance-based behavior (Hudiyawati, Ainunnisa, & Riskamala, 2021).

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In addition to being a worldwide health issue, diabetes mellitus has a significant negative influence on its patients' quality of life, particularly in terms of psychological issues. The difficulties in managing diabetes are becoming more complicated as the country's diabetes case count rises to approximately 90 million (International Diabetes Federation, 2021). Diabetes discomfort, or mental stress brought on by challenges managing diabetes, is one element that is frequently disregarded (Polonsky, Fisher, Hessler, Stuckey, Snoek, Tang, & Perez, 2019). This phenomenon is becoming more and more relevant given that diabetes is linked to mental health conditions like anxiety, depression, and stress brought on by diabetes (Pardhan, Siddique, Motahara, & Islam, 2024) in addition to physical complications like heart disease, kidney failure, and visual impairment (Lestari & Zulkarnain, 2021; Cahyani, Rasfayanah, Abdullah, Natsir, & Irmayanti, 2024).

Diabetes patients frequently experience diabetes distress, a psychological disorder brought on by several causes, including a lack of social support, severe lifestyle adjustments, and an inability to control blood sugar levels (Polonsky et al., 2019). According to earlier research, several variables, including spirituality, self-efficacy, and familial support, influence how stressed-out diabetics are (Asshiddiqi et al., 2021). However, statistics from the Surakarta Islamic Hospital indicate that the number of patients receiving treatment decreased from 1,498 in 2022 to 592 in 2023. This drop could be a sign of excellent diabetes care or, conversely, the existence of people who decide not to continue medication for psychological and social reasons. Thus, it is essential to comprehend the primary causes of diabetes distress to implement more suitable therapies to enhance the well-being of individuals with type 2 diabetes mellitus.

This study is unique in that it examines all the variables that affect diabetes distress in people with type 2 diabetes. This study incorporates ten variables simultaneously, in contrast to earlier research that only looked at certain aspects, such as inadequate blood sugar management (German et al., 2023), elevated HbA1c levels, and the number of comorbidities (Sayed Ahmed et al., 2022), and the length of diabetes mellitus (Islam et al., 2015). These factors include blood sugar levels, age, gender, education, income, length of diabetes, therapy compliance, complications from diabetes, and family support. This study can offer a more thorough understanding of the most important elements impacting diabetic distress since it has a larger combination of variables.

Furthermore, earlier research in a variety of settings, including a tertiary hospital in Klaten, Central Java (Asshiddiqi et al., 2021) and the diabetes clinic at King Saud University Medical City Hospital (Batais et al., 2021), concentrated more on psychological and social factors like family behavior, spirituality, and self-efficacy. Nonetheless, this research endeavors to integrate psychological elements with medical and demographic variables, which have not been fully investigated. As a result, this study will not only further scholarly knowledge of diabetes distress but may also serve as a foundation for the creation of more potent stress-reduction techniques for individuals with type 2 diabetes.

RESEARCH METHOD

A cross-sectional, specially focusing on descriptive quantitative study. The study took place from July-September 2023, in Islamic Hospital, Surakarta. The independent variables were age, gender, education level, income level, blood sugar levels, duration of diabetes mellitus, medication adherence, treatment regimen, diabetes complications and family support, while the dependent variable is diabetes distress. Using accicental sampling and slovin formula, 150 respondents were selected, who met specific inclusion and exclusion criteria.

The inclusion criteria required patients who were willing to be participants, male and female patients, patients aged over 20 years, all patients diagnosed with type 2 diabetes mellitus who underwent treatment. While exclusion criteria involved patients who experienced serious health problems hemodynamically, such as patients who experienced a decrease in the level of consciousness and patients who were unable to communicate well, such as stroke patients.

Data obtained from the results of measurement of diabetes distress is done using the Diabetes Distress Scale (DDS) questionnaire. The Diabetes Distress Scale (DDS-17) questionnaire was used to assess the level of diabetes distress in patients, including

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emotional distress, relationship with doctors, difficulty managing diabetes, and social support. Participants answered 17 questions based on experiences in the past month, using a 6-point Likert scale from 1 (never distressed) to 6 (almost always). Scores were calculated by taking the average of each domain, where <2.0 indicates low distress, 2.0-2.9 moderate distress, and ≥3.0 high distress needing more intervention.

Blood sugar testing is conducted through laboratory tests, such as the current blood sugar test. The test results are compared with standardized values, with a blood sugar level of ≥200 mg/dL indicating diabetes.

The Family Support Questionnaire consisted of 20 questions to assess the level of family support in four main aspects, namely emotional support, instrumental support, valuation support, and information support. Responses to this questionnaire were measured using a Likert scale with four answer options, namely Very Often (4), Often (3), Sometimes (2), and Never (1). Based on the accumulated scores, family support was categorized into high 60-80, medium 40-59, and low 20-39.

Analysis techniques using univariate tests for variance analysis using the pearson test and in multivariate analysis using multiple linear regression. Research ethics were obtained from the Muhammadiyah University Surakarta Medical Faculty Health Research Ethics Commission with the number. 3040/C.8-III/FIK/VII/2023.

RESEARCH RESULTS

Table 1. Characteristics of Respondents(N=150)

Variable	Results
Age (Mean±SD)(Range)(Year)	(56.69±10.366)(35-79)
Gender (n/%)	
Male	103/68.7
Female	47/31.3
Education (n/%)	
Elementary School	31/21.3
Junior High School	19/12.7
Senior High School	62/41.3
College	37/24.7
Complications of diabetes (n/%)	
Were complications	84/56.0
No complications	66/44.0
Treatment method (n/%)	
Routine Medical Treatment	60/40.0
Not taking regular medication	90/60.0
Income Level (Mean±Median)(Range)(IDR)	(2.770.630 ± 651.843)(1.750.000-4.500.000)
Blood Sugar Levels (Mean±Median)(Range)(mg/dL)	(192.19±73.599)(71-430)
Length of the disease (Mean±Median)(Range)(Years)	(3.45±1.736)(1-10)
Treatment compliance (Mean±Median)(Range)(Likert)	(18.75±5.729)(5-25)
Family Support (Mean±Median)(Range)(Likert)	(85.27±9.891)(63-110)
Diabetic Distress (Mean±Median)(Range)(Likert)	(38.62±19.773)(17-97)

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Tabel 1 shows characteristics of respondents with a mean age and standard deviation (56.69±10.366) ranging from 35-79 years. The majority of participants were male (68.7%), had a senior school education (41.3%), and had with complications (56%) after that as many as 60% of participants did not follow the treatment method regularly.

Respondents with a mean income level and standard deviation (2.770.630 ± 651.843) ranging from 1.750.000-4.500.000 IDR. Respondents with a mean blood sugar level and standard deviation (192.19±73.599) ranging 71-430 mg/dL. Respondents with a mean length of the disease and standard deviation (3.45±1.736) ranging 1-10 years. Respondents with a mean treatment compliance and standard deviation (18.75±5.729) ranging 5-25 likert scale. Respondents with a mean family support and standard deviation (85.27±9.891) ranging 63-110 likert scale and respondents with a mean family support and standard deviation (38.62±19.773) ranging 17-97 likert scale.

Table 2. Results of Analysis Pearson Test

Variables	Diabetes Distress	
	Pearson Correlation	Sig (2-Tailed)
Age	-.162*	.048
Gender	.077	.348
Education Level	-.245**	.003
Income Level	-.121	.141
Blood Sugar Levels	-.032	.700
Length of the disease	-.128	.119
Complications of diabetes	-.065	.432
Treatment compliance	-.338**	.000
Medication adherence	-.011	.890
Family Support	-.258**	.001

Pearson test results that show a sig value <0.05 are only age, education, treatment method and family support. This means that there is a correlation between age, education, treatment method and family support with diabetes distress. Pearson correlation score <1 indicates a poor correlation level.

Table 3. Final Model of Multivariate Analysis of Multiple Logistic Regression Test

Variable	B	SE	Exp(B)	Lower	Upper	Sig.
Age	-.404	.164	-.212	.749	1.335	.015
Gender	2.441	3.210	.057	.970	1.031	.448
Education Level	-3.779	1.840	-.204	.561	1.783	.042
Income Level	-.001	.003	-.020	.619	1.616	.830
Blood Sugar Levels	-.020	.021	-.074	.893	1.120	.351
Length of the disease	-.436	1.043	-.038	.660	1.515	.677
Complications of diabetes	1.363	3.391	.034	.759	1.317	.688
Treatment compliance	-10.792	3.149	-.268	.903	1.107	.001
Medication adherence	-.199	.276	-.058	.868	1.152	.471
Family Support	-.333	.156	-.167	.915	1.093	.034

Tabel 3. Result regression logistic shows variable age (exp(B)=-0.212; 95%CI=0.749-1.335 Sig=0.015), variable gender (exp(B)=0.057; 95%CI=0.970-1.031 Sig=0.448), variable education (exp(B)=-0.204; 95%CI=0.561-1.783 Sig=0.042), varibel income level (exp(B)=-0.020; 95%CI=0.619-1.616 Sig=0.830), variable blood sugar level (exp(B)=-0.074; 95%CI=0.893-1.120 Sig=0.351), variable length of the disease (exp(B)=-0.038; 95%CI=0.660-1.515 Sig=0.677), variable complications of diabetes (exp(B)=0.034; 95%CI=0.759-1.317 Sig=0.688), variable treatment compliance (exp(B)=-0.268; 95%CI=0.903-1.107 Sig=0.001), variable medication adherence (exp(B)=-0.058; 95%CI=0.868-1.152 Sig=0.471), variable family support (exp(B)=-0.167; 95%CI=0.915-1.093 Sig=0.034).

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DISCUSSION

There was a significant relationship between treatment regimen and the occurrence of diabetes distress, namely that the treatment regimen of patients who are compliant in taking treatment can affect their quality of life. This is influenced by patients in routinely taking medication and reducing the occurrence of complications due to diabetes. This can improve patient health and diabetes distress can be avoided (Arifin, Van Asselt, Setiawan, Atthobari, Postma, & Cao, 2019). Patients who show poor compliance with the treatment they are undergoing are a factor in the occurrence of diabetes distress. Nurses have an important role as educators or health education related to the treatment that must be undergone by patients so that patients understand the need for treatment that must be undergone with compliance in carrying out treatment so that their blood sugar will be controlled so that it can improve the quality of life of diabetes patients and can reduce the risk of diabetes distress and provide patients with a good perception of their disease (Cahyani et al., 2024).

In addition to the role of nurses as educators, there are several strategies that can be applied to improve patient adherence to diabetes treatment and reduce the risk of diabetic distress. One of them is an effective therapeutic communication approach between nurses and patients. Good communication can help patients feel more supported and understood, so they are more motivated to follow the treatment plan that has been set. Nurses can use empathic communication techniques, active listening, and constructive feedback to build patient trust. Psychological approaches can also be integral to improving patient adherence (Hudiyawati, & Maulana, 2019).

Diabetes distress often arises due to the emotional burden that patients feel in dealing with chronic diseases such as diabetes. Nurses can work with psychologists or counselors to provide emotional support and teach stress management techniques, such as relaxation or mindfulness. Social support from family and the immediate environment also plays an important role in helping patients undergo treatment more consistently (Lestari, & Zulkarnain, 2021). In a bigger context, the role of nurses as educators also includes advocating for health policies that support patients with diabetes. Nurses can be involved in public health programs that aim to raise awareness about diabetes, reduce stigma, and provide better access to health services. Thus, efforts to improve medication adherence and prevent diabetes distress are not only done at the individual level, but also at the community and health system levels (Pardhan et al., 2024).

There was a significant relationship between age and the occurrence of diabetes distress. Age greatly influences the occurrence of distress. A relatively young age can influence the occurrence of distress, this is because young people do not yet have experience in dealing with their illness, so that when facing the burden of life, they do not yet have much experience in managing and carrying out management of their illness related to treatment and fear of complications due to their illness. Increasing age can cause someone to be at risk of developing diabetes mellitus. Entering the age of 55 years and above has a risk of developing diabetes. This occurs because of age factors, physiologically the body's functions and abilities begin to decline, resulting in a decline in the function of insulin secretion or insulin resistance, which will affect the body's ability to process blood glucose less than optimally (Batais et al., 2021). The role of nurses in conducting assessments and carrying out effective communication and providing education related to diabetes in young patients or those newly diagnosed with diabetes who really need information related to diet, monitoring blood sugar levels and preventing complications and the effects of diabetes distress can influence the way of thinking and management of diabetes therapy so that patients can control diabetes (Ducat, Rubenstein, Philipson, & Anderson, 2015).

There was a significant relationship but there was a negative relationship between family support and the occurrence of diabetes distress. In this study, participantss received good family support. Diabetes distress can affect the quality of life of patients. This is the impact of how much support the patient receives from the family which can increase or decrease the occurrence of distress (Pujiwati, Hadiyanto, & Basri, 2023). Diabetes distress not only impacts the patient's physical condition, but also significantly affects psychological, social aspects and overall quality of life. Family support plays a crucial role in determining the extent to which patients can overcome diabetes distress. Families who provide emotional,

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instrumental, and informational support can help patients feel more motivated and able to face the challenges associated with diabetes. Conversely, a lack of support from the family can worsen the condition of distress and hinder the patient's adaptation process to the disease (Parviniannasab, Faramarzian, Hosseini, Hamidizadeh, & Bijani, 2024). Emotional support from family, such as providing attention, affection, and empathy, can help patients feel less alone in dealing with their illness. This can reduce feelings of isolation and increase patient confidence in managing diabetes. In addition, instrumental support, such as assisting patients in monitoring blood sugar, reminding them of medication schedules, or preparing healthy meals, can ease the burden on patients and improve adherence to treatment plans (Polonsky et al., 2019).

Diabetes mellitus patients require lifelong treatment, this depends on the treatment of the disease to receive and carry out treatment management for patients, good physical and psychological support can provide motivation for patients in their lives so that with motivation and enthusiasm from family support can increase immunity so that patients do not experience diabetes distress. Good support and motivation from the family greatly influences the patient's psychology in overcoming health problems and can even reduce the patient's anxiety level, this can improve the patient's quality of life in living their life. The role of nurses in increasing family independence by providing education about diabetes self-management education to the patient's family greatly influences the patient's psychological condition in living with diabetes, can provide full support and assistance and teach the family independence in caring for and accompanying the patient so that it can improve the patient's quality of life (Bhaskara, Budhiarta, Gotera, Saraswati, Dwipayana, Semadi, & Suastika, 2022).

Support and motivation from family not only have a positive impact on the psychological aspects of the patient but can also affect the patient's physiological and behavioral responses in dealing with their illness. When patients feel emotionally and socially supported by their families, they tend to experience lower levels of anxiety and stress. This can result in improved medication adherence, better blood sugar control, and a reduced risk of diabetic complications. Thus, family support not only improves patients' quality of life psychologically, but also physically (Siburian, Gulo, & Naibaho, 2024).

Motivation from the family can encourage patients to adopt a healthy lifestyle, such as eating nutritious foods, exercising regularly, and avoiding bad habits such as smoking or excessive alcohol consumption. Families can act as “role models” or friends in undergoing healthy activities, so that patients feel more motivated and not alone in the process of behavior change. For example, families can invite patients to take a walk together, cook healthy meals, or do other physical activities that support diabetes management (Retnowati, & Satyabakti, 2015).

CONCLUSION

This study showed that the most significant factors affecting diabetes distress were age, education, treatment method and family support. These findings underline the importance of medication adherence and family support in mitigating the risk of distress as well as the role of routine medication in the long-term care and management of diabetic patients.

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