International Journal Of Health, Engineering And Technology (IJHET) *E-ISSN 2829 - 8683*
Volume 5, Number 4, November 2026, *Page. 3933 - 3941*
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The Application Of Integrated Psychoeducation And Psychopharmacological Strategies In The Management Of Generalized Anxiety Disorder In Patients With Comorbid Type 2 Diabetes Mellitus: A Comprehensive Case Report

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Abstract

Type 2 Diabetes Mellitus (T2DM) is a global health challenge frequently accompanied by significant psychological comorbidities. Generalized Anxiety Disorder (GAD) has a high prevalence among diabetic patients, with both conditions influencing each other through complex neuroendocrine mechanisms. Emotional instability and excessive worry often serve as primary barriers to achieving optimal glycemic control. This case report aims to evaluate the effectiveness of a holistic approach combining advanced psychopharmacology and structured psychoeducation in a young adult patient with a genetic risk of T2DM. Mr. MT, a 32-year-old male, presented with dominant physical complaints including palpitations, dizziness, and persistent epigastric pain for six months. Through in-depth psychiatric evaluation, a pattern of uncontrollable worry (overthinking) was identified, related to family burdens and fear of hereditary disease after discovering an increase in HbA1c levels. Laboratory results showed drastic fluctuations in glycemic control, with peak HbA1c reaching 12.9%. The patient was diagnosed with Generalized Anxiety Disorder with somatic manifestations exacerbated by metabolic conditions. Management involved the use of Escitalopram, low-dose Aripiprazole, Alprazolam, and Trihexyphenidyl, integrated with family psychoeducation interventions and relaxation techniques. Case analysis indicates that chronic activation of the hypothalamic-pituitary-adrenal (HPA) axis due to anxiety triggers cortisol release, inducing insulin resistance and hyperglycemia. The use of Aripiprazole as an SSRI augmentation agent provided dopaminergic stability, helping to reduce cognitive distress. Psychoeducation was proven to increase the patient's self-efficacy in diabetes management and improve medication adherence, which directly correlated with decreased HbA1c levels. The integration of mental health services into diabetes management is crucial. A multidimensional approach encompassing pharmacological stabilization and psychosocial reinforcement through psychoeducation is key to breaking the bidirectional cycle between anxiety and diabetes.

Keywords: Generalized Anxiety Disorder, Type 2 Diabetes Mellitus, HbA1c, Psychoeducation, Psychopharmacology.

INTRODUCTION

Type 2 Diabetes Mellitus (T2DM) has become a global epidemic that imposes an enormous health and economic burden. In Indonesia, this phenomenon demonstrates a highly concerning trend, with the prevalence of diabetes among individuals aged 15 years and older continuing to increase over time ("Efektivitas Psikoedukasi," n.d.). National data from the Indonesian Health Survey (Survei Kesehatan Indonesia [SKI]) and the Basic Health Research Survey (Riset Kesehatan Dasar [Riskesdas]) confirm that Indonesia ranks fifth globally in the number of adults living with diabetes, with projections indicating that this figure will exceed 28 million by 2045 (Perkumpulan Endokrinologi Indonesia [PERKENI], 2021). This disease is often referred to as a silent killer because of its ability to progressively damage almost every organ in the body through vascular and neuropathic complications ("Pedoman Pengelolaan dan Pencegahan Diabetes Melitus Tipe 2," 2021).

Although the physical aspects of diabetes have been managed through strict medical protocols, the psychological aspects of patients' well-being are frequently overlooked in clinical practice. In fact, a diabetes diagnosis imposes a substantial emotional burden on affected individuals. Patients are often confronted with demands for drastic lifestyle changes, painful self-monitoring of blood glucose levels, and fear of long-term complications such as

amputation, blindness, and kidney failure ("Efektivitas Psikoedukasi," n.d.). These circumstances create fertile ground for the development of mental health disorders, particularly Generalized Anxiety Disorder (GAD).

Generalized Anxiety Disorder is characterized by excessive anxiety and worry about various aspects of life that are difficult to control and persist for at least six months ("Clinical Practice Guidelines for the Management of Generalised Anxiety Disorder," n.d.). The prevalence of clinically significant anxiety among individuals with diabetes ranges from 14% to 55%, a rate substantially higher than that observed in the general population ("Anxiety and Diabetes," n.d.). The relationship between these two conditions is bidirectional. Uncontrolled anxiety can trigger biological mechanisms that exacerbate insulin resistance, while hyperglycemia itself can disrupt neurotransmitter function in the brain, subsequently worsening psychological symptoms ("Anxiety and Diabetes," n.d.).

RESEARCH METHODS

Case Report

Patient Identity and Medical History

Mr. MT, a 32-year-old male residing in the Sukamara area of Central Kalimantan, presented to the Emergency Department (ED) of Nawawi Mahmuda Regional General Hospital, Sukamara, with acute clinical manifestations consisting of palpitations (a pounding heartbeat), vertigo, and severe epigastric pain accompanied by extreme restlessness. The patient reported that this was not the first occurrence; he had experienced sudden episodes of anxiety, often without any clear situational trigger, over the preceding six months.

A detailed history obtained through autoanamnesis revealed that Mr. MT was experiencing chronic psychosocial stress. His primary stressor stemmed from the deteriorating health of his parents. The patient felt frustrated because his parents were not adherent to their regular medication regimens. This situation triggered cognitive distress; he felt that his efforts had been futile and believed that his parents did not appreciate his sacrifices. The logistical burden was also substantial, as the patient had to undertake a 12-hour motorcycle journey between Sukamara and Ketapang to manage his parents' medical care. This physically exhausting journey was compounded by the emotional burden of frequently having to leave his wife and young child, as well as profound feelings of guilt toward his coworkers because he often had to request permission to be absent or take leave from work.

A turning point in his psychological condition occurred when Mr. MT realized that he had a strong family history of type 2 Diabetes Mellitus. Fear of this hereditary disease prompted him to undergo an HbA1c test independently. When the results showed a level above the normal range, he experienced a severe exacerbation of anxiety. He became trapped in a pattern of overthinking, felt that his body was affected by numerous diseases, and frequently anticipated adverse scenarios that had not yet occurred (anticipatory anxiety). These psychological symptoms subsequently manifested as social withdrawal; he frequently isolated himself in his room, his interactions with his wife and child decreased substantially, and he began experiencing tremors and cold sweats when in crowded places or public facilities. His gastrointestinal complaints associated with gastroesophageal reflux disease (GERD) were reported to recur more frequently as the intensity of his anxiety increased.

Physical Examination and Serial Laboratory Investigations

At the time of examination in the ED, the patient's general condition was relatively stable, although he appeared markedly tense and restless. Assessment of his vital signs indicated increased autonomic activity that remained within a compensated range.

Clinical Parameter	Examination Result	Normal Value
General Condition	Appeared restless	Calm
Consciousness	Compos mentis	Compos mentis
Blood Pressure	130/90 mmHg	<120/80 mmHg
Pulse Rate	90 beats/min	60–100 beats/min
Respiratory Rate	22 breaths/min	12–20 breaths/min
Body Temperature	36.5 °C	36.5–37.5 °C
Oxygen Saturation	98%	95–100%

The most crucial aspect of Mr. MT's medical monitoring was the serial laboratory data demonstrating a correlation between his psychological condition and glycemic control. The patient underwent routine HbA1c testing, which revealed fluctuating results over time.

Examination Date	HbA1c Result (%)	Metabolic Control Status
April 15, 2025	5.9	Prediabetes / Poorly Controlled
July 13, 2025	7.4	Diabetes Mellitus (Initial Diagnosis)
October 15, 2025	5.9	Good Control (Following Initial Treatment)
January 24, 2026	12.9	Very Poorly Controlled (Relapse)

The dramatic increase in HbA1c to 12.9% in January 2026 occurred after the patient decided to discontinue follow-up visits and stop taking his medication from August through December 2025 because he felt that his symptoms had disappeared. This illustrates a pattern of nonadherence associated with the patient's limited understanding of the chronic nature of diabetes and anxiety.

Multiaxial Diagnosis

Based on the clinical findings and the diagnostic criteria of the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), or the Indonesian Classification and Diagnosis of Mental Disorders, Third Edition (PPDGJ-III), Mr. MT's diagnoses were established as follows.

The primary diagnosis was Generalized Anxiety Disorder (F41.1). The diagnostic criteria were met by persistent anxiety and worry lasting more than six months concerning various aspects of life, including health, family, and work, accompanied by motor tension, manifested as tremors and restlessness, and autonomic hyperactivity, manifested as palpitations and gastric pain. The general medical conditions were Type 2 Diabetes Mellitus (E11) and Gastroesophageal Reflux Disease (K21.9). The psychosocial factors included problems involving the primary support group due to his parents' illnesses and work-environment difficulties associated with feelings of guilt over taking leave.

Dynamics of Pharmacological Management

Mr. MT's pharmacological treatment strategy was designed to address acute symptoms while providing long-term stabilization. The author adjusted the medication dosages periodically according to the patient's clinical response and tolerance of adverse effects.

Initiation Phase (February 2025)

During this phase, the primary focus was to reduce overwhelming anxiety and improve sleep patterns. Escitalopram at a dose of 3.5 mg was administered as a first-line antidepressant for Generalized Anxiety Disorder. The low initial dose was intended to minimize anxiogenic adverse effects that frequently occur during the first weeks of selective serotonin reuptake inhibitor (SSRI) treatment. Aripiprazole at a dose of 3.5 mg was used as an augmentation agent to promote emotional stabilization and reduce cognitive distress associated with overthinking. Alprazolam at a total dose of 8 mg was used as a rapid-acting anxiolytic to manage the anxiety crisis in the ED. This dose was relatively high and required

close monitoring for sedative effects. Arkine (trihexyphenidyl) at a dose of 2 mg was administered to prevent the emergence of antipsychotic-induced extrapyramidal symptoms (EPS), such as akathisia or muscle rigidity.

Maintenance and Dose Adjustment Phase (May–July 2025)

After a clinical response had been achieved and the HbA1c level had decreased to 5.9%, the dosages were adjusted to minimize the long-term medication burden. Aripiprazole was reduced to 1.5 mg, while alprazolam was substantially reduced to 0.5 mg to prevent dependence. Escitalopram and Arkine were maintained at the same dosages.

Relapse and Re-evaluation Phase (April 2026)

The patient returned after five months of missing treatment follow-up. His anxiety and somatic symptoms recurred with greater intensity, accompanied by a substantial increase in HbA1c to 12.9%. Treatment was reinitiated with a stronger emphasis on psychological factors and education regarding treatment adherence.

Implementation of Psychoeducation and Follow-Up

Given the patient's history of nonadherence, intensive psychoeducational interventions were initiated in April 2026. The psychoeducation sessions involved Mr. MT and his wife, who served as his primary caregiver. The educational materials addressed the mechanisms linking stress and blood glucose, explaining how negative thoughts trigger the release of the stress hormone cortisol, which directly increases blood glucose levels. This was intended to establish an understanding that managing one's thoughts is as important as managing one's diet.

Genetic risk management was also addressed by explaining that, although hereditary factors contribute to diabetes risk, the condition can be managed through lifestyle modifications. This intervention aimed to alleviate the patient's hopelessness regarding the disease as an “inherited illness.” Relaxation training was provided by teaching the patient the Slow Deep Breathing (SDB) technique, to be practiced for 10–15 minutes whenever he began experiencing palpitations or restlessness. This technique was intended to enable him to reduce sympathetic nervous system tone independently.

Medication adherence education emphasized that psychiatric and diabetes medications must be taken regularly even when physical symptoms are no longer present, in order to prevent a dangerous “glycemic ping-pong” phenomenon that may harm blood vessels.

The patient was scheduled for monthly follow-up appointments at both the psychiatric outpatient clinic and the internal medicine outpatient clinic to ensure coordination between emotional stabilization and metabolic control.

RESULTS AND DISCUSSION

Neurobiological Analysis: The Relationship Between the HPA Axis, Anxiety, and Diabetes

The case of Mr. MT provides a highly tangible clinical illustration of the neuroendocrine cascade linking psychological distress to metabolic dysfunction. In Generalized Anxiety Disorder (GAD), the brain's alarm system, particularly the amygdala, remains in a state of persistent hyperactivity. This condition stimulates the hypothalamus to release corticotropin-releasing hormone (CRH), which subsequently triggers the anterior pituitary gland to secrete adrenocorticotropic hormone (ACTH) (Anxiety and Diabetes: Innovative Approaches to Management in Primary Care, n.d.).

ACTH then stimulates the adrenal cortex to release cortisol into the systemic circulation. Cortisol, known as the primary stress hormone, has significant catabolic effects on glucose metabolism. Cortisol stimulates gluconeogenesis in the liver and inhibits the translocation of glucose transporter 4 (GLUT4) to the cell membrane in muscle and adipose

tissues, thereby effectively inducing insulin resistance (Pengaruh Tingkat Kecemasan Terhadap Kadar Gula Darah, n.d.). In Mr. MT's case, an untreated period of excessive worry resulted in chronic cortisol exposure, explaining why his HbA1c level remained elevated (7.4%), despite being a newly diagnosed patient of a relatively young age.

In addition to the HPA axis, the sympathetic nervous system also plays a crucial role. The release of catecholamines (epinephrine and norepinephrine) triggers the breakdown of glycogen into glucose (glycogenolysis) to provide rapid energy for the fight-or-flight response. The clinical manifestations of palpitations and cold sweats experienced by the patient provide direct evidence of this sympathetic overactivity (Faktor Stres dan Depresi dengan Kadar Gula Darah Penderita Diabetes Mellitus Tipe 2, n.d.). The HbA1c surge to 12.9% in January 2026 indicates a complete failure of this regulatory system due to accumulated stressors and the discontinuation of medical interventions.

The Significance of HbA1c Fluctuations and Their Psychological Impact

HbA1c monitoring is the gold standard for assessing long-term glycemic control over the preceding 2–3 months (Pedoman Diabetes Melitus Tipe 2 2021, n.d.). However, in patients such as Mr. MT, these laboratory results can often become a double-edged sword. Learning that his HbA1c level is elevated triggers further anxiety (illness-related anxiety), which subsequently contributes to further increases in blood glucose levels (Pengaruh Tingkat Kecemasan Terhadap Kadar Gula Darah, n.d.).

Research indicates that individuals with diabetes have anxiety levels that are 20% higher than those of individuals without diabetes mellitus (DM) (Anxiety and Diabetes: Innovative Approaches to Management in Primary Care, n.d.). Elevated HbA1c levels (>12%) are statistically associated with a significantly increased risk of depression and anxiety (Gambaran Tingkat Kecemasan, Depresi, dan Stres pada Penderita Diabetes Mellitus, n.d.). In Mr. MT's case, each one-unit increase in the anxiety score is predicted to increase random blood glucose levels by 1.594 units (Pengaruh Tingkat Kecemasan Terhadap Kadar Gula Darah, n.d.). This phenomenon reinforces the theory that poor metabolic control results not only from insufficient insulin but also from emotional instability that impairs insulin efficacy at the cellular level.

Literature Review: Mechanisms of Action of the Psychopharmacological Regimen

The selection of combination therapy for Mr. MT was based on the need to target multiple neurotransmitter pathways involved in GAD and his medical comorbidities.

Escitalopram: Serotonergic Stabilization

Escitalopram is a selective serotonin reuptake inhibitor (SSRI) with high affinity for the serotonin transporter (SERT) (Escitalopram for the Treatment of GAD: Efficacy Across Different Subgroups and Outcomes, n.d.). In the treatment of GAD, increased serotonin availability in the synaptic cleft helps regulate fear circuits in the amygdala and worry circuits in the prefrontal cortex. Escitalopram was selected because it has minimal drug interactions with oral antidiabetic medications, which is particularly important for patients with type 2 DM (Clinically and Pharmacologically Relevant Interactions of Antidiabetic Drugs, n.d.). The initial dose of 3.5 mg administered to the patient was intended to avoid exacerbation of acute anxiety, which is sometimes triggered by SSRI initiation (the jitteriness phenomenon) (Anxiolytic and Antidepressant Properties of Alprazolam in Generalized Anxiety Disorder: A Systematic Literature Review, n.d.).

Aripiprazole: Dopaminergic Stabilization and Augmentation

Aripiprazole is a second-generation atypical antipsychotic with a unique mechanism of action as a partial agonist at D2 and 5-HT1A receptors and an antagonist at 5-HT2A receptors (Aripiprazole, n.d.). The use of aripiprazole as an adjunctive therapy to SSRIs has been shown to improve remission rates in patients with treatment-resistant anxiety or severe somatic symptoms (Aripiprazole Augmentation of Combination Escitalopram and Sertraline

in the Treatment of Refractory Obsessive-Compulsive Disorder, n.d.). Its partial agonist mechanism allows aripiprazole to act as a dopamine stabilizer—reducing dopamine activity in the mesolimbic pathway, thereby alleviating agitation and anxiety, while increasing dopamine activity in the mesocortical pathway, thereby improving executive function and reducing overthinking (Aripiprazole, n.d.). From a metabolic perspective, aripiprazole carries a substantially lower risk of weight gain and insulin resistance than other antipsychotic agents, such as olanzapine or clozapine, making it an ideal choice for Mr. MT, who already has diabetes (Association Between Antipsychotic Medication Use and Diabetes, n.d.).

Alprazolam: Acute Autonomic Control

Alprazolam works by binding to an allosteric site on the GABA $_A$ receptor complex, increasing the affinity of the inhibitory neurotransmitter GABA for its receptor. This produces a rapid sedative effect by increasing chloride ion influx into neurons, resulting in hyperpolarization and reduced cellular excitability (Anxiolytic and Antidepressant Properties of Alprazolam in Generalized Anxiety Disorder: A Systematic Literature Review, n.d.). The high initial dose of 8 mg was intended to interrupt the cycle of acute panic and severe autonomic symptoms; however, reducing the dose to 0.5 mg during the maintenance phase is essential to avoid cognitive adverse effects and the risk of misuse (Anxiolytic and Antidepressant Properties of Alprazolam in Generalized Anxiety Disorder: A Systematic Literature Review, n.d.).

Arkine (Trihexyphenidyl): Management of Adverse Effects

Arkine is a muscarinic anticholinergic agent that acts on the central nervous system to restore the balance between dopamine and acetylcholine (Trihexyphenidyl: Benefits, Dosage, and Side Effects, n.d.). Although aripiprazole carries a low risk of extrapyramidal symptoms (EPS), akathisia (a feeling of being unable to remain still) may still occur. Administering Arkine helps ensure that the patient does not experience additional distress due to motor adverse effects, which patients with anxiety often misinterpret as a worsening of their primary condition (Trihexyphenidyl: Benefits, Dosage, and Side Effects, n.d.).

The Role of Family Psychoeducation in Breaking the Vicious Cycle of Anxiety and Diabetes

The psychoeducational intervention provided to Mr. MT was not merely an informational exercise but a therapeutic strategy intended to change the patient's perception of his illness. Psychoeducation has been shown to be effective in reducing anxiety levels among people with diabetes by improving their understanding of the disease and their coping skills (Pemberdayaan Pasien Diabetes Melitus untuk Menurunkan Kecemasan melalui Psikoedukasi, n.d.).

Analysis of the Psychoeducational Components in Mr. MT's Case:

Intervention Strategy	Mechanism of Change	Clinical Impact
Disease literacy	Eliminating myths about hereditary diabetes being "inevitable."	Reduced fatalism and increased motivation to achieve glycemic control.
Caregiver involvement	Reducing the burden of patient isolation and ensuring medication adherence monitoring.	Improved treatment adherence from 0% (August–December) to regular adherence after April 2026.
Breathing techniques (SDB)	Activation of the parasympathetic nervous system through vagus nerve stimulation.	Immediate reduction in palpitations and systolic blood pressure during anxiety crises.

Problem-focused coping	Teaching the patient how to communicate with colleagues and family members about his illness.	Reduced guilt and psychosocial stressors in the workplace.

Research by Restiningrum et al. (2024) indicates that group psychoeducation can reduce psychological distress scores from the severe category (>30 on the K10 scale) to the moderate category (<25) (Psikoedukasi untuk Mengurangi Distres Psikologi pada Penderita Diabetes Melitus Tipe 2, n.d.). In Mr. MT's case, the success of psychoeducation is reflected in his willingness to resume treatment after an extended period of disengagement and his ability to identify the triggers of his overthinking.

Alignment with National Clinical Guidelines (PERKENI and PDSKJI)

The management of this case is consistent with the Indonesian Guidelines for the Management of Type 2 Diabetes Mellitus in Adults (2021 and 2024) issued by PERKENI. These guidelines emphasize the importance of comprehensive management, with education serving as the first pillar (Unduhan, n.d.). Failure to achieve glycemic targets is often attributable to non-medical factors, including the patient's psychiatric condition.

On the other hand, the Clinical Practice Guidelines for Psychiatry (2022) and the PDSKJI guidelines for Generalized Anxiety Disorder emphasize that pharmacological treatment should be combined with psychotherapy or psychoeducation to achieve better long-term outcomes (Clinical Practice Guidelines for the Management of Generalised Anxiety Disorder (GAD) and Panic Disorder (PD), n.d.). The case of Mr. MT demonstrates that separating diabetes care from psychiatric care will only lead to treatment failure in both domains. Integration at the primary healthcare level, such as through the Prolanis program, is strongly recommended to facilitate early detection of anxiety symptoms in patients newly diagnosed with diabetes, thereby preventing severe metabolic complications, such as an HbA1c level of 12.9% (Hubungan DM Tipe 2 dengan Kejadian Cemas pada Peserta Prolanis Puskesmas Limpung Kabupaten Batang, n.d.).

CONCLUSION

The case report of Mr. MT confirms that Generalized Anxiety Disorder has a destructive metabolic impact through chronic activation of the HPA axis, leading to insulin resistance and a drastic failure of glycemic control, with HbA1c levels rising from 5.9% to 12.9%. There is a strong bidirectional relationship between the patient's perception of the genetic burden of the disease and the intensity of anxiety symptoms. Fear of hereditary disease triggers an avoidant coping style, resulting in medication nonadherence. The psychopharmacological combination of Escitalopram (an SSRI), Aripiprazole (a low-dose atypical antipsychotic used as an augmentation agent), and Alprazolam (a short-term anxiolytic) has proven effective in stabilizing psychological and autonomic symptoms without imposing an adverse metabolic burden. Furthermore, family psychoeducation is a key intervention that has successfully improved the patient's self-efficacy and restored medication adherence following a period of relapse. Involving family members as a support system has been shown to reduce the patient's level of emotional distress.

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