

**Psychological stress as a risk factor for psychosomatic disorders: the case of diabetes
(A clinical illustration)**

التوتر النفسي كعامل خطر للإصابة الأمراض السكوسوماتية مرض السكري كنموذج

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Abstract:

The present study aims to investigate the relationship between psychological stress and the emergence of psychosomatic disorders, using diabetes as an applied model. The research relied on the clinical approach, as it provides an in-depth understanding of the studied case within its real and personal context. Three main tools were used: observation, clinical interview, and case study. A patient with diabetes, followed at the Annaba University Hospital Center, was selected to highlight how psychological factors (stress) interact with physiological factors (diabetes), in addition to applying the Stroop Test for psychological stress. The results indicated that chronic stress represents a risk factor in the exacerbation of psychosomatic disorders among diabetic patients as it contributes to the disruption of the psycho-physiological balance.

Keywords: Psychological stress; Psychosomatic disorders; Diabetes .

ملخص:

تهدف الدراسة الحالية إلى الكشف عن العلاقة بين التوتر النفسي وظهور الأمراض السكوسوماتية، مع اعتمادا على مرض السكري كنموذج تطبيقي. وقد استند البحث على المنهج العيادي لما يوفره من إمكانية فهم معمق للحالة المدروسة في سياقها الواقعي والشخصي. اعتمدت الدراسة على ثلاث أدوات أساسية من الملاحظة، المقابلة العيادية و حيث تم اختيار حالة مصابة بمرض السكري تتابع بالوحدة الاستشفائية بسيدي عمار بعناية، وذلك لتسليط الضوء على كيفية تفاعل العوامل النفسية (التوتر) مع العوامل الجسدية (مرض السكري) إلى جانب تطبيق اختبار ستروب للتوتر النفسي. Test Stroop.

وذلك النتائج على أن التوتر المزمن يمثل عامل خطر في تفاقم الأمراض السيكوسوماتية لدى مرض السكري، حيث ساهم في اضطراب التوازن النفسي- الفيزيولوجي
كلمات دالة : التوتر النفسي – الأمراض السكوسوماتية – مرض السكري .

1.Introduction

Humans live in constant interaction with their surrounding environment, receiving stimuli that trigger various responses, whether joy or sadness, and sometimes exhilaration or depression. Thus, the individual's life is a dynamic interplay between external environmental stimuli and their internal requirements, with responses being either positive or negative, accompanied by internal physiological changes that increase or decrease the activity of the body's vital systems, leading to a state of emotional arousal and Psychological Stress.

This stress is not always negative, despite the imbalance and internal disturbance it causes the individual. Were it not for a certain degree of psychological stress, the individual would not care about what is happening around them. Without tension driving creativity, self-realization, and excellence, no effort would be made to achieve the best performance in competition. Stress and emotions are the driving fuel that motivates humans to perform various behaviors.

With the change in life's demands and the increasing pace and acceleration of events, the individual among us has become unable to keep up with this acceleration and fulfill all their increasing demands and needs, resulting in a succession of failures and frustrations. Psychological stress then transforms from a positive charge (psychological energy) necessary to push us to achieve our goals and make appropriate decisions, into a negative, inhibiting charge that hinders clear thinking and effective interaction and response to situations.

This psychological stress generated within the individual's psyche becomes a source of pain and disruption after having been a catalyst for life and work. This is the result of a failure to manage stress, eliminate its symptoms, and achieve a state of psychological balance. The repetition of stressors, the increase in their severity, their persistence over a period of time, and the repeated unsuccessful attempts to eliminate and discharge them will lead the individual to a state of physical fatigue and psychological exhaustion, where the symptoms of a disorder replace the temporary, transient symptoms (the normal physiological response). These symptoms manifest as a state of mental, muscular, or motor inhibition, where the stress disappears and its source is not apparent on the surface, but its effect takes another form, appearing in one of the body's organs as psychosomatic disorders.

The subject of psychosomatic diseases has generated controversy among many researchers and scientists studying human beings and investigating their psychological and physical troubles, due to their widespread prevalence across different and varying age stages. This wide spread of these chronic and serious diseases has prompted those interested in the field to search for the relationship between the mind and the body to explain these illnesses and address the problem stating: "The mind thinks and the body responds."

This type of illness refers to the existence of a set of tangible organic injuries caused by psychological and emotional disturbances, which indicates the strong connection between the body and the mind and the extent of the emotional factor's influence on the human body. Manifestations of the psychological factor include various psychological pressures,

deprivation, severe repression, and emotional psychological trauma (Zalouf&Senoussaoui, n.d., p. 141).

The individual's internal balance is directly affected after the onset of emotion, leading to a disturbance in the body's biochemical balance, which varies according to the intensity and duration of the emotion. A response in a specific body organ is considered an actual organic disorder of psychological origin, i.e., a psychosomatic disorder. Thus, the manifestations of psychosomatic diseases appear as actual physical injuries in individuals, and among these diseases is diabetes, as a clear example of the reciprocal effects between the psychological state and the physiological system.

Diabetes is considered one of the psychosomatic disorders in which psychological factors play a significant role in causing or exacerbating the individual's pathological condition. Developing countries show the highest rates of diabetic disorders due to population distribution, poor living conditions, unemployment, widespread poor habits, poverty, malnutrition, and other manifestations and factors that contribute to the worsening of the problem, which has led scientists, those interested in the medical field, physiological doctors, and workers in the psychological field to attach great importance to diabetes (Abu Al-Qasim, 2013, p. 183). Psychological studies have indicated that states of anxiety, stress, and acute and chronic emotions are among the most important factors leading to the onset of diabetes or predisposing to its appearance. This is due to the direct impact of these states of anxiety and emotions on the endocrine glands and the increased secretion of certain hormones such as adrenaline, whose level increases in the blood, as well as growth hormone from the pituitary gland, thyroid hormone, etc. Furthermore, the deficiency in hormone secretion leads to a weak degree of absorption (Khair Al-Zarrad, 2000, p. 388).

In this context, Dejours (1977) pointed out that the onset of diabetes frequently follows and is associated with a specific and violent emotional or affective shock, and that there is a significant correlation between blood sugar level during exposure to violent emotions and stressful situations (Mirewad&Hammouda, 2014, p. 277).

Therefore, diabetes is a chronic disease that has specific effects on the psychological state of the patient and their family. The disease represents a long-term state of continuous conflict between the affected individual and the disease and its life-threatening implications. The role of the psychological factor is to accelerate the onset of diabetes in individuals with a genetic predisposition. The relationship between diabetes and the psychological factor is considered a bidirectional one, as a poor psychological state in a diabetic patient leads to an imbalance in blood sugar levels beyond the normal range, and vice versa. The diabetic patient's reactions differ from one person to another, manifested in their acceptance of the disease and adherence to treatment, or their rejection and non-acceptance of the disease or treatment. Consequently, there are many pressures on the patient that negatively affect them and those around them (Ben Said, 2018, p. 233).

The discovery of the disease constitutes a violent psychological shock, causing a narcissistic injury to both the affected person and their family, and a strong sense of guilt in the latter, especially since this disease is incurable and requires vigilance and continuous monitoring. The stress experienced by the patient creates a poor situational and emotional

state, as the loss of good health leads to a deterioration of the patient's psychological condition and results in psychological torment that overwhelms the body and impedes its activity. The diabetic patient remains hostage to the continuous medication imposed on them through insulin injections and the resulting consequences, where psychological pressure can lead to behavioral responses such as aggression or depressive states, and sometimes to anxiety and difficulties in interacting with others, often resulting in withdrawal, neglecting the disease, and non-acceptance, sometimes even leading to self-destruction. Other symptoms appear in the affected person upon receiving death threats related to fainting episodes and the serious, anxiety-provoking, and frightening complications of the disease, which can lead to severe sadness and pessimism dominating their life (Zalouf, 2011, pp. 85-90).

Based on the foregoing, the current study aims to determine whether psychological stress is a risk factor for psychosomatic diseases, using diabetes as a model. This highlights the importance of studying the variable of psychological stress in its relationship with psychosomatic diseases, with diabetes as a model.

Based on this, the research problem is defined by answering the following questions:

- Is psychological stress considered a risk factor for psychosomatic diseases, using diabetes as a model?

Central Question from which the Partial Questions branch out:

Partial Questions

- Does psychological stress contribute to the emergence of psychosomatic diseases, with diabetes as a model?
- How is psychological stress manifested through the Stroop Test in patients with psychosomatic diseases, using diabetes as a model?

2.Study Hypotheses

General Hypothesis: Psychological stress is a risk factor for psychosomatic diseases, with diabetes as a model that appears elevated through the Stroop Test.

Partial-Hypotheses

- Psychological stress contributes to the emergence of psychosomatic diseases, with diabetes as a model.
- Psychological stress appears elevated through the Stroop Test in patients with psychosomatic diseases, using diabetes as a model.

3.Study Variables

The following concepts were addressed

Psychological Stress: Physiological reactions performed by the body to confront changes or threats encountered, whether originating from the environment in which the individual lives or from within the individual, as an attempt to return the person to their natural state (Al-Nawaiseh, 2013, p. 59).

Psychosomatic Diseases: Bodily symptoms arising from emotional factors, involving one organ system that is under the control of the autonomic or voluntary nervous system (Abdul Moati, 2003, p. 31).

Diabetes: Diabetes is a disease resulting from a disorder in the metabolic process, characterized by elevated blood glucose concentration due to an absolute or relative deficiency of insulin (Fouqia, 2003, p. 104).

4. Importance of the Study

The importance of the study lies in:

- Determining whether psychological stress is a risk factor for psychosomatic diseases, using diabetes as a model.
- Identifying the degree of elevation of psychological stress through the Stroop Stress Test.

5.Previous Studies

There have been many studies that investigated the problem of psychological stress among patients with chronic diseases in general (heart disease, cancer, hypertension, etc.) and particularly diabetic patients. Most of these studies attempted to highlight the main stressors that lead to psychosomatic diseases, with diabetes as a model.

A study conducted by Assia Ben Said (2018), titled: "Psychological Factors and their Relationship with Diabetes: An Anthropological Study," attempted to show that the psychological factor is a bidirectional factor in the illness, based on a case study sample of male and female diabetic patients. The study showed that a poor psychological state may contribute to elevated blood sugar, and vice versa. It also found that psychological stress weakens adaptation to the disease and reduces responsiveness to treatment.

A study conducted by SamerRadwan et al. (2012), titled: "Psychological Stress in Adolescents with Type 1 Diabetes and its Relationship with Some Variables," aimed to identify the psychological stressors facing adolescents with Type 1 diabetes and their relationship with certain variables. The sample consisted of (50) affected adolescents (25 males and 25 females). The results showed that adolescents with "Type 1" diabetes are exposed to high stress, and a relationship was found between psychological stress and hospital admissions; as the number of hospital admissions increased, psychological stress increased. It was also found that females are exposed to more psychological stress than males, and statistical analysis did not show a significant relationship between stress and age at diagnosis.

- Commentary on the Studies

We were interested in these studies because they primarily focused on diabetic patients and the extent of the impact of psychological stress. They are similar to our study in that they show that the diabetic patient, as a result of their disease, falls under many pressures that they cannot overcome.

6.Study Procedures

6.1Study Methodology

The methodology is considered the foundation of scientific research, and it varies according to the study. It is also the method followed to reach specific results that serve the study.

We used the Clinical Method because it serves our current study, and this is within the framework of the Cognitive Behavioral Theory. Pierron R (1979) defines it as: "the method

that allows knowledge of the psychological functioning and behavior with the aim of reaching a clear picture of the psychological phenomena for which the patient is considered the source" (cited in Abbas, 1990, p. 38).

We relied on this method to clearly delineate the psychological events emanating from the patient with psychosomatic diseases, using diabetes as a model, and to illustrate the danger of psychological stress on the latter, relying on its tools: the interview, observation, case study, and the application of the Stroop Stress Test (Test Stoop).

- Case Study (The Clinical Method)

The case study is an exploratory clinical method that focuses on the individual and aims to develop hypotheses. It is the container in which the clinician organizes and evaluates all the information and results obtained from the client, through both types of observation and interviews, in addition to the social history, medical examinations, and psychological tests. The case study allows for the description of normal and abnormal, familiar or rare phenomena, and the formulation of hypotheses for studying personality, researching causality, or treating psychological disorders (Boussenna, n.d., p. 16).

Through the case study, we were able to gather detailed and comprehensive information about the diabetic patient regarding their life, disease history, the pressures they were exposed to, etc., by means of observation, the clinical interview, and the application of the test.

6.2 Study Sample

The study sample consists of one case affected by a psychosomatic disease, diabetes. This case was referred for examination by the treating physician for diabetes, for psychological follow-up, given that I monitor these cases for psychological treatment resulting from the non-acceptance of the disease and consequently irregular medication intake, at the hospital institution in Annaba Wilaya Province.

6.3 Study Tools

Any study requires specific means to clearly and accurately reach the desired results. In this study, we used several tools, including Clinical Observation, the Semi-Structured Interview, the Case Study, and the Stroop Stress Test.

A. Clinical Observation

Observation may be **direct**, as occurs in the diagnostic interview and through the application of psychological tests, or it may be **indirect**, by obtaining information from people who had a direct opportunity to observe the client, as is the case, for example, in evaluating social maturity. It is especially useful when combined with other tools to detect consistency or inconsistency between data from different sources (Abdul-Wahab Mahmoud, 2016, p. 34).

In this study, we relied on direct clinical observation.

B. Clinical Interview

It is a type of conversation between the other (the patient) and the psychologist in a face-to-face situation with the aim of identifying the patient's problems and revealing conflicts and their significance. The interview thus takes the form of dialogue and

confrontation, allowing the patient the possibility of free self-expression, and consequently understanding the problems they are suffering from (Abbas, 2002, p. 48).

The clinical interview varies in terms of the type of questions asked and is divided into three types: the non-directed clinical interview, the directed clinical interview, and the semi-directed clinical interview.

We relied on the semi-directed clinical interview as it allows us to gather as much information as possible about the patient while adhering to the subject of our study.

C.The Stroop Stress Test

Definition of the Stroop Stress Test

The Stroop Test is a psychological tool used to study attention and the brain's executive functions. The participant reads the names of colors written in an ink color different from their meaning (e.g., the word "RED" written in blue ink), and they are asked to name the ink color instead of reading the word. This generates what is called Cognitive Interference, and it measures the individual's ability to control attention and inhibit automatic responses in favor of intended responses.

The Stroop Stress Test: When the test is administered in a stressful environment (setting a short time limit, adding annoying sounds, or close monitoring of performance), the Stroop Test aims to measure:

- Cognitive performance under pressure.
- Physiological changes (such as heart rate, etc.).

We selected the Stroop Stress Test in this study because it reveals the degree of psychological stress.

Test Description: The test is in the form of a booklet where the client writes their answers and consists of three subtests:

1. Subtest I: 50 lines of 4 color names (Green, Red, Blue, Yellow), printed in black. The subjects quickly write the initial letters of each color's name in the corresponding boxes. (First Task).
2. Subtest II: 50 lines of 4 colored squares (Green, Red, Blue, Yellow). The subjects quickly write the initial letters of the color in the corresponding boxes. (Second Task).
3. Subtest III: 50 lines of 4 color names (the same as before) printed in colored ink. Each name can be written in the three other colors or in the same color. The subjects must write the initial letter of the ink color used to write the words in the corresponding boxes (Interference of two tasks).

The time allotted for giving the answer is 90 seconds for each card.

- **History of the Test:** The history of the test dates back to the end of the last century, to the works of N. Wundt and J. McK. Cattell on the programming time for naming objects and colors and reading words. Since reading colors requires time, unlike reading words, this was the reason for the emergence of studies by W. James in the *Principles of Psychology* journal.

The important aspect of the test is the state of conflict and distraction studied by E. R. Jaensch in his works on different types of perception.

The test was developed by the American psychologist J. R. Stroop in 1935 under the name Color-Word Test. Stroop used this test regarding the interference in sequential verbal reactions. His study was published in the *Journal of Experimental Psychology* and was followed by a sole study using the Color-Word Test in 1938.

Instructions: The instructions must be as detailed and simplified as possible for the individuals to understand them.

- In the first card, subjects must read the words written in black.
- In the second card, they must read the words written in different colors that do not carry their semantic meaning.

However, in the third card, they must name the different colored rectangles. After that, the second card is presented again, but this time, the subjects must name the color of the ink used to write the words (giving the color aspect and inhibiting the semantic aspect). (CREAPSY / Editions & Impressions Amerdil)

7.Presentation and Analysis of Study Results

7.1 Case Presentation

Sabrina is a 50-year-old married woman, a mother of one child, and works as a nurse in a hospital. She discovered she had diabetes about a year and two months ago when several symptoms began to appear, such as dizziness, frequent urination, excessive thirst, along with eating a lot and having a high temperature.

7.1.1 Analysis of the Semi-Structured Clinical Interview Content

Since learning of her diagnosis, diabetes was a strong shock for Sabrina, which is evident in her statement: "I didn't expect a day would come when I'd get a disease like this." Thus, the diagnosis of diabetes constituted a psychological trauma for the patient. Her initial non-acceptance of the disease is shown in her statement: "At first, I didn't accept this disease; it took me a year to get a little used to it, and now it's normal." It is clear from her words that she initially rejected her illness, but over time, she became more understanding of her situation and her disease: "I accepted it, and I put in my mind that it's normal, especially since my father has diabetes." Regarding the cause of her illness, she believes it stems from the excessive pressures and responsibilities she bears at work and at home, which is evident in her statement: "My sugar came from too many responsibilities and the stress I have."

She does not consider her illness an obstacle to her work; through work, she seeks to vent and forget the pressure she experiences from the illness and her responsibilities. She believes that work helps her overcome all the problems she faces, according to her statement: "My job is what makes me forget my problems and the pressure on me." However, in case of crowding and chaos at her workplace, she becomes very anxious, which is shown in her statement: "When I am with the crowds, I am always stressed, the pressure affects me, and my sugar level rises. I love calm." Thus, she lives in a state of psychological stress both at work and at home.

Regarding her relationship with her family environment, she suffers from too many responsibilities and a lack of understanding from her husband, especially in her statement: "No one understands you; I do everything, both a woman's and a man's role." This indicates the pressure from the responsibilities she performs. She says that since her marriage, she has been suffering from these pressures, with a dependent, irresponsible husband, which she believes was the cause of her illness, stating: "Since I got married, I've been the one suffering; I'm the one who handles everything. He just sleeps, wakes up, and goes to work; he doesn't even care about his daughter. He gave me sugar (diabetes)." Thus, all this suffering and the psychological stress she experienced was a risk factor in the onset of diabetes as a psychosomatic disorder, especially since the case had a genetic predisposition (father is affected).

Sabrina believes that diabetes is in God's hands, but she feels inadequate and has not accepted it. She does not adhere to the diet and advice given to her by those around her, blaming herself for it, which is evident in her statement: "I don't stick to the diet; I crave and eat as if I'm not sick, and I know I'm harming myself." She confirmed this by saying: "I am not serious, I cheat, I cheat on the diet," (accompanied by signs of regret on her face).

The patient "Sabrina" is afraid of the deterioration of her health and is terrified of the complications of diabetes, which is evident in her statement: "I'm afraid of going blind and my kidneys failing. I prefer to die than to suffer and have my daughter suffer with me. Death is one thing, there is no God but Allah." The diagnosis of diabetes affects the psychological well-being of the patient and leads to an imbalance in psychological equilibrium, and consequently, a deterioration in the psychological state and the appearance of psychological disorders such as tension, introversion, severe sadness, fear of death, etc. This is what appeared in the case through the interview.

- After conducting the semi-structured clinical interview with the case Sabrina, the Stroop Stress Test was applied, which took 90 seconds to answer each card. The results are in the following table:

Table 01 : Results of Stroop Stress Test

Name	RG	RS	IT
Sabrina	6.3	1.2	4.2

- Indicator Clarification:

- **RG:** Global Responses: Measures overall performance, i.e., the number of correct versus incorrect answers across all phases.
- **RS:** Specific Responses: Measures accuracy and concentration in situations requiring higher discrimination (e.g., the conflict condition).
- **IT:** Time Index: Measures the speed of response, i.e., the time taken to process information.

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7.1.2 Presentation and Analysis of Test Results

The results of the Stroop Stress Test for the case showed that the Global Response (RG = 6.3) falls within the average level, reflecting generally acceptable performance without reaching a high level of resistance to psychological stress.

However, the Specific Responses (RS = 1.2) were clearly low, indicating difficulty in controlling selective attention when facing situations of cognitive interference, where the effect of psychological stress is evident in the decline of accuracy and concentration.

The Time Index (it = 4.2) revealed a relative slowness in cognitive processing, suggesting that the patient resorted to slowing down the response as a compensatory mechanism to reduce errors. However, this was not sufficient to maintain high performance. Overall, these results reflect that there is psychological stress embodied in a weak ability to control cognitive conflict and the balance between speed and accuracy.

8. Discussion of Results

Through the presentation and analysis of the content of the semi-structured clinical interview and obtaining the results of the Stroop Stress Test, it became clear that the case Sabrina experienced a state of stress and psychological pressures from bearing multiple responsibilities, especially in her married life where she played the role of wife, mother, and the role of the man (dependent, irresponsible husband...). In addition to her work in the hospital, all this served as the triggering factor for the onset of the disease. We must also note that the case had a genetic predisposition to the disease.

This aligns with what Dejours (1977) pointed out, that diabetes often follows and is associated with a violent emotional shock, and that there is a significant correlation between blood sugar level during exposure to violent emotions and stressful situations. Furthermore, the results of the Stroop Stress Test for Sabrina showed a degree of psychological stress, manifested in a decline in accuracy of concentration alongside relative slowness in cognitive processing, reflecting a limitation in her ability to effectively cope with psychological stress. All these data illustrate that psychological stress directly affects cognitive control mechanisms by weakening attentional control and increasing the likelihood of making mistakes when exposed to conflict-inducing situations. The results also reveal a high cognitive sensitivity to stress, embodied in the difficulty of maintaining the cognitive balance between speed and accuracy.

9. Conclusion

It is clear from this study that stress is not limited to affecting only the emotional or cognitive aspects but extends to constitute a fundamental factor in the disruption of human physical and psychological balance. Chronic exhaustion and its associated emotional disorders contribute to an increased susceptibility to psychosomatic diseases, with diabetes serving as a model for this. Research has proven that recurrent psychological pressures negatively affect the secretion of hormones regulating blood sugar levels, leading to difficulty controlling the disease and the exacerbation of its complications. We observed that it is important to study the psychological aspect of diabetic patients to understand the pressures cases experience in its onset, which was one of the study's objectives.

10. Recommendations and Suggestions

In light of the study results, we suggest the following:

- The necessity of intensifying field studies on the relationship between psychological stress and psychosomatic diseases.
- Encouraging multidisciplinary research (Psychology, Medicine, Immunology) to understand the interactions between psychological and biological factors.
- Enhancing the integration between medical treatment and psychological treatment, especially in cases of chronic diseases.
- Encouraging the adoption of healthy lifestyle patterns (balanced nutrition, physical activity, good sleep) to reduce the effects of psychological stress.

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