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Perceived Stress and Psychological Well-Being Among Patients with Diabetes: The Mediating Role of Emotional Regulation

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ABSTRACT

This study investigated the relationship between perceived stress and psychological well-being among patients with diabetes, with particular emphasis on the mediating role of emotional regulation. Diabetes is a chronic health condition that requires continuous self-management and may create considerable psychological and emotional challenges for individuals, making it important to understand the factors that contribute to patients' psychological well-being. A quantitative cross-sectional research design was used to examine the relationships among perceived stress, emotional regulation, and psychological well-being in adult patients diagnosed with diabetes in Pakistan. The study included 421 respondents who were selected through non-probability convenience sampling from relevant healthcare settings. Data were collected through an adopted structured questionnaire administered using Google Forms, and participation was voluntary with informed consent and confidentiality maintained throughout the data collection process. Perceived stress was assessed using the Perceived Stress Scale, emotional regulation was measured through the Emotion Regulation Questionnaire, and psychological well-being was assessed using the Ryff Scales of Psychological Well-Being. The collected data were organized and analyzed using IBM SPSS. Descriptive statistics were used to summarize the characteristics of the respondents and study variables, while Pearson Product-Moment Correlation was used to examine the relationships among the major variables. Multiple Linear Regression was conducted to determine the predictive contribution of perceived stress and emotional regulation to psychological well-being, while mediation analysis using PROCESS Macro Model 4 was performed to examine whether emotional regulation explained the relationship between perceived stress and psychological well-being. The findings demonstrated that perceived stress was negatively associated with psychological well-being, indicating that greater levels of perceived stress were related to poorer psychological well-being among patients with diabetes. Emotional regulation showed a positive relationship with psychological well-being and significantly contributed to its prediction, suggesting that effective management of emotional experiences may support better psychological adjustment. Furthermore, the mediation analysis indicated that emotional regulation partially mediated the relationship between perceived stress and psychological well-being, showing that perceived stress was related to psychological well-being both directly and indirectly through emotional regulation. These findings highlight the importance of considering psychological and emotional factors alongside medical treatment in diabetes care. The study suggests that incorporating stress-management strategies, emotional regulation skills, psychological counseling, and supportive interventions into diabetes care may help patients cope more effectively with the emotional demands of chronic illness and promote better psychological well-being. The findings may also provide useful direction for healthcare professionals, researchers, and practitioners seeking to develop more comprehensive and patient-centered approaches to diabetes management.

Introduction

Perceived Stress Among Patients with Diabetes

Diabetes is a complex health condition that affects many areas of a person's daily life. Individuals living with diabetes are required to regularly monitor their blood glucose levels, take prescribed medications, follow dietary recommendations, and maintain appropriate physical activity. Effective diabetes management also requires continuous attention to the condition and regular follow-up visits with healthcare professionals. Because of these ongoing responsibilities, living with diabetes can place considerable demands on individuals and influence their physical, emotional, and psychological well-being. Therefore, psychological pressure built from the anxiety of risks associated with the conditions and its management is not uncommon. Studies have shown that such psychological pressure is experienced by a large portion of the population living with diabetes (Perrin et al., 2017). It is postulated that diabetes-related emotional distress is a result of feelings of ineffectiveness and powerlessness (Morales-Brown et al., 2024).

Another study has shown that the level of stress associated with a diabetes condition is subjective. What stresses a person with diabetes may not stress another person with the same condition. There are various cases of diabetes management that become distressing, and may affect self-management of the condition in a negative way, for example strict dietary restrictions (Panagi et al., 2022). People who are recently diagnosed with the condition experience more distress than those who have had the condition for a long time. Although there is much information available about how diabetes management may become distressing, and alter the quality of life of a person, not much has been done to help manage the psychological effects of the condition (Siddharthan et al., 2021).

Students often experience feelings of panic, anxiety and helplessness when they feel they do not possess the mental strength to deal with their illness and its demands. This may distract them from dealing adequately with their illness and may lead to a cycle of psychological distress. It has been recently reported that distress related to diabetes (diabetes distress) is associated with patients' perceptions of emotional incompatibility and loss of control (European Association for the Study of Diabetes, 2026).

Stress is perceived differently by different people. This may be important when dealing with the psychological aspects of patients suffering from diabetes. From the available evidence, it may be concluded that emotional control is an important factor in dealing with stress (Hara et al., 2014). This may vary according to the individual and the stress-related situation. There is evidence to suggest that emotional control and regulation may be the important psychological factors that affect patients suffering from stress related to their diabetes (Shrout et al., 2020).

Psychological Well-Being Among Patients with Diabetes

Positive psychological functioning, known as psychological well-being, describes the ability to maintain psychological, social and spiritual resiliency, which enables an individual to face the normal stresses of life in a fulfilling and meaningful way. It encompasses self-acceptance and personal growth as well as the ability to maintain satisfying relationships with others (Kalra et al., 2018). Importantly, psychological well-being includes positive emotions, growth and functioning and is not merely the absence of psychological problems. People with diabetes, in particular, need psychological well-being in order to self-manage their condition and adjust psychologically to a new way of life. The consequences of poorly controlled diabetes affect all aspects of an individual's being and may lead to emotional exhaustion and affect self-management behaviors (Debono & Cachia, 2007).

Common problems associated with adjusting to a diabetic way of life include emotional issues related to loss of control of one's health, treatment and lifestyle. Feelings of distress may also stem from fear of developing diabetes-related health problems and complications. People who have problems self-managing their diabetes often report feelings of anxiety, fear and emotional exhaustion. According to recent studies, psychological distress associated with diabetes, affects a person's sense of self and may lead to an individual perceiving themselves as being powerless and having no control over their diabetes. Studies on chronic illness have shown how necessary psychological processes are to adaptation and have shown that individuals are able to evaluate and regulate their emotions to promote their psychological health and well-being (Wieringa et al., 2018). Persons with higher levels of perceived stress report lower levels of psychological well-being. The perception of stress as being constant, unmanageable and uncontrollable, may result in decreased psychological well-being. It is important to consider that psychological well-being is influenced by a number of factors, including the individual's ability to control the source of stress, as well as the individual's ability to regulate emotional responses. Ruminating on emotions and avoiding responses to emotional stimuli negatively influence psychological well-being (Karademas & Thomadakis, 2020).

Emotional Regulation Among Patients with Diabetes

The capacity to regulate one's emotions is the ability to identify and understand feelings and the ability to alter emotional responses to various stimuli. Emotional regulation is crucial for all individuals to control their actions and behavior to negative stimuli rather than automatically responding to it. Individuals who suffer from chronic illnesses and conditions find emotional regulation crucial since there are limits to the control one has in alleviating the sources of stress and suffering. Effective emotional regulation enables sufferers to respond to the demands of their condition and engage in actions and behaviors required to improve their condition, and cope with the consequences of the illness (Coccaro et al., 2021).

Constant and unrelenting emotional demands and obligations are sometimes difficult to manage by people suffering from chronic diseases and conditions. This is especially true with individuals suffering from diabetes. The conditions and consequences associated with the disease often result from unmanaged emotions and negative responses. Some of the strongest emotions suffered by people with diabetes include fear of suffering from the complications of the disease. People with the condition also suffer from emotional and psychological distress and negative responses to the demands and inconveniences associated with the management of the condition. Recent findings suggest that emotional consciousness and judgment as well as emotional control are essential in the management of diabetes related conditions (Kane et al., 2018).

Results from diverse clinical populations indicate that the use of adaptive emotion regulation strategies is related to higher levels of well-being, while the inability to regulate emotions is linked to worse psychological conditions (Kollin et al., 2024). Related diabetes research indicates that emotion regulation affects the psychological condition of patients and the way they accept and adapt to their condition (Rahmania & Rizkillah, 2022). Emotion regulation may connect perceived stress and the psychological condition of people with diabetes. Negative emotions and psychological stress lead to an increase in emotional needs. The inability to regulate emotions may increase the impact of stress on the psychological condition of people with diabetes. It has been shown that for people with chronic illnesses, including people with diabetes, the inability to regulate emotions increases stress and negative psychological condition, and sometimes worsens their physical symptoms (Aliche & Idemudia, 2025).

Integrated Relationship Among the Study Variables

Literature on diabetes and psychology focuses on the association of stress, emotional regulation, and mental health. There are many physical and mental demands of having diabetes and some of these aspects of the disease are uncontrollable and unmanageable. As a result, a person may feel very stress and may have increased emotional demands (Jalilvand et al., 2012). The regulation of emotions can help people manage the effects of stress and maintain mental equilibrium. However, not being able to regulate emotions has been shown to have adverse effects on psychological health (Bhunia, 2013).

Emotional regulation no doubt plays an important role in coping with stress and enhancing mental health. It is conceivable that emotional regulation is the means by which stress is coped with and mental health is attained. It is postulated that stress represents mental health concerns and emotional regulation describes mental health in people with diabetes. There is evidence that considers emotional factors to describe the psychosocial aspects of diabetes (Distress) and assist in the understanding of why some people with diabetes feel unmanageable psychological distress (Bekhet & Mugableh, 2012).

Research Objectives

1. To examine the relationship between perceived stress and psychological well-being among patients with diabetes.
2. To assess the relationship between perceived stress and emotional regulation among patients with diabetes.
3. To investigate the mediating role of emotional regulation in the relationship between perceived stress and psychological well-being among patients with diabetes.

Problem Statement

patients with diabetes are constantly faced with challenges both physically and mentally. This is due to the nature of the treatment and the condition itself. Factors such as the psychological distress caused by the fear of condition related complications, treatment and the everyday lifestyle changes brought about by the condition affect the patient's overall quality of life. Mental distress causes further complications related to self-control and the management of the condition. It has been reported that Type 2 diabetes patients in Pakistan experience various levels of psychological distress (Razavizadeh Tabadkan et al., 2019). Although a good body of literature has been published on diabetes related psychological distress and associated mental conditions of patients including

perceived stress, self-regulation and psychological health; not enough studies have looked at psychological stress and self-regulation and their relationship in the context of diabetes.

Emotional regulation, for example, is related to diabetes-related emotional distress (Coccaro et al., 2021). However, other studies emphasize that the lack of understanding of emotional mechanisms, in general, is related to understanding diabetes distress. While these studies focus on emotional mechanisms of diabetes distress and the need to incorporate emotional components of coping in diabetes management, they do not investigate emotional regulation as a stress-coping mechanism. More recently, interventions that focus on the emotional aspects of diabetes affect the overall emotional state of patients and how they cope with diabetes (Atefeh et al., 2022). Thus, the role of emotional regulation in diabetes management needs to be examined. Examining this would help health care professionals better understand the emotional state of patients and develop emotional-focused interventions for patients with diabetes in addition to regular diabetes management.

Significance of the Study

This study is significant because it focuses on the psychological experiences of patients with diabetes by examining perceived stress, emotional regulation, and psychological well-being together. Understanding the mediating role of emotional regulation may help clarify how patients manage stress associated with living with a chronic illness and how this may influence their psychological well-being. The findings may provide useful information for healthcare professionals, psychologists, diabetes educators, and counselors to better understand the emotional needs of patients with diabetes and consider psychological support alongside medical treatment. The study may also help patients recognize the importance of managing emotional responses when dealing with diabetes-related stress. Furthermore, the findings can provide a useful foundation for future researchers interested in diabetes, stress, emotional regulation, and psychological well-being, particularly in developing culturally relevant psychological interventions and support programs for patients with chronic health conditions.

Literature Review

Perceived Stress and Psychological Well-Being in Patients with Diabetes

Fisher et al. (2023) assessed diabetes-related stress and psychological well-being of 207 recently diagnosed Type 2 diabetes patients. Research participants completed surveys and 14-day diary cards to report stress, mood, and psychological distance and to elaborate on their self-care behaviors. Results showed diabetes-related stress and the presence of diabetes stressors affected participants' mood and psychological well-being. The authors stressed the influence of diabetes on psychological well-being.

Stahlmann-Brown et al. (2025) assessed psychological well-being of diabetes patients in the U.S. between 2005 and 2017. The study analyzed the relationship between diabetes duration and psychological well-being. The results showed worsening psychological well-being with increasing diabetes duration. This large-scale study showed that living with diabetes was associated with deterioration of psychological functioning and well-being. Positive psychological well-being and function is equally as important as the diagnosis and management of physical health concerns associated with diabetes. Woods-Giscombe et al. (2019) conducted an early intervention study that explored the effects of group counseling on diabetes stress and psychological well-being of 63 diabetes patients. The counseling intervention reduced diabetes stress and improved participants' mood, coping, and psychological well-being.

Emotional Regulation and Psychological Experiences of Diabetes

Wierenga et al. (2017) conducted an integrative review on 14 studies on emotion regulation in relation to chronic illness. The authors noted that the process of controlling and modifying emotions is critical in managing the effects of a chronic condition, including the psychological and emotional stresses associated with the illness. From the studies reviewed, individuals with higher levels of emotion regulation showed signs of lower diabetes-related stress and depression and anxiety. The authors noted that there was ample evidence to incorporate emotional regulation strategies when formulating and implementing plans to manage the health and psychological needs of individuals with chronic conditions.

Jafari and Deghani Arani (2019) reviewed the regulation of emotions and diabetes distress in 298 adults with type 1 and type 2 diabetes. The researchers evaluated participants' experiences with negative emotions, emotion regulation, diabetes distress, and other psychological and social stresses, as well as participants' diabetes self-management and literacy. The data indicated that more negative emotions are associated with more diabetes stress. Conversely, the participants' skills to regulate their emotions was

associated with less diabetes stress. Thus, the researchers concluded that the ability of an individual with diabetes to manage their emotions may influence how the individual psychologically copes with their diabetes.

Trudel-Fitzgerald et al. (2026) completed a scoping review on the emotion regulation of persons with type 1 diabetes. The review located a total of 8 studies. Of the 8 studies, 5 were cross-sectional studies, and the remaining 3 studies were longitudinal studies. Research cohorts in the studies ranged from 60-301. Results of the studies indicated that person's inability to regulate their emotions led to higher levels of diabetes stress. Additionally, the use of cognitive reappraisal by the study participants led to a decrease in their diabetes stress levels. Based on their review, the authors identified that more studies are needed in this area.

Perceived Stress, Emotional Regulation and Diabetes-Related Outcomes

Balakrishnanpillai et al. (2024) studied Type 1 and Type 2 diabetic patients in the handling of diabetes-related stress, and emotional regulation, and the relationship with HbA1c, using structural equation Modelling. The researchers found that in the presence of diabetes stress, participants' ability to manage negative emotions, and regulate their feelings, decreases. To test their hypothesis that stress management and emotional regulation are related to psychological and diabetes related outcomes, the researchers conducted a behavioral intervention, which is yet to be fully implemented and evaluated.

In a related study, Embaye et al. (2023) used structural equation Modelling to study the role of emotional regulation in Diabetes-related stress among adults with Type 1 diabetes, and the relationship with their diabetes management. The researchers found that emotional regulation plays a significant role in diabetes stress and management. Also, in a more recent study, studied the relationship between illness uncertainty and diabetes health-related self-care among Type 2 diabetes patients, and the role of cognitive emotional regulation in this relationship. The researchers found that emotional regulation plays a significant role in diabetes stress and management.

Emotional Regulation as a Mechanism Linking Perceived Stress and Psychological Well-Being

Stress and emotional regulation are connected. This is evident in patients suffering from chronic illness, for example, patients suffering from diabetes. The ability to manage and control one's emotions is known as emotional regulation. Stress and the inability to control and manage emotions are closely connected. Patients suffering from chronic illnesses who have high-stress levels often experience distressing emotional conditions. In their study, Wierenga and colleagues concluded that for patients suffering from chronic illness, circumstances that reduce stress levels help patients to adapt and use effective emotional regulation strategies. Özdemir et al. (2025), in their study, examined emotional conditions associated with stress and psychological aspects of diabetes. They concluded that for a diabetes patient to control stress and related conditions, emotional conditions also need to be managed. Furthermore, adaptive emotional regulation helps to control stress related to chronic conditions. These findings indicate that stress affects emotional regulation; in the process of coping with the conditions associated with a chronic illness, effective emotional regulation helps patients to control related psychological conditions.

Emotional regulation help patients to manage psychological conditions related to a chronic illness. Effective emotional regulation gives patients the ability to manage conditions associated with a chronic illness. The adjustment of emotions, or emotional regulation, is another means of integrating various facets of the psychosocial impacts of illness. For instance, the impact of emotional regulation of diabetes-related stress and other emotions has been documented (Farahani et al., 2019). Other researchers have reported the role of cognitive emotion regulation in the case of diabetes (Demir & Çelikkaleli, 2023). Still, most of the research has been on diabetes-related stress, uncertain illness and its effects, as well as self-care and its relationship to metabolic conditions. As a result, exploring the relationship between perceived stress and emotional well-being and how emotional regulation may affect that relationship is crucial.

Research Gap

Although previous research has established that psychological stress and diabetes-related distress are associated with poorer psychological outcomes among patients with diabetes, important gaps remain in understanding the psychological mechanisms underlying these relationships. Studies have examined emotional regulation in relation to diabetes distress and have shown that difficulties in regulating emotions are associated with greater diabetes distress among adults with Type 1 and Type 2 diabetes (Dorandish & Abouzari, 2022). Other research has investigated mediation models involving diabetes distress, coping, depressive symptoms, and psychological well-being, but these studies have generally examined different combinations of variables rather than specifically testing emotional regulation as a mediator between perceived stress and psychological well-being (Ajele et al., 2021). Moreover, recent evidence from Pakistan indicates a substantial burden of diabetes distress among adults with Type 2 diabetes,

highlighting the importance of investigating psychological factors within diabetes care in the local context. Therefore, a specific gap exists in determining whether emotional regulation explains the relationship between perceived stress and psychological well-being among patients with diabetes. Addressing this gap can provide a more integrated understanding of how patients' emotional processes may influence their psychological well-being while coping with the continuing demands of diabetes.

Hypotheses

H1: There is a significant relationship between perceived stress and psychological well-being among patients with diabetes.

H2: Perceived stress and emotional regulation significantly predict psychological well-being among patients with diabetes.

H3: Emotional regulation significantly mediates the relationship between perceived stress and psychological well-being among patients with diabetes.

Conceptual framework

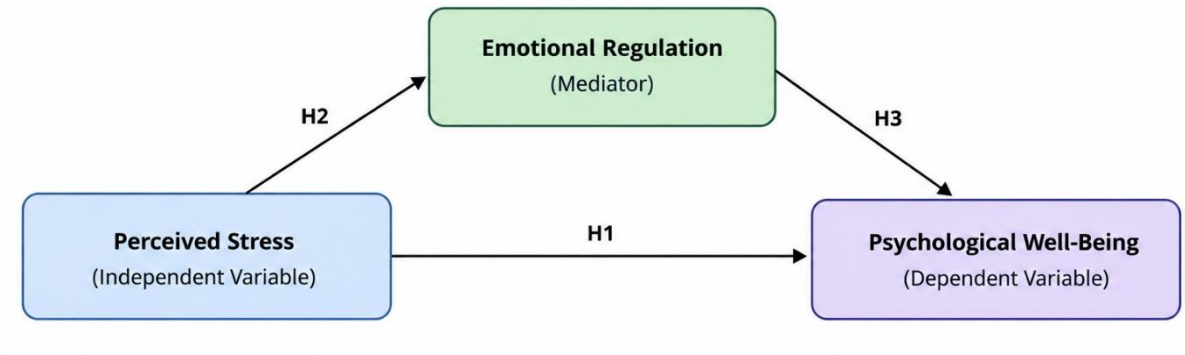


Fig 1: Conceptual Framework

Methodology

Research Design

This study used a quantitative, cross-sectional research design to assess the relationship between diabetes patients perceived stress, emotional regulation, and psychological well-being. It used an adapted questionnaire to collect data. The data was collected through an-one-one interview format. The data was analyzed through SPSS.

Population

The study's population consisted of adults residing in Pakistan, diagnosed with diabetes. The researchers visited diabetes care centers and other health care facilities in Pakistan, and approached diabetic patients receiving health care services there. The researchers aimed to cover the entire diabetes care services area in Punjab, Sindh, KPK, Pakistan.

Sampling

The researchers used a non-probability, convenience sampling method to recruit study participants.

Sample Size

There were 421 participants in the study. The participants were chosen from among adult patients with diabetes. The respondents were given an opportunity to provide or withhold their consent to participate and provided signed consent prior to the collection of any data.

Data Collection Methods

The researchers collected data through an adapted, structured questionnaire. The questionnaires were designed in the format of an online survey and sent through secure online websites to study participants. Brief information about the study was provided to participants. The informed consent form allowed participants to answer the questionnaire individually. Data were collected online. The researcher maintained the confidentiality of the participants throughout the process of collecting and transferring the data.

Perceived Stress

Perceived stress was assessed using a structured scale designed to examine how individuals experience and evaluate stressful situations in their daily lives. The scale focuses on participants' perceptions of the extent to which different circumstances and experiences are considered stressful. It is commonly used in psychological and health-related research to assess individuals perceived levels of stress. For the present study, the relevant items were incorporated into the structured questionnaire.

Emotional Regulation

The Emotion Regulation Questionnaire (ERQ) developed by Gross and John (2003) was used to assess emotional regulation. The ERQ consists of two subscales assessing reappraisal and suppression. These subscales help evaluate the strategies and methods people use in regulating and controlling their emotions.

Psychological Well-Being

Psychological well-being was assessed through a structured measure covering different aspects of individuals' psychological functioning. These aspects included how individuals viewed themselves, their sense of direction and purpose in life, their ability to develop and maintain meaningful relationships, and their progress toward personal goals. The relevant items were adapted and incorporated into the questionnaire used for this study. Data were collected electronically by distributing the questionnaire to the selected participants through Google Forms.

Data Analysis

The data and information obtained from the structured questionnaire were previously arranged and organized using the computer software program, MS Excel. Prior to analysis, the researchers checked the data to determine if they were correctly and appropriately coded. The data were then exported to the statistical software package SPSS for further analysis. The elements and variables of the research were described using fundamental and elementary statistics. The relationships among the variables perceived stress and emotional regulation, and psychological well-being were determined using the correlation analysis. To assess the impact of stress and emotional regulation on psychological well-being, multiple regression analysis was performed. Lastly, to determine if emotional regulation mediated the relationship between perceived stress and psychological well-being, the PROCESS macro model 4 was performed.

Table 1: Demographic Characteristics of the Respondents (N = 421)

Variables	Categories	Frequency (f)	Percentage (%)
Gender	Male	226	53.7
	Female	195	46.3
Age	18–30 years	82	19.5
	31–40 years	105	24.9
	41–50 years	119	28.3
	51–60 years	78	18.5
	61 years and above	37	8.8
Educational Level	Primary/No formal education	74	17.6
	Secondary	96	22.8
	Intermediate	103	24.5

Variables	Categories	Frequency (f)	Percentage (%)
	Bachelor's degree	91	21.6
	Master's degree or above	57	13.5
Marital Status	Single	96	22.8
	Married	286	67.9
	Divorced/Separated	20	4.8
	Widowed	19	4.5
Duration of Diabetes	Less than 5 years	124	29.5
	5–10 years	143	34.0
	11–15 years	91	21.6
	More than 15 years	63	15.0
Type of Diabetes	Type 1	71	16.9
	Type 2	350	83.1
Total Respondents	—	421	100.0

Table 1 shows the demographic information and diabetes conditions for 421 participants. About 53.7% of the participants were males and 46.3% were females. The highest percentage of participants (28.3%) were between 41 and 50 years. The second highest (24.9%) of the participants were between 31 and 40 years. Concerning educational attainment, the highest (24.5%) and second highest (21.6%) of the participants attained intermediate and bachelor's degrees, respectively. The largest percentage (67.9%) of the participants was married. The longest (34.0%) of the participants had diabetes between 5 to 10 years, and the second longest (29.5%) had diabetes for less than 5 years. The highest (83.1%) of the participants had Type 2 diabetes, and the second highest (16.9%) had Type 1 diabetes.

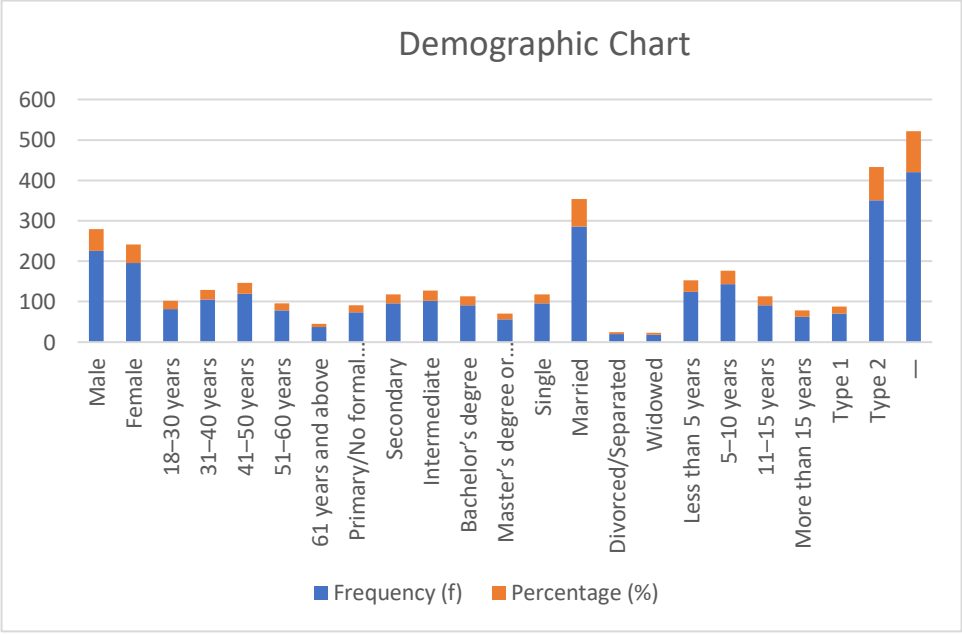


Fig. 2: Demographic Characteristics of Respondents (N= 421)

Table 2: Reliability Statistics, Mean Scores, and Standard Deviations of Study Variables (N = 421)

Variables	No. of Items	Cronbach's Alpha (α)	Mean (M)	Standard Deviation (SD)
Perceived Stress	10	0.86	2.91	0.64
Emotional Regulation	10	0.88	3.17	0.59
Psychological Well-Being	18	0.91	3.24	0.57

Descriptive data about the study variables and the results of the reliability test are given in Table 2. The internal consistency of the measures was evaluated using Cronbach's alpha and was found to be between 0.86 and 0.91. Therefore, it was considered adequate to excellent for this study. The average rating of the participants for perceived stress was 2.91 (0.64), average emotional regulation was 3.17 (0.59), and average psychological well-being was 3.24 (0.57). The scales used in this study were found to have adequate internal consistency. Therefore, these scales could be used in subsequent analyses.

Table 3: Pearson Product-Moment Correlation Between Perceived Stress and Psychological Well-Being Among Patients With Diabetes (N = 421)

Variables	M	SD	1	2
1. Perceived Stress	2.91	0.64	1	
2. Psychological Well-Being	3.24	0.57	-0.42**	1

Correlation between perceived stress and psychological well-being among diabetes patients is shown in Table 3. Results indicated a negative and significant correlation between perceived stress and psychological well-being, $r = -0.42$, $p < .01$. Therefore, with higher perceived stress of the respondents, psychological well-being of the respondents was lower. Respondents were perceived to have lower stress; psychological well-being was perceived to be higher.

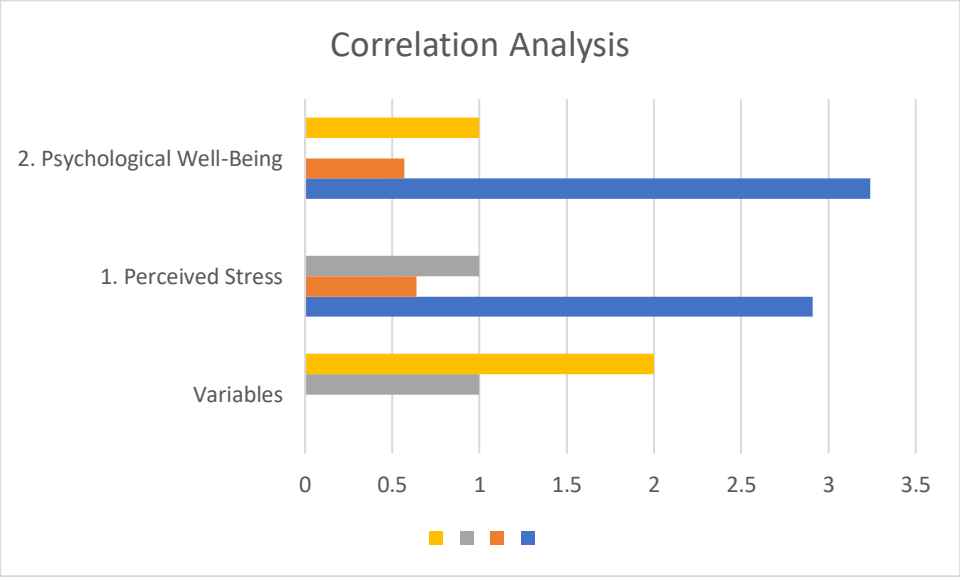


Fig 3: Correlation Analysis

Table 4: Multiple Linear Regression Analysis of Perceived Stress and Emotional Regulation Predicting Psychological Well-Being Among Patients With Diabetes (N = 421)

Predictor Variables	B	SE	β	t	p
Perceived Stress	-0.31	0.05	-0.35	-6.20	< .001
Emotional Regulation	0.38	0.05	0.40	7.09	< .001

Regression analysis results are shown in Table 4. Based on the analysis, stress and emotional regulation had a significant effect on psychological well-being. The overall regression model was significant ($F(2, 418) = 107.62$, $p < .001$). The model accounted for 34% of the variance in psychological well-being. Based on the results of the analysis, stress had a significant and negative effect on psychological well-being ($\beta = -0.35$, $p < .001$). Emotional regulation also had a significant and positive effect on psychological well-being ($\beta = 0.40$, $p < .001$). Generally, the results of the analysis showed that stress and emotional regulation had an effect on the psychological well-being of the participants.

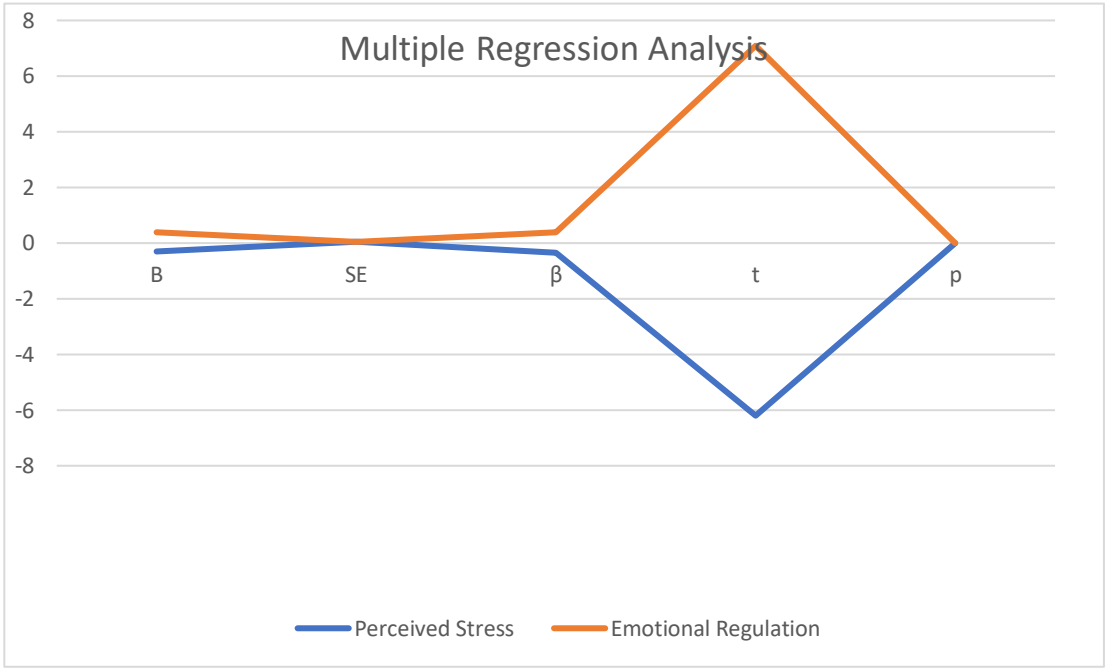


Fig 4: Multiple Regression Analysis

Table 5: Mediation Analysis of Emotional Regulation in the Relationship Between Perceived Stress and Psychological Well-Being Among Patients With Diabetes (N = 421)

Effect	B	SE	95% CI Lower	95% CI Upper
Total Effect of Perceived Stress on Psychological Well-Being	-0.48	0.06	-0.60	-0.36
Effect of Perceived Stress on Emotional Regulation (a)	-0.32	0.05	-0.42	-0.22
Effect of Emotional Regulation on Psychological Well-Being (b)	0.39	0.05	0.29	0.49
Direct Effect of Perceived Stress on Psychological Well-Being (c′)	-0.36	0.06	-0.48	-0.24
Indirect Effect Through Emotional Regulation (ab)	-0.12	0.03	-0.18	-0.07

Mediation analysis suggests that the total effect of perceived stress on psychological well-being was negative and significant (B = -0.48, 95% CI = [-0.60, -0.36]). The same was also true for the effect of perceived stress on emotional regulation (B = -0.32, 95%

CI = [-0.42, -0.22]), and emotional regulation on psychological well-being (B = 0.39, 95% CI = [0.29, 0.49]). The effect of perceived stress on psychological well-being was negative and significant (B = -0.36, 95% CI = [-0.48, -0.24]), even after the effect of emotional regulation was controlled. The effect of perceived stress on psychological well-being was also mediated through emotional regulation (B = -0.12, 95% CI = [-0.18, -0.07]), because the 95% confidence interval of the mediating effect did not include zero. Thus, emotional regulation of stress mediates the relationship between perceived stress and psychological well-being of patients with diabetes. Therefore, perceived stress has a direct and an indirect effect on psychological well-being through emotional regulation.

Discussion

The study aimed to understand the role of emotional regulation in the relationship between perceived stress and psychological well-being of patients with diabetes. It was found that perceived stress and emotional regulation have inverse relationships with psychological well-being. The results further showed that emotional regulation helps breakdown the relationship between perceived stress and psychological well-being. This means that patients' ability to manage emotional responses to stressors related to diabetes influences their psychological well-being (Razavizadeh Tabadkan et al., 2019).

Being that perceived stress and psychological well-being have an inverse relationship; it means that higher stress levels lead to lower well-being. Long-term nature of diabetes and the need for continuous self-management and self-regulation of various activities and processes related to the condition may lead to psychological exhaustion, and affect patients' emotional stability and sense of control as well as quality of life. It has also been documented that psychological stress and diabetes-related conditions may occur and influence each other. For instance, Research has shown that psychosocial stress among adults with type 1 and type 2 diabetes can influence diabetes-related conditions and emotional distress. Overall, the findings suggest that diabetes-related conditions may affect patients' psychological well-being and contribute to broader experiences of stress (Far & Jahangir, 2018).

The results also demonstrated a positive relation between emotional regulation and psychological well-being. People who can control their emotions in an effective way can improve their mental health condition. Emotional control describes the ability to regulate feelings such as nervousness, anxiety, and other psychological distresses. Effective control of emotions can alleviate feelings of anxiety and nervousness (Mangoulia et al., 2024). It is vital for patients with diabetes because there are several unpredictable and unexpected conditions that can challenges them emotionally and psychologically throughout their everyday life. For instance, diabetes can be effectively controlled by managing blood sugar level; however, there are numerous emotional circumstances that can lead to excessive nervousness and anxiety, including blood sugar level management. In a research study, it has been found that higher emotional control can reduce diabetes distress while lower emotional control can increase diabetes distress. Therefore, it is essential for patients with diabetes to regulate their emotions in a proper and effective manner to lead a qualitative and a healthy life (Majidzadeh et al., 2022).

The other important finding of the current study was that emotional regulation and psychological well-being were positively related, and stress and psychological well-being were negatively related. Given the above findings, patients with higher emotional control were less stressed. Effective emotional control gives patients the capacity to regulate their emotions in a proper and effective way to manage feelings of anxiety and nervousness to gain control over their physical and psychological distress. According to the study conducted by Gonzalez et al. (2015), use of cognition to regulate emotions can increase diabetes distress in Type 2 Diabetes. The findings support the notion that how individuals manage psychological stress associated with diabetes may have an impact on their psychological adjustment to the condition. The findings of this study demonstrated that emotional regulation mediated the relationship between perceived stress and psychological well-being. Hence, it can be postulated that stress may impact psychological well-being of individuals with diabetes via their capability to regulate their emotions. In the presence of increased stress conditions, it may be difficult for individuals to regulate their emotions, especially if the stress conditions are chronic. As a consequence, it may lead to a deterioration in their psychological well-being (Akyirem et al., 2024). Other studies have reported similar relationships whereby the regulation of emotions was associated with diabetes distress and other consequences on the quality of diabetes control and management. Additionally, other studies have reported that an emotion regulation focused therapy was effective in improving emotional regulation and reducing diabetes distress.

The importance of partial mediation rests in the fact that, in the presence of emotional regulation, the relationship between perceived stress and psychological well-being remains significant. This suggests that emotional regulation helps explain part of the relationship between stress and well-being. Other variables, such as social and economic conditions, as well as physical and psychological aspects of the patient, may also contribute to psychological well-being of persons with diabetes. Family members also

play a role as sources of social support and as partners in emotional regulation. The patient's psychological well-being may also be conditioned by the presence of psychological and social aspects beyond emotional regulation (Özdemir et al., 2025).

Conclusion

The findings of this study highlight the importance of addressing psychological factors in the management of diabetes. The results showed that higher levels of perceived stress were associated with lower psychological well-being among patients with diabetes. In contrast, patients who were better able to regulate their emotions tended to report higher levels of psychological well-being. These findings suggest that emotional regulation plays an important role in helping individuals cope with the challenges of living with diabetes. Therefore, healthcare professionals should pay attention not only to the physical aspects of diabetes but also to the emotional and psychological needs of patients. Supporting patients in managing stress and developing healthy emotional regulation strategies may contribute to improved psychological well-being and overall quality of life.

It was noted that emotional regulation was a mediator between perceived stress and psychological well-being, suggesting that among the other factors that may also play a role, emotional regulation was particularly important. The study shows the need to create a diabetic management program that includes methods and techniques to manage stress and teaches emotional regulation to diabetic patients. The program should integrate psychological counseling to help patients achieve the psychological well-being and recover the emotional control they have lost. The program should be designed to be flexible and integrative to all diabetic patients including children.

Future Implications

Future research should continue to explore the psychological aspects of diabetes and other chronic health conditions, particularly among children and adolescents. Studies involving different age groups, healthcare settings, and chronic illnesses may provide a broader understanding of how perceived stress, emotional regulation, and psychological well-being are connected. Longitudinal research would also be valuable in examining how these factors change over time and influence one another throughout the course of illness. Such research may help healthcare providers develop more effective strategies to support the emotional and psychological well-being of individuals living with chronic conditions. These studies might also track if the regulation of emotions improves psychological health. Other factors that influence psychological adjustment to diabetes, such as the duration of the illness, family, social, and emotional support, and the quality of life and health of the individual might also be studied. Further, the adherence of the individual to the prescribed treatment and management plan for diabetes might be investigated. Various studies might test the effects of behavioral and emotional regulation strategies, as well as of stress management and other psychological therapies. Psychological and emotional assessment and regulation interventions might be routinely provided as part of the diabetes management plan.

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