Perceived life stress, Psychological Well-being and Quality of Life among Patients with Diabetes:Mediating Role of Cognitive Functioning

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NATIONAL UNIVERSITY OF MODERN LANGUAGES

ISLAMABAD

2024

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M.Phil. Psychology National University of Modern Languages Islamabad, 2024

A THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF M.PHIL. PSYCHOLOGY

MASTER OF PHILOSOPHY

In Psychology

To

DEPARTMENT OF APPLIED PSYCHOLOGY

FACULTY OF SOCIAL SCIENCES

NATIONAL UNIVERSITY OF MODERN LANGUAGES, ISLAMABAD

NATIONAL UNIVERSITY OF MODERN LANGUAGES FACULTY OF SOCIAL SCIENCES

THESIS AND DEFENSE APPROVAL FORM

The undersigned certify that they have read the following thesis, examined the defense, are satisfied with the overall exam performance, and recommend the thesis to the Faculty of Applied Psychology for acceptance.

Thesis Title: ―Perceived life stress, Psychological Well-being and Quality of Life among Patients with Diabetes: Mediating Role of Cognitive Functioning

Submitted by: Misbah Waseem Registration #:25-MPhil/Psy/S22

Master of Philosophy

Degree name in full

Psychology

Name of Discipline

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Abstract

Title: Perceived life stress, Psychological Well-being and Quality of Life among Patients with Diabetes: Mediating Role of Cognitive Functioning

The aim of this study was to examine the association between Perceived life stress, Psychological Well-being and Quality of Life among Patients with diabetes and to investigate the mediating role of Cognitive Functioning in this relationship. The data were collected through purposive sampling technique from 230 male and female diabetic patients from Out-Patients Department (OPDs) of different hospitals of Islamabad and Rawalpindi cities of Pakistan. A cross-sectional research design was used to conduct the data of the present study. The Urdu version of all the questionnaire were used to measure variables. In this study, Perceived Stress Questionnaire (Levenstein, 1993), Psychological Well-being (Ryff & Keyes, 1995), Well-being Health-Related Quality of Life (DeVellis, 2003) and Cognitive Functioning Self-Assessment Scale (Annunziata, Muzzatti, Giovannini, & Lucchini, 2012) were used. For the present sample, the Alpha coefficient reliability of the test scores for these measures ranged from .80 to .95 that was in acceptable range and quite satisfactory. The findings of the study indicated that perceived life stress was significantly negatively correlated with psychological well-being and quality of life whereas perceived life stress was significantly positively correlated with cognitive functioning among diabetic patients. However, significant physical exercise (yes\no) related variables emerged on study variables. T- test shows that diabetic patients who did not engage in physical exercise experienced significantly higher level of perceived life stress and higher level of cognitive abnormalities. The mean differences between age-wise, marital status and job status have been found out to be highly significant. Moreover, mediation models were tested to investigate the relationship between the perceived life stress, psychological well-being and quality of life using cognitive functioning as a mediator. Using regression analysis, result suggest that a significant change in the relationship after adding the mediators. However, present study will guide the other elements such as social support and physical exercise may serve as a protective barrier against the negative impact of perceived life stress on the psychological well-being and quality of life of diabetes patients. Engaging in regular physical activity aids in diminishing stress, enhancing mood and promoting general well-being.

Keywords:Perceived life stress, Psychological Well-being, Quality of life, Cognitive functioning

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDIXES

DEDICATION

This dissertation is devoted to my beloved parents and my honorable supervisor

"Dr.Tasnim Rehna"

Without whom I would not have had a year to peacefully inspect the new construct.

ACKNOWLEDGEMENT

Foremost, I owe deep sense of gratitude to ALLAH ALMIGHTY, the most gracious, the most merciful, the most beneficent, and the Lord and the Creator of the entire universe for showering his abundant Grace and providing me with courage and knowledge to complete this task.

It is a genuine pleasure to convey the utmost appreciation to my honorable and devoted Supervisor Dr.Tasnim Rehna to supervise my work. Without her professional guidance, determination, immense knowledge and overwhelming attitude to help her students, this project was impossible to be completed. She not only taught me domain knowledge of Psychology but her sincere advice, incredible conveyance of ideas and recommendations of writing a dissertation prepared me to carry out outstanding research in future. I pay my thanks to the diabetes patients too, who took part in the research, understand the nature and purpose of the study and cooperated for the collection of data. I am also Thankful to the administrations of the firms for permitting me to conduct the research in their organizations. Most prominently, I pay my heartiest regards and support to my mother and father for their emotional, moral and financial support. It's only because of their inspirations, love, care and encouragement I have done writing my thesis. I would also like to pay a huge thanks to my brother Mohsin Khan for tolerating, supporting and assisting me whenever I was stuck at any point.

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Candidate of Master of Philosophy at the National University of Modern Language do hereby declare that the thesis "Perceived life stress, Psychological Well-being and Quality of Life among Patients with Diabetes: Mediating Role of Cognitive Functioning" submitted by me in partial fulfillment of MPhil degree, is my original work, and has not been submitted or published earlier. I also solemnly declare that it shall not, in future, be submitted by me for obtaining any other degree from this or any other university or institution.

I also understand that if evidence of plagiarism is found in my thesis/ dissertation at any stage, even after the award of a degree, the work may be cancelled, and the degree revoked.

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Signature of Candidate

Misbah Waseem

Name of Candidates

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Date

LIST OF ABBREVIATIONS

PLS	Perceived Life Stress
PWB	Psychological Well-being
QOL	Quality of Life
CF	Cognitive Functioning

CHAPTER I

INTRODUCTION

Diabetes mellitus is a chronic ailment that impacts both industrialized and developing nations. According to the International Diabetics Federation (IDF), the condition afflicted 415 million individuals globally in 2015, and this number is projected to increase to 642 million by 2040. Approximately 14.2 million persons between the ages of 20 and 79 are afflicted with diabetes in the Sub-Saharan Africa region. With a population of over 1.3 million, Ethiopia stands as one of the most densely populated nations in the area and has the highest prevalence of diabetes. Diabetes mellitus, a common long-term health problem in the country, affects around 3.8% of the population. (Atlas, 2015).

The incidence of diabetes mellitus has been seeing a substantial rise in recent decades. The global prevalence of this issue is rapidly increasing and has already reached epidemic proportions (Yisahak et al., 2014). The age-standardized prevalence of adult diabetes in China was 11.6%, while the prevalence of prediabetes was 50.1% in 2013. According to Wang (2013), it was estimated that 113.9 million people in China had diabetes and 493.4 million were prediabetic in that year. The International Diabetes Federation, also known as the IDF, predicts that by 2035, more than 592 million people around the globe would have diabetes (Hassali, 2015). Living with diabetes greatly diminishes one's standard of living. In addition to the challenges of regularly taking oral antidiabetic medications, the anxiety associated with injecting insulin under the skin and the occurrence of low blood sugar levels may cause emotional distress in diabetic patients and further diminish their overall health-related well-being (Vancampfort, 2015).

The leading cause of death in 2019, with about 1.5 million people losing their lives to diabetes, is the World Health Organization (WHO) as reported by Aamir (2019). Pakistan is particularly susceptible to mortality caused by diabetes, given that the prevalence of this condition is higher in countries with lower and moderate economic levels. Foot issues affect 15% of individuals with diabetes in Pakistan. Peripheral vascular disease is a frequent complication associated with diabetes that may lead to the development of diabetic foot. Diabetics have a risk

that is four times higher than non-diabetics to develop peripheral artery disease, which may potentially lead to foot ulcers and the need for amputation (Ali, 2012).

High blood glucose levels, caused by either an inadequate supply of the hormone insulin or its improper usage, are hallmarks of the chronic disease known as diabetes. Consequently, the absence of insulin or the cell's resistance to insulin leads to an elevation in blood glucose levels, which is a defining feature of diabetes (Aynalem, 2018). Diabetes mellitus has a global impact, affecting about 422 million people. Diabetes is a prominent global public health concern, impacting persons worldwide, with rapidly increasing prevalence in both developing and industrialized countries (Sicree, 2009).

Classifications of Diabetes Mellitus

Type 2 diabetes mellitus, or T2DM, and type 1 diabetes, also known as T1DM, are the two main forms of diabetes. Previously, distinguishing between the two forms of diabetes has relied on many parameters including the age at which the disease begins, the extent of β cell function decline, insulin resistance, the presence of auto-antibodies associated with diabetes, and the need of insulin treatment for survival. However, none of these characteristics definitively distinguish one form of diabetes from another, nor do they include the whole spectrum of diabetes phenotypes (Lesley, 2016).

Type 1 Diabetes Mellitus, also known as Insulin-Dependent Diabetes, Juvenile Diabetes, or Autoimmune Diabetes Mellitus

Type 1 diabetes leads to the degradation of β-cells at different rates. Type 1 diabetes (T1DM) often manifests rapidly and is commonly seen in youngsters, however it may also impact adults. Ketoacidosis might manifest as the first symptom of the illness, especially in children and adolescents. Some individuals may encounter a slight increase in blood sugar levels, known as hyperglycemia, which may rapidly escalate to a more serious condition called severe hyperglycemia or ketoacidosis while they are sick or under other forms of stress. Individuals who still have functioning β-cells may be able to prevent the occurrence of ketoacidosis for an extended period of time. During the typical clinical presentation of type 1 diabetes, there is a lack of insulin synthesis, which may be confirmed by the presence of low or undetectable levels of C-peptide in the blood or urine (Desse et al., 2010).

Type 2 diabetes mellitus, adult-onset, age-onset, non-insulin-dependent, and diabetes mellitus.

Insulin resistance in the periphery and inadequate insulin synthesis by the pancreatic beta cells characterise type 2 diabetes. Insulin resistance, caused by high amounts of free fatty acids and proinflammatory cytokines in the blood, results in reduced glucose uptake by muscle cells, increased glucose synthesis by the liver, and enhanced fat breakdown. The significance of excess glucagon should not be underestimated. Actually, a dysfunction in the communication between the beta cells responsible for secreting insulin and the alpha cells responsible for secreting glucagon characterises type 2 diabetes. Because of this disturbance, glucagon levels in the blood rise, which causes blood sugar levels to be high. Insulin resistance and inadequate insulin synthesis are the two conditions necessary for type 2 diabetes mellitus to occur. For example, insulin resistance is present in every overweight person, but diabetes only develops in individuals whose bodies are unable to produce enough insulin to compensate for their insulin resistance. Their insulin concentrations may be elevated, but insufficient for the level of glycemia in non-insulin-dependent diabetes (Burtis et al., 2012).

Type 2 diabetes mellitus comprises over 90% of all diabetes diagnoses in adults (Bereda, 2021). Type 2 diabetes mellitus is the most common form of diabetes. It is a less severe type of diabetes that progresses slowly (sometimes over a period of time) and can usually be controlled with dietary changes and oral medications. Unmanaged and unaddressed type 2 diabetes has equally grave implications as Type I diabetes. The aetiology of diabetes mellitus remains elusive. Both genetic and environmental variables have a role in this, as stated by Ebenezer in 2003. In high-income nations, type 2 diabetes makes up around 85–95% of all cases; in low- and middle-income countries, the number is much greater. The primary causes of this may be attributed to things including fast-paced sociocultural shifts, an ageing population, more urbanization, less physical exercise, and unhealthy habits and ways of living (World Health Organization, 2019).

Risk Factors

Major risk factors for type 2 diabetes include family history, obesity, race/ethnicity, age of 40 years or older, previously documented impaired fasting glucose or impaired tolerance

to glucose, hypertension, hyperlipidaemia, and a history of gestational diabetes mellitus (Sacks, 2001). Diabetes is a long-term medical condition characterised by a partial or total lack of insulin. The notable clinical characteristics of this condition consist of symptomatic glucose intolerance, leading to high blood sugar levels, as well as alterations in lipid and protein metabolism (Kroon, 2009).

Complications

Diabetes mellitus is associated with a range of chronic problems that have a detrimental influence on the standard of life and possibly the lifespan of affected persons. These complications have significant consequences for people as well as the community. problems of diabetes may be classified into two categories: microvascular problems, which include nephropathy, neuropathy, and retinopathy, and macrovascular consequences, which include cardiovascular and cerebrovascular diseases (Stumvoll et al., 2010). The prevalent chronic sequelae were erection dysfunction (64%), impaired vision (33.8%), and cardiovascular problems (30.1%). Additionally, hypertension alone accounted for 68% of cases, while neuropathy and nephropathy accounted for 29.5% and 15.7% respectively. Similarly, there was a consistent pattern of acute consequences, with a range of 30.5%. The most prevalent complication was diabetic ketoacidosis at 71%, followed by hypoglycemia at 19.4%. However, hyperosmolar hyperglycaemic state was not noteworthy in this context (Liu et al., 2010).

Diagnostics

Right now, two diagnosis tests for diabetic are recommended: fasting plasma glucose measurement and HbA1c measurement in the context of diabetic signs and signs. Individuals displaying signs and symptoms accompanied with a fasting plasma glucose concentration of 7.0 mmol/L (126 mg/dl) or a HbA1c of 6.5% (48 mmol/mol) are categorised as having diabetes. It is advisable to repeat testing, preferably with the same test, as soon as possible on the following day if people who show no symptoms have increased levels. This is done to verify the diagnosis (Geneva, 2006).

Stress may worsen or trigger the onset of diabetes (Lloyd et al., 2005). Stress is defined as an adverse emotional encounter accompanied with foreseeable a) biochemical, b) physiological, c) cognitive, and d) behavioural alterations targeted at modifying the stressful

occurrence or adjusting to its aftermath (Taylor, 2015).It is prevalent in contemporary society and arises from routine everyday challenges (such as conflicts with family members, work-related issues, and deadlines), adverse life occurrences (such as the loss of a loved one, financial difficulties, and divorce), and the additional challenges of managing chronic disease (Madhu et., 2021).

Perceived Life Stress:

Perceived life stress refers to the subjective experience of a person about the level of stress they are experiencing at a certain moment or during a specific period of time. Perceived stress encompasses emotions related to the lack of control and predictability in one's life, the frequency of dealing with bothersome issues, the amount of change happening in one's life, and the level of trust in one's problem-solving abilities. The focus is not on quantifying the specific sorts or occurrences of stressful events experienced by an individual, but rather on assessing their overall perception of the stressfulness of their life and their capacity to cope with such stress. People may experience identical adverse life experiences, but their assessment of the effect or severity of these events might vary due to characteristics such as personality, resources for coping, and support. Perceived stress is the result of how a person perceives and evaluates their surroundings as posing a danger or beyond their capacity to cope, thereby impacting their overall well-being (Lazarus & Folkman, 1984).

An individual experiences stress when they view an event as threatening to their well-being, possibly damaging, or causing them loss. As a result, they may try to deal with the event and its effects by psychological, physiological, and behavioural means. The stimuli or situations that cause stress are known as stressors, according to Mason (1975). When people are under stress, it may cause emotional distress and a desire to take control of the situation. Physiological stress responses are common and serve to protect organisms from harm and assist in managing stressful conditions (McEwen et al., 1999). Although stress is often associated with negative outcomes, it may also provide chances for growth and improvement (Lazarus & Folkman, 1984).

According to Cohen's original theory of perceived stress, the stressor is not the actual event that happens to the person, but rather the emotional reaction that is influenced by cognitive processes to that experience (Cohen et al., 1983). Perceived stress is a multifaceted concept that

is influenced by factors such as the individual's perception of their ability to effectively handle external demands and their perception of helplessness as an internal response to negative emotions and a lack of control in the face of stress (Liu et al., 2020).

Perceived stress is globally acknowledged as a public health issue due to its association with individuals' way of life. The concept of perceived stress lacks unanimity, yet it is closely linked to coping abilities. Stress response is the organism's reaction to a challenging environment, where the person responds to various stresses in order to adapt, progressing through three stages: arousal, resilience, and depletion. Stress, depending on its severity and duration, leads to a deterioration of the body's immune system, resulting in the emergence of numerous signs and symptoms of illnesses (Michels, 2010).

Individuals facing a stressful circumstance use various cognitive, emotional, and behavioural strategies to preserve their physical and psychological health and manage or regulate stress. Every individual may interpret any stressful occurrence, even a routine everyday interaction, in distinct ways. The answers to occurrences vary from person to person depending on the meanings assigned to them. The coping mechanisms used by a person may have a direct impact on their health results. Additionally, these methods might indirectly influence the individual's physical and psychological well-being by aiding in their adaptation to medical therapies (Aldwin, 2007). The emotions, both good and negative, that one feels when confronted with a stressful situation are a direct result of their immediate evaluation of their whole state of being (Lazarus & Folkman, 1984). Psychological well-being, as defined by Ryan and Deci (2001), may be impacted when a person encounters any stressor, thereby affecting their overall functioning. Research has shown that psychosocial stressors, as indicated by Everly and Lating (2019), which are triggered by cognitive evaluations during stressful situations or events, have a direct or indirect impact on an individual's psychological well-being (Essex, 1999).

Psychological Wellbeing

Psychological well-being refers to an individual's own evaluation of their life, including good emotions, involvement, and significance. This term encompasses a diverse range of positive emotions, including satisfaction, enjoyment, and a feeling of achievement (Diener et al., 2010).

Similarly, Seligman (2002) created the notion of "positive psychology," which regards psychological well-being as a fusion of contentment and pleasure. This definition acknowledges that happiness is determined by positive emotions, pleasure, and a sense of significance and direction in life, rather than only the lack of negative events or sensations.

Kitchener and Jorm (2002) define psychological wellbeing as a mental state devoid of any mental disorders. From the vantage point of constructive psychology, it includes the ability to have joy in life, strike a balance between different aspects of one's existence, and work towards building psychological resilience. Two components of positive well-being have been identified by several researchers (Ryff et al., 2008): subjective (hedonic) well-being, which focusses on enjoyment and pleasure, and psychological (eudaimonic) well-being, which concentrates on the actualisation of one's potential. Happiness plus meaning equals well-being, as correctly stated by Snyder and Lopez (2007). Ryan and Deci (2001) state that when people talk about their subjective well-being, they're referring to how they personally rate their own lives. People are considered to be psychologically well-adjusted when they report high levels of happiness and contentment with their life. It is the amalgamation of experiencing positive emotions and performing optimally. Psychological wellbeing balance is achieved when a person is both joyful and productive, and consistently prepared to face difficulties.

Psychological well-being refers to an individual's own evaluation of positive psychological experiences, such as happiness, life satisfaction, and a feeling of meaning and direction. It is an all-encompassing concept that encompasses all facets of an individual's psychological and emotional well-being, including good interpersonal connections, personal advancement and maturation, favourable self-regard and self-acknowledgment, and a feeling of autonomy over one's own existence. At its core, psychological well-being is being able to successfully traverse life's obstacles, having meaningful connections, and feeling pleasant feelings towards oneself and one's life. Well-being is a complex idea that goes beyond just not having mental disease. It encompasses a person's overall feelings of pleasure, contentment, and achievement in life. Psychological well-being is a crucial element of an individual's overall health and happiness. Eudaimonic is a mental state characterized by the presence of pleasurable emotions, optimal psychological functioning, and a profound feeling of meaning and purpose in one's existence. Researchers disagree on what exactly constitutes psychological well-being. The

World Health Organisation (WHO) defines psychological well-being as an individual's capacity to make the most of their strengths, take part in meaningful work, and deal with the normal stresses and difficulties of life in a healthy and positive way. The term underscores the diverse nature of psychological well-being, including good emotions, psychological functioning, and a sense of purpose and significance in life (Dhanabhakyam, 2023).

Psychological well-being as defined by Ryff (1995), pertains to the degree to which individuals see themselves as having significant autonomy and influence over their lives and actions. Therefore, Ryff et al., (1989) proposed six fundamental aspects of psychological well-being: 1) self-acceptance; 2) good interpersonal relationships; 3) autonomy; 4) control over one's surroundings; 5) having a sense of purpose in life; and 6) personal progress. The concept of psychological well-being encompasses various dimensions and is influenced by factors such as life esteem, life satisfaction, mindfulness, physical activity, and social support. The following attributes include an individual's autonomy, mastery of their environment, potential for personal growth, aptitude for forming fulfilling connections, and sense of life's meaning.

Dimensions of Psychological Well-being

Autonomy: Self-determination refers to the capacity to reject societal influences and make independent choices, while still regulating one's behaviour based on internal values and evaluating oneself according to own standards. A high score suggests that individuals possess a high level of autonomy and are capable of autonomously regulating their activities without being influenced by external factors. They possess self-sufficiency and have the ability to engage in independent thought. They exhibit nonconformity to social standards and display indifference towards others' perceptions of them. Individuals without autonomy depend on others. They have apprehension over the opinions of others and make efforts to adhere to their expectations.

***Positive relationships*:** Establishing warm, fulfilling, and reliable connections with others; displaying genuine care for the well-being of others; possessing the ability to really understand and share the emotion of others, as well as fostering deep compassion and closeness; comprehending the dynamics of reciprocity in relationships. Establishing positive interpersonal interactions with loved ones, friends, and romantic partners is crucial for maintaining psychological wellness (Frederick et al., 1999). These interactions provide individuals emotional

support, foster a feeling of community, and contribute to their overall enjoyment and well-being (Peterson et al., 2004). Individuals that possess a high level of good relationships have a sense of connection, respect, and profound affection. They possess common characteristics, experience closeness, and feel confident in their connections. Individuals with a low score in this facet experience feelings of underappreciation, contempt, lack of affection, disconnection, misunderstanding, and rejection.

Purpose in life. Having goals and a clear sense of direction; experiencing a sense of purpose in both current and previous life; maintaining beliefs that provide meaning and objectives for living. The presence of a clear and meaningful objective in life is a crucial element of overall well-being as it offers individuals guidance and significance (Argyle, 1999). Having a distinct and well-defined objective enhances individuals' probability of experiencing satisfaction and happiness (Sheldon et al., 2001). Individuals who get high scores in this particular domain have a strong inclination towards achieving goals and a profound belief that life has significance or purpose. They primarily want to effect change in their society, and they are also deeply committed to their principles. These individuals possess a clear understanding of the purpose and meaning of their existence. Individuals with diminished self-worth have the belief that their existence lacks purpose. They have the belief that their purpose on this earth is to accomplish certain objectives.

Personal Growth. Continued development and growth, receptivity to new experiences, realization of one's potential, and perceived progress in self and behaviour over time are all aspects of personal development. This development is characterized by increased self-knowledge and efficacy. If an individual achieves a high score on this assessment, it suggests that they possess a propensity for embracing novel experiences and consistently adapting. They demonstrate an awareness of personal growth and development in both their behaviour and self-perception across time. Individuals see themselves as advancing or developing on a favourable trajectory, attaining their utmost capabilities and reaching maturity. They possess a heightened self-awareness and are capable of acquiring proficiency in new abilities. Individuals with low scores encounter a dearth of variation and exhibit a heightened sense of ennui towards life. They seem apathetic about their life and sense a lack of advancement.

Environmental Mastery. Demonstrates a strong feeling of proficiency and capability in handling the surroundings; effectively manages a wide range of external activities; utilizes surrounding opportunities in an efficient manner; capable of selecting or creating environments that align with personal requirements and beliefs (Ryff, 2014). High scores indicate that the individual effectively utilizes opportunities and have expertise in managing environmental factors and activities, including generating circumstances that align with personal needs. Individuals with a low score may have a sense of powerlessness and lack the necessary means to cope with their environment. Individuals with low scores consistently experience heightened levels of anxiety and frustration.

Self-acceptance. Displays a favourable outlook towards oneself, recognizes and accepts many aspects of one's personality, both positive and negative; and experiences optimism over previous experiences (Ryff, 2014). Individuals with a low score experience dissatisfaction with themselves, distress over previous events, worry about certain personal traits, and have a want to be someone different from their current self. Individuals that get high scores on this assessment have a positive self-perception, as well as a favourable view of their prior actions and choices. Individuals are requested to assess their degrees of self-acceptance.

The psychological well-being idea posits that an individual's mental health is intricately linked to certain facets of life. Impaired psychological well-being is linked to a higher likelihood of experiencing negative health outcomes, such as depression and chronic illnesses caused by stress (Steptoe et al., 2015). Several studies have investigated the advantageous aspects of psychological well-being (Lyubomirsky et al., 2005). Psychological well-being is a component of the broader concept of health, which encompasses overall well health (Steptoe et al., 2015). Higher levels of psychological well-being are associated with a reduced risk of death, as shown by studies conducted by Chida & Steptoe, 2008.

Psychological well-being is defined as attaining a state of optimal balance in all areas of one's life. An individual may effectively navigate any circumstance in their life while keeping a cheerful attitude towards the world. They are usually proactive and warmly welcome others with genuine delight and friendliness. Psychological well-being covers an individual's physical, mental, and social aspects. Physical well-being pertains to an individual's degree of physical fitness, which may be assessed by their sleep patterns, amount of physical activity, drinking and

smoking habits, and other relevant aspects. Mental well-being refers to an individual's ability to effectively cope with stress and have a positive outlook on life. Social wellbeing pertains to an individual's level of social acceptance within a group. Consequently, having a good and supportive social disposition will enhance their social wellbeing. The majority of psychologists hold the belief that well-being signifies the highest level of psychological functioning and life experience (Ryan, 2001).

Well-being encompasses the state of having positive emotional and mental health, which are fundamental aspects of an individual's overall quality of life across different situations (López et al., 2001). Psychological well-being, as defined by this perspective, encompasses individuals' evaluations of their current and previous lives. This includes their emotional responses to events, their moods, and their judgements about their own lifestyles (Diener et al., 1984). Ballesteros et al. (2003) assert that well-being is a condition that is always in flux and subject to change. Individual quality of life refers to an individual's total state of well-being (Nibedita, 2018). The psychological well-being of individuals with illnesses is affected by their perspective of the condition, physical symptoms, and social experiences, all of which contribute to their overall quality of life. Psychological well-being encompasses several positive emotions and states such as contentment, satisfaction with life, self-fulfilment, calmness, and happiness. These factors all contribute to an individual's total state of well-being (Subramanian, 2022).

Health-related quality of life

The 1948 World Health Organization definition of health encompasses a state of holistic well-being, including physical, psychological, and social aspects, while also emphasizing the absence of sickness or impairment. The phrase "health-related quality of life" focuses specifically on factors that directly impact an individual's physical and mental well-being. Nevertheless, due to the complexity and broad scope of the notion, there is no commonly accepted definition of health-related quality of life (Fayers et al., 2000). When examining health-related quality of life, most definitions revolve on two primary aspects. Health and performance include several dimensions, such as physiological, role-playing, social, and mental components (Bullinger, 1991). Furthermore, health-related quality of life encompasses both subjective and objective dimensions, distinguishing it from the broader concept of overall quality of life (Testa et al., 1996).

Moreover, the concept of quality of life in terms of health is defined by an individual's own evaluation of their total state of well-being in connection to their cultural and value systems. This assessment considers the individual's own goals, expectations, standards, and concerns (World Health Organization, 1997). The four components of health-related quality of life include physical and motor skills, mental wellness, social and economic conditions, and somatic perception (such as symptoms, including pain). Importantly, the idea emphasizes the need of distinguishing between an impartial measurement of health (based on observable symptoms) and the patient's own experience (i.e., HRQoL) of that condition when using both objective and subjective evaluation methods. An objective evaluation is a technique used to ascertain an individual's true position or the factual information, disregarding their subjective ideas or emotions about their specific circumstance. Conversely, a subjective evaluation entails acknowledging the patient's narrative of the occurrence while taking into consideration the emotional dimension of their experience. This assessment should include the whole range of psychological states. It is essential to recognize not just negative emotional states like melancholy and worry, but also good aspects of one's experience such as satisfaction, hope, and flexibility (De, 1997). To get a comprehensive assessment of a patient's quality of life, it is important to do both types of evaluations.

Diener (1984) defines quality of life as an individual's subjective evaluation of their degree of pleasure, contentment, and overall perspective of their own existence. It is widely considered that this judgement is strongly associated with a range of biological, economic, psychological, and social aspects (Garavito et al., 2001).

In 1993, the World Health Organization introduced health-related quality of life as a measure that encompasses an individual's physical, psychological, and social dimensions of their well-being. According to Guyatt (1993), the notion of quality of life was first introduced by American economist John C in the 1950s, with its definition originating from the field of sociology. Over time, the medical area became more included into the notion of quality of life. Health-related quality of life has become a crucial aspect of health monitoring as it is a quantifiable measure of overall health outcomes (Atlanta, 2000). It assesses the impact of illness and medical interventions on patients. In the 1980s, the idea of health-related quality of life was

expanded to include specific factors that have been shown to affect physical or mental health (McHorney, 1999).

In the past, quality of life was described as 'experiencing a happy existence' and deriving 'pleasure from one's life'. Quality of life is now defined as a quantitative measure that considers several elements related to an individual's or a group's living conditions, such as economic, health, and environmental aspects. Levine proposed a model in 1999 that characterizes socio-psychological quality of life as the unique and important parts of an individual's existence that have an effect on them. Additionally, it includes how a person sees himself in relation to others, considering not just their immediate physical location but also the cultural norms and values of their community, as well as the duties, responsibilities, and expectations that are inherent to that community (Levine, 1991). Referring to this notion, Saxen and Orley (1997) delineated the factors that influence an individual's quality of life, including their bodily well-being, psychological state, degree of autonomy, social relationships, and the surrounding environment (Saxena, 1997).

In the 1990s, Schipper and colleagues introduced the notion of health-related quality of life (Schipper et al., 1990). They defined it as the functional impact of an illness and its treatment, as perceived by the patient. The statement explicitly asserts that an individual's well-being may significantly affect their whole existence and ability to operate, ultimately influencing the evaluation of their standard of living. When assessing the quality of life in a medical context, healthcare professionals should include the subjective experience of the patient, including how the disease and treatment affect their lives. Health-related quality of life may be defined as the assessment of a patient's perception of their own position in life as it evolves with the progression of a certain illness and its treatment.

Quality of life, on a global scale, refers to the overall state of public health. However, when considering individuals who are affected by a disease or receiving treatment, signs of dysfunction or impairment associated with their specific condition are used. In the field of health, this process is referred to as "the ability of patients to manage and lead their lives in accordance with their assessment of their medical condition" (López et al., 2001).

Health-related quality of life encompasses several aspects of life quality that have a direct or indirect connection to health (Bullinger et., 1993). Although the phrases quality of life and health-related quality of life are sometimes used interchangeably, they are typically regarded as separate concepts. Quality of life refers to the total level of satisfaction one has with their life. It may be seen as a single idea or divided into several areas of life. Health-related quality of life refers to an individual's subjective evaluation of their physical, psychological, and social well-being. It encompasses the areas of physical, psychological, and social health.

Cognitive function is greatly impacted by health-related quality of life. Poor health-related quality of life may lead to cognitive deterioration, impacting memory, focus, and cognitive abilities. It is often linked to long-term diseases, physical discomfort, and mental strain. Cognitive function, as defined by Baltes et al., (1999) encompasses the mental processes of acquiring knowledge, manipulating information, and thinking. Cognitive dysfunction is a broad word that refers to any attribute that hinders cognitive abilities, which may vary in severity from moderate to severe. Cognitive impairment is characterized by challenges in remembering, acquiring new knowledge, doing unfamiliar tasks, and focusing or making judgement that affect their everyday activities (Petersen et al., 1999). People may have several negative impacts on their life, including impairments in executive function, memory, attention, orientation, language, and recall. Having difficulty speaking can make it hard for a person to communicate effectively, which can hinder their ability to fulfil social roles to the desired extent (Kiely, 2014). Attention deficits can lead to physical impairments, self-reported disability (Ble, 2005), and difficulties in performing daily activities such as eating, bathing, and personal hygiene (Bronnick, 2006). Problems with attention, memory, and executive function may be connected to the persistence of chronic pain (Attal, 2014). Being aware of cognitive dysfunction can contribute to feelings of depression (Jorm, 2021).

Cognitive functions

The mind refers to the cognitive energy or mechanism by which knowledge and comprehension are obtained via thinking, personal encounters, and sensory perception (Gersh et al., 2005). The cognitive process encompasses several mental activities, such as acquiring information, focusing attention, retaining memories, making judgements and evaluations, using logical reasoning and problem-solving skills, making decisions, and understanding and

generating language. Human cognitive function encompasses both conscious and unconscious processes, which may be either concrete or abstract. It includes intuitive abilities, such as language understanding, as well as conceptual abilities, which include creating mental models of language. Cognitive processes use preexisting information and generate new knowledge.

Perception refers to the cognitive process of processing sensory information in order to comprehend and engage with the surrounding world. Sensory processing involves the systematic analysis, recognition, and understanding of sensory information in order to construct a coherent and meaningful perception of the surrounding environment. Perception has a significant role in shaping an individual's experience and reaction to their surroundings (Sternberg, 1996).

Memory refers to the cognitive process by which data is encoded, preserved, and then recalled. Coding enables the detection of chemical and physical inputs from the external environment. During the first phase, the information has to be modified in order to be included into the coding process. Storage is the subsequent phase of memory or processing. This implies because the information is retained for a brief duration. Lastly, the final step involves retrieving the stored data. The retrieval of this knowledge is necessary for its restoration to awareness. Memory is essential for the processes of studying, decision-making, and solving issues (LaRocque et al., 2014).

Attention is the cognitive function of focusing on certain information while disregarding other inputs. It entails directing cognitive resources towards certain stimuli or activities, improving perception, and facilitating mental handling (Barsalou, 2014).

Language The use of language is a cognitive function that allows humans to comprehend and articulate concepts via conversation. It encompasses the capacity to use symbols, sounds, and gestures to communicate significance. Language is crucial in shaping our thinking, understanding, and how we connect with others (Barsalou, 2014).

Thought-Problem Solving: Problem-solving is a mental process that involves recognising, examining, and addressing difficulties or barriers. It requires cognitive adaptability, ingenuity, and the use of tactics to achieve a resolution. Problem-solving is a crucial skill that is necessary for successfully adjusting to unfamiliar circumstances and accomplishing objectives (Barsalou, 2014).

The primary cognitive impairments seen in individuals diagnosed with type 1 diabetes are a decrease in the speed at which information is processed and a decline in psychomotor

efficiency. Additionally, numerous deficiencies have been observed, including impairments in motor velocity, lexicon, overall cognitive abilities, visuoconstruction, attention, somatosensory evaluation, motor prowess, memory, and executive functioning. People with type 1 diabetes may have changes in cognitive function as a result of the disease's effects on blood sugar management. Psychomotor efficiency, attention, motor speed, memory, verbal IQ, and academic achievement are only some of the many functions that benefit from better glycaemic control. For example, a study known as the Diabetes Control and Complications Trial that lasted for 18 years discovered that people with type 1 diabetes mellitus who had an average glycated haemoglobin level below 7.4% did noticeably better on tests that measured psychomotor efficiency and motor speed than those whose average HbA1c level was above 8.8%. In addition, during acute hyperglycemia, cognitive functions in type 1 and type 2 diabetic patients are impaired, leading to an increase in mental subtraction errors, a decrease in inhibition and focus, a slowdown in information processing speed, a decrease in attention, and impaired working memory (Kodl, 2008).

Prior research have shown a correlation between type-2 diabetes mellitus and a 50% higher likelihood of developing dementia. This suggests that diabetes increases the susceptibility to cognitive deterioration (Biessels, 2006). According to Wong (2014), it has been associated with reduced attention, processing and motor speed, executive functioning, and verbal memory. Individuals who get diabetes in midlife have a 19% greater risk of cognitive impairment over a span of 20 years compared to those without diabetes (Rawlings, 2014). Given the increasing prevalence of type 2 diabetes and longer lifespans, it is crucial to assess cognitive impairment levels in order to initiate preventive interventions at an early stage. Moreover, lifestyle variables such as tobacco use and excessive weight gain elevate the likelihood of developing dementia. The source of this information is the International Diabetes Federation, in the year 2015. The most advantageous approach seems to be lifestyle interventions that include personalised dietary modifications with cardiovascular exercise (Zilliox, 2016).

Individuals diagnosed with metabolic syndrome are at a heightened risk of acquiring cognitive impairment. The cause of neurocognitive illnesses like Alzheimer's disease is widely established to include metabolic anomalies such as hyper or hypoglycemia, the polyol pathway, and the accumulation of advanced glycation end products (Begley, 2016). The main factor responsible for the observed connection between metabolic syndrome and cognition was

hyperglycemia (Dik, 2007).

Impaired cognitive functioning in old age is detrimental since it further reduces the already reduced functional capacity. It diminishes the ability to do daily tasks, effectively carry out self-care activities, manage the typical symptoms of chronic illness, and keep track of regular medication, leading to a substantial decrease in quality of life (Zhou et al., 2019).

Rationale

In this study, we set out to examine whether there is a connection between diabetes perceived life stress, their psychological wellbeing, and their overall quality of life. Prior research has shown that patients diagnosed with diabetes often encounter elevated levels of psychological distress, such as sadness and anxiety, which may have adverse effects on their overall quality of life (Ajele, 2022). Moreover, this study provides insights into the relationship between cognitive function and perceived life stress, psychological wellbeing, and quality of life.

By selecting diabetic patients as the sample, this study addresses a critical gap in understanding the interplay between perceived stress, psychological well-being, quality of life, and cognitive functioning. Diabetic individuals represent a population at high risk of experiencing these issues, making them an ideal group for examining these relationships. The findings of this research have the potential to inform tailored interventions to improve cognitive functioning, reduce stress, and enhance the overall quality of life in this vulnerable population.

There has been little research in Pakistan that has specifically examined the overall quality of life, depressed tendencies (Yusuf et al., 2017), foot care behaviours (Syed, 2019), and the influence of family and culture on physical activity (Tariq, 2022) among individuals with diabetes. There is little information about the specific connection between life stress and health-related quality of life, as well as the role of cognitive functioning in understanding this connection.

Research often focuses on medical or lifestyle interventions for diabetes, while psychological interventions (e.g., stress management, cognitive training) receive less attention.Chronic illnesses like diabetes are well-known to be influenced by psychological factors, but limited research directly addresses how perceived life stress impacts psychological well-being and quality of life in diabetic patients.

The primary objective of this research is to examine the correlation between the perceived life stress, psychological well-being, and the quality of life connected to health. Additionally, the study aims to explore the role of cognitive functioning as a mediator among individuals with diabetes. Gaining insight into these linkages is crucial for comprehending the intricate impact of diabetes on many aspects of an individual's life. The research aims to examine the impact of stress perception on psychological well-being and quality of life, as well as the role of cognitive function in mediating this relationship. The goal is to gain valuable insights that can be used to develop comprehensive interventions and support systems specifically designed to enhance the overall health and coping abilities of individuals with diabetes.

Research Objectives

1. To explore the relationship between perceived life stress, psychological wellbeing, health-related quality of life, and cognitive functioning among patients with diabetes
2. To analyze the impacts of perceived life stress on psychological well-being, health-related quality of life, and cognitive functioning among patients with diabetes.
3. To evaluate the influence of cognitive functioning on psychological wellbeing and health related quality of life among patient with diabetes
4. To investigate the mediating role of cognitive functioning in the relationship between perceived life stress and psychological well-being among patients with diabetes.
5. To investigate the mediating role of cognitive functioning in the relationship between perceived life stress and health-related quality of life among patients with diabetes
6. To assess the role of demographic factors on the study variables.

Research Questions

Q1: What is the relationship between perceived life stress, psychological wellbeing, quality of life among patients with diabetes and mediating role of cognitive functioning?

Q2: What is the impact of perceived life stress on cognitive functioning, psychological wellbeing and quality of life among patients with diabetes?

Q3: What is the mediating role of cognitive functioning in relationship between perceived life stress and psychological wellbeing among patients with diabetes?

Q4: What is the mediating role of cognitive functioning in relationship between perceived life stress and quality of life among patients with diabetes?

Conceptual Model of the Study

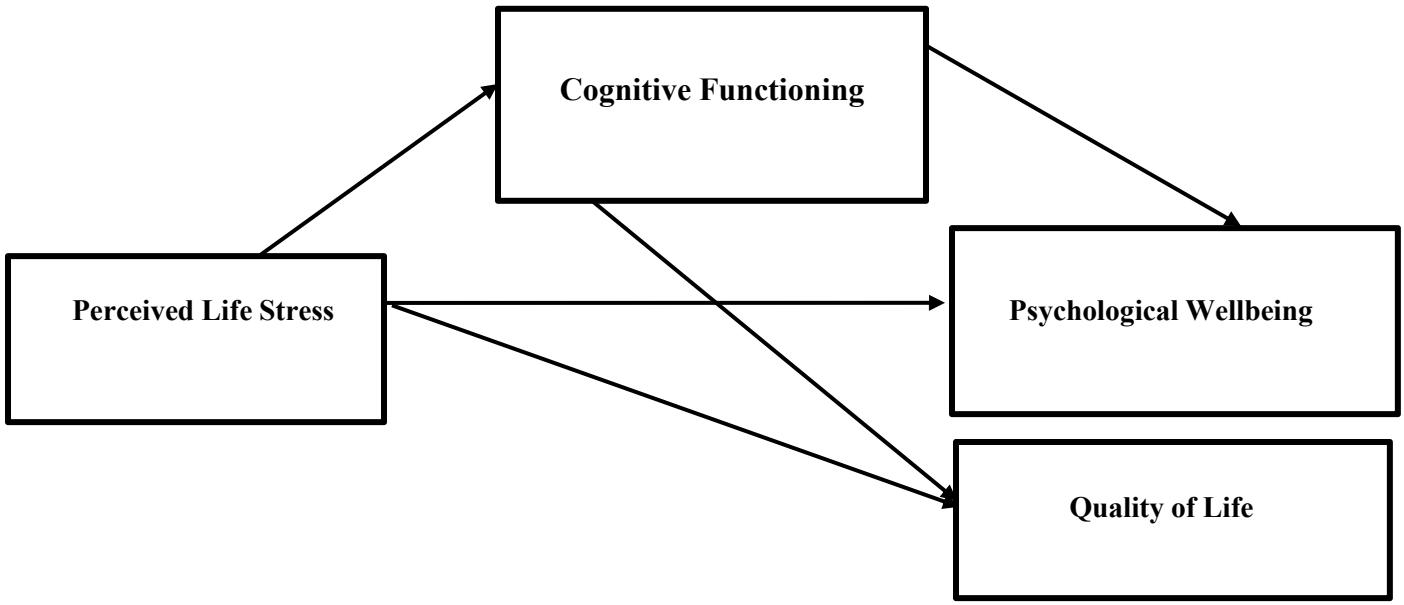

Figure 1. Showing the relationship of perceived life stress, psychological wellbeing and quality of life among patients with diabetes along with the mediating role of cognitive functioning.

Operational definitions

Perceived Life Stress may be described as the degree to which events in an individual's life are evaluated as stressful, unexpected, and beyond their control (Phillips, 2012). However, in this research, the concept of perceived life stress was defined operationally as those who scored high on this scale, suggesting elevated levels of perceived stress, while those who scored low on this scale indicated a reduced level of felt stress.

Psychological Wellbeing refers to the state of an individual's mental health and overall emotional state. Psychological wellbeing is a mental state characterized by the absence of a mental disorder. From the perspective of positive psychology, it encompasses an individual's capacity to derive enjoyment from life and maintain a balance between various activities while striving for psychological resilience (Kitchener et al., 2002). In this research, psychological

wellbeing has been measured using a psychological wellbeing scale, where higher scores represent higher levels of wellbeing and lower scores represent lower levels of wellbeing.

Health-Related Quality of Life. In the present research, the term "quality of life" refers specifically to health-related quality of life. This concept defines quality of life as the impact of sickness and its treatment on a patient's functioning, as experienced by the patients themselves (Schipper, 1990). Nevertheless, in this research, the concept of health-related quality of life was defined and measured in a way that higher scores indicate a greater quality of life, while lower scores indicate a worse quality of life.

Cognitive Functioning. Cognitive functioning encompasses several mental capacities such as learning, thinking, reasoning, remembering, problem solving, decision making, and attention (Carroll et al., 1993). The present research has used a cognitive functioning self-assessment scale to measure cognitive functioning. Higher scores on the scale indicate worse cognitive functioning, whereas lower values indicate better cognitive functioning.

CHAPTER II

LITERATURE REVIEW

Diabetes stands as the predominant chronic multifactorial condition impacting individuals across all age demographics. Diabetes mellitus remains a significant global public health challenge. It is a carbohydrate metabolic condition in which blood glucose levels remain elevated over time due to decreased insulin production or action (Kerner, 2014). With its rising prevalence and death rate, it places an emotional and financial load on the patient, as well as a social cost on the country's economy. Diabetes mellitus is a leading cause of cardiac mortality, blindness, renal failure, depression, and suicide (Qidwai, 2010). Amputations of the diabetic foot are also becoming more prevalent as the condition progresses.

Individuals, particularly adults, are predisposed to developing diabetes due to a combination of genetics and lifestyle factors. Obesity, a sedentary lifestyle, and consuming more processed foods rich in sugar are among them. According to WHO Asia-Pacific cutoffs, the total weighted prevalence of generalized obesity in Pakistan was 57.9% (42% in men and 58% in females), whereas central obesity was 73.1% (37.3% in males and 62.7% in females) (Basit, 2021). Similarly, a diet heavy in canned and highly processed foods, along with little to no physical activity, may predispose children to diabetes in the future. All of these causes contribute to the growing number of pre-diabetics in the nation, who are constantly at risk of developing diabetes--approximately 10.91% of the adult population as of 2018 (Aamir, 2019). Diabetes was also shown to be much more prevalent in urban regions (15.1%) than rural ones (1.6%) (Adnan, 2021). The rising displacement of people from rural to urban regions, along with adaptation to the urban sedentary style of life in Pakistan, raises concerns about the possibility of a rise in the number of cases.

Type 2 diabetes is caused by a complex interaction of biological, environmental, and metabolic variables. Risk factors such as strong familial diabetes history, advancing age, obesity, and physical inactivity elevate susceptibility. Minority groups face heightened risks due to genetic predispositions and adaptations to unhealthy American dietary and lifestyle norms. Women with a history of gestational diabetes, along with their offspring, are also at increased risk. Insulin resistance markedly raises the likelihood of impaired glucose tolerance and type 2

diabetes. Individuals with insulin resistance share similar risk factors, including hyperinsulinemia, atherogenic dyslipidemia, glucose intolerance, hypertension, a prothrombotic state, hyperuricemia, and polycystic ovary syndrome. Effective interventions for preventing and delaying type 2 diabetes focus on modifying environmental risk factors, such as reducing obesity and promoting physical activity. Awareness of these risk factors facilitates early screening, detection, and treatment among high-risk populations, aiming to reduce both microvascular and macrovascular complications (Fletcher, 2002).

Diabetes and its complications are closely linked to psychological and psychiatric issues, according to Lustman (2000). These include depression, (Anderson et al., 2001) poor-eating habits, (Peveler, 2005) and fear of hypoglycemia (Gold, 1997). Moreover, patients with type 2 diabetes mellitus also have a two-fold greater risk for comorbid depression compared to healthy controls, hampering the quality of life of patients (Pouwer et al., 2003). Past research also indicates that patients with diabetes suffer from high levels of diabetes-specific emotional stress (Pouwer, 2005). This is associated with functional impairment, poor adherence to exercise, diet and medications, and inadequate glycemic control (Bhutani, 2014).

Diabetes are the major cause of premature death and disability globally, and they occur 2-4 times more frequently in diabetics than in the general population (Xiaokun, 2011). It is a major cause of visual loss, end-stage renal failure, and stroke. These issues are two to five times more common in diabetics (Bak, 2018). Diabetes can cause a wide range of physiological and psychological problems, including sexual issues. Lower sexual functions or dysfunctions known as loss of libido can occur in both males and females due to diabetes. Severe vision loss, acute renal illnesses that necessitate dialysis or kidney transplantation, coronary artery disease (also known as heart attack), cerebrovascular diseases such as stroke, and hypertension are all frequent. Because of the severity of the negative repercussions of diabetes, it is vital to discover the origins of the problem in order to help to improving the nation's health situation (Afshari et al., 2017).

Type 2 Diabetes Mellitus corresponds to 90-95% of all cases of diabetes mellitus and has a multifactorial etiology, involving genetic inheritance and environmental factors such as: diet, physical inactivity, obesity, and advanced age. Individuals with type 2 diabetes require specialized care, ongoing self-management, and effective strategies to manage perceived stress. A study was conducted to identify the perceived stress and self-care activities of patients

associated with socio-demographic, clinical, and lifestyle variables. The findings of the study revealed that most patients were elderly, cardiopathic, hypertensive, did not practice physical activity, did not follow a diet, among other aspects. The perceived stress level represented an average score that is, less than half of the total value, suggesting a low perception of stress in the sample. Regarding the self-care domain, it was generally found to be low, as patients did not perform self-care activities on at least six days a week. The study participants consistently adhered to a specific diet for an average of 5.2 days per week and regularly used medications on average 4.7 days per week (Moreschi, 2018)

The relationship between different patient-reported outcomes, demographic characteristics, patients' self-management of chronic illnesses, and medical outcomes is part of a growing body of research (Rubin et al., 1999). For example, diabetes patients who actively manage their condition better (Hibbard et al., 2007); patients who are more involved, knowledgeable, confident, and competent are more likely to take actions that will improve their own health and are more likely to have their medical needs addressed (Hibbard, 2008).

Diabetes requires rigorous daily care, which can have a significant psychological and social toll. This can lead to poor blood glucose control and a higher risk of complications (Wändel et al., 19971). From the perspective of the patient, reducing the burden caused by diabetes necessitates a strategy that guarantees integration, is easily accessible, and is affordable. Additionally, they should be patient-centered, with a focus on strengthening patients' self-assurance and capacity to successfully handle their condition (Funnell et al., 2002). In light of this, patient-reported outcomes like quality of life and assessments of quality of care are increasingly frequently used as indicators of health care systems and are generally regarded as essential to assessing how well these systems respond to the needs of their users (Devlin et al., 2010).

The high prevalence of diabetes that already exists and is predicted to rise in the future is having a serious negative impact on the healthcare system and peoples' quality of life. The impact of diabetes on retinopathy, foot ulcers, depression, sexual dysfunction, and cardiovascular and renal illnesses is well covered in diabetes literature (Trikkalinou, 2017). Nonetheless, there is a lack of information regarding the general health consequences of functional mental diseases, such as social dysfunction, anxiety, confidence, and other relevant characteristics. There has

been few research on the quality of life for diabetics with regard to depression, social support, and sleep (Semenkovich, 2015). Diabetes is becoming increasingly common, which lowers quality of life and increases psychosocial issues. Therefore, it has become increasingly important in the last ten years to evaluate the psychosocial and mental health of patients with chronic life-threatening illnesses. This is essential to understanding the main psychological elements that are most effected. In order to deal with the underlying psychological problems and manage the disease, it may be helpful in modifying the intervention and treatment needs (Trikkalinou, 2017).

Perceived Life Stress

Diabetes is strongly impacted by stress, both physically and through disturbances in social behaviours and psychological well-being (Lloyd et al., 2005). Björntorp (1997) proposed a theory explaining the link between stress and diabetes, claiming that felt emotional strain results in a hopelessness response can activate the hypothalamic-pituitary-adrenal axis leading to elevated cortisol levels that counteract insulin's actions. Several studies support the idea that psychological stress and stressful life events are linked to the development of type 2 diabetes (Heraclides, 2009).

Perceived stress has been correlated with inadequate regulation of metabolic control (Surwit, 1992), that can result in major long-term problems for diabetes people.These complications include blindness, kidney failure, lower limb amputation, coronary heart disease, nerve damage, sensory loss, Alzheimer's disease, and vascular dementia (De et al., 2012). Furthermore, these problems, as well as diabetes itself, are a major source of stress for these patients owing to lifestyle modifications, balanced diet, exercise, regular medical exams, and drug usage (Mooy et al., 2000). It may also cause a economic crisis for patients as well as their household, which will have an impact on health systems and national economies by impacting medical costs,job losses and earning. Diabetes-related stress has an impact on the well-being of diabetic patients and may lead to psychological symptoms such as worry (Trovato et al., 2006).

Diabetes is the chronic and most complication producing disease, not only it affects the physical wellbeing also affects the psychological wellbeing. Diabetes can be a significant source of stress for individuals affected by this condition. Assessment of the level of stress can help them to manage and recover from stress. Previous studies assessed the perceived level of stress

in diabetic clients. The findings of the study revealed that 52% of the diabetic clients have high level of stress. Age, occupation and dietary pattern had significant association with stress level (Tamilselvi et al., 2014).

Other study have produced similar conclusions (Honish et al., 2006). According to Miftari & Melonashi (2015), "the patients in the age group of 30 to 40 revealed a lower stress level and a higher quality of life, owing to the fact that youthful people are more joyful, happy, and have a good attitude on life." The results show a significant negative link between stress and the quality of life of diabetic patients, demonstrating the negative effect of stress on life quality. It can be noticed that when an individual experiences high levels of stress, their quality of life is profoundly impacted. Stress is a harmful feeling that is associated with changes in behavior, biochemistry, physiology, and cognitive functioning, directly affects an individual's ability to think clearly, regulate their emotions, and make decisions. This usually leads to disruptions in daily life and lowers one's standard of living and lifestyle (Khatatneh et al., 2018).

"Stress" functions as both a causal factor and a consequence in diabetes.There is a scarcity of research on stress levels and related issues among diabetics in India. A study was done to assess perceived stress levels and related characteristics among diabetes patients at a rural tertiary healthcare institution in South India. Researchers employed a pre-tested semi-structured survey to collect sociodemographic, disease-related, treatment-related, and behavior-related data from hospitalised patients.The study found that "perceived stress" was reported by 97 (39.3%) of the participants. More youthful age, shorter duration of diabetes, existence of comorbidities, being underweight, encountering disputes at work or home in the previous month.

People with diabetes experience a lower quality of life when they perceive stress. An imbalance in insulin levels in the body causes stress in the patient's life. Stress as a result act as a barrier to proper glucose regulation in the body, which has a direct impact on the individual's fight-or-flight response, causing additional imbalances in cognitive functions. Stress-induced mental problems have a significant impact on an individual's life and deplete their quality of life. The study's findings show that stress has a detrimental association with quality of life. Following the research, the value of 'r' was determined to be -.583**, which is negatively significant at the 0.001 level. Based on the findings, it is obvious that increasing stress levels in an individual (diabetes patient) reduces their quality of life somewhat. The previously mentioned findings

were supported by "Stress triggers different physical and mental reactions in women and men with diabetes that contribute to a decrease in life quality" (Miftari et al., 2015). The duration of disease was also found to influence the amount of stress and life satisfaction in diabetic patients. The findings revealed a statistically significant positive relationship between the level of stress and the duration of the sickness, implying that the longer the condition lasts, the more stressed individuals become. On the other side, we have a substantial negative relationship with quality of life, implying that the longer the sickness lasts, the poorer the quality of life.

Psychological Wellbeing

Psychological well-being is influenced by how a person perceives their situation, as well as by physical symptoms and social interactions. Physical manifestations in the management of diabetes often include transient episodes of hypoglycemia or hyperglycemia, as well as chronic problems. The well-being of a person with diabetes is frequently connected to their awareness of their capacity to handle the daily challenges of managing the illness and the problems associated with treatment. Other concerns include meeting social responsibilities, preserving social connections, achieving optimal metabolic management, and avoiding or delaying the development of problems associated with diabetes (Ramya, 2022).

The well-being of diabetic patients is linked to their view of their capacity to manage the challenges of diabetes and its treatment, maintain social connections, and avoid the development of complications, all of which contribute to a higher level of life satisfaction (Eiser et al., 2001). Diabetes itself is a significant contributor to stress in these individuals. Indeed, this condition necessitates modifications in one's lifestyle, dietary adjustments, regular medical check-ups, medication, and may lead to significant consequences. These many factors influence the mental health of individuals with diabetes. Modifications in lifestyle, such as quitting smoking, dietary adjustments, and acquiring the skills to administer injections, may all have an impact, alongside the concern related to a long-term disease (Davis et al., 1999).

Boghle & Prakash (2012) found that individuals with high psychological well-being have elevated levels of life satisfaction, self-esteem, good emotions, and positive attitudes. Additionally, they demonstrate better ability to cope with stress, negative thoughts, ideas, and emotions.

When compared to those without diabetes, people with diabetes show a significant decrease in psychological wellbeing. People with a history of both type 2 diabetes and poor mental health also tend to have a reduced quality of life, according to the available research. A good measure of a person's mental health and general happiness is the degree to which they fear hypoglycemia. People with Type 2 diabetes have better health outcomes when they practise good mental states including optimism, thanksgiving, and positive affect. Among these advantages include lower mortality rates and improved glycaemic control. Unfortunately, poor glucose control, functional impairment, and mortality are among the adverse consequences linked to negative psychological syndromes like anxiety and depression experienced by many people with type 2 diabetes. Several factors impact the mental health of people with diabetes. These include positive and negative psychological syndromes, the dread of hypoglycemia, and positive and negative psychological moods. These factors could significantly impact how these individuals live their lives (Christina, 2017).

The mental and physical health of those living with diabetes mellitus is impacted. People with diabetes are at risk for mental health issues and the pain that comes with it, regardless of the kind of diabetes it is. The purpose of this study was to compare and contrast the psychological health and suffering of people with type I and type II diabetes mellitus as it relates to their diabetes. Two hundred diabetes patients living in Faisalabad were chosen for this study using a purposive sample method. Type I diabetes affected 50% of the people while type II diabetes affected 50% of the people. In comparison to those with type I diabetes, those with type II diabetes mellitus reported a far greater emotional burden, according to the research. In comparison to those with type I diabetes mellitus, those with type II diabetes showed less autonomy and environmental mastery (Batool et al., 2018).

Mahizadeh (2021) demonstrated the correlation between certain attributes and psychological well-being in persons diagnosed with type 2 diabetes. Questionnaires that had been validated were used to evaluate the well-being, adherence to medicine, diet, and levels of physical exercise in patients. The study's findings revealed a strong correlation between the level of medication adherence and the psychological wellbeing score, as determined by both univariate and multivariate analyses. Moreover, the results of both the univariate and multivariate analyses demonstrated a robust correlation between the psychological wellbeing score and adherence to

the diet. However, there were no notable variations in the psychological wellbeing score throughout the spectrum of physical exercise. The results revealed a significant correlation between the psychological wellness score and diabetes management.

The COVID-19 epidemic has detrimental impacts on diabetes patients, such as increased stress levels, poor lifestyles, and difficulty in controlling glucose levels. The objective is to assess the preventative measures and levels of reported stress in individuals with diabetes during the COVID-19 epidemic. The research revealed that the majority of participants were female, accounting for 66% of the total, and had type 2 diabetes, which was seen in 69.3% of the participants. The level of felt stress in patients diagnosed with type 2 diabetes was greater than that seen in those diagnosed with type 1 diabetes. Furthermore, females had a greater average value in preventative behaviours in comparison to men. Gender, employment position, and access to medication were shown to be significant determinants of felt stress and preventative behaviours. The average ratings for perceived stress and preventative behaviours were rather high and moderate, respectively. The high felt stress score showed an elevated level of stress, whereas the moderate preventative behaviours suggested adherence to the health regimens (Pazokian, 2021).

The goal is to investigate gender-based variations in stress perception among diabetics.The study results indicate a notable gender disparity in the stress levels of diabetes individuals, with females scoring higher than males. Women with diabetes can encounter social and environmental challenges that contribute to elevated levels of stress. For example, individuals may experience heightened stress due to the demands of their relationships, the need for family support, and the responsibilities of caregiving. (Rauf et al., 2016). Moreover, previous studies have shown that women have a higher propensity for common risk factors, such as obesity, physical inactivity, and hypertension. These risk factors might elevate stress levels and thus increase the susceptibility to type 2 diabetes.

Prior studies have confirmed the frequency of diabetic distress, perceived stress, and depressive symptoms in individuals who have developed Type 2 diabetes at an early age. The objective is to investigate how these factors are linked to socio-demographic and clinical variables. A cross-sectional study was conducted on persons between the ages of twenty and forty five who have Type 2 diabetes. The study's results indicated that the survey was completed

by persons with Type 2 diabetes, with women accounting for 48% of the participants. The age at which half of the population is older and half is younger was 42 years, while the length of time individuals had been diagnosed with diabetes was 5 years. Overall, 24% of the participants indicated a significant level of discomfort related to diabetes, while 46% reported experiencing a high level of perceived stress, and 41% showed heightened signs of depression. Women had a greater frequency of emotional issues compared to males. Diabetes distress was more prevalent among those who were administered non-insulin glucose-lowering medicines compared to those who were not prescribed any glucose-lowering drugs. However, it was not linked to any other clinical or socio-demographic factors.

The study conducted by Maindal et al. (2020) found that individuals who were jobless and taking antidepressant medication had high levels of perceived stress. Additionally, those with poor education level, unemployment, living alone, having a mental disease, and using antidepressant medication reported heightened depressed symptoms.

Quality of Life

The idea of quality of life is considered to be complex and dynamic, including several aspects such as well-being, health status, life satisfaction, and hope. It is closely connected to these factors but is also unique from them (King, 1998). Health-related quality of life refers specifically to the quality of life that is influenced by an individual's health issues. Health related quality of life refers to the assessment of the worth of one's lifespan, taking into account the effects of impairments, functional states, perceptions, and social opportunities that are altered by factors such as sickness, injury, treatment, or policy (Shumaker et al., 1995).

The difficulties of diabetes care may significantly impact both long-term and short-term mood consequences. Due to the ineffectiveness of their best efforts, many patients may experience a continuous sense of frustration, despair, or anger in response to their condition. Additionally, individuals may have feelings of pessimism or despair about their ability to prevent enduring problems. Confronting one's mortality and learning to cope with diabetes may be a difficult and distressing emotional ordeal. This may be especially challenging at certain stages of the disease's progression when diabetes becomes more evident, such as during the diagnostic phase, the initiation of insulin therapy, and the onset of long-term complications. In addition,

consistently elevated blood glucose levels might result in fatigue, perhaps leading to the development of depression. Recurrent bouts of hypoglycemia may be both scary and debilitating, causing discouragement (Prasanth, 2022).

Diabetes mellitus is a common and serious long-term disorder that leads to a significant number of illnesses and deaths. It has many ramifications on an individual's physical, social, and psychological wellbeing. However, the majority of studies conducted in our country has mostly focused on the disease's impact on mortality and morbidity. Patients with diabetes and the variables impacting their health-related quality of life were the subjects of a study at Ethiopia's University of Gondar referral hospital. As far as health-related quality of life is concerned, the survey found that scores in the physical domain were 50.9, in the psychological domain 54.5, in the social domain 55.8, and in the environmental domain 47.3. There was a significant correlation between diabetes and all domains with the exception of the psychological one. The health-related quality of life was shown to be higher among those who were physically active, followed the prescribed diet, took good care of their feet, used alcohol responsibly, and did not have any other medical concerns. Still, health-related quality of life tends to diminish with age, unemployment, and single status (Aschalew et al., 2020).

Previous research has looked at how people with diabetes mellitus rate their psychological wellbeing and how it relates to their overall quality of life. Male and female patients with type 2 diabetes mellitus did not differ significantly in terms of quality of life, according to these research. In terms of psychological wellbeing, however, there was a clear difference. Subramanian et al. (2022) found, however, that among T2DM patients, there was a statistically significant correlation between psychological wellbeing and QoL.

Diabetes is considered a major public health concern. The number of complications caused by diabetes has been steadily increasing over the last several decades. Diabetes has far-reaching effects on people's quality of life since it causes deficits in every aspect of functioning. People with type II diabetes had their quality of life assessed in a recent research. A tertiary healthcare facility used a simple sample strategy to conduct a research on 180 individuals who were diagnosed with type II diabetes. On average, those with type II diabetes scored 51.8 on the quality of life scale, according to the study. Physical factors (worth 55%), psychological elements (wort h 47%), social aspects (worth 55%), and environmental aspects (worth 50%)

were among the several areas used to assess quality of life in type II diabetes. An average domain-specific assessment indicates an average standard of living (Majeed et al., 2019).

Diabetes significantly impacts the quality of life, leading to deterioration in all areas of patient functioning. Diabetes has a significant impact on several aspects of quality of life, including physical, social, and psychological well-being (Basit, 2015). The estimated prevalence of diabetes in Pakistan is 6.9%, which equates to around 7 million people. An estimated 3 million cases are believed to go undiagnosed. In 2015, Diabetes was ranked as the fourth most non-communicable disease causing death, with 86,364 recorded fatalities (Atiq, 2018). As a chronic debilitating condition, diabetes requires regular patient check-ups to evaluate quality of life. Complications associated with diabetes impact several physiological systems and contribute to an elevated mortality risk. Controlling chronic illness relies only on improving the quality of life in patients, which is a crucial factor in managing the disease and preventing complications (Niiranen, 2018). In order to establish a reliable connection between patients and carers, it is essential to regularly assess the quality of life in persons with diabetes from a clinical standpoint. Regular evaluation aids in monitoring the condition of the illness, detecting early complications, and observing the outcome of the treatment plan.

Diabetes mellitus is a persistent noncommunicable ailment that is very prevalent (Ding, 2021). The incidence of diabetes has significantly risen in recent years due to changes in lifestyle (Uusitupa, 2019). The issue has escalated into a matter of public health that is causing widespread concern and constitutes a significant danger to global health issues (Wang, 2018). Individuals with diabetes are susceptible to consequences such as neurological and cardiovascular disorders, as well as diabetic foot conditions. Not to mention that mental health problems like depression and anxiety are common and may greatly affect a person's social and emotional health as well as their ability to go about their daily lives normally, leading to a diminished quality of life (Jannoo, 2015). Diabetes is associated with a decline in quality of life, and research shows that people with the disease often have a low QoL (Carter, 2022). Patients with poor quality of life may be less likely to follow their treatment plans, which might manifest as resistance to hospitalization or uncontrolled blood glucose levels. As a result, studying diabetics' QoL is crucial. According to Hall (2020), a person's view of their physical, mental, and social well-being all contribute to their overall quality of life. Based on what Rubin has said, the

end goal of any health therapy should be an improvement in quality of life, or QoL (1999). Physical and social functioning, as well as the subjective assessment of mental and physical health, are used to evaluate quality of life (Donini, 2020). Those living with diabetes are less likely to have a high quality of life than those without the disease, according to studies (Lucendo, 2018). A key indicator of effective diabetes treatment is improving patients' quality of life (Speight, 2020).

Diabetes significantly impairs the quality of life. The majority of patients have a range of long-term problems, including as micro-vascular consequences (such as neuropathy, nephropathy, and retinopathy) and macro-vascular complications (such as myocardial infarction, angina pectoris, stroke, and amputation) (Grandy, 2008). In addition to the challenges of regularly taking oral antidiabetic medications, the anxiety around the need for subcutaneous insulin injections and the occurrence of hypoglycemia may cause emotional distress for diabetic patients and further diminish their overall health-related quality of life (Vancampfort, 2015).

There are a number of ways in which diabetes may affect physical health. The genesis and consequences of long-term difficulties are among the most prominent challenges. A patient's quality of life is likely to decrease significantly if they are dealing with visual impairment, heart problems, end-stage renal disease, impotence, peripheral neuropathy causing chronic pain, or amputation. There will be a decrease in the patient's ability to function independently and in their capability to participate in pleasurable activities.. Diabetes is a significant source of physical handicap in adults, which may greatly impact their quality of life. The study revealed that coronary heart disease was the primary cause of disability, with stroke particularly impacting males (Gregg, 2000).

Diabetes is a developing chronic ailment that imposes a substantial responsibility of self-care on the person, including daily monitoring and administration of drugs, concern about the future, and anguish over the effects of diabetes on many parts of life. This group of metabolic diseases is defined by persistently elevated blood glucose levels (hyperglycemia) caused by insulin resistance, insulin insufficiency, or both. Researchers looked at how people with type I diabetes rated their quality of life and how often they experienced sadness based on their gender. From the Jammu region of India, 70 people, including 44 men and 26 females, ranging in age from 40 to 80 years old, were collected. The research found that there is a big difference between

the sexes when it comes to depression, physical and mental quality of life. The average scores showed that the participants' levels of depression were higher in the female group than in the male group. Charak et al. (2017) found no difference in quality of life between males and girls when it came to social and environmental factors.

Cognitive Functions

Cognitive abilities include perception, acquisition of knowledge, retention of information, making choices, focusing and language proficiency. Cognitive function refers to the mental processes involved in acquiring knowledge, manipulating information, and thinking (Baltes et al., 1999). Cognitive impairment refers to the difficulty individuals have in recalling information, acquiring new knowledge, engaging in novel tasks, and making judgements that impact their daily functioning. The range of cognitive impairment spans from mild to profound. People who have mild or moderate impairment may start to notice changes in their psychological function while still participating in their usual activities.On the contrary, individuals with severe impairment have a complete loss of their capacity to understand, write, or talk, and are incapable of living on their own, requiring continuous care and assistance (Hu et al., 2017).

The ability of patients to comprehend the significance of regular follow-up, taking care of themselves, adhering to dietary guidelines, engaging in physical activity, and taking medication primarily relies on their memory. However, cognitive deficiencies or impairments can have a detrimental impact on the treatment plan or lead to significant harm, particularly in patients with diabetes (Alosc, 2012). Individuals suffering from cognitive impairment are more susceptible to treatment-related problems, including hypoglycemia caused by skipped meals, inappropriate administration or timing of insulin, or adverse effects of oral medications (Yerrapragada, 2019).

There is strong evidence that type 2 diabetes mellitus is associated with brain structural abnormalities and poor cognitive function.Cognitive decline, such as moderate cognitive impairment, Alzheimer's disease, vascular dementia, and other types of dementia, may be detected in diabetic patients by neuropsychological testing in comparison to non-diabetic controls. Zherdova et al. (2018) found that the risk of dementia is 50% greater in those with type 2 diabetes.

Cognitive impairment may be a result of diabetes mellitus and its complications. Cognitive impairment is more common in people with type 2 diabetes mellitus than type 1 diabetes mellitus, according to the evidence that is currently available (Lyu et al., 2020).The most obvious obstacle to learning and memory in type 2 diabetes is the cognitive impairment caused by the condition (McCrimmon et al., 2012).A loss in cognitive performance may hasten central nervous system ageing and increase the likelihood of acquiring neurodegenerative disorders such as Alzheimer's disease (Cheng et al., 2012).

The primary cognitive deficits seen in persons with type 1 diabetes are a decrease in psychomotor efficiency and a deceleration in information processing speed. Additional shortcomings have been noted, including deficits in visuoconstruction, overall cognitive ability, motor prowess, memory, executive function, somatosensory assessment, motor velocity, and language. Patients diagnosed with type 1 diabetes have varying cognitive performance based on their glucose control. Improved glycaemic management positively impacts cognitive abilities such as verbal IQ scores, memory, psychomotor efficiency, motor speed, attention, and academic accomplishment. Specifically, a study conducted over a period of 18 years called the Diabetes Control and Complications Trial found that individuals with type 1 diabetes who maintained an average glycated haemoglobin (HbA1c) level of less than 7.4% performed better on tests measuring psychomotor efficiency and motor speed compared to those with an average HbA1c level of more than 8.8%. In addition, when patients with type 1 and type 2 diabetes experience acute hyperglycemia, there is a decrease in the speed of all cognitive functions, an increase in errors during mental subtraction, a loss of inhibition and focus, a decline in the speed of processing information, a reduction in attention, and an impairment in working memory (Kodl, 2008).

Cognitive impairments ranging from slight to substantial were seen in a variety of areas in studies comparing persons with and without diabetes mellitus. Included in this group are abilities related to visual-spatial perception, focus, psychomotor skills, and motor speed. Ohmann (2010), Moheet (2015), Li (2017) & Tonoli (2014) all found evidence supporting this. There are many cognitive deficits that have been associated to type 2 diabetes. These include difficulties with paying attention, remembering what one has seen, speaking clearly, working memory, complex motor skills, recalling information quickly or at a later date, and executive

function (Gregg et al., 2000). Neglected diabetes increases the risk of cognitive impairment in those with the disease. Research shows that the effects of diabetes on cognition start to show up after five years or more. According to research (Hamed et al., 2013), chronic diabetes seems to have the most impact on areas such as attention, focus, and recent memory when compared to a control group. However, some investigations in this area have reached conflicting findings in the literature; these studies include those from India. Cognitive decline with age is a real possibility for middle-aged people, especially those above the age of 50 (Halder, 2018).

Diabetes mellitus is linked to mild to severe cognitive impairments. A comprehensive investigation was conducted to elucidate the cognitive implications of type 1 and type 2 diabetes, using influential research that track individuals longitudinally. Onset of cognitive impairment in individuals with type 1 diabetes occurs quickly after diagnosis and may manifest at any stage of life. While the extent of these effects is often mild, they are particularly noticeable in individuals who develop type 1 diabetes at a young age (before 7 years old) or who have microvascular diseases such proliferative retinopathy. The prevalence of type 2 diabetes has significantly increased during the last two decades, mostly as a result of the worldwide obesity epidemic. This particular kind of diabetes is now impacting individuals at increasingly younger ages. Once again, it is worth noting that cognition may be impacted, especially in persons who have worse control over their blood sugar levels. Additionally, there is data suggesting that the longer a person has diabetes, the faster they may experience cognitive decline, and their likelihood of developing dementia significantly rises (Ryan et al., 2020).

Prior research has shown a correlation between the speed at which certain cognitive abilities deteriorate and the level of felt stress. Linear mixed-effects models, which took into account age, sex, education, and vascular risk factors revealed that higher levels of felt stress were linked to faster declines in overall cognition, episodic memory, and visuospatial ability (all $p < 0.05$). The subsequent models that took into consideration depressive symptoms, vascular diseases, and demographics yielded comparable outcomes (Capuano et al., 2017).

There is evidence linking both type 1 and type 2 diabetes to brain abnormalities and poor cognitive performance across a variety of categories. Research by Messier (2005) and Berg et al. (2010) has linked Type 2 Diabetes Mellitus (T2DM) to a decrease in cognitive abilities, particularly influencing processing speed, working memory, and verbal memory.

Vasoconstriction and alterations in abstract thinking are two areas of cognition that may vary in older people (Awad et al., 2004). To understand the cognitive loss associated with type 2 diabetes, it is necessary to be aware of the interaction between glucose and insulin and their critical roles in controlling cognitive function (Geijselaers et al., 2015).

Previous study found that the prevalence of cognitive impairment was 63.8% in individuals with diabetes, which is much higher than the 10.8% prevalence in the general population. The odds ratio, a measure of the association between diabetes and cognitive impairment, was calculated to be 5.93. Diabetics had a poorer score on the Addenbrooke's Cognitive Examination, and the presence of hypertension or a prior history of myocardial infarction event increased the chances of cognitive impairment. Diabetes impacted four out of the five cognitive sub-domains evaluated, which included attention, memory, language, and visuospatial abilities. This is important because cognitive impairment across various domains affects behaviours such as decision-making, problem-solving, establishing new routines, and abandoning old ones. This might potentially affect an individual's capacity to manage their diabetes since it affects their self-care, problem-solving skills, drive to comply with instructions, and adherence to exercise regimens. Consequently, reduced cognitive perf ormance may initiate a harmful loop of unregulated glucose and further cognitive impairments. A study conducted in Kerala used the Montreal Cognitive Assessment to investigate cognitive impairment in individuals with diabetes. The findings revealed that 54.29% of diabetics had cognitive impairment (Lalithambika, 2019).

Theoretical Framework

The current study is based on the Bio-psychosocial model of health and illness.

Biopsychosocial Model:

The biopsychosocial model of health and sickness, proposed by Engel in 1984, posits that the source, manifestation, and outcome of wellness and disease are determined by the interactions among biological, psychological, and social components. Historically, prevailing views such as the nature versus nurture argument suggested that each of these elements alone had the ability to alter the trajectory of development. The bio psychosocial paradigm posits that health-related outcomes are determined by the interaction of individuals' genetic composition

(biology), mental health and behaviour (psychology), and social and cultural milieu, rather than any one element being adequate. The bio-psychosocial paradigm emphasizes an individual's subjective interpretation of their symptoms and the way they and their families react to the symptoms they are encountering (Morof, 2002). The bio-psychosocial paradigm encompasses the influence of biological, psychological, and social variables on health outcomes.

Role of biological factors

In 1977, Engel developed the Biopsychosocial Model of Illness, an interdisciplinary framework that offers a thorough account of the intricate interplay of biological, social, and psychological factors and their influence on health and disease. Biological components, such as genetic materials and information inherited from parents, might make a person more likely to develop certain illnesses. Research indicates that have a familial lineage with type 2 diabetes mellitus is a powerful indicator of the condition (Cole, 2020). Biological variables might provide assistance when explaining the possible health issues that can arise from an untreated disease. Regrettably, if diabetes mellitus is not addressed, it may result in several debilitating health complications, including blindness, amputations, an increased susceptibility to heart disease and stroke, and nerve damage (Papatheodorou, 2010). The allocation of resources for addressing diabetes mellitus-related concerns is projected to represent 12% of global healthcare spending. In addition, diabetes mellitus has the potential to be fatal. According to Atlas (2015), the ailment claimed the lives of 5 million individuals in 2015. Regrettably, it is expected that this figure will rise, with obesity being a significant contributing factor. Other factors that contribute to this increase in occurrence include inactive lifestyles, urbanisation, the eating of high-calorie meals, and low levels of education.

Cognitive processes play a crucial role in the biological aspects that impact human health and behaviour under the bio psychosocial paradigm. Cognitive functions refer to a variety of mental processes, such as perceptions, memory, attention, and problem-solving skills. These processes are all based on the neurological and physiological systems of the brain. Neurobiological problems, such as Alzheimer's disease, schizophrenia, or traumatic brain damage, may lead to deficiencies in cognitive functioning. Diabetes has a biological impact on brain tissues and cerebrovascular structures, resulting in a range of structural and functional abnormalities in the nervous system. These abnormalities might contribute to a deterioration in

cognitive performance. The atypical glucose metabolism linked to diabetes, including hypoglycemia, prediabetes, and hyperglycemia, may lead to brain dysfunction and cognitive impairment. The brain and neural tissues primarily rely on glucose as their main source of energy. Therefore, any changes in carbohydrate metabolism may directly affect the brain's functional output, including cognition, executive ability, and memory. Diabetes mellitus has various effects on neuronal function and mental capacity. These effects include reduced blood flow to brain tissues due to cerebrovascular disease, abnormalities in neuronal glucose uptake and metabolism caused by diabetes-related changes in glucose transporters, altered metabolism in specific brain areas due to insulin resistance, and neuronal damage resulting from recurrent episodes of low blood sugar caused by diabetes medication (Sebastian, 2023).

Social and environmental factors

Fortunately, there are some modifiable factors that might potentially reduce the risk of health complications after a diagnosis of diabetes mellitus, and these variables are within the individual's control. These factors include maintaining a nutritious diet, according to prescribed medical protocols, reducing body weight in cases of overweight or obesity, ceasing tobacco use, limiting alcohol intake, and engaging in increased physical activity. However, there are some factors that are beyond of an individual's sphere of influence. The health outcomes of individuals with diabetes mellitus are significantly influenced by social determinants of health. Social determinants of health refer to the environmental factors that impact an individual's health and the resulting health consequences.

These factors include an individual's financial situation, the standard and accessibility of healthcare and services, the opportunity to get education and its quality, the social and community environment, the local neighbourhood, and the physical infrastructure (Braveman, 2014). These variables have extensive consequences for the health, health risks, quality of life, and longevity of individuals with diabetes mellitus. Poverty, limited availability of nutritious food, inadequate education, and a poor income have all been associated with an elevated susceptibility to diabetes mellitus (Martikainen et al., 1999). Individuals with low health literacy have a reduced likelihood of taking required measures to protect their health, which puts them at a higher risk of experiencing issues associated to diabetes mellitus. Individuals of lower socioeconomic class may have limited access to nutritious dietary choices which puts them at a

higher risk of acquiring elevated blood glucose levels. There is a correlation between having a low socio-economic position and experiencing worse physical and mental health results.

Diabetes mellitus and its impact on the family.

Most persons afflicted with diabetes mellitus seem to adapt well. However, this does not apply universally. An individual's interpretation of their diagnosis might impact the process of adapting to it. Individuals who have inadequate coping mechanisms and limited social support systems often suffer a decrease in overall well-being and psychological health (Patricio et al., 2011) A diagnosis of diabetes mellitus often requires substantial lifestyle changes that impact not only the individual with diabetes, but often the whole family. Certain physical impairments, such as visual impairment or limb loss, may lead to a person relying on others for essential needs, resulting in a sense of burden on their family. The condition's enduring consequences may also give rise to psychological problems. The family may find it difficult to comprehend the individual's experience, while the patient may sense a lack of understanding. The family may need to make many modifications, such as diversifying and limiting their food choices, dedicating more time and energy to meal preparation, and receiving help with frequent blood sugar monitoring. Research has shown that a family setting that provides support may enhance the adherence to medicine, improve metabolic control, and promote self-management of the medical condition (Rintala, 2013). Nevertheless, some family members may find themselves overwhelmed by fear over potential long-term health implications and hypochondria.

Psychological implications

As mentioned before, diabetes mellitus need lifelong treatment. Certain individuals may find it challenging to come to terms with the idea that they will have to rely on drugs indefinitely. This might result in patients developing resistance to treatment regimens, which can lead to psychological distress and exacerbation of physical issues (Kalra et al., 2013). Research suggests that people undergo a range of intense emotions upon receiving a diagnosis, similar to the emotional stages described in Kubler (1969) Stages of Grief Model (Oken, 1969). People who are diagnosed with a chronic illness often have a diminished ability to express themselves. After diagnosis, the individual often experiences a shift from a state of good health, vitality, and energy to feelings of guilt, self-blame, and harm to their sense of self-worth, as described by

Nardi (2012). This particularly applies to young folks who may have the belief that their lives have been robbed from them. Similarly, prioritizing the psychological well-being of individuals with diabetes mellitus continues to be a primary objective in reducing distress. Diabetes-related discomfort pertains to the psychological and behavioral adaptations that a person must make after being diagnosed with diabetes (Aljuaid, 2018).

The Diabetes Attitudes Wishes and Needs (DAWN) study, conducted in 13 countries worldwide, revealed that individuals with diabetes exhibited sub optimal adherence to treatment regimens, inadequate self-care practices, and elevated levels of anxiety linked to their condition (Peyrot, 2005). The second Diabetes Attitudes Wishes and Needs (DAWN 2) study, conducted in 17 countries, examined the psychological effects of diabetes on individuals. The study revealed that 13.8% of diagnosed individuals were prone to depression, 44% experienced distress related to diabetes, and 12% had a lower quality of life compared to those without the disease (Nicolucc, 2013).Both studies directed attention on the significant physical and psychological challenges linked to diabetes, as well as the unfulfilled requirements of the community. The results underscore the need of adopting a therapeutic strategy that focuses on the individual, including the active engagement of family members, implementing effective self-management techniques, and conducting a comprehensive assessment of the quality of patient care.

CHAPTER III

RESEARCH METHODOLOGY

Research Design

The current study aimed to investigate the association between perceived life stress, psychological well-being, and quality of life in diabetes patients, as well as the mediating role of cognitive function. To achieve the study's objectives, a cross-sectional correlation research design was selected. To evaluate perceived life stress, the wellbeing-health-related quality of life and cognitive function self-assessment scales were translated into Urdu for this study. The other research variables, such as psychological well-being, were measured using previously developed measures. These scales had previously been used on the population. To achieve these goals, the current study was carried out in three stages.

First Stage: Translation of the study Scales. In the first stages of the study, the Perceived Stress Questionnaire (PSQ) was modified to assess stressful life events and situations that might cause or exacerbate illness symptoms. Another tool that was translated to assess the functional effects of sickness and treatment from the patient's point of view is the Wellbeing Health Related Quality of Life (WB-HRQoL). The Cognitive Functioning Self-Assessment Scale, which measures cognitive skills including learning, reasoning, remembering, problem-solving, decision-making, and attention, was also translated at the first stage of the study. Additional study measures have also been designed and validated from a Pakistani indigenous perspective.

Second Stage: Pilot study. Stage two of the research included conducting a pilot study to determine the study scales' psychometric properties, such as item-total correlations and reliability coefficients. The pilot research also looked at how the factors were related to each other.

Third Stage: Main study. The main study was the final phase of the research, and it focused mostly on testing the study's hypotheses.

Phase-I: Translation of the Study Scales

The current research used a back translation procedure to assure semantic equivalence while translating the Perceived Stress Questionnaire, Well-being Health-Related Quality of Life, and Cognitive Functioning Self-Assessment. The translation and cross-cultural adaptation of the measures used in this study were conducted following the widely recognized guidelines proposed by Beaton et al.(2000) for the adaptation of self-report(Questionnaire)tools in research.These guidelines provide a systematic process to ensure that self report tools(Questionnaire) remain conceptually equivalent across different cultures.The translation process was carried out in the following phases:

Stage-I: English to Urdu translation. During the inital stage, the scale was linguistically translated from English to Urdu. To accomplish this objective, a group of five Ph.D. researchers with excellent multilingual skills were tasked with translating the original English text into Urdu. The researchers had a thorough understanding of the original language (English), making it very probable for them to find an easily accessible counterpart in the target language. Additionally, they were capable of creating specific language elements that the final group of participants could understand. The experts were informed about the objective and characteristics of the research.

Stage-II: Committee approach. Upon completion of the first translation, all translations underwent scrutiny by three proficient specialists with extensive multilingual expertise, using the "Committee Approach". The panel consisted of a Ph.D. faculty member and two Ph.D. scholars from the National Institute of Psychology and the National University of Modern Languages in Islamabad. The experts were tasked with meticulously scrutinising the translated things and selecting those that effectively represented the appropriate context, syntax, and language. Additionally, they were ordered to evaluate the items' "cultural and semantic equivalence".

Stage-III: Performing back translation. Upon the selection of the Urdu-translated queries taken from the Perceived Stress Questionnaire (PSQ), Wellbeing Health Related Quality of Life (WB-HRQoL), and Cognitive Functioning Self-Assessment Scales (CFSS), they were re-translated into English. A team of five Ph.D. academics from the Institute of Psychology at the National University of Modern Languages in Islamabad was chosen to translate the documents

that had been previously translated from Urdu into English. In order to ensure the conceptual and linguistic precision of the Urdu translations, the reverse translation was implemented.

Stage-IV: Implementing a committee-based methodology. After the back translation process was completed, the final committee approach was employed to select the back translated articles. Three independent specialists, including one Ph.D. faculty member and two Ph.D. academics from the Institute of Psychology at the National University of Modern Languages in Islamabad, comprised the committee. The back translated items were subjected to a meticulous examination and comparison with the original scale's items. This was done to guarantee that the two versions (original English, as detailed in Appendix H, and translated English, as detailed in Appendix J) were semantically and contextually equivalent.

Stage-V: Finalization PSQ, WB-HRQoL, and CFSS for the pilot project. The Urdu translation items for the scale were finalized (refer to Appendix I) for use in the pilot research using the committee approach of back translation.

Instruments

The following instruments were used during the pilot research.

Demographic sheet with consent form.

A demographic sheet was provided along with the questionnaire to collect data on the personal characteristics of the participants, in addition to the informed consent agreement. Demographic information includes gender, age, family system, kinds of diabetes (type I and type II), education level, marital status, employment status, residence physical activity etc.

The Perceived Stress Questionnaire

The Perceived Stress Questionnaire is a tool used to measure an individual's perception of stress. In this research, the Perceived Stress Questionnaire was used to evaluate the influence of stressful life events on symptoms of disease. Perceived Stress Questionnaire was developed by Levenstein in 1993. The Perceived Stress Questionnaire is a 30-item Likert scale that uses a 4-point scoring system, where 1 represents "Almost" and 4 represents "Usually". The Perceived Stress Questionnaire consists of four subscales: such as fatigue (Items 1,8,13,15; this domain

includes assessing feelings of fatigue or exhaustion, capturing the physical and mental tiredness experienced by individuals), irritability (items 3,10; this domain includes measures the frequency or intensity of irritability, which refers to a state of being easily annoyed or angered), harassment (items 2,6,19,24; this domain includes assessing experiences related to harassment, which can include various forms of unwanted or distressing behaviors from others.), overloaded (items 4,11,28.29; this domain includes measuring the perceived demands and overload in daily life. It may capture feelings of being overwhelmed or stretched thin due to various responsibilities), lack of joy (items 5,7,16,17,21,23,25; this domain focused on the absence or reduction of positive emotions or joy in one's life, possibly indicating a decrease in overall well-being.), tension (items 12,14,26,27; this domain includes assessing feelings of tension and nervousness. It captures the psychological and physiological aspects of stress-related tension.), worries (items 9,18,20,22,30; this domain includes measures the frequency and intensity of worries or concerns that individuals experience in their daily lives). The original study revealed alpha reliability of the subscales ranging from.90 to.92. There is an item with reversed coding on the scale. The eight elements (1,7,10,13,17,21,25, and 29) are reversed, meaning that 4 is equal to 1, 3 is equal to 2, 2 is equal to 3, and 1 is equal to 4.

Psychological Wellbeing

Autonomy, environmental mastery, personal growth, positive connections with others, purpose in life, and self-acceptance are six particular characteristics of wellbeing and happiness that were examined in the present study using the concept of Psychological Wellbeing (Ryff et al., 2007). In 1995, Ryff and Keyes proposed the idea of mental wellbeing. There is an 18-item 7-point rating scale for psychological wellbeing, with 1 being a severe disagreement and 7 a strong agreement. Psychological Wellbeing has six sub-scales including self-acceptance (Items 1,2,5; this domain include items of respondent's positive attitude about his or her self), positive relations with others (Items 6,13,16: this domain includes the items of respondent's engagement in meaningful relationships with others that include reciprocal empathy, intimacy, and affection), purpose in life (Items 3,7,10: this domain includes the items of respondent's strong goal orientation and conviction that life holds meaning), personal growth (Items 11,12,14: this domain includes the items of respondent continues to develop, is welcoming to new experiences, and recognizes improvement in behavior and self over time), environmental mastery (Items 4,8,9:

this domain includes the items of respondent makes effective use of opportunities and has a sense of mastery in managing environmental factors and activities, including managing everyday affairs and creating situations to benefit personal needs), autonomy (Items 15,17,18: this domain includes the items of respondent is independent and regulates his or her behavior independent of social pressures). The original studies found that the subscales' alpha reliability values were between 0.70 and 0.89. (Ryff & Keyes, 1995). On this scale, there is one item whose coding is backwards. Eight items—numbered 4, 5, 6, 7, 10, 14, 15, and 16—have had their placements switched around. A few changes have occurred: item 1 is now item 7, item 2 is item 6, item 3 is item 5, item 4 stays put, item 5 is item 3, item 6 is item 2, and item 7 is now item 1.

Wellbeing health-related quality of life

The present study evaluated six aspects of quality of life using the Wellbeing Health-Related Quality of Life scale. A person's physical, emotional, and social health, as well as their overall quality of life as it relates to illness and its treatment, are all components of wellbeing (Revicki, 1989). When DeVellis first proposed the idea of health-related quality of life in 2003, it was a new concept. Using a 19-item 5-point rating scale, where 1 represents strongly disagreeing and 7 represents strongly agreeing, the wellbeing health-related quality of life is evaluated. There are four separate subscales that make up the concept of health-related quality of life: physical (Items 1, 2, 3, 5, 14), environmental (Items 9, 10, 11), psychological (Items 4, 6, 7, 8, 16, 17, 18, 19), and social (Items 12, 13, 15). Alpha reliability of wellbeing health -related quality of Life have been reported .89 in the original study (DeVellis, 2003). There is no item with inverse coding on this scale.

Cognitive Functioning Self-Assessment Scale.

Participants' self-reported cognitive functioning was assessed using the Cognitive Functioning Self-Assessment Scale (Annunziata & Lucchini, 2012). Each item on the Cognitive Functioning Self-Assessment Scale is rated on a five-point scale, with a range of 1 (Never) to 5 (Always). The scale consist of 18 items. There are a total of thirty-six questions over the three subscales measuring attention, memory, and spatial-temporal orientation. Previous study indicated alpha coefficients for the sub-scales to be 0.88 and 0.79, and there is no item with reverse coding (Annunziata et al., 2018).

Population

The research was carried out with individuals who had diabetes. The primary investigation had a total of 230 individuals, consisting of 142 males and 68 females. The age range of the participants was 15 years and older, with a mean age of 1.38 and a standard deviation of 478. The data was obtained from diabetic individuals who were selected from the Out-Patient Departments (OPDs) of several hospitals in Islamabad and Rawalpindi, Pakistan.

Sampling Methodology

The present research used a purposive sampling technique to get data.

Inclusion /Exclusion Criterion:

The study included patients who had received a diagnosis of diabetes (type 1 and type 2) at least 1 year before, confirmed by a glycated haemoglobin (A1C) test and fasting plasma glucose. A sample of diabetic patients was selected within the age range of 15 years and older. This investigation excluded patients with any co-morbid medical conditions or psychiatric disorders.

Data Collection

The researcher contacted participants by recruiting diabetic people from Out-Patient Departments (OPDs) and collecting data from several hospitals in Islamabad and Rawalpindi, Pakistan. During the process of gathering data from patients, the researcher offered a concise explanation of the study's objective and goal, along with guarantees about all elements of research ethics. As a condition for their agreement to take part in the research, people were granted the entitlement to privacy and secrecy, along with the choice to withdraw from the study at any point. They provided their demographic information and signed a permission form to show their acceptance. A booklet including the Perceived Stress Questionnaire (PSQ), Psychological Wellbeing (PWB), Wellbeing Health Related Quality of Life (WB-HRQoL), and Cognitive Functioning Self-Assessment Scale (CFSS) was then distributed to the participants. Only people who had received a diagnosis of glycated haemoglobin (A1C) and fasting plasma glucose at least one year before were eligible to participate. Each subject had individual

administration of the exams. Each participant required around 20 minutes to complete the questionnaire.

Data Analysis

We used SPSS version 20 to examine the data. Following data entry into the data editor, we cleaned the data to remove outliers and missing values. The average value was used to replace missing data. There were no outliers in the data. A number of analysis were performed on the data that was entered. Reliability analyses, item total correlation, ANOVA, t-test, regression, and inter-scale correlation are all part of this larger category of statistical investigations. Following the completion of the analysis, the findings were shared and discussed.

Research Ethics

Participants were asked to sign an informed consent form at the start of the data collection process to indicate their readiness to participate in the study. The researcher provided a clear description of the study's purpose and goals, as well as assurances on all areas of research ethics, to people with diabetes before they participated in the data collection procedure. Participants were guaranteed anonymity and privacy and had the option to stop participating at any time until the research was completed.

When including patients aged 15 years and above with diabetes in a study, specific ethical concerns arise regarding younger participants (e.g those age under 20 years).Some individuals may have cognitive impairments due to diabetes which could affect their ability to provide inform consent. Minors (typically under 20) cannot legally provide full informed consent. Parental or guardian consent is required to enroll them in a study.

Phase II: Pilot Study

In the second step of the research, a pilot study is carried out.

Objectives. This study aimed to ascertain the measuring scales' psychometric characteristics.

Sample. Initially, 85 people who had diabetes (type I & type II) were chosen for the research. Fifteen patients' data had an 83% response rate; however, due to missing data, insincere answers, and predictable responses, that did not met the study criteria, the data had to be excluded.

Seventy people with a diabetes diagnosis made up the final sample for the pilot study and met the inclusion criteria. Participants were male and female and had a history of at least one year of living with a diabetes diagnosis, whether type 1 or type 2. Testing in the lab, notably the glycated haemoglobin (A1C) test (HbA1c), verified the diagnosis. The individuals taking part in this research are all diabetics who are actively managing their condition with lifestyle modifications, oral hypoglycemic drugs, insulin, or both. Participants were adults 15 year or above with a mean age of 1.39 and a standard deviation of.49; males made up 61% of the sample (n = 43) and females 38% (n = 27). Participants with diabetes were selected using an purposive sampling technique from the Out-Patient Departments (OPDs) of several hospitals in Islamabad and Rawalpindi, Pakistan, to provide the data.

Procedure

The researcher personally reached out to each participant on an individual basis. The researcher presented the participants with a concise elucidation of the nature and aims of the investigation. The data collection for this study included the use of purposive sampling strategy to choose diabetic persons from outpatient departments (OPDs) and different hospitals in Islamabad and Rawalpindi. Prior to commencing the study, participants were provided with informed permission, which included a demographic sheet. Additionally, additional ethical norms of research were adhered to, such as giving participants the freedom to withdraw from the study at any given time. Participants were provided with a guarantee of their privacy and confidentiality rights, along with an assurance that their information would only be used for this research and would be kept entirely secret. The participants were originally provided with a booklet including the Perceived Life Stress Questionnaire (PSQ), Psychological Wellbeing (PWB), Wellbeing Health Related Quality of Life (WB-HRQoL), and Cognitive Functioning Self-Assessment Scale (CFSS) to fill out. The people included in the study had to meet the criteria of having been diagnosed with diabetes (type 1 or type 2) at least one year ago, as determined by the glycated haemoglobin (A1C) test and fasting plasma glucose. The questionnaires were handed to each participant separately, and it took more than 20 minutes for each person to complete the survey booklet. After collecting the relevant data, a statistical analysis was performed. The results were calculated using the SPSS 20 version.

Results

This section presents the findings from the pilot study. Other psychometric properties of the study scale, namely perceived life stress (PLS), psychological wellbeing (PWB), quality of life (QoL), and cognitive function (CF), such as reliability estimates and item-total correlations, are also displayed.

Table 1

Descriptive Statistics and Alpha Reliability Coefficient of Perceived Life Stress, Psychological Wellbeing, Quality of Life, and Cognitive Functioning Among Patients with Diabetes (N=70)

Scales	No. of Items	α	*M*	*SD*	Range		Skewness	Kurtosis
					Actual	Potential		
PSQ	30	.70	80.93	11.15	55-101	30-120	-0.34	-0.62
FA	4	.60	7.89	3.19	4-15	4-16	0.40	-0.98
IR	2	.60	4.59	1.69	2-8	2-8	0.44	0.05
HR	4	.70	10.56	3.49	4-16	4-16	-0.38	-1.27
OL	4	.61	9.59	3.90	4-16	4-16	0.003	-1.22
LOJ	7	.60	20.86	4.15	12-28	7-28	-0.08	-0.64
TEN	4	.60	12.16	3.12	5-16	4-16	-0.66	-0.65
WO	5	.70	15.30	3.35	8-20	5-20	-0.41	-1.00
PWB	18	.70	74.91	15.69	36-109	18-126	-0.11	.007
SA	3	.64	14.69	4.22	7-21	3-21	0.001	-1.07
PR	3	.60	8.93	5.35	3-21	3-21	0.38	-1.04
PIL	3	.62	10.67	4.82	3-21	3-21	-0.28	-0.62
PG	3	.60	15.14	4.78	6-21	3-21	-0.72	-0.90
EM	3	.60	16.37	4.47	4-21	3-21	-1.03	0.31
AU	3	.70	9.11	5.66	3-21	3-21	0.71	-0.66
HRQoL	19	.87	61.14	14.70	36-95	19-95	0.31	-0.92
PHY	5	.72	14.94	4.73	6-25	5-25	0.35	-0.94
EN	3	.76	10.54	3.55	3-15	3-15	-0.24	-0.10
PSY	8	.76	26.07	6.89	14-40	8-40	0.20	-0.85
SO	3	.72	9.59	3.54	3-15	3-15	-0.10	-1.07
CF	18	.76	49.13	9.33	30-74	18-90	0.31	0.29
STO	9	.70	23.91	5.82	11-39	9-45	-0.04	-0.04
AT	5	.70	13.16	3.68	6-24	5-25	0.53	0.99
ME	4	.70	12.06	3.43	5-18	4-20	-0.16	-0.80

Note. FA= Fatigue; IR= Irritability; HR= Harassment; OL= Overload; LOJ= Lack of Joy; TEN= Tension; WO= Worries; SA= Self-acceptance; PR= Positive relations; PIL= Purpose in life; PG= Personal Growth; EM= environmental mastery; AU= Autonomy; PHY= Physical; EN= environmental; PSY= Physical; SO= Social; AT; Attention; ME= Memory; STO= Spatial-temporal orientation

Table 1 presents the descriptive statistics for each of the study variables, including the mean, standard deviation, range, skewness, and kurtosis.The results indicate that the skewness (±2) and kurtosis (±10) values are within the acceptable range, suggesting that the data follows a normal distribution (Gravetter & Wallnow, 2012). Furthermore, the alpha coefficients of all scales range from .70 to .87, which suggests that the reliability indices are acceptable to sufficient. The results showed that the scales worked well for the indigenous Pakistani people who took part in the main study.

Table 2

Item Total Correlation and Corrected Item Total Correlation of Perceived Stress Questionnaire Scale (N=70)

Item	Item-Total-Correlation	Corrected Item-Total-Correlation
	Fatigue	
1	.67**	.36
8	.74**	.49
13	.58**	.30
15	.69**	.38
	Irritability	
3	.87**	.44
10	.82**	.44
	Harassment	
2	.72**	.45
6	.76**	.54
19	.78**	.59
24	.63**	.37
	Overload	
4	.69**	.40
11	.72**	.46
28	.77**	.52

29	.51**	.19
	Lack of Joy	
5	.31**	.16
7	.43**	.23
16	.67**	.45
17	.70**	.49
21	.45**	.26
23	.57**	.30
25	.56**	.30
	Tension	
12	.68**	.39
14	.67**	.38
26	.71**	.38
27	.63**	.38
	Worries	
9	.54**	.31
18	.43**	.25
20	.73**	.56
22	.73**	.55
30	.85**	.65

p **<.01

Table 2 presents the item-total and corrected item correlations for the seven subscales (fatigue, irritation, harassment, overload, loss of joy, tension, and worries) of the Perceived Stress Questionnaire (PSQ). A significant correlation (p<.001,.01) between the values of each individual sub-scale and the total score of that sub-scale indicates that the scale is reliable and internally consistent. This subscale's internal consistency is further supported by the updated item-total correlation, which shows a positive relationship between each item and the overall score of the scale when an item's value is subtracted from the total. In sum, the data in the table prove that the scale was appropriate for use in this research.

Table 3

Item Total Correlation and Corrected Item Total Correlation of Psychological Wellbeing Scale (N=70)

Item	Item-Total-Correlation	Corrected Item-Total-Correlation
	Self-acceptance	
1	.70**	.39
2	.80**	.60
5	.80**	.42
	Purpose in Life	
3	.85**	.17
7	.82**	.63
10	.56**	.50
	Positive Relations	
6	.55**	.54
13	.88**	.54
16	.79**	.27
	Personal Growth	
11	.88**	.64
12	.87**	.58
14	.37**	.11
	Environmental Mastery	
4	.52**	.10
8	.84**	.59
9	.86**	.62
	Autonomy	
15	.67**	.37
17	.88**	.68
18	.81**	.54

p **<.01

All six of the Psychological Wellbeing Scale's subscales have their item-total and adjusted item correlation values shown in Table 3. Purpose in life, positive relationships, self-acceptance, environmental mastery, personal growth and autonomy are all components of this scale. The high positive connection (p<.001,.01) between the values of each sub-scale and the total score of that sub-scale suggests that the scale is trustworthy and consistent with itself. Additional support for the internal consistency of each subscale is provided by the updated item-total correlation, which shows a positive link between each item and the overall score of the scale when an item's value is subtracted from the total. In sum, the data in the table prove that the scale was appropriate for use in this research.

Table 4

Item Total Correlation and Corrected Item Total Correlation of Wellbeing-Health Related Quality of Life Scale (N=70)

Item	Item-Total-Correlation	Corrected Item-Total-Correlation
	Physical aspect	
1	.68**	.47
2	.79**	.60
3	.62**	.39
5	.72**	.52
14	.64**	.42
	Environmental aspect	
9	.84**	.61
10	.86**	.66
11	.76**	.53
	Psychical aspect	
4	.57**	.42
6	.61**	.47
7	.56**	.38
8	.54**	.38

16	.67**	.51
17	.50**	.33
18	.70**	.58
19	.70**	.56
	Social aspect	
12	.76**	.48
13	.81**	.55
25	.84**	.61

p **<.01

Table 4 presents the component-total and correct item correlations for six subscales (physical aspect, environmental aspect, psychical aspect, and social aspect) of the Wellbeing-Health-Related Quality of Life Scale. There is a substantial positive correlation (p<.001,.01) between the numbers of each sub-scale and the total score of that sub-scale, suggesting that the scale is very reliable and internally consistent. Additional support for the internal consistency of each subscale is provided by the updated item-total correlation, which shows a positive link between each item and the overall score of the scale when an item's value is subtracted from the total. In sum, the data in the table prove that the scale was appropriate for use in this research.

Table 5

Item Total Correlation and Corrected Item Total Correlation of Cognitive Functioning Self-Assessment Scale (N=70)

Item	Item-Total-Correlation	Corrected Item-Total-Correlation
	Spatial-temporal orientation	
3	.59**	.44
4	.67**	.55
7	.60**	.44
9	.48**	.33
10	.36**	.19
13	.38**	.18

14	.35**	.16
17	.73**	.59
18	.65**	.48
	Attention	
1	.75**	.56
2	.80**	.64
6	.55**	.31
8	.64**	.41
12	.61**	.38
	Memory	
5	.70**	.46
11	.67**	.38
15	.74**	.52
16	.80**	.60

p **<.01

Table 5 displays the item-total and corrected item correlation values for the focus, memory, and spatial-temporal orientation subscales of the Cognitive Functioning Self-Assessment Scale. The correlation between the results of each sub-scale and the sum of that sub-scale demonstrates the scale's strong reliability and internal consistency (p<.001,.01). The corrected item-total correlation demonstrates a positive link between the scores of each item and the overall score of the scale, providing additional evidence of the internal consistency of each sub-scale. When the item's value is removed, this connection is still there. The results in the table demonstrate that the scale is effective for the individuals who were supposed to participate in the research.

Discussion

Further analysis and examination of the link between all the components that were explored is the goal of the present study. All four tests—the one measuring cognitive performance, the one measuring health-related quality of life, the one measuring psychological

wellbeing, and the one measuring felt stress—contained psychometric elements including reliability coefficients and item-total correlations.

Study Variables of the Reliability Coefficients. Assessing the psychometric qualities of all the scales used in the study was a secondary goal of the pilot project. The goal was accomplished by estimating reliability and item-total correlations for the following instruments: the Stress Perceived Questionnaire (PSQ), the Psychological Wellbeing Scale (PWS), the Health-Related Quality of Life Scale (WB-HRQoL), and the Cognitive Functioning Self-Assessment (CFSS). According to the results shown in Table 1, the Cronbach's Alpha value of the Perceived Stress Questionnaire (PSQ) is.70, suggesting that the scale is valid and trustworthy for measuring patients' perceived levels of life stress. Reliability values between.90 and.92 indicate a high degree of consistency in the previous research (Levenstein, 1993). The findings from Table 1 show that PWB is a reliable measure for measuring patients' wellbeing, with a high degree of dependability (.70). Assessments of psychological wellbeing have also shown a high degree of reliability in earlier studies (Ryff & Keyes, 1995). With a high reliability value of.87, the Wellbeing Health Related Quality of Life measure demonstrates great internal consistency. Health-Related Quality of Life has also shown high reliability in previous studies (DeVellis, 2003). Table 1's findings show that CFSS is quite reliable, with a coefficient of.76. It may be concluded that CFSS is a reliable instrument for evaluating patients' cognitive abilities. According to prior research (Annunziata et al., 2018), the Cronbach's alpha values for the scale were 0.88 and 0.79. For each of the four variables, we calculated their means, standard deviations, skewness, and kurtosis, as well as their actual and predicted ranges. The findings showed that the scores on all the scales and subscales are distributed normally.

Item total Correlations. We analyzed the sample using item-total correlations to see how each item connected to the overall score. Also included were the item total correlations that underwent correction. Item total correlation was the deciding factor in selecting rotation. The positive and statistically significant results of the perceived life stress (PLS) item-total correlation (Table 2) further indicate that this construct is reliable and has internal consistency. Results of item total correlation calculations for psychological wellbeing (PWB) are shown in Table 3. These calculations show that the scale is internally consistent and dependable enough to be used in the primary study to evaluate hypotheses. The results on the quality of life (QoL) scale show that all

of the items are reliable and consistent with one another, as shown in Table 4. Based on the results shown in Table 5, it is clear that the CF scale is valid for measuring cognitive abilities and is both internally consistent and dependable.

Main Study

Phase-III: Main Study

In the third phase of the main study intended to investigate the association between perceived life stress, psychological wellbeing, quality of life among diabetes patients as well as the mediation role of cognitive function. The main study focused on following objectives:

Objectives. The major study's aims are as follows:

1. To explore the relationship between perceived life stress, psychological wellbeing, health-related quality of life, and cognitive functioning among patients with diabetes
2. To analyze the impacts of perceived life stress on psychological well-being, health-related quality of life, and cognitive functioning among patients with diabetes.
3. To evaluate the influence of cognitive functioning on psychological wellbeing and health related quality of life among patient with diabetes
4. To investigate the mediating role of cognitive functioning in the relationship between perceived life stress and psychological well-being among patients with diabetes.
5. To investigate the mediating role of cognitive functioning in the relationship between perceived life stress and health-related quality of life among patients with diabetes
6. To assess the role of demographic factors on the study variables.

Hypotheses

1. Perceived life stress (i.e fatigue, irritability, harassment, overload, lack of joy, tension and worries) has negative relationship with psychological wellbeing (i.e self-acceptance, purpose in life, positive relations, personal growth, environmental mastery and autonomy) and health related quality of life (i.e physical, environmental, psychical and social aspects) among patients with diabetes.
2. There is a positive correlation between cognitive functioning (such as spatial temporal orientation, attention, and memory) and psychological wellbeing (including self-acceptance, purpose in life, positive relations, autonomy, environmental mastery, and autonomy) as well as health-related quality of life (including physical, environmental, psychical, and social aspects) among patients with diabetes.

3. Cognitive functioning, which includes spatial temporal orientation, attention, and memory acts as a mediator between perceived life stress (such as fatigue, irritability, harassment, overload, lack of joy, tension, and worries) and psychological wellbeing (including self-acceptance, purpose in life, positive relations, personal growth, environmental mastery, and autonomy) in patients with diabetes.
4. Cognitive functioning (i.e spatial temporal orientation, attention and memory) mediates the relationship between perceived life stress (i.e fatigue, irritability, harassment, overload, lack of joy, tension and worries) and health related quality of life (i.e physical, environmental, psychical and social aspect) among patient with diabetes.

Sample.

The main research had a sample of 210 persons diagnosed with diabetes, consisting of 142 men and 88 females. The participants' ages ranged from 15 year and above (M = 1.38, SD =.487). The purposive sampling approach was used to get the sample. Patients with diabetes who were included in the study came from several hospitals in Islamabad and Rawalpindi as well as outpatient departments (OPDs). Each participant was approached one-on-one by the researcher, who briefed them about the study's goals and methodology.The individuals taking part in this research are all diabetics who are actively managing their condition with lifestyle modifications, oral hypoglycemic drugs, insulin or both.Participants were also assured of confidentiality and informed consent, ensuring that they were fully aware of their involvement in the study.The measurement of felt life stress was conducted using the perceived stress questionnaire (PSQ). The eligibility requirement was a minimum duration of one year from the diagnosis of diabetes. Furthermore, with the assessment of subjective stress, many study scales were delivered in a booklet, to gather comprehensive data on the experiences of individuals with diabetes. Moreover, the data was utilized to fulfil the goals of the pilot study.

Table 6

Frequencies and Percentages of Demographic Characteristics of the Sample (N = 230)

Variables	*F*	*%*
Gender		
Male	142	61.7
Female	88	38.3
Missing	0	0
Age		
Young Adults (Below than 30)	59	25.7
Middle Adults (31-50)	98	42.6
Late Adults (Above than 51)	73	31.7
Missing	0	0
Family System		
Joint	147	63.9
Nuclear	83	36.1
Missing	0	0
Types of Diabetes		
Type I	86	37.4
Type II	144	62.6
Missing	0	0
Education Level		
Primary Education	54	23.5
Secondary Education	68	29.6
Higher Education	64	27.8
Illiterate	44	19.1
Missing	0	0
Marital Status		
Married	127	55.2
Unmarried	52	22.6
Divorced	31	13.5
Widow	20	8.7

Missing	0	0
Job Status		
Private	83	36.1
Government	58	25.2
Business	48	20.9
Nothing	41	17.8
Missing	0	0
Residence		
Urban	162	70.4
Rural	68	29.6
Missing	0	0
Physical Exercise		
Yes	79	34.3
No	151	65.7
Missing	0	0

Table 6 displays the frequency and percentages of demographic characteristics in the final sample. A total of 70 out of 230 participants in the primary trial had their data excluded due to missing information. The primary study comprised 230 participants, with 16% being males and 14% being females. Among the participants, 25% fell within the age range of ≤ 30 (young adults), 42% fell within the age range of 31−50 (middle adults), and 31% fell within the age range of ≥50 (late adults). Even more so, 36% of the population lived in nuclear families, while 63% were part of mixed families. The prevalence of type II diabetes was 62%, whereas type I diabetes was found in 37% of the patients. 23% are allocated to elementary education, 29% are allocated to secondary school, 27% are allocated to higher education, and 19% are allocated to the illiterate category. 55% of the population were married, 22% were single, 13% were divorced, and 8% were widows. Out of the total population, 36% were employed in the private sector, 25% were employed in the government sector, 20% were involved in business, and 17% were unemployed. 70% of the population resides in urban regions, while 29% live in rural areas. Additionally, 34% of the population participated in the physical exercise group, while 65% did not. The attrition rate was 23 percent.

Instruments.

Similar to the pilot research, the main study made use of the following instruments:

1. Demographic sheet and Consent Form
2. Perceived Stress Questionnaire (PSQ)
3. Psychological Wellbeing (PWB)
4. Wellbeing Health Related Quality of Life (WB-HRQoL)
5. Cognitive Functioning Self-Assessment Scale (CFSS)

Procedure

The data was obtained by the purposive sampling method. The researcher recruited diabetic individuals from Out-Patient Departments (OPDs) and obtained additional data from many hospitals in Islamabad and Rawalpindi. During the process of gathering data from individuals with diabetes, the researcher presented a concise explanation of the study's objectives and goals, along with assurances on the adherence to all ethical principles in the research. As a condition for their agreement to take part in the research, people were granted the entitlement to privacy and secrecy, also having the option to stop participating in the research whenever they choose. They provided demographic information and signed a consent form to show their acceptance. The participants were provided with a booklet that included questionnaires such as the Perceived Life Stress Questionnaire (PSQ), Psychological Wellbeing (PWB), Wellbeing Health Related Quality of Life (WB-HRQoL), and Cognitive Functioning Self-Assessment Scale (CFSS). Participation was limited to persons who had received a diagnosis of diabetes (either type 1 or type 2) at least one year before, and had undergone both a glycated haemoglobin (A1C) test and fasting plasma test. Each participant had individual administration of the examinations. Each participant required around twenty minutes to complete the questionnaire.

CHAPTER IV

RESULT

Analyses pertaining to hypothesis testing are the primary emphasis of this section. The major goal of the study was to examine diabetic patients' reported levels of life stress, psychological wellbeing, and quality of life. The role of cognitive functioning as a mediator was also intended to be evaluated in the research.

For every variable, we ran a regression analysis. Psychological wellbeing, quality of life, and cognitive functioning were all included as independent variables in a multiple regression study. For the purpose of calculating the extent to which the independent variable explains the variance in the dependent variable, the Adjusted R2 was computed. A confidence interval of 95% was used in the research.

Group differences in gender, family system, types of diabetes, residence, and physical activity were assessed for all study variables using T-tests.

The effect of family income, level of education, marital status, and employment status on each of the study variables was examined using an analysis of variance (ANOVA).

Table 7

Descriptive Statistics and Alpha Reliability Coefficient of Perceived Life Stress, Psychological Wellbeing and Quality of life and Cognitive Function Among Diabetic Patients (N=230)

Scales	No. of Items	α	*M*	*SD*	Range		Skewness	Kurtosis
					Actual	Potential		
PSQ	30	.86	86.73	15.76	46-109	30-120	-1.10	0.11
FA	4	.70	12.41	3.08	4-16	4-16	-0.09	-0.32
IR	2	.70	6.59	1.09	3-8	2-8	-0.67	0.55
HR	4	.70	8.24	3.03	4-16	4-16	0.53	-0.61
OL	4	.70	11.70	3.45	4-16	4-16	-0.90	-0.52
LOJ	7	.70	19.43	5.83	9-28	7-28	-0.24	-1.42
TEN	4	.74	12.49	1.98	8-16	4-16	-0.70	0.19
WO	5	.72	15.41	3.71	5-20	5-20	-1.15	0.07
PWB	18	.80	66.32	19.90	41-111	18-126	1.11	-0.31
SA	3	.70	9.67	3.79	3-17	3-21	0.57	-0.39
PR	3	.75	11.03	4.41	3-20	3-21	1.10	-0.27
PIL	3	.70	11.70	4.71	7-21	3-21	1.02	-0.56
PG	3	.87	7.44	2.77	3-17	3-21	0.89	-0.50
EM	3	.85	12.71	5.50	4-20	3-21	-0.04	-1.52
AU	3	.81	13.77	2.71	10-21	3-21	0.73	-0.02
HRQoL	19	.92	64.47	11.32	46-92	19-95	0.82	-0.26
PHY	5	.81	14.42	3.44	11-25	5-25	1.96	2.89
EN	3	.80	11.30	2.46	3-15	3-15	-0.45	0.29
PSY	8	.84	27.71	6.44	12-39	8-40	-0.20	-0.66
SO	3	.80	11.04	1.60	9-15	3-15	0.46	-0.82
CF	18	.95	62.50	15.48	32-85	18-90	-0.87	-0.49
STO	9	.84	27.66	9.99	10-45	9-45	-0.42	-0.93
AT	5	.80	20.78	3.39	12-25	5-25	-1.38	0.94
ME	4	.80	14.06	3.80	6-20	4-20	-0.67	-0.61

Note. FA= Fatigue; IR= Irritability; HR= Harassment; OL= Overload; LOJ= Lack of Joy; TEN= Tension; WO= Worries; SA= Self-acceptance; PR= Positive relations; PIL= Purpose in life; PG= Personal Growth; EM= environmental Mastery; AU= Autonomy; PHY= Physical; EN= environmental; PSY= Physical; SO= Social; AT= Attention; ME= Memory; STO= Spatial-temporal orientation

Results for all study variables are shown in Table 7, together with descriptive statistics such as means, standard deviations, range, skewness, and kurtosis. According to Gravetter and Wallnow (2012), the data shows a normal distribution with skewness (±2) and kurtosis (±10) values that are considered acceptable. In addition, the reliability indices are excellent to good, with alpha values ranging from.92 to.95 across all scales. So, the scales were found to be appropriate for the main study's indigenous Pakistani population.

Table 8

Correlation of main study variables (N=230)

	1	2	3	4
1. PLS	-	-.86**	-.81**	.84**
2. PWB	-	-	.85**	-.86**
3. QOL	-	-	-	-.70**
4. CF	-	-	-	-

. *p<.05, **p<.01

Note: PLS = Perceived Life Stress; PWB= Psychological Wellbeing; QOL =Quality of Life; CF= Cognitive Functioning

Table 8 shows the results of bivariate correlations between PLS, PWB, QoL and CF. Values indicate that perceived life stress has a significant (**p<.01) negative correlation between Psychological Wellbeing and Quality of Life and significant (**p<.01) positive relationship between cognitive functioning.

Table 9

Multiple Regression Analysis on Psychological Wellbeing by Perceived Life Stress (N=230)

	Self-acceptance							Purpose in life							Positive relations						
						95% CI							95% CI							95% CI	
PLS	*B*	*SE B*	*β*	*t*	p	*LL*	*UL*	*B*	*SE B*	*β*	*t*	*p*	*LL*	*UL*	*B*	*SE B*	*β*	t	p	*LL*	*UL*
FA	-.26	.08	-.21	-3.31	.001	-.42	-.10	-.44	.07	-.31	-5.77	.000	-.59	-.29	-.51	.09	-.33	-5.52	.000	-.69	-.33
IR	-.01	.15	-.005	-.12	.905	-.31	.27	-.28	.14	-.07	-1.93	.055	-.57	.006	.02	.17	.006	.15	.876	-.32	.37
HR	.02	.05	.02	.56	.570	-.07	.12	-.20	.04	-.13	-4.09	.000	-.29	-.10	-.32	.05	-.20	-5.46	.000	-.44	-.20
OL	-.25	.07	-.23	-3.52	.001	-.39	-.11	-.25	.07	-.20	-3.68	.000	-.39	-.11	-.26	.08	-.19	-3.11	.002	-.42	-.09
LOJ	-.06	.03	-.09	-1.88	.061	-.12	.003	-.03	.03	-.04	-1.02	.307	-.09	.02	-.04	.03	-.05	-1.23	.219	-.11	.02
TEN	.001	.08	.001	.01	.991	-.15	.16	.12	.07	.05	1.56	.120	-.03	.27	.14	.09	.06	1.54	.124	-.04	.33
WO	-.43	.05	-.42	-7.32	.000	-.54	-.31	-.46	.05	-.39	-8.12	.000	-.57	-.35	-.41	.06	-.32	-6.04	.000	-.55	-.28
	R = .83, R^2= .69 (F = 73.13**)							R=.88, R^2=.79 (F= 119.01**)							R=.85, R^2=.73 (F= 85.91***)						
	Personal Growth							Environmental Mastery							Autonomy						
FA	-.17	.08	-.19	-2.14	.033	-.33	-.01	-.17	.08	-.19	-3.66	.033	-.33	-.01	-.16	.06	-.19	-2.47	.014	-.30	-.03
IR	-.38	.15	-.15	-2.53	.012	-.68	-.08	-.38	.15	-.15	.36	.012	-.68	-.08	.13	.12	.05	1.04	.299	-.12	.38
HR	.09	.05	.10	1.92	.055	-.002	.19	.09	.05	.10	-2.11	.055	-.002	.19	-.13	.04	-.14	-3.06	.002	-.21	-.04
OL	-.11	.07	-.14	-1.60	.110	-.25	.02	-.11	.07	-.14	-7.10	.110	-.25	.02	-.07	.06	-.09	-1.23	.217	-.19	.04
LOJ	-.02	.03	-.05	-.74	.454	-.08	.03	-.02	.03	-.05	1.63	.454	-.08	.03	-.08	.02	-.17	-3.05	.003	-.13	-.02
TEN	-.33	.08	-.23	-4.05	.000	-.49	-.17	-.33	.08	-.23	1.27	.000	-.49	-.17	.08	.06	.06	1.22	.223	-.05	.221
WO	-.11	.06	-.15	-1.89	.059	-.23	.005	-.11	.06	-.15	1.22	.059	-.23	.005	-.28	.05	-.39	-5.65	.000	-.38	-.18
	R = .65, R^2= .42 (F = 23.28**)							R=.72, R^2=.52 (F= 34.67**)							R=.75, R^2=.56 (F= 41.45***)						

***p*<.001, 01, **p*<.05, Non-significant = *p*>.05

Note. FA= Fatigue; IR= Irritability; HR= Harassment; OL= Overload; LOJ= Lack of Joy; TEN= Tension; WO= Worries

Perceived life stress affects several components of psychological wellbeing in diabetics patients, as seen in Table 9. The findings indicate that diabetes patients' self-acceptance was substantially affected by the stress they felt. According to a substantial F ratio (R^2 =.69, F = 73.13, p <.001), 69% of the variability in self-acceptance could be explained by the reported life stress. Worries had the most negative effect on self-acceptance among the several ways in which perceived life stress was measured (B = -.43, β = -.42, p <.001). This indicates that self-acceptance falls by -.43 units for every one unit rise in worries.Fatigue and overload were another negative predictor of self-acceptance. No significant relationship was found between self-acceptance and factors like irritation, harassment, tension, or lack of joy. (R^2 =.79, F = 119.01, p <.001), the majority of the overall variance in predicting one's life purpose was determined to be influenced by perceived life stress. Worries were shown to be the most significant predictor among all categories (B = -.46, β = -.39, p <.001), suggesting that a decrease of -.46 units in purpose in life would occur for every one unit rise in worries. Fatigue was another strong and statistically significant factor that predicted a decline in life purpose (B = -.44, β = -.31, p < .001). Purpose in life declines by -.44 units for every unit rise in fatigue. The existence of irritation and overload was another negative indicator of life's purpose. Having a feeling of purpose in life was not substantially predicted by being irritable, lack of joy and tension. In predicting positive relationships among diabetes patients, the findings show that the perceived life stress dimensions jointly explained 73% of the variance, with a substantial F ratio (R^2 =.73, F = 85.91, p <.001).While evaluating separately through beta weights, fatigue was the strongest negative predictor (B = -.51, β = -.33, p < .001) of positive relations reflecting that one unit increase in fatigue will decrease positive relations by -.51 units. Positive relationships were shown to be adversely affected by harassment,overload, and worries. However, positive connections were unaffected by annoyance, lack of enjoyment, and irritability. Perceived life stress accounted for 42% of the variance in individual development. The statistical significance of this association was shown by the F ratio, which reads (R^2 =.42, F = 23.28, p <.001). According to the research, the most significant negative impact on personal development was irritation (B = -.38, β = -.15, p <.01). This translates to a -.38 unit drop in personal development for every unit rise in irritation. The second negative predictor tension had a regression coefficient (B) of -.33, a standardized regression coefficient (β) of -.23, and a significance level (p) of less than .001. The beta value indicates that a one-unit increase in tension will result in a loss of -.33

units in personal growth. Personal growth was negatively predicted by irritability. Harassment, overload, lack of joy and worries did not significantly predict personal development in diabetes patients. The collective influence of perceived life stress on predicting environmental mastery among diabetes patients accounted for 52% of the variability ($R^2 = .52$, $F = 34.67$, $p < .001$). The study found that irritation had a significant negative impact on environmental mastery. Specifically, for every one unit increase in irritability, there was a corresponding loss of 0.38 units in environmental mastery. This relationship was statistically significant ($B = -.38$, $\beta = -.15$, $p < 0.001$). Environmental mastery was negatively predicted with irritability and tension.. Instances of harassment, overload, absence of pleasure and worries were not shown to be major indicators of one's ability to effectively navigate and control their surroundings. The findings indicate that the perceived life stress dimensions together accounted for 56% of the variation in predicting autonomy among diabetes patients, with a significant F ratio ($R^2 = .56$, $F = 41.45$, $p < .001$). When examining the beta weights, concerns emerged as the most influential negative predictor ($B = -.28$, $\beta = -.39$, $p < .001$) of autonomy. This means that for every one unit rise in worries, autonomy is expected to drop by -.28 units. Fatigue,harassment and lack of joy were also identified as negative indicators of autonomy. Nevertheless, the presence of irritation, overload and tension did not have a significant impact on the level of autonomy in diabetes patients.

Table 10

Multiple Regression Analysis on Quality of Life by Perceived Life Stress (N=230)

	Physical aspects							Environmental aspects						
						95% CI							95% CI	
PLS	*B*	*SE B*	*β*	*t*	*p*	*LL*	*UL*	*B*	*SE B*	*β*	*t*	*p*	*LL*	*UL*
FA	-.21	.07	-.18	-2.70	.007	-.36	-.05	-.19	.07	-.24	-2.80	.005	-.33	-.05
IR	-.34	.14	-.11	-2.34	.020	-.63	-.05	-.17	.13	-.07	-1.33	.184	-.43	.08
HR	-.14	.04	-.13	-2.99	.003	-.24	-.05	.13	.04	.16	2.95	.004	.04	.21
OL	-.13	.07	-.13	-1.86	.063	-.27	.007	-.22	.06	-.32	-3.65	.000	-.35	-.10
LOJ	-.03	.03	-.06	-1.18	.238	-.09	.02	-.01	.02	-.02	-.40	.688	-.06	.04
TEN	-.23	.07	-.13	-2.95	.003	-.39	-.07	.05	.07	.04	.73	.466	-.08	.19
WO	-.33	.05	-.36	-5.84	.000	-.45	-.22	-.09	.05	-.14	-1.83	.068	-.19	.007
			R = .80, R^2= .64 (F = 58.76**)							R=.67, R^2=.45 (F= 26.51**)				
	Psychical aspects							Social aspects						
FA	-.55	.18	-.26	-3.08	.002	-.91	-.20	-.13	.04	-.25	-3.30	.001	-.21	-.05
IR	-.02	.34	-.003	-.05	.954	-.69	.65	-.05	.07	-.04	-.76	.443	-.21	.09
HR	-.33	.11	-.15	-2.90	.004	-.56	-.10	.04	.02	.08	1.70	.090	-.007	.09
OL	-.41	.16	-.22	-2.52	.012	-.73	-.09	-.21	.03	-.45	-5.84	.000	-.28	-.14
LOJ	-.06	.07	-.05	-.91	.364	-.20	.07	.001	.01	.003	.04	.963	-.03	.03
TEN	.19	.18	.06	1.07	.282	-.16	.56	.06	.04	.07	1.56	.119	-.01	.14
WO	-.32	.13	-.18	-2.38	.018	-.58	-.05	-.05	.03	-.11	-1.66	.098	-.10	.009
			R=.67, R^2=.45 (F= 26.69***)							R=.75, R^2=.56 (F= 41.42***)				

**p<.001, 01, *p<.05, Non-significant = p>.05

Note. FA= Fatigue; IR= Irritability; HR= Harassment; OL= Overload; LOJ= Lack of Joy; TEN= Tension; WO= Worries

Table 10 demonstrated the impact of perceived life stress on the various aspects of quality of life in diabetes patients. The results suggest that the perceived stress in life was responsible for 64% of the variation in the physical aspect, as shown by a significant F ratio (R^2 = .64, F = 58.76, p < .001). The beta weights indicate that irritation had the most significant negative impact on the physical aspects (B = -.34, β = -.11, p < .001), suggesting that a one-unit increase in irritability would result in a loss of -.34 units in the physical aspect. Worries emerged as a significant negative predictor of the physical component, with a substantial effect (B = -.33,

β = -.36, p < .01). This indicates that a one-unit increase in worries leads to a fall of -.33 units in the physical aspect. Fatigue, harassment and tension were shown to have a negative impact on the physical component. The presence of overload and absence of happiness were not shown to be significant indicators of the physical dimension. The results indicate that the perceived life stress was responsible for up to 45% of the variation in the environmental aspect. This relationship was statistically significant (R^2 = .45, F = 26.51, p < .001). The results also show that being overloaded had a bigger negative impact on the environmental aspect (B = -.22, β = -.32, p < .001). This means that increasing the level of overload by one unit will result in a loss of -.22 units in the environmental aspect. Fatigue and harassment were other influential factors that negatively predicted the environmental element. The presence of irritability, absence of pleasure, tension, and anxieties did not significantly predict the environmental element. In order to forecast the physical well-being of diabetic patients, it was found that perceived life stress accounted for 45% of the total variability (R^2 = .45, F =26.69, p < .001). Among the factors considered, fatigue emerged as the most influential predictor of physical well-being (B = -.55, β = -.26, p < .001), showing that a one-unit rise in fatigue would lead to a decrease of -.55 units in physical well-being. Harassment, overload, and worries were identified as significant factors in predicting the psychological element. Irritability, absence of pleasure, and tension were not significant predictors of the psychological element. The Adjusted R2 value for the social component suggests that perceived life stress contributed to 56% of the variation in the social aspect among diabetes patients (R^2 = .56, F = 41.42, p < .001). The results indicate that overload had the most significant negative impact on the social component (B = -.21, β = -.45, p < .001), suggesting that increasing overload by single unit would result in a fall of -.21 units in social aspects. Fatigue was shown to be a significant predictor, with a drop of 0.31 units in the social aspect of diabetes patients. The regression coefficient (B) was -0.31, the standardized coefficient (β) was -0.25, and the p-value was less than 0.001. Irritability, harassment, lack of pleasure, tension, and anxieties did not significantly predict social aspects among diabetes patients.

Table 11

Multiple Regression Analysis on Cognitive deficits by Perceived Life Stress (N=230)

	Spatial Temporal Orientation							Attention							Memory						
						95% CI							95% CI							95% CI	
PLS	*B*	*SE B*	*β*	*t*	p	*LL*	*UL*	B	*SE B*	*β*	*t*	*p*	*LL*	*UL*	*B*	*SE B*	*β*	t	p	*LL*	*UL*
FA	.56	.22	.17	2.55	.011	.13	1.00	.21	.07	.19	2.81	.005	.06	.36	.31	.08	.25	3.71	.000	.14	.47
IR	.58	.41	.06	1.39	.165	-.24	1.41	.06	.14	.02	.43	.664	-.21	.34	.34	.15	.10	2.17	.031	.03	.66
HR	-.30	.14	-.09	-2.13	.034	-.57	-.02	.11	.04	.10	2.33	.021	.01	.20	.01	.05	.01	.28	.774	-.09	.12
OL	.21	.20	.07	1.08	.279	-.17	.61	.12	.06	.13	1.88	.061	-.006	.26	.26	.07	.24	3.55	.000	.12	.41
LOJ	.28	.08	.16	3.25	.001	.11	.46	-.002	.03	-.003	-.05	.958	-.06	.05	.09	.03	.14	2.80	.005	.02	.16
TEN	-.09	.22	-.01	-.41	.682	-.53	.35	.25	.07	.14	3.30	.001	.10	.40	-.07	.08	-.03	-.81	.414	-.23	.09
WO	1.37	.16	.51	8.38	.000	1.05	1.70	.42	.05	.46	7.60	.000	.31	.53	.26	.06	.26	4.31	.000	.14	.39
	R = .81, R^2= .66 (F = 62.42**)							R=.81, R^2=.66 (F= 61.87***)							R=.81, R^2=.66 (F= 62.87***)						

***p*<.001, 01, **p*<.05, Non-significant = *p*>.05

Note. FA= Fatigue; IR= Irritability; HR= Harassment; OL= Overload; LOJ= Lack of Joy; TEN; Tension; WO= Worrie

Table 11 shows the correlation between perceived life stress and cognitive abnormalities in diabetes individuals. The data show that the felt stress in life was responsible for 66% of the variation in the spatial temporal orientation of diabetes patients. This relationship was statistically significant, as shown by a substantial F ratio ($R^2 = .66$, $F = 62.42$, $p < .001$). The beta weights indicate that irritability had the highest negative predictive of spatial temporal orientation ($B = .58$, $\beta = .06$, $p < .001$), meaning that a one-unit increase in irritability would result in a loss of .58 units in spatial temporal orientation. Another significant factor that strongly predicts spatial temporal orientation is fatigue ($B = -.56$, $\beta = .17$, $p < .01$). This means that an increase in fatigue by one unit will result in a drop in spatial temporal orientation by -.56. Harassment and lack of joy were both shown to be negative predictors of spatial temporal orientation. Irritability, overload, and tension were not significant predictors of spatial temporal orientation. The findings indicate that the perceived stress in life was responsible for up to 66% of the variation in attention among diabetes patients. This relationship was statistically significant ($R^2 = .66$, $F = 61.87$, $p < .001$). The results also demonstrate that worries had a larger negative impact on attention Another significant predictor of attention was fatigue, harassment, and tension. Non-significant predictors of attention were irritability, overload, and lack of joy. The study found that perceived life stress accounted for 66% of the total variation in memory among diabetes patients ($R^2 = .66$, $F = 62.87$, $p < .001$). Fatigue and irritation were identified as the most influential factors in predicting memory performance. The lack of joy and overload were both strong predictors of attention. Harassment and tension did not have a significant impact on the level of attention among diabetes patients.

Table 12

Multiple Regression Analysis on Cognitive deficits by Psychological Wellbeing (N=230)

	Self-Acceptance							Positive relations							Purpose in life						
						95% CI							95% CI							95% CI	
CF	*B*	*SE B*	β	*t*	*p*	*LL*	*UL*	*B*	*SE B*	β	*t*	*p*	*LL*	*UL*	*B*	*SE B*	β	t	p	*LL*	*UL*
STO	-.18	.01	-.47	-9.28	.000	-.21	-.14	-.09	.02	-.20	-3.60	.000	-.15	-.04	-.13	.02	-.30	-6.11	.000	-.17	-.09
AT	-.13	.05	-.11	-2.61	.009	-.22	-.03	-.51	.06	-.37	-7.48	.000	-.64	-.37	-.47	.05	-.36	-8.47	.000	-.58	-.36
ME	-.36	.05	-.37	-7.33	.000	-.46	-.27	-.46	.07	-.37	-6.64	.000	-.60	-.32	-.38	.05	-.33	-6.88	.000	-.50	-.27
	R = .86, R^2= .75 (F = 230.77**)							R=.83, R^2=.69 (F=171.11**)							R=.87, R^2=.77 (F=252.39***)						
	Personal Growth							Environmental Mastery							Autonomy						
STO	-.13	.02	-.46	-5.86	.000	-.17	-.08	.06	.04	.11	1.43	.154	-.02	.15	-.04	.02	-.15	-2.11	.036	-.08	-.003
AT	-.02	.05	-.02	-.40	.685	-.13	.08	-.32	.11	-.19	-2.78	.006	-.55	-.09	-.24	.05	-.31	-4.81	.000	-.35	-.14
ME	-.13	.05	-.18	-2.32	.021	-.24	-.02	-.78	.11	-.54	-6.65	.000	-1.01	-.55	-.22	.05	-.31	-4.29	.000	-.32	-.12
	R = .63, R^2= .40 (F = 50.42**)							R=.59, R^2=.35 (F= 41.79**)							R=.69, R^2=.47 (F= 68.48***)						

***p*<.001, 01, **p*<.05, Non-significant = *p*>.05

Note. AT= Attention; ME= Memory; STO= Spatial-temporal orientation

Table 12 displays the correlation between cognitive deficiencies and psychological wellbeing in diabetes individuals. The results suggest that cognitive impairments were responsible for 75% of the variation in self-acceptance among diabetes patients. This relationship was statistically significant, as shown by a high F ratio ($R^2 = .75$, $F = 230.77$, $p < .001$). The beta weights indicate that memory had the most significant negative impact on self-acceptance ($B = -.36$, $\beta = -.37$, $p < .001$), suggesting that increasing memory by one unit would result in a drop in self-acceptance by -.36 units. Self-acceptance was negatively predicted by spatial temporal orientation and attentiveness.The beta values show that a single unit rise in attention led to a loss of 0.51 units in positive relations ($B = -0.51$, $\beta = -0.37$, $p < 0.001$), while a single-unit rise in memory lead to a decrease of 0.46 units in positive relations ($B = -0.46$, $\beta = -0.37$, $p < 0.001$). Another significant predictor of positive relations was spatial temporal orientation. The results suggest that cognitive deficits explain 77% of the variation in the purpose in life of diabetic patients, with a significant F ratio ($R^2 = .77$, $F = 252.39$, $p < .001$). Among the cognitive deficits, attention was found to be the strongest predictor ($B = -.47$, $\beta = -.36$, $p < .01$) of purpose in life. This means that increasing attention by one unit will result in a decrease of purpose in life by -.47 units. Spatial temporal orientation and memory negatively predicted purpose in life. The cognitive deficiencies of diabetes patients jointly accounted for 40% of the variation in predicting personal growth ($R^2 = .40$, $F = 50.42$, $p < .001$). The beta values revealed that spatial temporal orientation and memory had a negative impact on personal growth. Attention did not significantly predict personal growth. The results suggest that cognitive deficiencies were responsible for 35% of the variability in environmental mastery, as shown by a substantial F ratio ($R^2 = .35$, $F = 41.79$, $p < .001$). The beta weights indicate that memory had the most significant negative impact on environmental mastery ($B = -.78$, $\beta = -.54$, $p < .001$), suggesting that a one-unit increase in memory would result in a drop in environmental mastery by -.78 units. Another negative predictor of environmental mastery was spatial temporal orientation and memory. The cognitive deficiencies of diabetes patients together accounted for 47% of the variation in predicting autonomy ($R^2 = .47$, $F = 68.48$, $p < .001$). The relationship between spatial temporal orientation, attention and autonomy was shown to be negatively predictive, with a greater effect seen for spatial temporal orientation and attention. Spatial temporal orientation, attention and memory were negative predictors of the autonomy of diabetes patients.

Table 13

Multiple Regression Analysis on Quality of life by Cognitive deficits (N=230)

	Physical aspects							Environmental aspects						
						95% CI							95% CI	
CF	*B*	*SE B*	*β*	*t*	*p*	*LL*	*UL*	*B*	*SE B*	*β*	*t*	*p*	*LL*	*UL*
STO	-.07	.02	-.22	-3.36	.001	-.12	-.03	-.05	.02	-.21	-2.71	.007	-.09	-.01
AT	-.32	.05	-.32	-5.52	.000	-.44	-.21	.04	.05	.06	.97	.332	-.05	.14
ME	-.28	.06	-.31	-4.68	.000	-.40	-.16	-.31	.05	-.49	-6.20	.000	-.42	-.21
	R = .75, R^2=. 57 (F = 100.48**)							R=.62, R^2=.39 (F= 48.47**)						
	Psychical aspects							Social aspects						
						95% CI							95% CI	
CF	*B*	*SE B*	*β*	*t*	*p*	*LL*	*UL*	*B*	*SE B*	*β*	*t*	*p*	*LL*	*UL*
STO	.25	.04	.40	5.36	.000	.16	.35	-.01	.01	-.10	-1.41	.157	-.04	.007
AT	-.76	.12	-.40	-6.21	.000	-1.00	-.52	-.002	.03	-.005	-.08	.936	-.06	.05
ME	-1.09	.12	-.64	-8.80	.000	-1.34	-.85	-.25	.03	-.59	-8.03	.000	-.31	-.19
	R=.69, R^2=.47 (F= 68.92***)							R = .68, R^2= .46 (F = 65.65**)						

***p*<.001, 01, **p*<.05, Non-significant = *p*>.05

Note. CF= Cognitive deficits; AT= Attention; ME= Memory; STO= Spatial-temporal orientation

Table 13 shows how cognitive deficits affect several aspects of diabetes quality of life. According to the data, cognitive deficiencies explained 57% of the variance. in the physical aspects of diabetics. An *F* ratio of 100.48, with a *p*-value less than.001, demonstrated that this link was statistically significant (R^2 =.57). A one-unit increase in attention would lead to a decrease of -.32 units in physical aspects, according to the beta weights, which show that attention had the most negative effect on physical aspects (B = -.32, β = -.32, p <.001). An association of -.28 in physical aspects was found for every one-unit increase in memory, suggesting that memory is a strong negative predictor of physical aspects (B = -.28, β = -.31, p <.01). A person's spatial-temporal orientation was shown to have a negative correlation with their physical aspect. The entire variance in predicting environmental aspects was 39% explained by cognitive deficiencies (R^2 =.39, F = 48.47, p <.001). Out of all the cognitive deficiencies,

memory was shown to have the greatest impact on environmental aspects (B = -.31, β = -.49, p <.001), suggesting that a -.31 unit decline in environmental aspects would be the outcome of a one-unit rise in memory. Although attention had no discernible effect, spatial temporal orientation was another strong predictor of environmental variables. The results suggest that verbal cognitive deficiencies were responsible for 47% of the variation in the physical aspect, as shown by a substantial F ratio (R^2 = .47, F = 68.92, p < .001). The findings indicated that spatial temporal orientation, attention and memory were significant predictors of the physical aspect. The cognitive deficiencies accounted for 46% of the total variation in predicting social aspect, as shown by the cumulative variance (R^2 = .46, F = 65.65, p < .001). The beta number suggests that memory has a negative impact on social aspect. Attention and spatial temporal orientation did not significantly influence the social aspect among diabetes patients.

Table 14

Means, SDs and t values of Study Variables based on Gender (N=230)

	Male (n = 142)		Female (n = 88)				95%CI LL	95%CI UL	
Variables	*M*	*SD*	*M*	*SD*	*t*	*p*			*Cohen's d*
FA	12.51	3.07	12.25	3.11	.63	.529	-.56	1.09	.08
IR	6.59	1.06	6.58	1.14	.08	.936	-.28	.30	.009
HR	8.13	3.05	8.42	3.01	-.69	.488	-1.10	.52	.09
OL	11.85	3.28	11.48	3.72	.78	.434	-.55	1.29	.10
LOJ	19.51	5.80	19.30	5.91	.27	.783	-1.34	1.78	.03
TEN	13401	1.98	12.82	1.99	.72	.469	-.33	.72	.09
WO	15.39	3.75	15.45	3.65	-.13	.894	-1.06	.92	.01
SA	9.68	3.80	9.65	3.79	.05	.956	-.98	1.04	.007
PIL	11.01	4.41	11.07	4.43	-.10	.919	-1.24	1.12	.01
PR	11.67	4.74	11.74	4.68	-.10	.914	-1.33	1.19	.01
PG	7.51	2.87	7.33	2.61	.48	.625	-.55	.92	.06
EM	12.41	5.58	13.20	5.58	-1.06	.287	-2.26	.67	.14
AU	13.79	2.74	13.75	2.69	.10	.917	-.68	.76	.01
PHY	14.56	3.47	14.19	3.40	.79	.430	-.55	1.29	.10
EN	11.35	2.53	11.22	2.37	.40	.685	-.52	.79	.05
PSY	27.89	6.45	27.43	6.45	.52	.604	-1.27	2.18	.07
SO	11.07	1.60	11.00	1.61	.32	.747	-.36	.50	.04
STO	27.61	9.74	27.74	10.45	-.09	.926	-2.80	2.55	.01
AT	20.87	3.32	20.64	3.50	.49	.618	-.67	1.13	.06
ME	14.13	3.96	13.95	3.55	.33	.739	-.84	1.19	.04

***p<.001, **p<.01

Note. FA=Fatigue; IR=Irritability; HR=Harassment; OL=Overload; LOJ=Lack of Joy; TEN=Tension; WO=Worries; SA=Self-acceptance; PIL=Purpose in life; PR=Positive relations; PG=Personal Growth; EM=Environmental Mastery; AU=Autonomy; PHY=Physical; EN=Environmental; PSY= Physical; SO= Social; AT; Attention; ME= Memory; STO= Spatial-temporal orientation

Table 14 presents the group disparities in all research variables according to gender. The data in the table suggest that there were no significant differences in perceived life stress, psychological wellbeing, quality of life and cognitive deficiencies across genders.

Table 15

Means, SDs and t values of Study Variables based on Family System (N=230)

	Joint (n = 147)		Nuclear (n = 83)				95%CI		
							LL	UL	
Variables	*M*	*SD*	*M*	*SD*	*t*	*p*			*Cohen's d*
FA	12.29	3.07	12.64	3.11	-.83	.406	-1.18	.48	.11
IR	6.59	1.10	6.58	1.08	.09	.928	-.28	.31	.009
HR	8.08	2.93	8.53	3.21	-1.07	.283	-1.27	.37	.14
OL	11.46	3.54	12.13	3.28	-1.41	.159	-1.60	.26	.19
LOJ	19.21	6.01	19.82	5.51	-.75	.449	-2.18	.97	.10
TEN	12.94	1.94	12.94	2.07	-.004	.997	-.54	.53	.00
WO	15.12	3.92	15.94	3.25	-1.62	.106	-1.82	.17	.22
SA	9.84	4.02	9.36	3.35	.91	.363	-.55	1.50	.12
PIL	11.41	4.61	10.35	3.96	1.76	.079	-.12	2.25	.24
PR	12.02	4.86	11.12	4.41	1.39	.165	-.37	2.17	.19
PG	7.38	2.77	7.55	2.78	-.45	.650	-.92	.57	.16
EM	13.10	5.37	12.02	5.68	1.43	.154	-.40	2.56	.19
AU	13.95	2.85	13.47	2.44	1.27	.203	-.25	1.21	.18
PHY	14.57	3.61	14.16	3.13	.87	.382	-.51	1.34	.12
EN	11.41	2.41	11.10	2.57	.93	.348	-.35	.98	.12
PSY	28.29	6.36	26.69	6.49	1.82	.070	-.12	3.34	.24
SO	11.14	1.63	10.87	1.54	1.24	.213	-.15	.71	.17
STO	27.25	10.46	28.39	9.13	-.82	.410	-3.84	1.57	.11
AT	20.54	3.61	21.20	2.92	-1.43	.152	-1.58	.24	.20
ME	13.81	3.93	14.51	3.53	-1.33	.183	-1.72	.33	.18

****p*<.001, ***p*<.01

Note**.** FA=Fatigue; IR=Irritability; HR=Harassment; OL=Overload; LOJ=Lack of Joy; TEN=Tension; WO=Worries; SA=Self-acceptance; PIL=Purpose in life; PR=Positive relations with others PG=Personal Growth; EM=Environmental Mastery; AU=Autonomy; PHY=Physical; EN=Environmental; PSY=Physical; SO=Social; AT; Attention; ME=Memory; STO=Spatial-temporal Orientation

Table 15 display the group disparities in all research variables according to family system. Perceived life stress, psychological wellbeing, quality of life and cognitive impairments were not significantly different based on family system.

Table 16

Means, SDs and t values of Study Variables based on Types of Diabetes (N=230)

	Type I (n = 86)		Type II (n = 144)				95%CI		
							LL	UL	
Variables	*M*	*SD*	*M*	*SD*	*t*	*p*			*Cohen's d*
FA	12.23	3.27	12.52	2.97	-.68	.494	-1.11	.54	.09
IR	6.48	1.11	6.65	1.07	-1.18	.238	-.46	.11	.15
HR	7.57	2.67	8.65	3.17	-2.63	.009	-1.88	-.27	.36
OL	11.81	3.59	11.64	3.38	.37	.711	-.75	1.10	.04
LOJ	19.26	6.06	19.53	5.71	-.35	.727	-1.84	1.29	.04
TEN	12.65	2.23	13.11	1.81	-1.70	.090	-.99	.07	.22
WO	14.86	4.08	15.74	3.43	-1.75	.081	-1.87	.10	.23
SA	9.66	4.34	9.67	3.44	-.007	.994	-1.02	1.01	.002
PIL	11.71	4.90	10.63	4.05	1.81	.071	-.09	2.26	.24
PR	12.43	5.10	11.26	4.42	1.83	.068	-.08	2.43	.24
PG	7.71	3.15	7.28	2.52	1.12	.263	-.32	1.17	.15
EM	12.93	5.18	12.58	5.69	.46	.645	-1.13	1.82	.06
AU	14.07	2.76	13.60	2.67	1.27	.203	-.25	1.20	.17
PHY	14.98	3.75	14.09	3.21	1.89	.059	-.03	1.80	.25
EN	11.06	2.48	11.44	2.45	-1.14	.252	-1.04	.27	.15
PSY	28.30	6.40	27.36	6.46	1.07	.285	-.78	2.67	.14
SO	10.94	1.61	11.10	1.60	-.74	.460	-.59	.27	.09
STO	26.65	10.67	28.26	9.56	-1.18	.237	-4.29	1.07	.15
AT	20.12	3.79	21.17	3.07	-2.30	.022	-1.95	-.15	.30
ME	13.70	3.75	14.28	3.82	-1.12	.264	1.60	.44	.15

***p<.001, **p<.01

Note. FA=Fatigue; IR=Irritability; HR=Harassment; OL=Overload; LOJ=Lack of Joy; TEN=Tension; WO=Worries; SA=Self-acceptance; PIL=Purpose in life; PR=Positive relations with others PG=Personal Growth; EM=Environmental Mastery; AU=Autonomy; PHY=Physical; EN=Environmental; PSY=Physical; SO=Social; AT; Attention; ME=Memory; STO=Spatial-temporal Orientation

Table 16 illustrates the mean differences between type I and type II diabetes. The values in the table indicate that there was no statistically significant difference ($p > .05$) detected in psychological wellbeing and quality of life among different forms of diabetes. Perceived life stress (i.e harassment) showed significant variations ($p<.001$, $p<.05$) across different kinds of diabetes. However, other dimensions of perceived life stress such as fatigue, irritation, overload, lack of joy, tension and worries did not exhibit significant differences among types of diabetes. There were significant differences in cognitive impairments (i.e attention and memory) with p-values of less than .001 and less than .05, respectively. However, there were no significant

differences in cognitive deficits related to spatial temporal orientation across different forms of diabetes.

Table 17

Means, SDs and t values of Study Variables based on residence (N=230)

	Urban (n = 162)		Rural (n = 68)				95%CI		
							LL	UL	
Variables	*M*	*SD*	*M*	*SD*	*t*	*p*			*Cohen's d*
FA	12.46	3.06	12.29	3.14	.37	.706	-.71	1.04	.05
IR	6.59	1.06	6.59	1.16	-.01	.991	-.31	.31	.00
HR	8.02	2.86	8.76	3.38	-1.69	.092	-1.60	.12	.23
OL	11.83	3.43	11.40	3.51	.87	.384	-.54	1.42	.12
LOJ	19.57	5.85	19.09	5.80	.57	.566	-1.17	2.14	.08
TEN	12.92	2.07	12.99	1.79	-.22	.820	-.63	.50	.36
WO	15.41	3.86	15.43	3.33	-.03	.972	-1.07	1.04	.005
SA	9.62	3.93	9.78	3.46	-.29	.768	-1.24	.92	.04
PIL	11.23	4.55	10.56	4.03	1.05	.295	-.58	1.92	.15
PR	11.88	4.75	11.25	4.61	.92	.354	-.71	1.95	.13
PG	7.31	2.81	7.75	2.66	-1.08	.279	-1.22	.35	.16
EM	12.76	5.50	12.60	5.54	.19	.845	-1.41	1.72	.02
AU	13.74	2.76	13.85	2.76	-.28	.776	-.88	.66	.03
PHY	14.36	3.37	14.56	3.63	-.39	.697	-1.17	.78	.05
EN	11.11	2.60	11.75	2.05	-1.79	.073	-1.33	.06	.27
PSY	28.14	6.36	26.69	6.57	1.56	.120	-.37	3.28	.22
SO	10.98	1.62	11.19	1.57	-.90	.368	-.66	.24	.13
STO	27.40	10.31	28.28	9.24	-.60	.544	-3.72	1.97	.08
AT	20.61	3.40	28.18	3.35	-1.15	.249	-1.53	.39	2.24
ME	14.05	3.76	14.09	3.91	-.07	.944	-1.12	1.04	.01

***p<.001, **p<.01

Note. FA=Fatigue; IR=Irritability; HR=Harassment; OL=Overload; LOJ=Lack of Joy; TEN=Tension; WO=Worries; SA=Self-acceptance; PIL=Purpose in life; PR=Positive relations with others PG=Personal Growth; EM=Environmental Mastery; AU=Autonomy; PHY=Physical; EN=Environmental; PSY=Physical; SO=Social; AT; Attention; ME=Memory; STO=Spatial-temporal Orientation

Table 17 displays the group differences in all research variables depending on residency. The data in the table suggest that there were no significant differences in perceived life stress, psychological wellbeing, quality of life, and cognitive impairments among different residences.

Table 18

Means, SDs and t values of Study Variables based on Physical Exercise (N=230)

	Yes (n = 79)		No (n = 151)				95%CI LL	95%CI UL	
Variables	*M*	*SD*	*M*	*SD*	*t*	*p*			*Cohen's d*
FA	11.92	3.38	12.67	2.89	-1.76	.082	-1.58	.09	.23
IR	6.47	1.23	6.65	1.00	-1.19	.235	-.48	.11	.16
HR	8.42	2.94	8.15	3.09	.62	.531	-.56	1.09	.08
OL	11.01	3.71	12.07	3.27	-2.21	.028	-1.99	-.11	.30
LOJ	19.49	6.11	19.40	5.70	.11	.906	-1.50	1.69	.01
TEN	12.58	2.08	13.13	1.91	-1.98	.049	-1.08	-.003	.27
WO	14.48	4.29	15.90	3.27	-2.79	.006	-2.42	-.41	.37
SA	10.09	4.32	9.44	3.48	1.22	.222	-.39	1.68	.16
PIL	11.72	5.16	10.67	3.93	1.72	.086	-.14	2.25	.22
PR	12.43	5.21	11.31	4.39	1.71	.087	-.16	2.40	.23
PG	7.66	2.94	7.33	2.68	.84	.397	-.43	1.08	.11
EM	13.82	5.49	12.13	5.43	2.23	.027	.19	3.18	.30
AU	14.33	3.01	13.48	2.51	2.26	.025	.10	1.58	.30
PHY	15.29	4.20	13.97	2.88	2.80	.005	.39	2.25	.36
EN	11.59	2.27	11.15	2.55	1.31	.191	-.22	1.12	.18
PSY	28.73	7.07	27.18	6.05	1.74	.082	-.20	3.31	.23
SO	11.15	1.72	10.99	1.54	.73	.461	-.27	.60	.09
STO	26.34	11.17	28.35	9.29	-1.45	.148	-4.73	.72	.19
AT	20.06	4.05	21.15	2.93	-2.33	.020	-2.00	-.17	.30
ME	13.24	4.03	14.49	3.61	-2.39	.018	-2.28	-.21	.32

***p<.001, **p<.01

Note: FA=Fatigue; IR=Irritability; HR=Harassment; OL=Overload; LOJ=Lack of Joy; TEN=Tension; WO=Worries; SA=Self-acceptance; PIL=Purpose in life; PR=Positive relations with others PG=Personal Growth; EM=Environmental Mastery; AU=Autonomy; PHY=Physical; EN=Environmental; PSY=Physical; SO=Social; AT; Attention; ME=Memory; STO=Spatial-temporal Orientation

Table 18 presents the group disparities in all the studied variables among diabetes patients, categorized by their engagement in physical activity (yes/no). The data in the table indicates that diabetic patients who did not engage in physical exercise experienced significantly higher levels of perceived life stress (specifically overload, tension, and worries) compared to those who did engage in physical exercise ($p < .05$). However, there were no significant differences observed in other domains of perceived life stress (such as fatigue, irritability, harassment, and lack of joy) between the two groups. The findings also indicated that diabetic patients who engaged in physical exercise demonstrated significantly higher levels of psychological wellbeing, specifically in the areas of environmental mastery and autonomy.

However, there were no significant differences observed in the other aspects of psychological wellbeing, such as self-acceptance, purpose in life, positive relations with others, and personal growth among those in the physical exercise group. The quality of life, specifically in terms of physical well-being, was considerably greater among diabetes patients who engaged in physical activity compared to those who did not. There were no significant changes in any aspects of quality of life across the exercise groups. When comparing diabetes patients who did not engage in physical exercise to those who did, it was shown that the group without physical activity had considerably higher levels of cognitive abnormalities in attention and memory. There were no significant differences seen in spatial temporal orientation across the exercise groups.

Table 19

Age-wise Comparison on Perceived Life Stress (N = 230)

	Young Adults (*N*=59)		Middle Adults (*N*=98)		Late Adults (*N*=73)					Mean (*i-j*)	95% *CI*		
	M	*SD*	*M*	*SD*	*M*	*SD*	*F*	η^2	*i-j*		*SE*	*LL*	*UL*
FA	11.66	3.51	13.15	2.60	12.03	3.13	5.33***	.04	Y<M	-1.49	.49	-2.67	-.31
									Y<L	-.36	.53	-1.62	.88
									M<L	1.12	.46	.02	2.23
IR	6.36	1.22	6.65	.97	6.68	1.11	1.80	.01					
HR	7.20	2.53	8.59	3.24	8.62	2.97	4.80**	.04	Y<M	-1.38	.49	-2.55	-.23
									Y<L	-1.41	.52	-2.65	-.18
									M<L	-.02	.46	-1.11	1.07
OL	11.44	3.83	12.42	3.01	10.96	3.54	4.06**	.03	Y<M	-.97	.56	-2.30	.35
									Y<L	.48	.59	-.93	1.89
									M<L	1.45	.52	.21	2.70
LOJ	18.19	6.23	20.29	5.61	19.29	5.67	2.44	.02					
TEN	12.54	2.32	13.20	1.81	12.90	1.87	2.07	.01					
WO	14.27	4.33	16.34	2.88	15.10	3.88	6.38***	.05	Y<M	-2.06	.59	-3.48	-.66
									Y<L	-.82	.63	-2.32	.67
									M<L	1.24	.56	-.08	2.56

*p<.05, **p<.01, ***p<.001

Note: FA=Fatigue; IR=Irritability; HR=Harassment; OL=Overload; LOJ=Lack of Joy; TEN=Tension; WO=Worries; SA=Self-acceptance; PIL=Purpose in life; PR=Positive relations: PG=Personal Growth; EM=Environmental Mastery; AU=Autonomy; PHY=Physical; EN=Environmental; PSY=Physical; SO=Social; STO=Spatial-temporal Orientation; AT; Attention; ME=Memory

The results of an ANOVA that analyzed three distinct age groups are shown in Table 19. Among the young, the middle-aged, and the late. To look at how diabetes patients' reported levels of life stress varied on average, post hoc analyses were performed. There was no statistically significant difference in fatigue between the young and late age groups, according to the data ($p > .05$). Distinct tiredness levels are seen in the middle and late age, while the difference is statistically significant ($p < .01$). Between the young and middle age, there is a highly significant difference ($p < .001$). Not only that, but there is a notable difference in harassment rates between the young and middle ($p < .01$), as well as a very significant difference ($p < .001$) between the young and late age. Harassment, however, does not vary significantly ($p > .05$) between the middle-aged and the late. In addition, the overload is highly statistically significant ($p < .001$) between the middle and late. The overload levels of the young and middle, as well as the young and late age groups, are not significantly different from one another ($p > .05$). There seems to be no discernible disparity in worries between the young and late, or between the middle and late age, according to the results ($p > .05$). Between the young and middle, there is a extremely significant difference ($p < .001$).

Table 20

Age-wise Comparison on Psychological Wellbeing, Quality of life and Cognitive Deficits among Diabetic Patients (N = 230)

	Young Adults (N=59)		Middle Adults (N=98)		Late Adults (N=73)					Mean	95% CI		
	M	*SD*	*M*	*SD*	*M*	*SD*	F	η^2	i-j	(i-j)	SE	LL	UL
SA	9.97	4.71	9.29	3.24	9.93	3.65	.85	.007					
PIL	12.19	5.22	10.23	3.63	11.16	4.49	3.73*	.03	Y<M	1.95	.71	.26	3.65
									Y<L	1.02	.76	-.78	2.82
									M<L	-.93	.67	-2.52	.66
PR	13.24	5.28	10.76	4.07	11.71	4.75	5.30	.04					
PG	7.68	3.26	7.01	2.70	7.84	2.36	2.15	.01					
EM	13.03	5.53	11.83	5.31	13.64	5.61	2.44	.02					
AU	14.42	2.94	13.28	2.22	13.92	3.01	3.51*	.03	Y<M	1.14	.44	.10	2.19
									Y<L	.50	.47	-.60	1.62
									M<L	-.64	.41	-1.62	.34
PHY	15.31	4.10	14.04	2.85	14.22	3.51	2.70	.02					
EN	11.02	2.61	11.03	2.39	11.89	2.37	3.11	.02	Y<M	-.01	.40	-.96	.94
									Y<L	-.87	.42	-1.88	.14
									M<L	-.86	.37	-1.75	.03
PSY	29.69	5.83	26.24	6.40	28.08	6.57	5.67**	.04	Y<M	3.45	1.04	.99	5.91
									Y<L	1.61	1.10	-1.00	4.22
									M<L	-1.83	.97	-4.14	.47
SO	11.10	1.60	10.76	1.50	11.38	1.69	3.31	.02*	Y<M	.34	.26	-.27	.97
									Y<L	-.28	.27	-.94	.38
									M<L	-.62	.24	-1.21	-.05
STO	25.88	11.28	29.09	8.66	27.18	10.42	2.04	.01					
AT	19.64	3.99	21.55	2.74	20.66	3.42	6.15***	.05	Y<M	-1.90	.54	-3.20	-.62
									Y<L	-1.01	.58	-2.38	.36
									M<L	.89	.51	-.32	2.10
ME	13.36	4.03	14.48	3.23	14.07	4.26	1.61	.01					

*p<.05, **p<.01, ***p<.001

Note. FA= Fatigue; IR= Irritability; HR= Harassment; OL= Overload; LOJ= Lack of Joy; TEN= Tension; WO= Worries; SA= Self-acceptance; PIL= Purpose in life; PR= Positive relations: PG= Personal Growth; EM= Environmental Mastery; AU= Autonomy; PHY= Physical; EN= Environmental; PSY= Physical; SO= Social; STO= Spatial-temporal orientation; AT= Attention; ME= Memory

The results of a three-group Analysis of Variance (ANOVA) are shown in Table 20. In the younger, middle-aged, and older age groups. We used post hoc analysis to look at how people with diabetes typically vary in terms of psychological wellbeing, quality of life and cognitive deficits. Neither the middle nor the older age groups vary significantly from one another with respect to their sense of life's purpose (p >.05), according to the data. Nevertheless, the purpose in life of young and middle-aged individuals differs significantly (p <.001). In addition, the autonomy levels of the young and middle age groups vary significantly (p <.001). On the other hand, when comparing the ages of the young, middle-aged, and old, there is no discernible difference in autonomy (p >.05). No statistically significant difference (p >.05) is seen between the young and middle-aged, young and late-aged, and middle-aged and late-aged groups with respect to the environmental component of quality of life. Additionally, the physical characteristics of the young and middle-aged groups differ significantly (p <.001). Neither the early nor the late age groups, nor the medium nor the late age groups, vary significantly from one another (p >.05). When it comes to the social aspect, the middle and late age vary significantly (p <.001). There was no discernible difference (p >.05) between the younger and older age groups, nor between the younger and older age groups and the medium-aged group. The results indicate that neither the early nor the late age groups, nor the medium nor the late age groups, show a statistically significant difference in attention (p >.05). Between the young and middle age, there is a highly significant difference (p <.001).

Table 21

Education-wise Comparison on Perceived Life Stress, Psychological Wellbeing, Quality of Life and Cognitive Deficits (N = 230)

	Primary (*N*=54)		Secondary (*N*=68)		Higher (*N*=64)		Illiterate (*N*=44)					Mean (*i*-j)	95% *CI*		
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	η^2	*i-j*		*SE*	*LL*	*UL*
FA	12.35	3.02	12.90	2.46	11.88	3.56	12.52	3.23	1.23	.01					
IR	6.50	1.02	6.69	1.04	6.41	1.21	6.80	1.04	1.44	.01					
HR	8.87	2.92	8.13	2.96	7.48	2.94	8.75	3.25	2.58	.03					
OL	11.20	3.62	12.03	3.10	11.30	3.69	12.41	3.35	1.49	.01					
LOJ	19.46	5.96	20.82	5.74	18.17	5.66	19.07	5.78	2.38	.03					
TEN	12.85	1.94	12.93	1.98	12.58	2.15	13.59	1.68	2.35	.03					
WO	15.19	3.70	15.84	3.31	14.95	4.19	15.70	3.57	.78	.01					
SA	9.96	3.80	9.18	3.13	10.09	4.38	9.43	3.81	.81	.01					
PIL	11.28	4.59	10.10	3.69	11.70	4.97	11.18	4.23	1.58	.02					
PR	11.57	5.04	10.85	4.05	12.58	5.15	11.86	4.48	1.51	.02					
PG	7.78	2.58	6.97	2.31	7.80	3.16	7.25	3.00	1.34	.01					
EM	13.35	5.52	12.63	5.49	13.16	5.43	11.41	5.55	1.21	.01					
AU	14.24	2.84	13.21	2.53	14.30	2.82	13.32	2.49	2.78**	.03	*P<S*	1.03	.49	-.23	-2.03
											P<H	-.05	.49	-1.34	1.23
											P<I	.92	.54	-.49	2.33
											S<H	-1.09	.46	-2.30	-.12
											S<I	-.11	.52	-1.46	1.23
											H<I	.97	.52	-.38	2.34
PHY	14.41	3.59	13.99	3.06	15.16	3.95	14.05	2.92	1.51	.02					
EN	11.63	2.57	11.03	2.62	11.34	2.51	11.25	2.00	.60	.008					
PSY	28.26	6.78	26.60	6.33	28.70	6.53	27.32	5.96	1.36	.01					
SO	11.33	1.72	10.90	1.46	11.13	1.64	10.80	1.59	1.18	.01					
STO	26.89	10.12	29.59	9.27	26.14	10.64	27.84	9.79	1.45	.01					
AT	20.94	3.34	21.21	3.04	20.03	3.75	21.00	3.34	1.51	.02					
ME	13.54	3.98	14.57	3.27	13.70	4.22	14.43	3.68	1.08	.01					

*p<.05, **p<.01, ***p<.001

Note. FA= Fatigue; IR= Irritability; HR=Harassment; OL=Overload; LOJ=Lack of Joy; TEN=Tension; WO=Worries; SA=Self-acceptance; PIL=Purpose in life; PR=Positive relations; PG=Personal Growth; EM=Environmental Mastery; AU=Autonomy; PHY=Physical; EN=Environmental; PSY=Physical; SO=Social; STO=Spatial-temporal Orientation; AT; Attention; ME=Memory

Table 21 displays the results of the Analysis of Variance (ANOVA) test, which compared four educational categories.Between primary, secondary, higher and illiterate groups. Post Hoc analyses were conducted regarding mean differences on psychological wellbeing among diabetic patients. Results depict that between primary and secondary, between primary and higher, between primary and illiterate, between secondary and illiterate, and higher and illiterate group, there is non-significant difference ($p > .05$) in autonomy. The difference between secondary and higher groups is highly significant ($p < .001$).

Table 22

Marital Status Comparison on Perceived Life Stress among Diabetic Patients (N = 230)

	Married (*N*=127)		Unmarried (*N*=52)		Divorced (*N*=31)		Widow (*N*=20)					Mean (*i-j*)	95% *CI*		
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	η^2	*i-j*		*SE*	*LL*	*UL*
FA	12.75	2.94	11.38	3.40	12.74	3.08	12.45	2.68	2.59	.03					
IR	6.65	1.04	6.40	1.22	6.48	1.09	6.80	1.05	.98	.01					
HR	8.29	3.16	7.17	2.51	9.39	3.20	8.95	2.46	4.15***	.05	M<UM	1.11	.49	-.15	2.39
											M<D	-1.09	.59	-2.64	.45
											M<W	-.65	.71	-2.51	1.20
											UM<D	-2.21	.67	-3.96	-.47
											UM<W	-1.77	.78	-3.80	.25
											D<W	.43	.85	-1.77	2.65
OL	11.85	3.23	10.79	4.03	12.71	3.06	11.60	3.51	2.20	.02					
LOJ	20.09	5.68	17.37	6.09	19.61	5.63	20.30	5.57	2.95*	.03	M<UM	2.72	.94	.27	5.18
											M<D	.48	1.15	-2.51	3.47
											M<W	-.20	1.38	-3.79	3.38
											UM<D	-2.24	1.30	-5.63	1.14
											UM<W	-2.93	1.51	-6.86	.99
											D<W	-.68	1.65	-4.96	3.59
TEN	12.94	1.87	12.60	2.52	13.16	1.71	13.45	1.43	1.08	.01					
WO	15.92	3.28	13.75	4.67	15.74	3.33	16.00	2.86	4.74***	.05	M<UM	2.17	.59	.63	3.71
											M<D	.17	.72	-1.70	2.06
											M<W	-.07	.87	-2.33	2.18
											UM<D	-1.99	.82	-4.12	.14
											UM<W	-2.25	.95	-4.12	.14
											D<W	-.25	1.03	-2.95	2.43

*p<.05, **p<.01, ***p<.001

Note. FA= Fatigue; IR= Irritability; HR=Harassment; OL= Overload; LOJ= Lack of Joy; TEN= Tension; WO= Worries; SA= Self-acceptance; PIL= Purpose in life; PR= Positive relations; PG= Personal Growth; EM= Environmental Mastery; AU= Autonomy; PHY= Physical; EN= Environmental; PSY= Physical; SO= Social; STO= Spatial-temporal orientation; AT= Attention; ME= Memory

Table 22 display the findings of the Analysis of Variance (ANOVA) test, which examined four categories of marital status. There are four categories: married, single, divorced, and widowed. We calculated post hoc analyses to see whether there were significant differences in the means of diabetes patients' reports of life stress. The results show there exists no major variation ($p > .05$) in harassment between the married and unmarried, the married and divorced, the married and widow, the unmarried and widow, and the divorced and widow groups. However, there is a highly significant difference ($p < .001$) between the unmarried and divorced. Lack of joy is also not significantly different ($p > .05$) between married and divorced, married and widow, unmarried and divorced, and divorced and widow groups. However, there is a highly significant difference between married and unmarried (the p-value is less than 0.001). The following groups: married and divorced, married and widow, unmarried and divorced, and between divorced and unmarried and widow groups. However, there is a highly non-significant difference ($p < .001$) between the unmarried and widow. There is a significantly difference ($p < .001$) between the married and unmarried groups.

Table 23

Marital Status Comparison on Psychological Wellbeing, among Diabetic Patients (N = 230)

	Married (*N*=127)		Unmarried (*N*=52)		Divorced (*N*=31)		Widow (*N*=20)					Mean (*i*-j)	95% *CI*		
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	η^2	*i-j*		*SE*	*LL*	*UL*
SA	9.40	3.48	10.56	4.87	9.65	3.11	9.05	3.31	1.34	.01					
PIL	10.54	3.97	12.69	5.37	10.55	4.05	10.55	4.09	3.27*	.04	M<UM	-2.14	.71	-4.00	-.30
											M<D	-.005	.87	-2.26	2.25
											M<W	.007	1.04	-2.71	2.70
											UM<D	2.14	.98	-.41	4.70
											UM<W	2.14	1.14	-.82	5.10
											D<W	-.002	1.24	-3.23	3.23
PR	11.25	4.33	13.75	5.48	10.77	4.50	10.60	3.84	4.63***	.05	M<UM	-2.49	.75	-4.46	-.54
											M<D	.47	.92	-1.91	2.87
											M<W	.65	1.10	-2.22	3.52
											UM<D	2.97	1.04	-5.68	-.27
											UM<W	3.15	1.21	.01	6.29
											D<W	.17	1.32	-3.24	3.59
PG	7.43	2.72	7.62	3.26	7.23	2.61	7.45	2.06	.13	.002					
EM	12.74	5.41	13.40	5.76	11.45	5.22	12.70	5.84	.81	.01					
AU	13.34	2.52	15.04	3.05	13.39	2.60	13.85	2.25	5.34***	.06	M<UM	-1.70	.43	-2.83	-.57
											M<D	-.04	.52	-1.42	1.32
											M<W	-.51	.63	-2.16	1.13
											UM<D	1.65	.60	.10	3.20
											UM<W	1.18	.69	-.61	2.99
											D<W	-.46	.75	-2.42	1.50

*p<.05, **p<.01, ***p<.001

Note. FA= Fatigue; IR=Irritability; HR=Harassment; OL=Overload; LOJ=Lack of Joy; TEN=Tension; WO=Worries; SA=Self-acceptance; PIL=Purpose in life; PR=Positive relations with others PG=Personal Growth; EM=Environmental Mastery; AU=Autonomy; PHY=Physical; EN=Environmental; PSY=Physical; SO=Social; STO=Spatial-temporal Orientation; AT; Attention; ME=Memory

Table 23 presents the findings of an Analysis of Variance (ANOVA) that examined the relationship between marital status and four different categories. Among the many marital statuses, include married, single, divorced, and widowed individuals. Post hoc analyses were conducted to examine the average differences in psychological wellbeing among individuals with diabetes. The results indicate that there is no statistically significant difference ($p > .05$) in purpose in life between the married and divorced groups, the married and widow groups, the unmarried and divorced groups, the unmarried and widow groups, and the divorced and widow groups. However, there is a highly significant difference ($p < .001$) in purpose in life between the married and unmarried groups. Additionally, there is no statistically significant difference ($p > .05$) in favourable associations between married and divorced groups, married and widow groups, and divorced and widow groups. The groups that are married and those who are not, as well as the groups that are neither married nor divorced, vary significantly ($p <.001$). In addition, the categories of people who are not married and those who are widowed vary significantly ($p <.001$). There is no statistically significant difference *(*$p >.05$) in terms of autonomy between the groups that consist of married and divorced individuals, married and widows, and unmarried and widows. The groups of those who are not married and those who are widowed highly significantly ($p <.001$). Furthermore, both the married and unmarried groups, as well as the unmarried and divorced groups, exhibit a highly significant difference ($p <.001$).

Table 24

Marital Status Comparison on Quality of Life and Cognitive Deficits among Diabetic Patients (N= 230)

	Married (*N*=127)		Unmarried (*N*=52)		Divorced (*N*=31)		Widow (*N*=20)					Mean (*i-j*)	95% *CI*		
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	η^2	*i-j*		*SE*	*LL*	*UL*
PHY	14.24	3.18	15.75	4.27	13.32	2.46	13.85	3.13	4.08**	.05	M<UM	-1.51	.55	-2.95	-.07
											M<D	.91	.67	-.84	2.67
											M<W	.38	.81	-1.72	2.49
											UM<D	2.42	.76	.44	4.41
											UM<W	1.90	.88	-.40	4.20
											D<W	-.52	.96	-3.04	1.98
EN	11.31	2.58	11.37	2.70	11.10	2.00	11.35	1.75	.08	.001					
PSY	26.76	6.40	30.54	5.70	26.77	6.35	27.85	6.96	4.68***	.05	M<UM	-3.77	1.03	-6.46	-1.09
											M<D	-.01	1.26	-3.27	3.25
											M<W	-1.08	1.51	-5.01	2.83
											UM<D	3.76	1.42	.07	7.46
											UM<W	2.68	1.65	-1.60	6.98
											D<W	-1.07	1.80	-5.75	3.60
SO	11.09	1.62	11.33	1.61	10.52	1.45	10.80	1.60	1.86	.02					
STO	28.54	9.45	29.94	11.60	28.23	9.10	28.25	9.69	1.68	.02					
AT	21.23	3.07	19.19	4.09	20.94	3.23	21.80	2.28	5.46***	.06	M<UM	2.03	.54	.63	3.44
											M<D	.29	.66	-1.42	2.00
											M<W	-.57	.79	-2.62	1.48
											UM<D	.29	.66	-1.42	2.00
											UM<W	-2.60	.86	-4.85	-.36
											D<W	-.86	.94	-3.31	1.58
ME	14.43	3.63	12.71	4.20	14.35	3.70	14.80	3.33	2.95**	.03	M<UM	1.71	.61	.11	3.31
											M<D	.07	.75	-1.88	2.02
											M<W	-.37	.90	-2.71	1.96
											UM<D	-1.64	.85	-3.85	.56
											UM<W	-2.08	.98	-4.65	.47
											D<W	-.44	1.07	-3.23	2.34

*p<.05, **p<.01, ***p<.001

Note: FA=Fatigue; IR=Irritability; HR=Harassment; OL=Overload; LOJ=Lack of Joy; TEN=Tension; WO=Worries; SA=Self-acceptance; PIL=Purpose in life; PR=Positive relations with others PG=Personal Growth; EM=Environmental Mastery; AU=Autonomy; PHY=Physical; EN=Environmental; PSY=Physical; SO=Social; STO=Spatial-temporal Orientation; AT; Attention; ME=Memory

The findings of an ANOVA that looked at four distinct groups depending on marital status are shown in Table 24. Between married, single, divorced, and widowed. To find out how people with diabetes varied on average in terms of cognitive impairment and quality of life, researchers used post hoc analysis. Physical aspect did not vary significantly ($p > .05$) among the categories of married and divorced, married and widow, unmarried and widow, and divorced and widow. The groups that consist of married people and those who are not married show a highly significant difference ($p < .001$). In addition, the unmarried and divorced groups also showed a high significant difference ($p < .001$). Also, when comparing the psychical aspects of the married and widowed, unmarried and widow, and divorced and widow, there is no statistically significant difference ($p > .05$). Among the married and unmarried categories, particularly among the unmarried and divorced persons, there is a high significant difference ($p < .001$). In terms of attention, there is no significance difference ($p > .05$) among the categories of married and divorced, married and widow, unmarried and divorced, and divorced and widow. Both the married and unmarried groups, as well as the unmarried and widow groups, exhibit a high significant difference ($p < .001$). According to the results, the memory performance of the married and widowed groups, the unmarried and divorced groups, the unmarried and widowed groups, and the divorced and widowed groups does not show significantly ($p > .05$). The groups that consist of married people and those who are not married show a high significant difference ($p < .001$).

Table 25

Job Status Comparison on Perceived Life Stress among Diabetic Patients (N = 230)

	Private (*N*=83)		Government (*N*=58)		Business (*N*=48)		Nothing (*N*=41)					Mean (*i-j*)	95% *CI*		
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	η^2	*i-j*		*SE*	*LL*	*UL*
FA	12.48	3.17	12.81	2.61	12.83	3.19	11.22	3.20	2.73*	.03	P<G	-.39	.52	-1.75	.95
											P<B	.28	.55	-1.15	1.71
											P<N	.21	.58	-1.29	1.72
											G<B	.68	.59	-.86	-2.22
											G<N	.61	.62	-1.00	2.22
											B<N	-.06	.64	-1.74	1.61
IR	6.65	.95	6.84	1.00	6.50	1.11	6.20	1.34	3.10*	.04	P<G	-.19	.18	-.67	.28
											P<B	.15	.19	-.36	.66
											P<N	.45	.20	-.08	.99
											G<B	.34	.21	-.20	.89
											G<N	.65	.22	.08	1.22
											B<N	.30	.22	-.29	.90
HR	8.24	3.16	8.64	3.05	7.96	3.01	8.02	2.82	.53	.007					
OL	11.94	3.29	12.21	2.99	11.83	3.56	10.37	4.02	2.66*	.03	P<G	-.26	.58	-1.78	1.25
											P<B	.10	.62	-1.50	1.71
											P<N	1.57	.65	-.12	3.26
											G<B	.37	.66	-1.35	2.10
											G<N	1.84	.69	.03	3.65
											B<N	1.46	.72	-.42	3.35
LOJ	19.81	5.81	20.95	5.73	19.42	5.56	16.54	5.48	5.04***	.06	P<G	-1.14	.97	-3.66	1.38
											P<B	.39	1.03	-2.28	3.06
											P<N	3.27	1.08	.46	6.08

											G<B	1.53	1.10	-1.34	4.40
											G<N	4.41	1.16	1.41	7.41
											B<N	2.88	1.20	-.25	6.01
TEN	12.92	2.13	13.16	1.64	12.77	1.83	12.88	2.32	.35	.005					
WO	15.48	3.92	16.07	2.94	15.69	3.34	14.02	4.35	2.67*	.03	P<G	-.58	.62	-2.21	1.04
											P<B	-.20	.66	-1.93	1.52
											P<N	1.45	.70	-.36	3.27
											G<B	.38	.71	-1.47	2.23
											G<N	2.04	.74	.11	3.98
											B<N	1.66	.78	-.36	3.68

*p<.05, **p<.01, ***p<.001

Note: FA=Fatigue; IR=Irritability; HR=Harassment; OL=Overload; LOJ=Lack of Joy; TEN=Tension; WO=Worries; SA=Self-acceptance; PIL=Purpose in life; PR=Positive relations: PG=Personal Growth; EM=Environmental Mastery; AU=Autonomy; PHY=Physical; EN=Environmental; PSY=Physical; SO=Social; STO=Spatial-temporal Orientation; AT; Attention; ME=Memory

Table 25 presents the results of an Analysis of Variance (ANOVA) that examined four different work statuses. Among private, government, business, and nothing. Post hoc analyses were conducted to examine the average differences in reported life stress among diabetes patients. The results indicate that there is no significant difference ($p > .05$) in fatigue between private and government, private and business, private and nothing, government and nothing , and business and nothing groups. A very high significant difference ($p < .001$) exists between business organizations and government. Additionally, between private and government, between private and business, between private and nothing , between government and business, between business and nothing, there is non-significant difference ($p > .05$) in irritability. The difference between government and nothing groups is highly significant ($p < .001$). No statistically significant difference ($p > .05$) was observed with respect to overload between the following groups: private and government, private and business, private and nothing, government and business, and business and nothing. The difference between government and nothing groups is highly significant ($p < .001$). When comparing groups that include both private and government, as well as private and business, between government and business, and between businesses and nothing, we find no statistically significant difference ($p > .05$) in the lack of joy. Both private and nothing group, as well as government and non-existent groups, exhibit a very high significant disparity ($p < .001$). The results show that there is no noticeable difference ($p > .05$) in concerns between private and government, private and business, private and non-affiliated, government and business, and business and non-affiliated groups. Nevertheless, non-affiliated organization and the government vary significantly ($p < .001$).

Table 26

Job Status Comparison on Psychological Wellbeing, Quality of Life and Cognitive Deficit among Diabetic Patients (N = 230)

	Private (*N*=83)		Government (*N*=58)		Business (*N*=48)		Nothing (*N*=41)					Mean (*i-j*)	95% *CI*		
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	η^2	*i-j*		*SE*	*LL*	*UL*
SA	9.60	4.01	9.05	3.05	9.17	3.81	11.24	3.94	3.24*	.04	P<G	.55	.64	-1.11	2.21
											P<B	.43	.67	-1.32	2.19
											P<N	-1.64	.71	-3.49	.21
											G<B	-.11	.73	-2.00	1.77
											G<N	-2.19	.76	-4.17	-.22
											B<N	-2.07	.79	-4.14	-.02
PIL	11.10	4.59	10.14	3.70	10.69	4.15	12.56	4.96	2.59	.03					
PR	12.16	4.70	10.07	3.89	11.90	4.37	12.83	5.66	3.49**	.04	P<G	2.08	.79	.03	4.14
											P<B	.26	.84	-1.92	2.44
											P<N	-.67	.88	-2.96	1.62
											G<B	-1.82	.90	-4.17	.52
											G<N	-2.76	.94	-5.21	-.31
											B<N	-.93	.98	-3.49	1.62
PG	7.73	2.92	6.91	2.11	7.02	2.93	8.10	2.97	2.17	.02					
EM	12.08	5.33	12.24	5.49	13.23	5.70	14.05	5.52	1.45	.01					
AU	13.95	2.78	12.98	2.25	13.71	2.62	14.61	3.06	3.14*	.04	P<G	.96	.45	-.22	2.16
											P<B	.24	.48	-1.01	1.50
											P<N	-.65	.51	-1.98	.67
											G<B	-.72	.52	-2.08	.63
											G<N	-1.62	.54	-3.04	-.21
											B<N	-.90	.57	-2.38	.57

*p<.05, **p<.01, ***p<.001

Note: FA=Fatigue; IR=Irritability; HR=Harassment; OL=Overload; LOJ=Lack of Joy; TEN=Tension; WO=Worries; SA=Self-acceptance; PIL=Purpose in life; PR=Positive relations: PG=Personal Growth; EM=Environmental Mastery; AU=Autonomy; PHY=Physical; EN=Environmental; PSY=Physical; SO=Social; STO=Spatial-temporal Orientation; AT; Attention; ME=Memory

Table 26 presents the results of an Analysis of Variance (ANOVA) study that examined four different work status groups. Among private, government, business, and nothing group. Post hoc analyses were conducted to examine the mean differences in psychological wellbeing across diabetes patients. The results indicate that there is no significant difference ($p > .05$) in self-acceptance between private and government, private and business, private and nothing and government and business groups. There is a very high significant difference ($p < .001$) between business and nothing, as well as between government and nothing groups. Furthermore, between private and business, between private and nothing, between government and business, between government and nothing , between business and nothing, there is non-significant difference ($p > .05$) in positive relations. Whereas between private and government, there is highly significant difference ($p < .001$). When it comes to autonomy, private and government, private and businesses, private and nothing, government and businesses, and businesses and nothing don't vary significantly ($p >.05$). A significant difference ($p <.001$) exists between the government and nothing groups.

Table 27

Job Status Comparison on Quality of Life and Cognitive Deficit among Diabetic Patients (N = 230)

	Private (*N*=83)		Government (*N*=58)		Business (*N*=48)		Nothing (*N*=41)					Mean	95% CI		
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	η^2	*i-j*	(*i-j*)	*SE*	*LL*	*UL*
PHY	14.55	3.69	13.45	1.85	13.88	2.68	16.17	4.67	5.85***	.07	P<G	1.10	.57	-.37	2.59
											P<B	.67	.60	-.89	2.25
											P<N	-1.61	.63	-3.27	.04
											G<B	-.42	.65	-2.12	1.26
											G<N	-2.72	.68	-4.49	-.96
											B<N	-2.29	.71	-4.14	-.46
EN	11.04	2.64	11.47	1.98	11.00	2.48	11.95	2.63	1.60	.02					
PSY	27.37	6.77	26.76	6.32	28.56	5.00	28.76	7.32	1.13	.01					
SO	11.04	1.44	10.95	1.51	10.83	1.79	11.44	1.80	1.17	.01`					
STO	27.18	10.02	29.16	8.91	29.88	10.32	23.93	10.18	3.28*	.04	P<G	-1.97	1.68	-6.34	2.39
											P<B	-2.69	1.78	-7.32	1.93
											P<N	3.25	1.88	-1.61	8.12
											G<B	-.72	1.92	-5.70	4.26
											G<N	5.22	2.01	. 02	10.43
											B<N	5.94	2.09	.52	11.37
AT	20.65	3.36	21.36	3.11	20.96	3.21	20.00	3.94	1.38	.01					
ME	14.28	3.79	14.59	3.33	14.40	3.75	12.49	4.22	2.99**	.03	P<G	-.30	.64	-1.97	1.35
											P<B	-.11	.68	-1.88	1.64
											P<N	1.78	.71	-.07	3.64
											G<B	.19	.73	-1.71	2.09
											G<N	2.09	.76	.12	4.08
											B<N	1.90	.79	-.16	3.97

*p<.05, **p<.01, ***p<.001

Note: FA=Fatigue; IR=Irritability; HR=Harassment; OL=Overload; LOJ=Lack of Joy; TEN=Tension; WO=Worries; SA=Self-acceptance; PIL=Purpose in life; PR=Positive relations: PG=Personal Growth; EM=Environmental Mastery; AU=Autonomy; PHY=Physical; EN=Environmental; PSY=Physical; SO=Social; STO=Spatial-temporal Orientation; AT; Attention; ME=Memory

Table 27 presents the findings of an Analysis of Variance (ANOVA) that examined four different work status groups. Amongst private, government, business and nothing group. Post hoc analyses were conducted to examine the average differences in quality of life and cognitive impairments among individuals with diabetes. The results indicate that there is no significant difference ($p > .05$) in the physical aspect between private and government groups, private and business groups, private and nothing and government and business groups. Both government and nothing, as well as business and nothing groups, exhibit a very high significant difference ($p <.001$). And when it comes to spatial temporal orientation, none of the groups private and government, private and business, private and non-existent, and government and business show any discernible difference ($p >.05$). A very significant difference ($p <.001$) exists between government groups and nothing, as well as between business groups and nothing groups. None of the groups private and government, private and business, private and nothing, government and business or business and nothing show any statistically significant difference ($p >.05$) in memory. The difference between government and non-government groups is very high significant ($p <.001$).

Mediation Analyses.

The study aimed to investigate the role of cognitive function in explaining the relationship between perceived life stress, psychological well-being, and quality of life in individuals with diabetes. The variables were subjected to mediation analysis using the Process Macro (Hayes, 2013). The Process tool, developed by Preacher and Hayes in 2008, combines the elements of the Sobel test and the interaction term in a single command. It is a computational approach used to evaluate route models, including moderation, mediation, and their combinations. The presence of cognitive functioning deficiencies did not have a significant mediating effect on the subdomains of perceived life stress, psychological wellbeing, and quality of life. Therefore, statistical analyses were conducted on the combined scores of these factors.

Table 28

Mediation analysis for Cognitive Functioning in the relationship between Perceived Life Stress and Psychological Wellbeing among diabetic patients (N=230)

	Psychological Wellbeing		*CI* 95%	
Predictors	Model I B	Model II B	*LL*	*UL*
(Constant)	162.98***	160.57***		
PLS	-1.04***	-1.08***		
STO		-.21	-.45	.02
Indirect Effect-PLS-STO		-.04	-.09	.01
R^2 = .86, ΔR^2=.003, F = 649.26***				
	Psychological Wellbeing		*CI* 95%	
Predictors	Model I B	Model II B	*LL*	*UL*
(Constant)	166.41***	160.57***		
PLS	-1.01***	-1.08***		
AT		-.74***	-1.10	-.38
Indirect Effect-PLS-AT		-.07	-.13	-.03
R^2 = .86, ΔR^2=.01, F = 649.26***				
	Psychological Wellbeing		*CI* 95%	
Predictors	Model I B	Model II B	*LL*	*UL*
(Constant)	167.75***	160.57***		
PLS	-1.03***	-1.08***		
ME		-.80***	-1.24	-.36
Indirect Effect-PLS-ME		-.05	-.19	-.02
R^2 = .86, ΔR^2=.01, F = 649.26***				

**p<.05, **p<.01, ***p<.001*

*Note***.** CL= Confidence Interval; LL= Lower Limit; UL= Upper Limit; FA= Fatigue; STO= Spatial Temporal Orientation; AT= Attention; ME= Memory

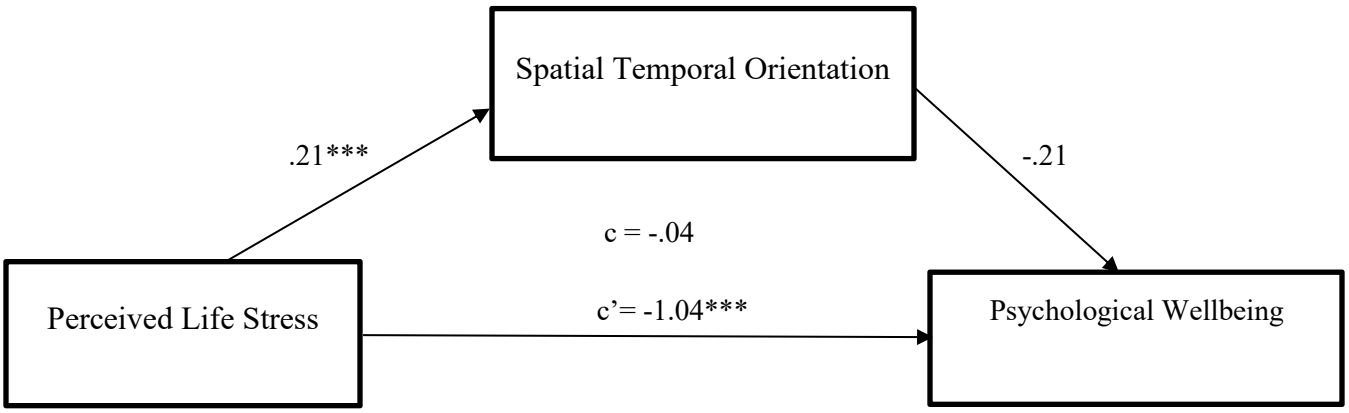

Figure 1: Mediating effect of Spatial Temporal Orientation in the relationship between Perceived Life Stress and Psychological Wellbeing

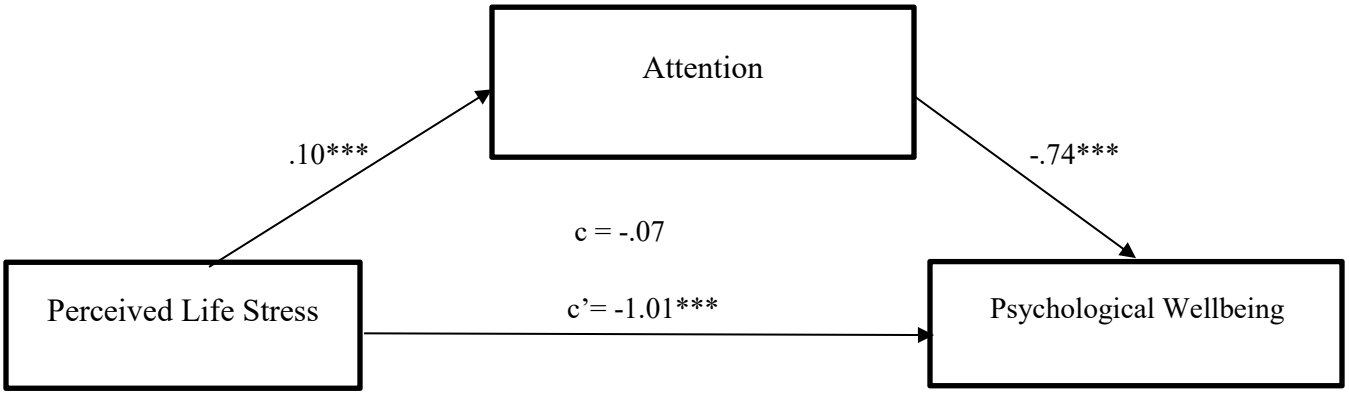

Figure 2: Mediating effect of Attention in the relationship between Perceived Life Stress and Psychological Wellbeing

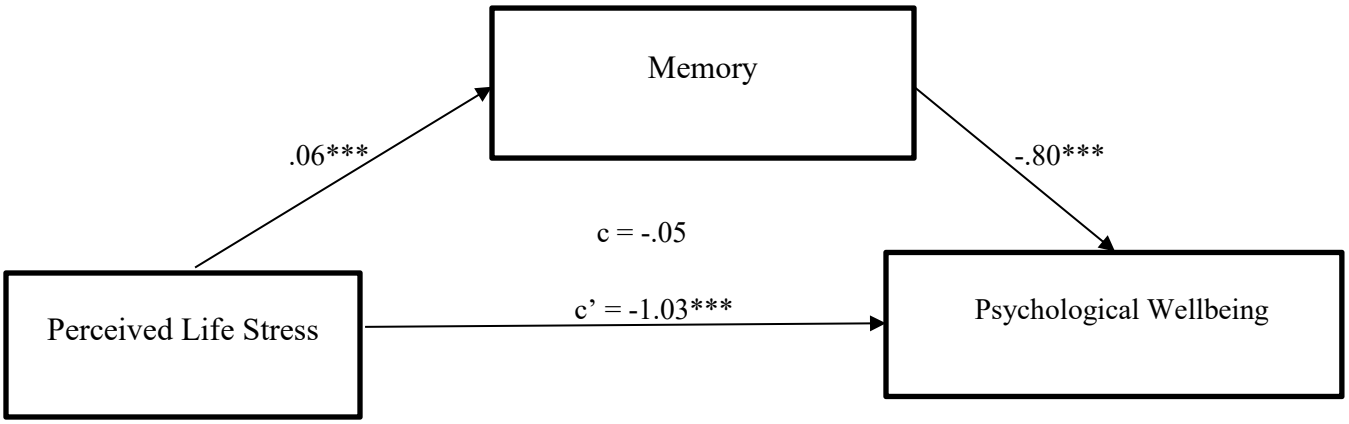

Figure 3: Mediating effect of Memory in the relationship between Perceived Life Stress and Psychological Wellbeing

Table 28 displays the findings of simple mediation studies investigating the influence of spatial-temporal orientation on the connection between perceived life stress and psychological well-being in diabetes patients. The table's direct effect values showed that spatial-temporal orientation played a crucial role in establishing a causal connection between perceived life stress and psychological wellbeing. The indirect effect, represented by the coefficient *B*=-1.04***, became smaller (-0.04) but remained statistically insignificant after including spatial-temporal orientation as a mediator. These results indicate that spatial-temporal orientation does not play a substantial role in regulating the relationship between perceived life stress and the psychological well-being of diabetes patients. The route diagrams (Figure 1) clearly demonstrate the direct and indirect impacts of perceived life stress and psychological well-being on diabetes patients. These pictures demonstrate a substantial and immediate impact of perceived life stress on psychological well-being. On the other hand, the perceived life stress does not have a substantial indirect influence on psychological well-being. This indicates that spatial-temporal orientation is not a major or effective mediating variable in these connections.

The findings also demonstrate the outcome of simple mediation analyses investigating the influence of attention on the connection between perceived life stress and psychological wellbeing in diabetes individuals. The findings indicated that attention, which is a component of cognitive performance, had a substantial role in connecting perceived life stress and psychological wellbeing. The data indicates that there was a substantial direct impact of perceived life stress on quality of life (*B* = -1.01***), which is considered an indirect effect. However, after including attention as a mediator, the impact decreased to -.07 but remained statistically significant. These results indicate that attention serves a crucial role in mediating the connection between perceived life stress and psychological wellbeing in diabetes patients. The findings have been elucidated using path diagrams (Figure 2), which not only demonstrate the direct and indirect effects but also indicate the noteworthy negative impact ($p<.001$) of perceived life stress (predictive variables) on attention (mediating factor) and attention on psychological wellbeing (outcome variable).

Ultimately, the outcome demonstrates that memory had a substantial role in connecting perceived life stress and psychological wellbeing. The data indicates that there was a substantial direct impact of perceived life stress on psychological wellbeing (*B* = -1.03***), which may be

considered an indirect effect. However, after including memory as a mediator, the impact decreased to -.05, but still remained significant. These results indicate that memory plays a crucial role in connecting perceived life stress with the psychological wellbeing of diabetes patients. The findings have been elucidated using path diagrams (Figure 3). These diagrams not only demonstrate the direct and indirect effects but also depict the substantial negative impact (p<.001) of perceived life stress (predictive variables) on memory (mediating factor), and the influence of memory on psychological wellbeing (outcome variable).

Table 29

Mediation analysis for Cognitive Functioning in the relationship between Perceived Life Stress and Quality of life among diabetic patients (N=230)

	Quality of life		*CI* 95%	
Predictors	Model I B	Model II B	*LL*	*UL*
(Constant)	118.54***	114.95***		
PLS	-.51***	-.58***		
STO		-.31***	-.46	-.16
Indirect Effect-PLS-STO		-.06	-.10	.02
R^2 = .81, ΔR^2=.02, F = 435.79***				
	Quality of life		*CI* 95%	
Predictors	Model I B	Model II B	*LL*	*UL*
(Constant)	120.09***	114.95***		
PLS	-.51***	-.58***		
AT		-.65***	-.88	-.42
Indirect Effect-PLS-AT		-.06	-.10	-.03
R^2 = .81, ΔR^2=.04, F = 435.79***				
	Quality of life		*CI* 95%	
Predictors	Model I B	Model II B	*LL*	*UL*
(Constant)	119.49***	114.95***		
PLS	-.54***	-.58***		
ME		-.50***	-.79	-.22
Indirect Effect-PLS-ME		-.03	-.06	-.009
R^2 = .81, ΔR^2=.02, F = 435.79***				

**p<.05, **p<.01, ***p<.001*

*Note***.** CL= Confidence Interval; LL= Lower Limit; UL= Upper Limit; FA= Fatigue; STO= Spatial Temporal Orientation; AT= Attention; ME= Memory

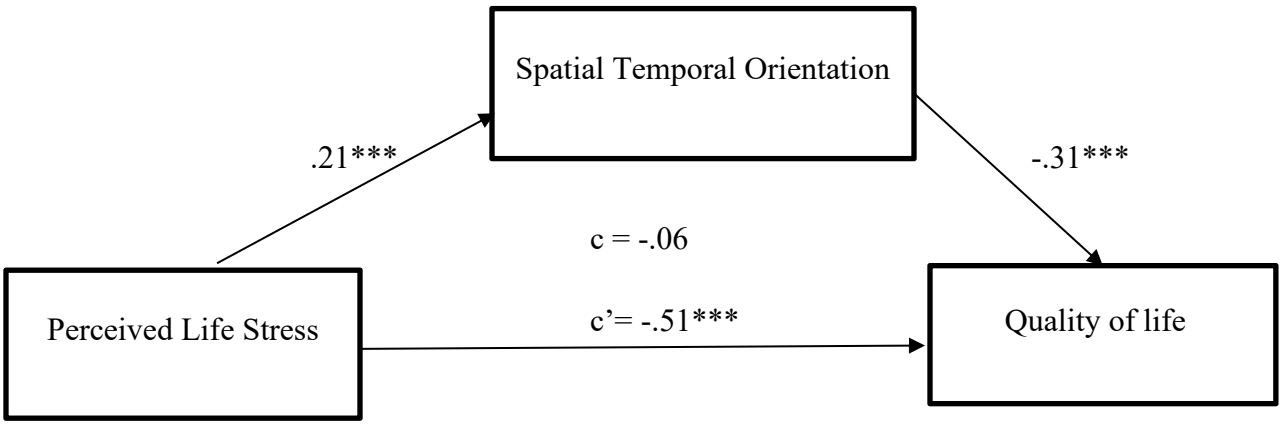

Figure 5: Mediating effect of Spatial Temporal Orientation in the relationship between Perceived Life Stress and Quality of Life

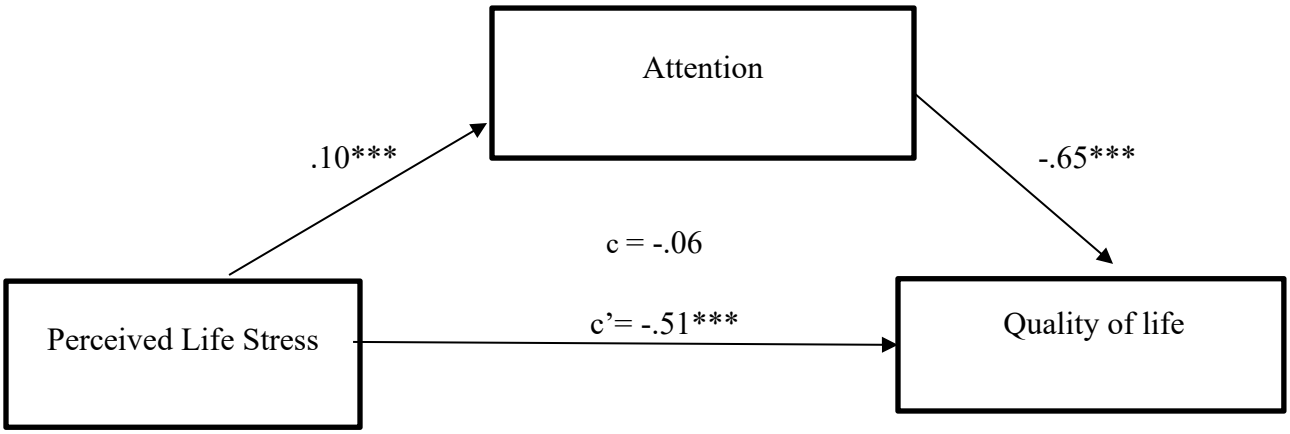

Figure 6: Mediating effect of Attention in the relationship between Perceived Life Stress and Quality of Life

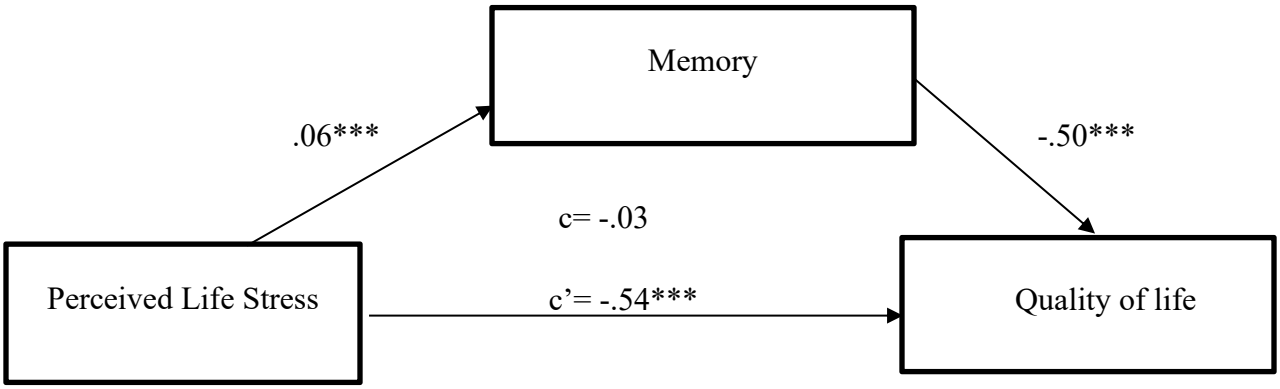

Figure 6: Mediating effect of Memory in the relationship between Perceived Life Stress and Quality of Life

In Table 29, we can see the results of simple mediation analyses that looked at how spatial-temporal orientation affected the relationship between quality of life and perceived life stress in people with diabetes. Perceived life stress and quality of life are causally related, as the table shown, and spatial-temporal orientation is a key component in this connection. A substantial mediation effect was shown by the direct impact value (*B*= -.51***). The indirect impact was previously significant, but it shrank to -.06 once spatial-temporal orientation was included as a mediator. These findings disprove the hypothesis that spatial-temporal orientation significantly regulates the association between diabetes patients' reports of life stress and their reported quality of life. Figure 4's route diagrams show how diabetes patients' quality of life and perceived stress affect them both directly and indirectly. This research looks at how stress in one's life affects quality of life in two ways: directly and indirectly. Perceived life stress significantly predicts attention negatively ($p<.001$), and attention mediates the effect on psychological wellbeing.

The findings also demonstrate the outcomes of straightforward mediation studies that investigate the influence of attention on the connection between perceived life stress and quality. The findings demonstrated that attention, as a component of cognitive performance, had a substantial role in connecting perceived life stress and quality of life. The data indicates that there was a large direct impact of perceived life stress on quality of life (*B* = -.51***), which may be considered an indirect effect. However, after including attention as a mediator, the effect became less (-.06) but still remained significant. These results indicate that attention plays a crucial role in moderating the relationship between perceived life stress and the quality of life of diabetes patients. The findings have been elucidated using path diagrams (Figure 5). These diagrams not only demonstrate the direct and indirect effects but also highlight the substantial negative impact ($p<.001$) of perceived life stress (predictive variables) on attention (mediating factor) and attention on quality of life (outcome variable).

The results show that memory is an important mediator between perceived life stress and quality of life. Although it may be seen as an indirect effect, the findings show that perceived life stress had a significant direct influence on quality of life (*B* = -.54***). The effect was still significant after accounting for memory as a mediator, albeit it was reduced to a smaller degree (-.03). These findings point to the importance of memory in the relationship between

perceived life stress and quality of life in diabetics. The findings have been elucidated using path diagrams (Figure 6). These diagrams not only display the direct and indirect effects but also demonstrate the substantial negative impact ($p<.001$) of perceived life stress (predictive variables) on memory (mediating factor) and memory on quality of life (outcome variable).

CHAPTER V

DISCUSSION

Summary

The current research looks into the connection between quality of life, psychological wellbeing, and perceived life stress in individuals with diabetes. The research also sought to examine how cognitive function influences the connection between perceived life stress, psychological well-being and quality of life. The present investigation used many scales. The present research included the translation and verification of the Perceived Stress Questionnaire (PSQ), Wellbeing Health-Related Quality of Life (WB-HRQoL) and Cognitive Functional Self-Assessment (CFSS). The researcher had previously created and verified an additional measurement tool, known as psychological wellbeing (PWB) scale. The data were obtained by a targeted sampling approach from diabetic individuals who were recruited from several hospitals in Islamabad and Rawalpindi, Pakistan.

Findings

The present study identified a negative relationship between psychological wellbeing and perceived life stress. The present investigation confirmed prior findings that perceived life stress had a negative impact on psychological well-being. Likewise, there exists an inverse correlation between the perception of life stress and the overall quality of life. The current research discovered that the perception of life stress has an adverse effect on the quality of life. On the other hand, cognitive function has a negative impact on the perception of life stress, psychological well-being and quality of life. The cognitive function results indicate a substantial mediating connection among observed stress in life, psychological wellbeing, and quality of life in individuals with diabetes.

Discussion

Finding out how 230 diabetics' psychological wellbeing, quality of life, and reported life stress affected their cognitive function was the major goal of the study. Furthermore, the study looked at how cognitive function affected the relationship between diabetes patients' perceptions of life stress, their psychological wellbeing and their quality of life generally. Sex,

family structure, type of diabetes, physical activity, age, education level, marital status,residence, and family history were some of the research factors that were compared across groups.

The Link between Research Variables.

Individuals with diabetes were shown to have lower levels of psychological well-being when their perceived life stress was higher, according to the main study hypothesis. To back up the first hypothesis, the study found that psychological wellbeing in diabetic patients was negatively correlated with perceived life stress. People whose blood sugar levels are consistently high report higher levels of stress than those whose levels are typically normal, according to previous research (Chouhan, 2006). In addition, patients' psychosocial functioning may be affected by the load of diabetes management, which might result in the emergence of psychopathological symptoms (Weinger, 2001). Strict glycaemic management, which requires self-care, is a major source of stress for people with diabetes. Since one's food, medication, and treatment choices may significantly impact one's social and financial well-being, as well as one's relationships with loved ones and friends, it is important that people be cautious about these choices (Islam et al., 2015).

Furthermore, the primary research hypothesis suggests that there exists an negative relationship between the perception of life stress and the quality of life among individuals with diabetes. The study's result, confirmed this premise by presenting evidence that perceived life stress is inversely connected with the health-related quality of life of diabetes patients. Prior research indicates that increased levels of perceived stress are linked to worse quality of life in patients with diabetes. Prior research has shown that many characteristics, including depressive symptoms, health-promoting lifestyle behaviours, diabetes health literacy, life satisfaction, and the duration of diabetes have a substantial influence on predicting the quality of life among individuals with diabetes (Jafari, 2024).

According to the study's second hypothesis, there is a positive correlation between cognitive deficiency and psychological wellbeing in individuals with diabetes. The study's findings, as shown in Table 8 strongly support the idea that there is a positive correlation between psychological wellbeing and cognitive deficiency in diabetes patients. Previous research have shown that there is a correlation between enhanced cognitive performance and increased

psychological well-being in individuals with diabetes. Several research have shown a correlation between lower psychological well-being, which encompasses conditions like depression, anxiety, and distress connected to diabetes, and a decline in cognitive function among patients with diabetes (Halder et al., 2020). Additional research has shown that subjective anxiety, sadness, and the length of sickness have been shown to have an adverse effect on cognitive abilities, namely in areas such as reaction inhibition, processing speed, and working memory (Duinkerken, 2020).

The second hypothesis of the research posits that there is a positive correlation between health-related quality of life and cognitive deficiency among diabetes patients. The study's findings as shown in Table 8 strongly support this theory and indicate a negative correlation between medical condition of life and cognitive deficiency in diabetes patients. This implies that lower scores suggest cognitive deficiencies .Previous research have shown a favourable correlation between changes in cognitive performance and changes in medical condition of life in diabetes patients. There is a correlation between cognitive decline and a decrease in health-related quality of life. Similarly, changes in health-related quality of life might be indicative of cognitive alterations. Previous research have shown a bidirectional link between cognitive performance and medical condition of life in diabetes patients. Individuals with diabetes are at a higher risk of developing cognitive impairments compared to the general population, with a likelihood that is 1-2 times higher (Zhang, 2019). Furthermore, this risk tends to rise as time goes on (Rawlings, 2014).

Predictive Role of the Study Variables. The purpose of this research was to examine how the perception of stress in life affects the psychological well-being, quality of health, and cognitive performance of diabetes patients. Analyses of multiple regression were performed to evaluate the study's hypothesis.

The findings of the present study, as shown in Table 9, indicate that perceived life stress, which includes feelings of fatigue, irritability, harassment, overload, lack of joy, tension and worries, is strongly and inversely associated with psychological wellbeing. Psychological wellbeing encompasses self-acceptance, purpose in life, positive relations, personal growth, environmental mastery, and autonomy. The research found that perceived life stress (such as fatigue, irritation, overload, tension, and worries) had a more pronounced negative impact on

each aspect of psychological wellbeing. Higher levels of fatigue, irritation, overload, worries and tension were shown to be linked with worse levels of psychological health in all domains. Put simply, persons who had higher degrees of fatigue, irritation, overload, tension and worries often had poorer levels of psychological well-being. Prior research on India has identified several factors that are linked to elevated levels of perceived stress. These factors include being over the age of 40, having diabetes for less than a year or between six and ten years, having any comorbidities, being underweight, experiencing recent conflicts at work or home, and lacking the financial means for treatment (Siddharthan, 2021).

The findings of the ongoing study (Table 10) indicate that the health-related quality of life (including physical, environmental, psychological, and social aspects) among diabetic patients is negatively influenced by perceived life stress, which encompasses fatigue, irritability, harassment, overload, lack of joy, tension, and worries. Prior research has shown a correlation between perceived stress and a decrease in medical condition of life among patients with diabetes, affecting several aspects of their overall well-being (Hadi, 1970). The value of living of diabetic patients is influenced by several factors, including the length of diabetes, education level, marital status, age, and adherence to recommended drugs (Alturaifi, 2022). Significantly, as the length of diabetes extends, the overall quality of life often declines, with the exception of physical functioning. Despite the course of the illness, patients make efforts to sustain their ability to do physical tasks (Siddharthan, 2021).

Table 11 indicated a positive correlation between cognitive performance (namely spatial temporal orientation, attention and memory) and perceived life stress (including fatigue, irritation, harassment, overload, lack of joy, tension and worries) in diabetes patients. Prior research has shown that the perception of stress is linked to the occurrence of both existing and new cases of cognitive decline in older individuals of both Black and white racial backgrounds, irrespective of their specific racial or ethnic group. Increased levels of stress perception were linked to higher likelihood of impaired cognition (Halsey, 2023).

Table 12 demonstrates that cognitive functioning (namely spatial temporal orientation, attention, and memory) had a negative impact on the psychological wellbeing of diabetes patients. This impact was seen in several aspects of psychological wellbeing, including self-acceptance, purpose in life, good connections, personal growth, environmental mastery and

autonomy. Prior studies have shown that persons who have had diabetes for a longer period of time often have worse cognitive performance, specifically in areas such as the ability to suppress responses, processing speed, and working memory. There is a correlation between worse cognitive performance and increased levels of subjective anxiety symptoms (Halder, 2020).

The findings from the present investigation as shown in Table 13 indicate that cognitive functioning (namely spatial temporal orientation, attention, and memory) has a detrimental impact on the health-related quality of life of diabetes patients, including physical, environmental, psychological, and social aspects. Diabetic individuals who have cognitive impairments have a worse health-related quality of life. Multiple studies have shown a connection between cognitive decline in domains such as memory, attention, processing speed, and executive function, and an elevated risk of anxiety, depression, and worse quality of life in individuals with both type 1 and type 2 diabetes (Alshayban et al., 2020).

Differences in Demographic Variables.

The study's ultimate goal was to evaluate the variations in average values among diabetes patients in the present study depending on their employment position, marital status, education, and age. The study variables were investigated for gender, family system, kinds of diabetes, residence and physical activity group differences using t-test analysis.

The current research analyses the differences between groups based on gender (male/female) across all study variables. The gender differences showed that males had a little greater level of reported life stress compared to females, although this difference was not statistically significant. Prior research has shown that female individuals diagnosed with diabetes likely to encounter elevated levels of perceived stress in comparison to their male counterparts. Various factors, including age, length of diabetes, comorbidities and conflicts at work or home, lead to elevated levels of perceived stress in females (Eiser, 2001). The findings indicate that men have a somewhat better psychological wellbeing compared to females, however this difference is not statistically significant. Previous research suggests that women with diabetes often have lower levels of psychological wellbeing in comparison to males. Research conducted by Devaraju (2019) indicates that female patients often have elevated levels of depressive symptoms and diminished general wellbeing, suggesting a more pronounced psychological

influence of diabetes on females. While males tend to have somewhat higher scores in quality of life compared to females, the difference is not statistically significant. Prior research has shown that there is variation in the quality of life experienced by male and female individuals with diabetes. However, several studies have found no substantial disparity between genders in terms of quality of life. Nevertheless, there are signs suggesting that female patients may exhibit worse quality of life ratings in comparison to males, namely in the domains of psychological wellness and stress management (Subramanian, 2022). The present research also indicates that males exhibit a little superior, but not statistically significant, cognitive performance in attention and memory-related functions compared to females. Research conducted previously indicates that cognitive performance deteriorates with age in diabetes patients of both genders. However, it has been shown that men have a more significant reduction in cognitive function as they get older (Eiser, 2001).

A different t-test was used to examine group disparities across all research variables, taking into account the family system (joint/nuclear). The study's results indicated that patients in the nuclear family system reported somewhat greater felt life stress compared to those in the joint family system, but this difference was not statistically significant. Prior research has shown that in a nuclear family structure, where there is a smaller number of family members to divide tasks, the main carer may have a greater burden of caring, resulting in increased reported life stress (Helgeson, 2012).Additional research has shown that in a communal household structure, where many generations coexist, there is a heightened feeling of accountability and distribution of burdens among family members, resulting in a reduced perception of stress in daily life (Siddharthan, 2021). The findings indicate that patients from joint family systems had somewhat greater psychological well-being compared to those from nuclear family systems, however this difference was not statistically significant. Prior research has shown that joint family systems have the potential to provide increased emotional support and social connections, leading to a favourable influence on the psychological wellbeing of individuals with diabetes (Bhandary, 2013). Additional research indicates that nuclear family structures might result in sensations of seclusion and solitude, which can have a detrimental impact on mental health and overall psychological well-being (Helgeson, 2012). Patients from the mixed family system had a slightly greater quality of life compared to those from the nuclear family system, however the difference was not statistically significant. Previous research indicates that diabetic individuals living in

joint family systems may have improved outcomes as a result of having access to a greater number of carers and a feeling of community, which may boost their general well-being (Vlastos, 2023). Additional research indicates that nuclear family structures, insufficient social assistance, and heightened caring obligations might have an adverse effect on one's quality of life (Helgeson, 2012). The present results also indicated that cognitive functions in the mixed family system scored insignificantly lower compared to the nuclear family system. Previous research has shown that the presence of social support and cognitive stimulation in joint family systems might contribute to the preservation of cognitive function. Conversely, the absence of such support and stimulation in nuclear family systems may have a detrimental effect on cognitive performance (Bhandary, 2013).

Table 16 indicated that there were significant variations among the research variables depending on the type of diabetes, namely type 1 and type 2. The study's results indicated that individuals with type 2 diabetes reported greater levels of perceived life stress compared to those with type 1 diabetes. Prior research has shown that individuals diagnosed with type 2 diabetes encounter psychological discomfort and negative affective disorders, such as clinical depression, which may hinder their ability to engage in self-care and adversely impact their overall quality of life (Massey, 2017). The present results indicate that those with type 2 had a little poorer degree of psychological wellbeing compared to those with type 1, however this difference was not statistically significant. Prior studies have shown that individuals diagnosed with type 1 diabetes may have difficulties in managing their condition, considerable pain associated with diabetes, and psychological obstacles that impact their overall well-being and quality of life (Van, 2020). The results further suggested that those with type 2 diabetes had a somewhat worse quality of life compared to those with type 1 diabetes, but this difference was not statistically significant. Prior studies have shown that type 1 diabetes might disrupt several aspects of life, such as psychological growth, occupational performance, interpersonal connections, and child-rearing responsibilities, possibly impacting individuals' overall well-being (Van, 2020). The present investigation found that those with type II exhibited considerably greater levels of cognitive function compared to those with type I. Previous research indicates that type 1 diabetes is linked to slight declines in cognitive function throughout a person's life, suggesting possible cognitive difficulties in persons with this illness (Van, 2020). Additional studies suggest that individuals

with type 1 diabetes have worse performance in verbal episodic memory and executive function/psychomotor processing speed compared to those with type 2 diabetes (Lacy, 2022).

A different t-test was used to assess the disparities between groups across all research variables, taking into account the participants' place of residence (urban vs rural). The outcomes of the current research indicate that the perceived life stress of urban population is not substantially different from that of rural population. Prior studies have shown that individuals living in rural areas are more likely to be afflicted by type 2 diabetes at a higher rate compared to urban populations. This disparity may be attributed to many reasons, such as lower socioeconomic level, less opportunities for physical exercise, and insufficient access to healthcare facilities (Talukder et., 2024). Urban environments are associated with lifestyle changes that increase the risk of diabetes in persons with higher economic resources. These changes include adjustments in nutrition and decreased physical activity. Recent research have shown that urban populations have a similar level of psychological wellbeing compared to rural populations, however the difference is not statistically significant. Prior research has shown that the psychological state of persons with diabetes or prediabetes is much worse than that of those without diabetes. However, these studies did not explicitly examine the differences in psychological wellbeing between rural and urban populations. Rural inhabitants have an increased susceptibility to diabetes as a result of the elevated occurrence of factors such as poverty, obesity, and physical inactivity in rural regions (Sińska, 2023). The current research found that urban populations have a somewhat inferior health-related quality of life in terms of physical, environmental, and social factors compared to rural populations, but this difference is not statistically significant. Prior research has shown that individuals with diabetes living in rural areas face significant deterioration in their health-related quality of life, particularly in terms of physical activity and psychological well-being, as compared to diabetic patients residing in urban areas (Thommasen, 2005). Recent research has shown that urban populations have a somewhat poorer level of cognitive functioning compared to rural populations, however this difference is not statistically significant. Prior research has shown that the prevalence of well-managed diabetes is greater in urban regions compared to rural ones, mostly attributable to the superior availability of high-quality healthcare services and health-related knowledge in urban settings. Unregulated diabetes poses a risk for cognitive deterioration (Aung, 2018).

The findings from table 18 indicate that group differences were examined in relation to physical activity (yes/no) across all research variables. The present investigation revealed that individuals with diabetes who engaged in physical exercise reported decreased levels of perceived life stress compared to those who did not engage in exercise. Prior research has shown that participating in physical exercise may effectively decrease the perceived stress levels in patients diagnosed with diabetes. Engaging in regular physical exercise might reduce the experience of stress by decreasing the likelihood of seeing events as stressful (Colberg, 2016). Further investigation found that diabetes individuals who participated in physical exercise had considerably higher levels of psychological wellbeing compared to those who did not engage in physical exercise. Prior research indicates that engaging in physical exercise is associated with enhanced psychological well-being, such as decreased levels of anxiety and sadness, among those diagnosed with diabetes. Engaging in physical activity aids in managing body weight, reducing hypertension, and enhancing overall wellness, hence potentially benefiting the mental health of those with diabetes (Jenkins, 2017). The current research shown that diabetes patients who participated in physical exercise had considerably greater levels of quality of life compared to those who did not engage in physical exercise. Prior research indicates that engaging in physical exercise is linked to enhanced quality of life outcomes, such as increased physical well-being and overall life contentment among those diagnosed with diabetes. Engaging in regular physical activity helps alleviate the adverse effects of stress on one's quality of life, resulting in improved overall well-being and contentment (Richter, 1981). The recent results indicate that diabetes individuals who participated in physical exercise had considerably worse cognitive performance compared to those who did not engage in physical exercise. Prior research indicates that engaging in physical exercise is associated with improved cognitive health and a decreased likelihood of cognitive deterioration in general (Colberg, 2016).

Table 19 displays the finding of an Analysis of Variance (ANOVA) study that examined three different age groups. Among the categories of young, middle and late age groups. Post hoc analyses were conducted to examine the average differences in reported life stress among diabetes patients. The results indicate that there is no statistically significant difference in fatigue between young and late ($p > .05$). However, there is a significant difference in fatigue between medium and late ($p < .01$). There is a significantly difference ($p < .001$) between the young and middle. Moreover, there is a substantial disparity ($p < .01$) between the young and

middle in terms of harassment, and a very significant disparity ($p < .001$) between the young and late age. However, there is no significant difference ($p > .05$) between the middle and late age. Furthermore, there is a statistically significant difference in overload between the middle and late ($p < .001$). However, there is no significant difference in overload between the young and middle, as well as between the young and late ($p > .05$). The data suggest that there is no statistically significant difference ($p > .05$) in anxieties between early and late, as well as between middle and late. A statistically significant difference ($p <.001$) exists in the comparison of the young and middle age.

Table 20 displays the results of the Analysis of Variance (ANOVA) that examined three different age groups. Among the young, middle, and elderly age cohorts. Post hoc analyses were conducted to examine the average differences in psychological wellbeing, quality of life, and cognitive deficiency among diabetes patients. The results indicate that there is no significant difference in purpose in life between young and late, as well as between middle and late age ($p > .05$). However, there is a very significant difference in purpose in life between young and middle age ($p < .001$). Moreover, there is a statistically significant difference ($p < .001$) in autonomy between the young and medium. However, there is no significant difference ($p > .05$) in autonomy between the young and late, as well as between the middle and late. Regarding the environmental element of quality of life, there is no statistically significant difference ($p > .05$) between the young and middle, young and late, and middle and late-aged groups. Furthermore, there is a substantial and statistically significant disparity in the physical aspect between the young and middle ($p < .001$). There is no significant difference ($p > .05$) between the early and late, as well as between the medium and late. In terms of the social component, there is a very significant difference ($p < .001$) between the middle and late age. However, no significant difference ($p > .05$) was identified between the young and medium, as well as between the young and late age groups. The findings suggest that there is no statistically significant difference in attention between early and late, as well as between medium and late ($p > .05$). A statistically significant difference ($p <.001$) exists in the comparison of the young and middle age groups.

Table 21 displays the results of an Analysis of Variance (ANOVA) study that examined four different education groups. Among the many educational categories, there are elementary, secondary, higher, and illiterate groups. Post hoc analyses were conducted to examine the mean differences in

psychological wellbeing across diabetes patients. The results indicate that there is no significant difference ($p > .05$) in autonomy between primary and secondary, primary and higher, primary and illiterate, secondary and illiterate, and higher and illiterate. There is a significantly significant difference ($p < .001$) between the secondary and upper categories.

Table 22 presents the findings of the Analysis of Variance (ANOVA) for four different groups of marital status. Among the several marital statuses, include married, unmarried, divorced, and widowed. Post hoc analyses were conducted to calculate the mean differences in reported life stress among diabetes individuals. The results indicate that there is no significant difference ($p > .05$) in harassment between the married and unmarried, the married and divorced, the married and widow, the unmarried and widow, and the divorced and widow groups. However, there is a highly significant difference ($p < .001$) in harassment between the unmarried and divorced groups. Moreover, there is no statistically significant difference ($p > .05$) in lack of joy between married and divorced, married and widow, unmarried and divorced, unmarried and widow, and divorced and widow groups. However, there is a highly significant difference between married and unmarried groups. The p-value is less than 0.001. There is no significant difference ($p > .05$) in worries between married and divorced, married and widow, unmarried and divorced, and divorced and unmarried and divorced groups. However, there is a highly nonsignificant difference ($p < .001$) in worries between unmarried and widow groups.Between married and unmarried, there is a statistically significant difference ($p <.001$).

Table 23 presents the results of an Analysis of Variance (ANOVA) that examined four different groups based on marital status. Among the categories of individuals, are those who are married, unmarried, divorced, and widowed. Post hoc analyses were conducted to examine the average differences in psychological wellbeing among individuals with diabetes. The results indicate that there is no statistically significant difference ($p > .05$) in purpose in life between the married and divorced, the married and widow, the unmarried and divorced, the unmarried and widow, and the divorced and widow. However, there is a highly significant difference ($p < .001$) in purpose in life between the married and unmarried groups.Furthermore, no statistically significant difference ($p >.05$) has been observed in the positive connections between married and divorced, married and widow, and divorced and widow. There is a high significant difference ($p < .001$) between married and unmarried, as well as between unmarried and divorced groups. Additionally, there is a highly significant difference ($p < .001$) between

unmarried and widow. Regarding autonomy, there is no statistically significant difference ($p > .05$) seen between the married and divorced, between the married and widow, and between the unmarried and widow. There is a very significant difference ($p < .001$) between the unmarried and widow groups.Additionally, a highly significant difference ($p < .001$) exists between the married and unmarried, as well as between the unmarried and divorced groups.

Table 24 presents the findings of the Analysis of Variance (ANOVA) that examined the impact of marital status on four different groups. Among the categories of individuals, are those who are married, unmarried, divorced, and widowed. Post hoc analyses were conducted to examine the mean differences in quality of life and cognitive impairment among diabetes individuals. The results indicate that there is no statistically significant difference ($p > .05$) in the physical aspect between the married and divorced, the married and widow, the unmarried and widow, and the divorced and widow. There is a significantly significant difference ($p < .001$) between married and unmarried. There is a very significant difference revealed between the unmarried and divorced ($p < .001$). Moreover, the psychical aspect shows no statistically significant difference ($p > .05$) between married and divorced, married and widow, unmarried and widow, divorced and widow. There is a very significant difference ($p < .001$) between married and unmarried groups, specifically between unmarried and divorced individuals. There is no statistically significant difference ($p > .05$) in attention levels between the married and divorced, the married and widow, the unmarried and divorced groups, and the divorced and widow groups. There is a very significant difference ($p < .001$) between married and unmarried, as well as between unmarried and widow groups. The findings suggest that there is no statistically significant difference ($p > .05$) in memory between the married and divorced, between the married and widow, between the unmarried and divorced, between the unmarried and widow, and between the divorced and widow groups. There is a significantly significant difference ($p < .001$) between married and unmarried.

Table 25 displays the results of the Analysis of Variance (ANOVA) where four categories of work status were assessed. Among private, government, business and nothing. Post hoc analyses were conducted to calculate the mean differences in reported life stress among diabetes individuals. The results indicate that there is no significant difference ($p > .05$) in fatigue between private and government, private and business, private and nothing, government

and nothing, and business and nothing. There is a significant difference ($p < .001$) between government and business groups. Moreover, there is no significant difference ($p > .05$) in irritation among private and government, private and business, private and nothing, government and business, and business and nothing. There is a very significant difference ($p < .001$) between government and nothing. Regarding overload, there is no statistically significant difference ($p > .05$) seen between private and government, private and business, private and nothing, government and business, and business and nothing. There is a very significant difference ($p < .001$) between government and nothing groups. Moreover, there is no statistically significant difference ($p > .05$) in the absence of pleasure across private and government, private and business, government and business, and business and non-existent organizations. There is a very significant difference ($p < .001$) between private and non-existent entities, as well as between government and non-existent groupings. The results suggest that there is no significant difference ($p > .05$) in concerns between private and government, private and business, private and non-existent, government and business, and business and non-existent. Regarding worries, there is a substantial difference ($p < .001$) between the government and non-existent group.

Table 26 displays the results of an Analysis of Variance (ANOVA) that examined four different work status groups. Amongst private, government, business and nothing. Post hoc analyses were conducted to examine the average differences in psychological wellbeing among individuals with diabetes. The results indicate that there is no significant difference ($p > .05$) in self-acceptance between private and government, private and business, private and nothing, and government and business. There is a very significant difference ($p < .001$) between business and non-business, as well as between government and non-government groups. Moreover, there is a distinction between private and corporate organizations. There is no significant difference ($p > .05$) in good relations between private and non-existent organizations, between government and business, between government and non-existent, and between business and non-existent. There is a significantly significant difference ($p < .001$) between business and government entities. Regarding autonomy, there is no statistically significant difference ($p > .05$) seen between private and government, private and business, private and nothing, government and business, and business and nothing organization. A statistically significant distinction ($p < .001$) exists between government and non-government.

Table 27 presents the results of an Analysis of Variance (ANOVA) study that examined four different work status groups. Amongst private, government, business and nothing. Post hoc analyses were conducted to examine the mean differences in quality of life and cognitive impairment among diabetes individuals. The results indicate that there is no significant difference ($p > .05$) in the physical aspect between private and government, private and business groups, private and nothing and government and business.A highly significant difference ($p < .001$) exists between business and non-business, as well as between government and non-government groups. In addition, there is no significant difference ($p > .05$) in spatial temporal orientation between private and government, private and business, private and non-existent , and government and business. There is a very significant difference ($p < .001$) between government groups and non-government, as well as between business and non-business. Regarding memory, there is no statistically significant difference ($p > .05$) seen between private and government groups, private and business groups, private and nothing, government and business groups, and business and nothing. A highly notable distinction ($p < .001$) exists between government and non-government.

Mediating Role of Cognitive Deficits

Mediation analyses were performed using the Process Macro (Hayes, 2013) to explore the influence of cognitive deficits (specifically, spatial temporal orientation, attention, and memory) on the connection between perceived life stress, psychological wellbeing, and quality of life in diabetic patients (hypothesis 9). This is the third hypothesis in the primary investigation. The Process tool, developed by Preacher and Hayes in 2008, combines the elements of the Sobel test and interconnected word into one order. It is a method of computation used to evaluate route models including moderation, mediation, and their combinations, as described by Preacher and Hayes in 2004.

Table 28's data suggest that cognitive deficiencies have a negative mediating role in the relationship between perceived life stress and psychological wellbeing. It demonstrates that individuals with cognitive impairments in stressful conditions have a subsequent decline in their psychological well-being. Diabetic persons who have cognitive impairments in areas such as spatial-temporal orientation, attention, and memory as a result of perceived life stress may suffer adverse effects on their psychological well-being. Impairments in cognitive function may worsen

symptoms of anxiety and depression. Even little abnormalities can have a major influence on everyday tasks, causing psychological discomfort.

Moreover, according to table 29 cognitive impairment acts as a negative mediator between perceived life stress and quality of life. It demonstrates that individuals with cognitive deficits in health-related quality of life have a subsequent deterioration in their overall quality of life. Cognitive deficits have a substantial effect on everyday activities, resulting in a drop in overall well-being. The reason for this is that cognitive impairments might hinder the capacity to carry out intricate duties, such as handling money, drugs, and home chores, which are crucial for living independently. In addition, cognitive impairments might hinder one's capacity to participate in recreational activities, socialize and work, resulting in feelings of isolation and reduced overall life contentment. Moreover, cognitive deficits may also affect the capacity to handle stress and emotions, resulting in heightened psychological discomfort and diminished overall well-being. In general, cognitive deficits may significantly affect everyday living, resulting in reduced overall well-being and quality of life.

Limitation and Suggestion:

The present work includes certain shortcomings that may have significant consequences. Initially, the research was limited to just two cities, namely Islamabad and Rawalpindi, and was conducted with a very small sample size. Therefore, the findings cannot be extrapolated to a broader population. A experimental study approach would enable us to get insight into the elements that impact perceived life stress. In this research, cognitive functioning acts as a mediator between perceived life stress, psychological wellbeing, and quality of life. However, other elements such as social support and physical exercise may serve as a protective barrier against the negative impact of perceived life stress on the psychological wellbeing and quality of life of diabetes patients. Establishing a robust support system consisting of family, friends, and healthcare professionals may provide emotional reinforcement, practical aid, and motivation to assist those with diabetes in managing stress, fostering a positive mindset, and enhancing their overall well-being. Engaging in regular physical activity aids in diminishing stress, enhancing mood, and promoting general well-being. Consequently, it acts as a safeguard against the detrimental impact of stress on mental health and quality of life.To have a complete knowledge of the phenomenon, it is recommended that future research include these factors.

Subsequent research in this domain can tackle this problem by carrying out investigations on behavioural interventions, such as cognitive-behavioral therapy, motivational interviewing, or mindfulness-based approaches, with the aim of enhancing self-care behaviours, medication adherence, and psychological well-being in individuals with diabetes.

Implications

The research draws conclusions based on both theoretical and practical factors. Theoretical consequences include the broadening of our comprehension of diabetes, including its aetiology, advancement and prospective therapeutic approaches. These investigations enhance scientific knowledge by revealing fundamental processes, identifying variables that increase the likelihood of negative outcomes, and confirming established ideas. The practical ramifications have a more immediate and concrete nature. These activities include the creation of novel diagnostic instruments, improvement of treatment regimens, and provision of information for public health policy. Conducting research on individuals with diabetes may result in the creation of improved drugs, treatments to modify lifestyle, and techniques for educating patients.

For diabetic doctors, implications include managing the health of their patients, educating them on how to manage their diabetes, and helping them reduce their risk of complications.

This study will provide significant benefits to the researchers in several aspects. Previous research lacked a translated scale to assess perceived life stress, quality of life, and cognitive functioning. Therefore, the present study aims to enhance our knowledge of these topics by providing a comprehensive measurement tool. This scale has been adapted into an Urdu form and is applicable in all contexts. Additionally, the research seeks to enhance understanding of how cognitive functioning acts as a mediator in the interaction between perceived life stress, quality of life, and cognitive functions in diabetes patients.

Conclusion

The current research revealed a correlation between perceived life stress and a decline in psychological wellbeing, diminished quality of life, and impaired cognitive performance in adults with diabetes. The current research further emphasizes the substantial influence of stress

on the overall welfare of individuals with diabetes. Individuals diagnosed with diabetes have a somewhat low health-related quality of life. Hence, it is important to priorities the primary factors that influence the health-related quality of life. This will enable the identification and implementation of suitable policies to effectively manage diabetes and eventually enhance the well-being of diabetic patients in this specific area. Incorporating stress management techniques into diabetes teaching programs is essential.

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اجازت نامہ

السلام علیکم !

امید ہے آپ خیریت سے ہوں گے۔ میں نیشنل یونیورسٹی آف ماڈرن لینگویجز کے شعبہ نفسیات میں ایم فل کی طالبہ ہوں۔ یہ سروے ذیابیطس کے شکار افراد کی زندگی کے تناؤ اور نفسیاتی صحت کے درمیان تعلق کے بارے میں تحقیق پر مبنی ہے ۔ آپ کی خدمت میں کچھ سوالنامے پیش کیے جارہے ہیں۔ آپ سے درخواست ہے کہ سوالناموں کے ساتھ دی گئی ہدایات کو غور سے پڑھیں اور ان کی روشنی میں جوابات دیں۔ آپ کو یقین دلایا جاتا ہے کہ آپ سے لی گئی معلومات مجموعی طور پر استعمال ہوں گی اور آپ کی تمام معلومات کو راز رکھا جائے گا اور یہ کہ اسے صرف تحقیقی مقاصد کے لئے استعمال کیا جائے گا۔ آپ کسی بھی وقت بغیر کسی جرمانے کے سوالنامے کو پر کرنا چھوڑ سکتے ہیں۔ براہ مہربانی کوئی سوال خالی نہ چھوڑیں اور تمام سوالوں کے واضح جواب دیں۔

جنس: (1 عورت (2 مرد

آپ کو زیابیطس کی تشخص کس عمر میں ہوئی؟ _____

خاندانی آمدنی ماہانہ: _____

خاندانی نظام: (1 مشترکہ (2 علیحدہ

زیابیطس کی اقسام (1 (چالیس سے کم عمر) Type-I ذیابیطس (2 (چالیس یا چالیس سے زیادہ عمر) Type-2 ذیابیطس

آپ کی تعلیم کا درجہ کیا ہے؟

(1 پرائمری تعلیم (پانچویں کلاس تک) (2 سیکینڈری (میٹرک تک تعلیم) (3 اعلی تعلیم (بیچلر، ماسٹر (4 ان پڑھ

آپ کی ازدواجی حثیت کیا ہے؟ (1 شادی شدہ (2 غیر شادی شدہ (3 طلاق یافتہ (4 بیوہ

آپ کا روزگار کا ذریعہ کیا ہے؟ (1 پرائیویٹ نوکری (2 سرکاری نوکری (3 کاروبار (4 کچھ نہیں

آپ کی موجودہ رہائش کہاں ہے؟ (1 شہر (2 دیہات

کیا آپ جسمانی ورزش کرتے ہیں؟ (1 جی ہاں (2 جی نہیں

سوالنامہ نمبر1

ہدایات :ہر بیان کے نیچے ایک رد عمل کا دائرہ اس بات کی نشاندہی کرے گا کہ آپ پچھلے سال کے دوران عام طور پر آپ پر کتنی بار لاگو ہوتا ہے۔

نمبر شمار	بیانات	عام طور پر	اکثر	کبھی کبھار	تقریبا
1	آپ آرام دہ محسوس کرتے ہیں۔				
2	آپ کو لگتا ہے کہ آپ سے بہت زیادہ مطالبات کیے جارے ہیں / توقعات کی جارہی ہیں۔				
3	آپ چڑچڑے اور بدمزاج ہیں۔				
4	آپ کے پاس بہت زیادہ کام / چیزیں ہیں کرنے کو۔				
5	آپ خود کو تنہا یا الگ تھلگ محسوس کرتے ہیں۔				
6	آپ خود کو تنازعات والی صورت حال میں پاتے / محسوس کرتے ہیں۔				
7	آپ محسوس کرتے ہیں کہ آپ ایسی چیزیں کر رہے ہیں جو آپ واقعی پسند کرتے ہیں۔				
8	آپ کو تھکاوٹ محسوس ہوتی ہے۔				
9	آپ کو خدشہ ہے کہ آپ اپنے مقاصد کو حاصل کرنے کا انتظام نہیں کر سکتے / سکتی۔				
10	آپ پرسکون محسوس کرتے / کرتی ہیں۔				
11	آپ کو بہت سے فیصلے لینے ہوتے ہیں۔				

12	آپ کو محسوس ہوتا ہے کہ آپ مایوس اور زچ ہو چکے ہیں۔				
13	آپ خود کو توانائی سے بھرپور محسوس کرتے ہیں۔				
14	آپ تناؤ محسوس کرتے ہیں۔				
15	لگتا ہے کہ آپ کے مسائل بڑھتے جا رہے ہیں۔				
16	آپکو محسوس ہوتا ہے ک آپ جلدی / عجلت میں ہیں۔				
17	آپ خود کو محفوظ محسوس کرتے ہیں۔				
18	آپ کو بہت سی پریشانیوں کا سامنا ہے۔				
19	آپ دوسرے لوگوں کے دباؤ میں ہیں۔				
20	آپ حوصلہ شکنی محسوس کرتے / کرتی ہیں۔				
21	آپ اپنے آپ سے لطف اندوز رہتے ہیں۔				
22	آپ مستقبل کو لے کر خوفزدہ ہیں۔				
23	آپ محسوس کرتے ہیں کہ آپ کام اس لئے کر رہے ہیں کیونکہ آپ کو کرنا ہے نا کہ اس لئے کہ آپ کرنا چاہتے / چاہتی ہیں۔				
24	آپ کو محسوس ہوتا ہے کہ آپ پر تنقید کی جاتی ہے یا آپ کے بارے میں اندازے لگائے جاتے ہیں۔				
25	آپ خوش مزاج ہیں۔				

26	آپ خود کو ذہنی طور پر تھکا ہوا محسوس کرتے ہیں۔				
27	آپ کو آرام کرنے / پر سکون ہونے میں دشواری ہوتی ہے۔				
28	آپ زمے داریوں کے بوجھ تلے دبے ہوئے ہیں۔				
29	آپ کے پاس اپنے لیے کافی وقت ہے۔				
30	آپ خود کو ڈیڈ لائن (آخری تاریخوں) کے دباؤ میں محسوس کرتے ہیں۔				

سوالنامہ نمبر2

ہدایات: ہر بیان کے نیچے ایک رد عمل کا دائرہ اس بات کی نشاندہی کرے گا کہ آپ کتنا متفق یا متفق نہیں ہیں۔

نمبر شمار	بیانات	بہت زیادہ متفق	کسی حد تک متفق	تھوڑا سا متفق	نہ ہی متفق ہیں اور نہ ہی غیر متفق ہیں	تھوڑ سا غیر متفق	کسی حد تک غیر متفق	بہت ذیادہ غیر متفق
1	مجھے اپنی شخصیت کے بیشتر حصے / خصوصیات پسند ہیں۔							
2	جب میں اپنی زندگی کی کہانی دیکھتا / دیکھتی ہوں تو مجھے بہت خوشی ہوتی ہے کے اب تک معاملات کس طرح حل ہوئے ہیں۔							

3	کچھ لوگ بے مقصد زندگی گزارتے ہیں لیکن میں ان میں سے نہیں ہوں۔							
4	روزمرہ کی زندگی کے تقاضے اکثر مجھے پریشان کرتے ہیں۔							
5	میں بہت حوالوں سے اپنی زندگی کی کامیابیوں سے مایوس ہوں۔							
6	قریبی تعلقات کو برقرار رکھنا میرے لیے مایوس کن رہا ہے۔							
7	میں ایک دن کو ایک دن کی ہی زندگی سمجھ کر گزارتا/گزارتی ہوں اور مستقبل کے بارے میں وقتاً نہیں سوچتا/سوچتی۔							
8	عام طور پر میں یہ محسوس کرتا ہوں کہ میں جن حالات میں رہتا/رہتی ہوں اس کا زمہ دار میں خود ہوں۔							
9	میں روزمرہ کی ذمہ داریوں کو اچھی طرح نبھاتا/نبھاتی ہوں۔							
10	مجھے کبھی کبھی ایسے لگتا ہے جیسے میں نے زندگی میں جو کچھ کرنا تھا سب کر لیا ہے۔							
11	میرے نزدیک زندگی سیکھنے تبدیل ہونے اور ترقی کا ایک مستقل عمل رہا۔							

12	میرے خیال میں زندگی میں نئے تجربات کا ہونا بہت اہم ہے جو میرے اور دنیا کے بارے میں میری سوچ کو چیلنج کر سکیں۔							
13	لوگ مجھے ایک سخی دل کی حثیت سے بیان کریں گے جو اپنا وقت دوسروں کو دینے کے لیے تیار رہتا/رہتی ہے۔							
14	میں نے بہت عرصہ پہلے اپنی زندگی میں بہتری یا تبدیلیاں لانے کی کوشش ترک کر دی۔							
15	میں مضبوط رائے والے لوگوں سے متاثر ہوں۔							
16	مجھے دوسروں کے ساتھ بہت گرم جوش اور قابل بھروسہ تعلقات کا کچھ خاص تجربہ نہیں رہا۔							
17	مجھے اپنی رائے پر بھروسہ ہے بھلے وہ دوسرے لوگوں کی انداز سوچ سے مختلف ہوں۔							
18	میں اپنے آپ کو اپنی سوچ کے مطابق جانچتا ہوں نہ کہ دوسروں کی اقدار اور رائے کے مطابق.!							

سوالنامہ نمبر3

ہدایات: ہر بیان کے نیچے ایک رد عمل کا دائرہ اس بات کی نشاندہی کرے گا کہ آپ کتنا متفق یا متفق نہیں ہیں۔پیمانے پر اپنا اختیار منتخب کرتے وقت، براہ کرم ذہن میں رکھیں کہ پچھلے 12 ماہ میں کیا ہوا ہے۔

نمبر شمار	بیانات	میں مکمل طور پر متفق نہیں ہوں	میں جزوی طور پر متفق نہیں	میں متفق نہیں ہوں، اور نہ غیر متفق	میں جزوی طور پر متفق ہوں	میں پوری طرح متفق ہوں
1	مجھے کوئی درد محسوس نہیں ہوتا /ہوتی۔					
2	میں بغیر کسی رکاوٹ /مشکل کے کوئی بھی جسمانی سرگرمی انجام دے سکتا /سکتی ہوں۔					
3	میں باآسانی سے سو جاتا /جاتی ہوں اور میں کافی دیر تک سوتا/سوتی ہوں، جب میں جاگتا/جاگتی ہوں تو میں آرام دہ(تازہ دم) محسوس کرتا/کرتی ہوں۔					
4	میں اپنا خیال رکھتا/ رکھتی ہوں۔					
5	میری جسمانی حالت (صحت)بہترین ہے۔					
6	میں ہمیشہ اچھے موڈ میں رہتا/رہتی ہوں۔					
7	میں شاذونادر ہی پریشان محسوس کرتا/کرتی ہوں۔					
8	مجھے اپنا وجود (اپنا آپ)اچھا لگتا / محسوس ہوتا ہے۔					
9	زندگی خوبصورت ہے۔					

10	دنیاخوبصورت ہے۔					
11	میرے خاندانی (گھر والوں سے) تعلقات بہترین ہیں۔					
12	میں اپنی نوکری بہترین انداز سے کر رہا/رہی ہوں۔					
13	میں باقاعدگی سے اپنے دوستوں سے ملتی/ملتا ہوں اور ان کی صحبت سے لطف اندوز ہوتا/ہوتی ہوں۔					
14	میں کہہ سکتا/سکتی ہوں کہ میری جنسی (ازدواجی) زندگی بہت اچھی ہے۔					
15	ملازمت پر ساتھیوں کے ساتھ میرے تعلقات اچھے ہیں۔					
16	میں اپنے مالی حالات سے مطمئن ہوں۔					
17	میں ماحولیاتی درجہ حرارت کے مطابق آسانی سے ڈھل جاتا/جاتی ہوں۔					
18	میں خود کو مکمل طور پر محفوظ محسوس کرتا/کرتی ہوں۔					
19	جہاں میں رہتا/رہتی ہوں یا کام کرتا/کرتی ہوں وہاں مجھے سانس لینے میں دقت محسوس نہیں ہوتی۔					

سوالنامہ نمبر4

ہدایات: ہر جملے کے لیے ایک رد عمل کا دائرہ اس بات کی نشاندہی کرے گا کہ یہ پچھلے سال کے دوران عام طور پر آپ پر کتنی بار لاگو ہوتا ہے۔

نمبر شمار	بیانات	کبھی نہیں	تقریبا کبھی نہیں	کبھی کبھی	تقریبا ہمیشہ	ہمیشہ
1	مجھے (کسی بھی چیز پر) توجہ مرکوز رکھنا مشکل لگتا ہے					
2	میں بہت جلد غائب دماغی کی حالت میں چلا جاتا / چلی جاتی ہوں۔					
3	مجھے ایک ہی وقت میں دو کام کرنے میں مشکل پیش آتی ہے چاہے وہ عام سے ہی کیوں نہ ہوں(مثال کے طور پر: جب میں چائے بناتے ہوئے بات کرتا / کرتی ہوں تو میں چائے کے برتن میں پانی ڈالنا بھول جاتا / جاتی ہوں یا پھر مجھے بات روکنی پڑ جاتی ہے۔					
4	مجھے دماغی طور پر حساب کتاب کرنے میں مشکل پیش آتی ہے (مثال کے طور پر جب میں خرید و فروخت کرتے ہوئے باقی چیزوں کا حساب کتاب نہیں کر پاتا / پاتی)۔					
5	الفاظ میری زبان کی نوک پر ہوتے ہیں(مطلب سوچنا نہیں پڑتا / بے ساختہ ہوں)۔				م	
6	میں کوئی کام کرتے وقت کام کے عین درمیان میں غائب دماغ ہو جاتا / جاتی ہوں۔					
7	مجھے معمول کے علاوہ اضافی سرگرمیاں سرانجام دینے میں مشکل پیش آتی ہے(مثال کے طور پر: مختلف لوگوں کے ساتھ کھانا یا چھٹیاں گزارنا)۔					

8	مجھے حالیہ / تازہ تازہ معلومات کو یاد رکھنے میں مشکل پیش آتی ہے(مثال کے طور پر: کسی فرد کا نام، کسی جگہ کا نام، کسی اشیاء کا نام یا کسی کا فون نمبر)۔					
9	مجھے ان معلومات کو بھی یاد رکھنا مشکل لگتا ہے جو کبھی مجھے بہت اچھے سے یاد / ذہن نشین تھی (مثال کے طور پر کوئی تاریخی / واقعات یا جغرافیائی محل وقوع)۔					
10	مجھے کچھ دن پہلے پیش آنے والے حالات واقعات کو یاد رکھنا بھی مشکل لگتا ہے(مثال کے طور پر :مجھے یاد نہیں رہتا کہ میں نے کل دوپہر کیسے گزاری یا میں گلی میں کس سے ملا / ملی)۔					
11	جو اشیاء مجھے اپنے ساتھ لے جانا ہوتی ہیں میں انھیں چھوڑ جاتا / جاتی ہوں جس کے باعث مجھے انھیں لے جانے کے لیے واپس جانا پڑتا ہے(مثال کے طور پر وہ کوڑا جو دروازے کے ساتھ اٹھانے کے لیے رکھا ہے یا میرے کھانے کا ڈبہ جب میں کام پر جاتا / جاتی ہوں)۔					
12	رسائل یا کتابیں وغیرہ پڑھتے وقت اہم معلومات کی تلاش کے لیے مجھے گزشتہ سطروں کو دوبارہ پڑھنے کی ضرورت پڑتی ہے تا کہ میں عبارت کے ساتھ چل سکوں(مثال کے طور پر: کسی کردار کا نام)۔					
13	میری حرکات میں ایک مناسب ربط / ترتیب نہیں ہے۔					
14	مجھے احساس ہوتا ہے کہ میری حرکات معمول سے بہت آہستہ ہو گئیں ہیں بلکہ کسی حد تک کاہلی کا شکار ہیں۔					
15	گفتگو کرتے وقت میں صحیح وقت پر صحیح الفاظ کا انتخاب نہیں کر پاتا / پاتی۔					
16	گفتگو کرتے وقت مجھے اپنی بات سمجھانے کے لئے مناسب الفاظ نہیں مل پاتے بلکہ میں عمومی الفاظ یا وضاحتیں استعمال کرتا / کرتی ہوں(مثال کے طور پر: مجھے					

	وہ چیز دیں)۔					
17	میرے لئے کسی جگہ / منزل تک پہنچنے کے لیے راستہ تلاش کرنا مشکل ہوتا ہے۔					
18	میں تاریخ یاد رکھنے میں کنفیوز ہوتا/ہوتی ہوں اور مجھے یاد نہیں رہتا آج کیا تاریخ ہے۔					