Physical Education, Health and Social Sciences

https://journal-of-social-education.org

E-ISSN: 2958-5996

P-ISSN: 2958-5988

Illness Perception, Self-Efficacy and Perceived Adherence to Lifestyle Modification in Adults with Type 2 Diabetes

Khadija [1], Afifa Anjum [2]

[1] Ms Health Psychology, Institute of Applied Psychology, University of Punjab, Lahore
Email: khjaleem7@gmail.com
[2] Associate Professor, Institute of Applied Psychology University of the Punjab Lahore
Email: anjumafifa.appsy@pu.edu.pk

DOI: https://doi.org/10.63163/jpehss.v3i4.914

Abstract

This current research study examined the relationship between Illness perception, self-efficacy and perceived adherence to lifestyle modification in adults with type 2 diabetes. It was hypothesized that there was likely to be a positive relationship between Illness perception, self-efficacy and perceived adherence to lifestyle modification in adults with type 2 diabetes. Cross-sectional research design was used. Non-probability sampling strategy was employed to recruit the sample of N=140 participants comprising of (n=71 male and n=69 female) adults (ages 21-71) from hospital of Lahore. The scales comprised, Brief Illness Perception Questionnaire (Broadbent et al. 2006), Diabetes Management Self-Efficacy Scale (Jason et. al, 2018), Perceived Adherence Life Style Modification Questionnaire (Nor et. al, 2022) and demographic information sheet in order to assess the research variables. The results were generated by the means of SPSS Version 23.00 employing Pearson product moment correlation analysis, multiple linear regression analysis, anova and independent sample t-test. The findings of study revealed all main study variables to be related to their scales. Illness perception were positive and significant predictor of perceived adherence lifestyle modification in adults with type 2 diabetes. While self-efficacy were negative and non-significant predictors of perceived adherence to lifestyle modification. There were significant differences between normal and overweight adults with type 2 diabetes for study variables. There were also significant differences between educational level cross study variables. Health professionals should employ clear and simple communication strategies, provide educational materials at appropriate reading levels, and offer additional support to ensure that all patients, regardless of their educational background, have the knowledge and tools to manage their diabetes effectively

Introduction

Diabetes is a long-term (chronic) illness which impacts how your body converts food into energy. Diabetes mellitus defined as how one's body uses glucose or blood sugar. The cells which compose the tissues and muscles rely heavily on glucose as a source of energy. It serves as the primary fuel for the brain. Diabetes results from the body's inability to absorb sugar, also known as glucose, into its living tissues and utilise it as fuel. As a result, the bloodstream begins to accumulate additional sugar. Serious health complications might result from having excessive sugar in the blood. The body converts most food into sugar (glucose), which is then released into the bloodstream (Eisenbarth, 2015).

1.1 Types of Diabetes

The three primary kinds of diabetes are type 1, type 2, and gestational (diabetes during pregnancy).

1.1.1 Type 1 Diabetes

The body mistakenly attacking itself is considered to be the etiology of type 1 diabetes. This response prevents the body from producing insulin. Type 1 diabetes affects between 5–10% of those who have the disease. Type 1 diabetes symptoms frequently appear suddenly. Typically, it is discovered in kids, teenagers, and young adults. To survive, people with type 1 diabetes must take insulin every day. There is currently no cure for type 1 diabetes (Atkinson, 2014).

1.1.2 Type 2 Diabetes

When you have type 2 diabetes, your body struggles to properly utilise insulin and maintain appropriate blood sugar levels. The majority of diabetics (90–95%) are type 2. It takes many years to develop, and adults are typically diagnosed with it (but a growing number of kids, teenagers, and young adults are as well). With healthy lifestyle modifications like weight loss, a nutritious diet, and regular exercise, diabetes of this type can be avoided or postponed (Atkinson, 2014).

1.1.3 Gestational Diabetes

When you have type 2 diabetes, your body struggles to properly utilise insulin and maintain appropriate blood sugar levels. The majority of diabetics (90–95%) are type 2. It takes many years to develop, and adults are typically diagnosed with it (but a growing number of kids, teenagers, and young adults are as well). With healthy lifestyle modifications like weight loss, a nutritious diet, and regular exercise, diabetes of this type can be avoided or postponed (Atkinson, 2014).

1.2 Symptoms of Diabetes

1.2.1 Type 1 Diabetes Symptoms

The severity of diabetes symptoms is influenced by blood sugar levels. Some people may not exhibit symptoms, particularly if they have type 2 diabetes or pre-diabetes. Symptoms of type 1 diabetes frequently appear suddenly and are more severe.

1. Thirstier than usual.
2. Frequent urination.
3. Weight loss
4. Exhaustion and weakness.
5. Experiencing irritability or other mood swings.
6. Having eyesight haze.
7. wounds heal slowly.
8. Frequently contracting infections like vaginal, skin, and gum diseases
9. Tingling or numbness in the palms of your hands or feet.
10. Inability to cure cuts (Patlak, 2022).

1.2.2 Type 2 Diabetes Symptoms

Due to their sluggish development over many years, you could not even experience any indications at all or fail to detect them. Diabetes of type 2 are increasing in prevalence across every age range, yet symptoms typically don't appear until adulthood. Diabetes type 2, which is more prevalent, can manifest at any age. People over 40 have a higher prevalence of type 2 diabetes (Atkinson, 2014).

1.2.3 Gestational Diabetes Symptoms

Symptoms of gestational diabetes are hardly noticeable. During the twenty-fourth and 28th week of pregnancy, obstetrician will do a gestational diabetes screening (Olokoba, 2012).

1.3 Causes

Overly high blood glucose levels are the root cause of diabetes.

1.3.1 Causes of Type 1 Diabetes

It affects the immune system. Insulin-producing cells in the pancreas are attacked and killed by the body. Without insulin, glucose accumulates up in the bloodstream rather than being able to enter cells. Some patients' genes might also be involved. A virus may also cause the immune system to assault (Patlak, 2022).

1.3.2 Cause of Type 2 Diabetes

If you do not engage in any physical activity but are overweight or obese, your risk of developing type 2 diabetes increases. Insulin resistance can occasionally result from excess weight and is widespread in type 2 diabetics. Additionally, the distribution of body fat affects results (Patlak, 2022).

1.3.3 Causes of Gestational Diabetes

During pregnancy, the placenta releases hormones that increase the body's cells' resistance to insulin. Insufficient insulin is produced by the pancreas to combat this resistance. Bloodstream glucose levels remain too high. A gland (the pancreas) behind and beneath the stomach produces the hormone insulin.

1. Insulin is released by the pancreas into the blood.
2. As the insulin moves about, sugar can enter the cells.
3. Insulin helps to reduce blood sugar levels.

The pancreas secretes less insulin when blood sugar levels fall (Chen, 2011).

1.4 Risk factors

Depending on the type of diabetes, different risk factors apply. In all types, family history could be important. Geographical location and environmental factors can increase the incidence of diabetes. Testing for the presence of autoantibodies—diabetic immune system cells—in family members of persons with diabetes is occasionally conducted. Type 1 diabetes is more likely to develop if certain autoantibodies exist. However, not everyone with these autoantibodies goes on to acquire diabetes (Zheng, 2015).

1.5 Prevalence of Diabetes

34.2 million people of all ages – about 1 in 10 – have diabetes in the U.S. while 7.3 million adults aged 18 and older (about 1 in 5) are unaware that they have diabetes (just under 3% of all U.S. adults). The number of people who are diagnosed with diabetes increases with age. More than 26% of adults age 65 and older (about 1 in 4) have diabetes in Pakistan (Eisenbarth et al., 2015).

1.6 Complications

Diabetes' long-term consequences emerge gradually. The likelihood of consequences increases with the duration of diabetes and the degree of blood sugar control. Diabetes problems could eventually become incapacitating or even fatal. Indeed, type 2 diabetes can develop from prediabetes. Potential issues involve the following:

- **Cardiovascular disease (CVD).** Diabetes significantly raises the risk of numerous heart conditions. These include coronary artery disease, heart attack, stroke, and arterial constriction (atherosclerosis), which can cause chest pain (angina).

- **Injury to the nerves (neuropathy).** The linings of the tiny blood arteries (capillaries) that feed the nerves might become damaged by an excessive sugar intake, particularly in the lower extremities. The tingling, numbness, burning, or pain that may result from this typically starts around the base of fingers or toes and progressively moves higher.
- **Digestion-related nerve damage.** Might result in issues with nausea, vomiting, diarrhea, or constipation. It might cause erectile dysfunction in men.
- **Nephropathy, or kidney damage.** The glomeruli, which are millions of microscopic blood artery clusters in the kidneys, filter the blood's waste. This vulnerable filtration system can be harmed by diabetes.
- **Retinopathy, or eye injury.** Diabetes (also known as diabetic retinopathy) can harm the blood vessels in the eyes. Blindness could result from this.
- **Foot injury.** Numerous foot issues are made more likely by nerve injury of the feet or inadequate blood circulation to the feet.
- **Skin and mouth conditions**. Diabetes may leave more prone to skin problems, including bacterial and fungal infections.
- **Impaired Hearing**. Diabetes patients are more likely to experience hearing issues.
- **Alzheimer's Condition**. Dementia risk may rise with type 2 diabetes (Patlak, 2022).

1.6.1 Management

The goal of managing diabetes is to keep blood sugar levels as close to their baseline as possible without actually lowering them. It is typically possible to achieve with dietary adjustments, physical activity, weight loss, and administration of the proper drugs (insulin, oral meds). The best way to treat diabetes is to take action to control hazards, which include:
By Adhering to a Nutrition Plan. taking recommended medicine, and upping your activity level, you can keep your blood sugar levels as close to normal as possible.
Maintain Triglyceride and Blood Cholesterol (HDL and LDL) levels as close to the normal ranges as you can.
Controlling Blood Pressure. Over 140/90 mmHg is considered to be high blood pressure.
Plan For Eating Well. Adopt a Dash diet or a Mediterranean diet (which emphasizes fruits, vegetables, whole grains, legumes, and healthy fats). These diets are low in calories and fats and high in fiber and nutrients. For assistance with understanding nutrition and meal planning, consult a qualified dietitian.
Doing Regular Exercise. On most days of the week, try to get in at least 30 minutes of exercise. jog or swim.
Achieving A Healthy Weight. Work with healthcare team to develop a weight-loss plan. Taking medication and insulin, if prescribed, and closely following recommendations on how and when to take it (Baker, 2014).

1.7 Illness Perception

People suffering from chronic illness, face many challenges beside the physical problems. Illness perception defined as personal thoughts, feelings, worries or apprehensions and experiences regarding an illness determine their appraisal and mechanism they adopt to manage their anxieties which in turn contribute to their overall experience of the illness and its impact on their life. Leventhal and his colleagues (1980) refer illness perceptions patient's own implicit common-sense beliefs about their illness and argued that by using these perspectives, they may better understand and control their sickness (Ogden, 2007; Baker, 2014).

1.7.1 Components of Illness Perceptions

There are five interrelated mechanisms that mark patients' views of their illness.

- Identity is the term a person chooses to identify their health problem and whatever signs they consider to be a part of it.
- Consequences—the anticipated repercussions and prognosis of the disease
- Personal theories on the illness's origins as a cause
- Timeline The length of time the patient anticipates the sickness to persist
- The degree to which a patient thinks they can overcome or control their ailment is referred to as cure or control (Cameron, 2003).

1.7.2 Health Belief Model

Hochbaum (1958) disrobed HBM for the first time. He talked about being prepared to act (Ogden, 2007).

In the initial level of interpretation, a person is exposed to the issue of a potential sickness through two passages: first, by their own self-reported symptoms and second, by social messages, which are reports from others. Leventhal asserts that a person's condition is given significance by regaining their understanding of their illness. Therefore, the formation of illness perceptions will be influenced by symptoms and messages from others. These cognitive representations of the health issue then give it significance and enable the person to create and consider effective coping mechanisms (Ogden, 2007).

The creation and identification of appropriate coping mechanisms is the following phase within the self-regulation approach. Approaching and prevention coping are two general types of coping that include the combination of other coping mechanisms. Individuals who are dealing with health issues create coping mechanisms in an effort to regain stability and normal functioning (Ogden, 2007).

Appraisal is the next level of the self-regulation model. Individuals must evaluate the effectiveness of their coping mechanisms in order to decide whether to stick with their current approach or adopt a different one (Ogden, 2007).

Fourth stage is the consequences of illness. According to patient's consequences are the results of one's illness which may be financial, emotional, physical, and many other. The consequences of the illness might be being insignificant (Ogden, 2007).

Fifth stage is person control on one's illness. It concerns about how much control person believed to be have on his/her illness. Control and cure are a dual faith. It concerns about insights of the illness and perceptions of control over the illness which may be by the individual themselves or by friends, relatives, medical professionals, and any other person (Forshaw, 2002).

Leventhal gives self-regulatory model of illness perception. According to self-regulation theory which specified the involvement of individuals in observing their own efforts and outcomes in managing their illness. This process is theorized as a dynamic one which changes in response to the patient's perception of illness change. These illness perceptions or thinking patterns directly affect individuals (Baum & Johnston, 2005).

1.7.3 Components of Health Belief Model

Hochbaum develops the idea. The following terms are defined:

1.7.3.1 Perceived Susceptibility. Strecher and Rosenstock (1974) described as dimension of subjective impression of the danger of getting a health condition (Baum, et al., 1997).

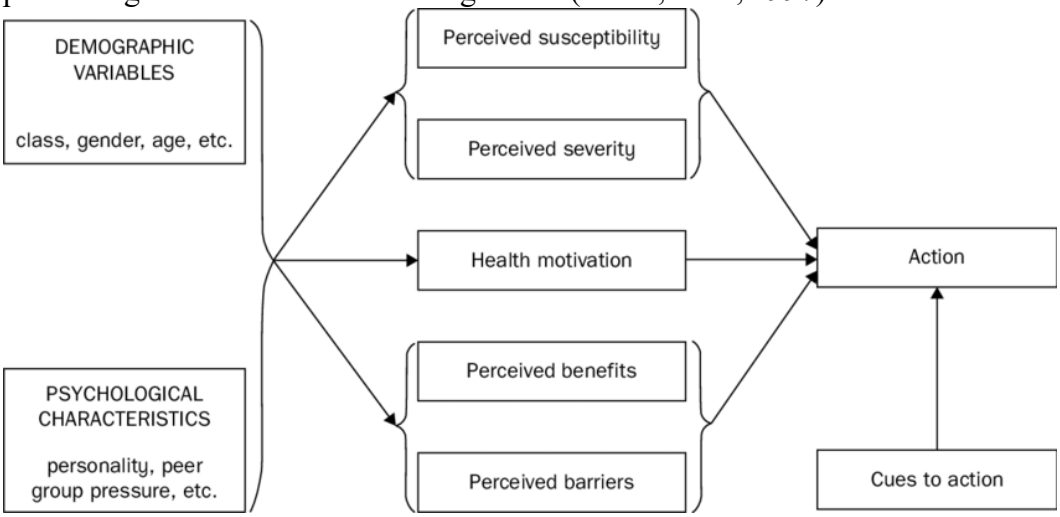
1.7.3.2 Perceived Severity. Strecher and Rosenstock (1974) feelings of seriousness of getting an illness (Baum, et al., 1997).

1.7.3.3 Perceived Benefit. Strecher and Rosenstock (1974) described perceived threat creates a force that influences behavior; that will be done relies on the conviction that

the various activities will be effective in lessening the threat posed by the sickness (Baum, et al., 1997).

1.7.3.4 Perceived Barriers. The potential drawbacks of a certain health measure or a perceived obstacle may serve as barriers to engaging in the advised behavior (Baum, et al., 1997).

1.7.3.5 Cues to Action. The motivation and desire to act are given by the severity and vulnerability combined, and the desired course of action is determined by the impression of rewards (fewer barriers). It is evident that the HBM places more of an emphasis on preventing disease than on achieving health (Baum, et al., 1997).



The Health Belief Model Abraham & Charles (2015).

1.8 Theoretical Framework

1.8.1 Leventhal model of Self-Regulation

The model proposes that patients will decide to cope with illness and threats that are consistent with their own understanding of experience. According to Leventhal's model, threat to health (perceived illness and symptoms) generate separate sets of representations in the recipient (1) cognitive representations (an interpretation of the nature of the threat-illness perception) and (2) emotional representations (an emotional impact such as fear, anxiety). These representations lead the patients to attempt some form of regulation and management of the condition. So, when a health threat of some form is sensed (via a primary appraisal), the individual will make a plan to avoid the threat or to control it. Leventhal's model conceptualizes people as problem solvers, who are actively involved in management of their illness and health. This means that patients can potentially be helped to achieve better health outcomes if they can provide more useful understanding of their condition and positive impact of taking on a more constructive coping mechanism (Donyai, 2000).

1.9 Self- Efficacy

Based on social cognitive theory, self-efficacy is the notion that one can employ drive & mental capacities to satisfy certain situational demands (Bandura, 1986; Wood & Bandura, 1989). Self-efficacy refers to the conviction that one can carry out actions to achieve a specific result (Feltz, 1988). The concept was originally proposed by the psychologist Albert Bandura. According to Bandura's, individuals who have a high level of self-efficacy—that is, people who have confidence in their ability to do well—are more inclined to regard challenging tasks as challenges to be overcome as opposed to avoidance.

1.9.1Theoretical Approaches

1.9.1.1 Social Cognitive Theory. The core of Bandura's concept of social cognition, which emphasizes the importance of social experience and observational learning in the formation of personality, is the theory of self-efficacy. The central idea of social cognition is the fact that a person's behaviors and responses, including social behaviors and cognitive processes, are influenced by the behaviors they have observed in others in practically every setting (Bandura, 1989).

1.9.1.2 Social Learning Theory. According to social learning theory, abilities are acquired exclusively or largely inside a social group. The development of a person's emotional and practical abilities, as well as their ability to accurately perceive themselves and others, depends on how they succeed or fail at engaging in dynamic interactions within groups. Social learning also encourages the acceptance of others. This idea contends that social learning occurs when individuals observe and model one another. Self-efficacy is a measure of a person's awareness of the abilities they can bring to a group (Feltz, 1988).

1.9.1.3 Self-concept Theory. It focuses on the way these impressions are organized and the way they remain active during life in order to clarify how people perceive and comprehend their own existence from cues they get from external sources. The manner in which individuals have come to interpret their connections with others, as well as themselves, is directly tied to both successes and failures. According to this idea, self-concept is dynamic (i.e., always evolving and not fixed at a specific age), ordered and taught (i.e., not present from birth) (Feltz, 1988).

1.9.1.4 Concept of Attribution. The concept of attribution is concerned with how people assign meaning to occurrences as well as how those beliefs affect and how they perceive themselves. According to attribution theory, there are three main causes: locus, stability and ability to be controlled (Bandura, 1989).

1.10 Sources of Self-Efficacy

1.10.1 Mastery Experiences

Bandura contends that having mastery experiences is the best approach to increase self-efficacy (Bandura, 1989).

1.10.2 Vicarious Experiences of Social Models

It can inspire you to think that you have the abilities necessary to accomplish a similar objective if you witness someone you perceive as being similar to yourself succeeding at something challenging (Bandura, 1989).

1.10.3 Belief in Success

A third source of self-efficacy is found through strengthening the belief that one has the ability to succeed. Those who are positively persuaded that they have the ability to complete a given task show a greater and more sustained effort to complete a task. It also lowers the effect of self-doubt in a person. However, it is important to remember that those who are doing the encouraging, put the person in a situation where success is more often. If they are put in a situation prematurely with no hope of any success, it can undermine self-efficacy (Bandura, 1989).

1.10.3.1 Factors Affecting Self-**Efficacy.** Self-efficacy is influenced by four aspects, according to Bandura. The main component affecting someone's self-efficacy is

Enactive attainment – the feeling of mastery. Failure diminishes self-efficacy whereas success increases it.

Modelling, often known as vicarious experience If others are capable of it, I'm able to do it, is how modelling is perceived. When we witness somebody achieving success, our

own self-efficacy rises; when we witness someone failing, it falls. Modelling is particularly helpful for those who tend to be uncertain of themselves, even though it doesn't have the same impact as first-hand experience.

Social persuasion–direct encouragement or dissuasion from another individual typically characterizes social persuasion. Encouragement tends to increase someone's self-efficacy whereas discouragement tends to decrease it.

Physiological factors – People frequently show symptoms of distress in stressful situations, such as shaking, discomfort, weariness, anxiety and feeling sick. Self-efficacy can be significantly changed depending on how one views these responses in themselves (Oikarinen, 2017).

1.11.1 Perceived Adherence

According to the definition of adhering, a patient with a chronic illness works actively, intentionally, and responsibly with healthcare experts to maintain their health. Adherence to treatment involves taking medications as prescribed and leading a healthy lifestyle that includes a balanced diet, regular exercise, quitting smoking (Oikarinen, 2017).

Patient's failure to follow their treatment plans may be purposeful or accidental. When a patient deliberately chooses not to take their prescribed medications, to take less of them, or to ignore suggestions for treatment, this is known as intentional non-adherence. There are many potential causes for willful non-adherence, such as monetary constraints or negative drug side effects. The term accidental non-adherence, on the other hand, relates to a patient's inability or lack of cognitive resources, which may result in non-adherence (Molloy et al., 2014; Pettersen et al., 2018).

1.11.2 Lifestyle Modification

Behavioral interventions that try to improve a variety of lifestyle health behaviors (Carlson, 2013). The cornerstone of diabetic care is adopting lifestyle changes, such as, regular exercise, quitting smoking, and receiving psychosocial support. Glycemic management must be the main focus of medical intervention. From a thorough diagnosis to the patient's departure from the hospital, a strategy for managing diabetes should be developed with the patient and the healthcare professionals. The patient should be given post-discharge drugs and advice on changing their lifestyle. In addition to these issues, evaluation should be taken into account (Pettersen et al., 2018).

Numerous studies have demonstrated the significant effects that lifestyle changes can have on glycemic control, HbA1C, self-reported weight, quality of life, and therapy costs. However, it was noted that physical activity had a significant impact on glycemic management and reduced cardiovascular risk. Adopting an active lifestyle by engaging in at least 60 minutes of daily exercise and eating a balanced diet can lower your risk of developing Type 2 diabetes and coronary artery disease. To maintain metabolic changes over the long term, lifestyle modification programmers are required, and these programmers must always include both dietary treatment and regular exercise (Carlson, 2013).

1.11.1.1 Good Eats. A balanced diet is one that has the right amounts of proteins, carbs, vitamins, and other nutrients. The patient benefits from blood sugar level maintenance. The recommended range for daily calorie intake and expenditure is 1000–1200 kcal for overweight women, 1200–1600 kcal for overweight males, and heavier for highly active women. Diets for patients are planned to produce a daily deficit in calories of 500–1000 kcal to encourage weight reduction of 0.5–1.0 kg per week. Numerous studies demonstrate a direct connection between a low-carbohydrate diet and weight loss (Carlson, 2013).

1.11.1.2 Get active- Be Energetic. Increased activity is a crucial diabetic tool. It indirectly improves insulin sensitivity. It is essential for preventing cardiovascular comorbidities, neuropathy, nephropathy, and other diabetes problems like retinopathy. If the patient selects brisk walking as their preferred exercise, the counsellor should instruct them to increase their daily step goal from 10,000 to 12,000 steps by five hundred at 3-day intervals. Resistance training may be preferred by some patient's over aerobic exercise. Strength training should not be done if you have comorbid conditions like hypertension or cardiovascular disease. A few examples of moderate-intensity physical activities are brisk walking, housework, lawn mowing, dancing, swimming, bicycling, and participating in sports. These hobbies could help you become more mentally and physically fit (Carlson, 2013).

Sr. Number	Age range	The Diabetes Category	Physical Activity	Time Frame
1	Adult (18-35 years)	T1DM, T2DM, prediabetes	Moderate to vigorous intensity physical activity Prolonged sitting should be interrupted every 30 min	At least 150 minutes every week
2	Adult (18 to 35)	Diabetes 1and 2	resistance exercise/ Strengthening exercise	2-3 sessions/week
3	Middle aged (>55 years) and (>36 years)	T1DM, T2DM	Flexibility training, balance Training, Yoga	twice a week.

Diabetes age range and category Prentice (2001).

1.11.1.3 Healthy Weight**.** Diabetes and heart problems are both associated with obesity. Therefore, a weight assessment is required to prevent these issues. If a diabetic patient's weight increases at the same time, cardiac comorbidities could result. BMI is a term used to quantify how much weight a person is in relation to their height. A high BMI might be a sign of extreme fatness. Healthy eating and regular exercise are crucial for weight management since they lower the risk of diabetic complications. The following table lists the BMI ranges according to weight status.

Body Index Mass as Per Weight

Sr. Number	Category	Range of BMI
1	Underweight	≤18.5
2	Average weight	18.5-24.9
3	overweight 25-29	25-29.9
4	Obesity	≥30

Weight category and BMI range (Smolin et al., 2020).

1.11.1.4 Glycemic management. The management of diabetes requires entail monitoring blood sugar levels. To avoid difficulties, it's crucial to keep BSL as close to normal as possible. A patient's quality of life can be improved by normal BSL. When a patient is ill, take the following actions:

- Check the patient's glycemic status
- Drink plenty of water and other fluids.

- Measure your body temperature each morning and night. A fever might indicate an infection.
- If a patient is having breathing difficulties and their BSL is below 60 mg/dl, they should go to the closest hospital right away (Smolin et al., 2020).

1.11.1.5 Mental Health and Diabetes. Because of fluctuations in BSL at particular times, diabetic patients are constantly in depressive states. BSL fluctuation can lead to mental health issues like weariness, tension, and particularly causes diabetic-related stress, sadness, and anxiety. We must routinely practice meditation and control our stress in order to keep our blood sugar levels in check if we have diabetes. Along with this, the fundamental strategies to manage diabetic distress are CBT, family therapy, and dialectical behavioral therapy (DBT). We must cultivate beliefs about living a healthy life, according to CBT. Family therapy comprises assisting members of the family in resolving conflicts and includes dialogue. And the primary goal of DBT is to impart skills. In addition to therapy, several antidepressant and anxiety medications aid in symptom relief (Smolin et al., 2020).

1.11.1.6 Lifestyle changes combined with medication. Pharmacotherapy and lifestyle changes are both effective in managing the condition. Numerous studies contrast the impact of medication and lifestyle change on the management of disease. These findings demonstrate that while medication and lifestyle change are comparable when taken alone, they are additive when combined (Smolin et al., 2020).

Literature Review

The purpose of this study was to shed light on how illness perception and self-efficacy impact type 2 diabetics' ability to maintain a lifestyle modification. It is important to investigate how persons with type 2 diabetes perceive their health. Compared to western literature, Pakistan has minimal empirical study and scant research data on this phenomenon. The literature review earlier studies that may be used to determine how these factors are related. The idea and conceptualization of perceived adherence to lifestyle modification in individuals with T2DM have undergone adjustments throughout the years because of concerns regarding illness perception and self-efficacy in themselves.

Researchers have acknowledged the significance of illness perception as a determinant of adherence to lifestyle change. However, further research on the effect of perceived adherence to lifestyle modification is required. Along with studying the association between illness perception, self-efficacy, and perceived adherence to lifestyle modification. This chapter provides a thorough overview of the most recent studies on self-efficacy, perceived adherence, and lifestyle modification related to illness perception. In people with T2DM, these factors have importance in determining their ability to manage their condition and prevent complications.

Research was conducted by Bilondi et al. (2021) to explore how people with type II diabetes mellitus (T2DM) perceived their illness perception and compliance with medicine. The study was cross-sectional. The study included 206 type II patients as its sample. The demographic and questionnaire, were used to collect the data. SPSS software was used to analyses the data. The findings of the pearson correlation revealed a relationship between medication adherence and illness perception. The regression analysis also revealed that illness perception predicts medication adherence.

The above research examined the link between patient illness perception and medication adherence, it is important to explore more researches that patients must be educated about their condition in order to strengthen their understanding of the illness and its relationship to increased medication adherence.

In the United States, another study was carried out to look into the connection between compliance with medications and how people perceive their illnesses. The sample

of the research was T2DM patients. The number of participants was 146. Women participants were more than as compared to men. The participants' average age was 64.38 years. The results show illness perception predict medication adherence (Noor et al., 2021).

Overall, these studies suggest that improving patients' illness perception may lead to better medication adherence among those with T2DM.

Similarly, Johansson and his colleagues (2018) also conducted a study to investigate how self-efficacy and illness perceptions are related to each other in Sweden population. Nurses made up the research's sample. There was a cross-sectional study. The participation sample was about 46. Demographics and questionnaires were employed to gather the data. The results shows that diabetes patients were more likely to report a weaker sense of self-efficacy. Reduced self-efficacy was linked to increased illness perception. People who reported having bad feelings about their condition and experiencing unfavorable effects from their diabetes were more likely to report having poor self-efficacy. People who reported having a more favorable perspective of their health were more likely to have higher self-efficacy scores.

There was relevant research which was done in diabetes patients to investigate illness perceptions and self-efficacy. The research was conducted in London. Both genders were participated in research. The size of the sample was 64 patients. The sample was collected from London hospital. According to the findings, self-efficacy and illness perception are significantly correlated (Griva et al., 2000).

Improving self-efficacy and perception of diseases important for better handling of diabetes. By addressing patients' perceptions of their condition and enhancing their confidence to deal with diabetes, it can improve patients' ability to manage their condition and achieve better health outcomes.

Moreover, the association between self-efficacy and illness perception has been studied in depth. The size of the sample was 115 individuals. The research was done in Australia. The participants filled out demographics and questionnaires. Regression analysis was performed. The results shows that self-efficacy is predicted by illness perception. According to the findings, diabetes patients who have a high illness perception score high on self-efficacy (Knowles et al., 2020).

Similarly, research was conducted by Zelber-Sagi et al. (2017) to investigate the connection between illness perception and modifying one's lifestyle. The study was carried out in Israel. The research design was cross-sectional. Sample size were 87 patients. Sample was collected from a lab. The sample was non-alcoholic liver patients. Both genders were part of research (54.1% male, 45.9 female). The findings indicate a substantial favorable association between changing one's lifestyle and perception of an illness.

Self-efficacy and illness perception are key factors in determining whether people change their lifestyles. It may help patients make positive lifestyle changes and improve their health outcomes.

Research was conducted by Leelacharas et al. (2015). The study was conducted in Thailand. Research sample was hypertension patients. The sample was collected from Bangkok health centers. A convenience sample of 660 participants take part in research. Both genders took part in research. According to the findings, changing one's lifestyle and perception of an illness are positively correlated.

A greater understanding of the condition may encourage lifestyle adjustment in hypertension sufferers.

Research was conducted in Poland to investigate whether self-efficacy and illness perception are connected. Sample comprised 226 individuals. Both genders were part of research. The study participants were multiple sclerosis. The generalized self-efficacy scale,

brief illness perception questionnaire, and demographic were utilized. The illness perception and self-efficacy were shown to be positively associated (Wilski and Tasiemski, 2016).

In order to influence behaviors and results connected to health, perceptions of illness are very important. The more positive illness perception may enhance self-efficacy.

Young-Whee (2011) looked into the relationship between people who have pulmonary TB's view of their condition, sense of self-efficacy, and level of self-care. The study made advantage of a convenient sample from two hospitals. 140 patients responded to a questionnaire requesting information on general characteristics. Self-efficacy and illness perception showed a statistically substantial positive association. Regression analysis revealed that among the factors, self-efficacy was the most effective predictor.

Among those diagnosed with pulmonary tuberculosis, self-efficacy and illness perspective were influential factors in self-care.

There was a study aimed to investigate the relationships among hypertensive patients' medication adherence, treatment satisfaction, and illness perceptions. Patients were gathered for this cross-sectional study from community pharmacies and doctor's offices in Beirut. The sample size was 117 participants. Patients who had strong adherence reported much higher treatment satisfaction. Regarding illness perception, even though adherent individuals' scores were lower than those of non-adherent participants', this difference did not statistically vary from zero (Saarti et al. 2016).

Illness perception is an important factor to consider in improving patient outcomes. Gender is not associated with illness perception and medication adherence

Research was conducted with T2DM patients. The study examined the link between compliance with medications and how people perceive their illnesses. The study was conducted in the United States. 174 participants (57.5%) were female. Adults aged 20 or older participate in the research. Self-efficacy and adherence showed a substantial positive correlation, but the sense of an illness perception and adherence showed a negative correlation (Shiyanbola et al. 2017).

Research was conducted by Mosleh and Almalik (2016) to evaluate if the illness perception of coronary heart disease patients may predict medication adherence. The study included a convenience sample of 254 individuals who went to the cardiac clinic. Participants filled out a self-reported questionnaire. Patients expressed a high degree of illness perception and were confident in their ability to manage their condition on their own or with the help of the right treatment. Male patients understood their illness better than female patients and thought it will have fewer negative effects. Perception of individual management and therapeutic control were both associated with medication adherence.

Mosleh and Almalik (2016) find that illness perception is associated with medication adherence, with individual management and therapeutic control perceptions being particularly relevant.

There was a relevant study to investigate how a group of type 2 diabetic patients from Iran viewed illness perception and medication adherence. The convenience sampling technique was used to draw 102 type 2 diabetes patients from Shiraz, Iran. The participants' average age was 40.7 ±11.4 years. 78% of responders were female, compared to 22% who were male. The participants filled out the questionnaire (Aflakseir, 2012). The study's showed that a higher degree of medication adherence was predicted by the notion of an illness perception

The study conducted by Hsiao et al. (2012) to examine how illness perception linked to medication adherence. The study included individuals with hypertension, and information was gathered at a family medicine clinic at a hospital in northern Taiwan. The respondents were 78 males. In addition to collecting information on medication adherence. The findings

demonstrated how the patients felt about their hypertension, which they perceived as a persistently a serious but stable illness. By using cluster analysis, the subjects were separated into three clusters. There were 46.15 percent of individuals in the initial cluster; they had a poor feeling of personal control but a less unfavorable belief in the consequences of their condition. The second group (11.97%) had more emotional reactions that were unfavorable and more negative ideas about the effects of their disease, but these people scored very well when it comes to feeling in change of their own lives and their attitudes towards their treatment. The medication adherence was highest in cluster 1 and lowest in cluster 2.

Medication adherence among individuals who have chronic diseases is significantly influenced by how sick individual feels.

Research was conducted with type 2 diabetes by Ashur et al. (2015) to investigate how illness perception affect medication adherence. The sample was relatively large about 523. The respondents had somewhat high views of personal control, treatment control, and outcomes. They noted a strong tendency to see diabetes as chronic.

Low treatment management perception and high diabetes identity perception were the two most important factors shown to be significant indicators of low compliance with medication.

The association between adherence to medication and how people perceive their illnesses was investigated in a study. The study involved 440 participants who completed a questionnaire to assess their illness perception domains. The majority of participants were female, aged between 60 to 69 years. Results showed 41.8% participants admitted to not taking their antihypertensive drugs as prescribed. The study found that medication non-adherence was significantly correlated with treatment control, patient understanding of hypertension, and patient emotions. However, the other dimensions of illness perception did not show significant relationships with medication non-adherence (Alfian et al. 2022).

Kemunto (2021) conducted a study to find out the patient views of their condition and medication compliance with hypertension being treated. The study found that only 33.3% of respondents reported high levels of medication adherence. Chi square tests showed that none of the socioeconomic variables were statistically significant for medication adherence. However, medication adherence was significantly associated with attitudes towards personal control but not with lower perceptions of emotional representation. The study suggests that interventions improve patients' perceptions of their personal control.

Shakya et al. (2020) conducted a descriptive correlational study to investigate the connection between patients' perceptions of their health and adherence to medication at the Nepal. The 77% of the participants were literate, and 51% were men. The study found that illness perception was positively correlated with adherence to medicine.

Improving patients' perception of their illness may improve treatment adherence. Both medication and behavioral treatment adherence heavily depend on reinforcement.

A study conducted by Yildirim and Baykal (2020) aimed to investigate how cardiology patients perceived their condition and its relationship with medication adherence. The study involved 110 individuals who were being monitored in the cardiac departments. The results showed that 72.7% of the participants were unable to take their medication as prescribed, and there was a statistically significant relationship between medication compliance and attitude towards disease.

Attitude towards disease plays an important role in medication compliance and interventions. Yildirim and Baykal (2020) find out that Education level also appears to influence perceptions of wellness and medication compliance. It highlighted the need for tailored education programs for patients with different educational backgrounds.

Research was done on how sickness perception and drug adherence relate to one another in TB participants. The research was conducted in North East London. The study found that patients with unfavorable emotional representations of their illness were more likely to miss planned clinic sessions. The findings suggest that illness perceptions can be a modifiable factor in improving medication adherence among TB patients (Rennie, 2015).

2.1 Indigenous Research

There have been studies conducted in Pakistan that have explored illness perception, self-efficacy, and perceived adherence to lifestyle modifications in adults with type 2 diabetes.

Research was conducted by Ahmed et al. (2021) in Pakistan to investigate the relationship between illness perception, self-efficacy, and medication compliance in individuals with hypertension. The research discovered a strong positive relationship among self-confidence and compliance with medication as well as between impression of the condition and adherence to medications.

Another research was conducted by But et al. (2020) to look at the connection between self-efficacy and illness perception in people with chronic pulmonary disease. The outcomes revealed that illness perception was positively correlated with self-efficacy in patients with COPD. The study suggests that improving illness perception can lead to improved self-confidence in people with pulmonary disease.

Those who have HCV frequently express fear or other unfavorable attitudes about HCV infection. Also noticeable was a lack of faith in the effectiveness of the treatments, particularly among those who had previously undergone unsuccessful anti-HCV therapies (Ullah et al. 2022).

Another research was carried to explore the connection with illness perception and medication adherence in patients with T2DM. The findings revealed a substantial positive association between adherence to medication and perceptions of sickness (Khan et al. 2011).

Saleem et al. (2011) study in Quetta City, to ascertain the connection between patients' knowledge of hypertension medicine and its adherence. Two validated questionnaires were used to collect data, and descriptive statistics and a spearman rank correlation analysis were used for analysis. The study found that a majority of patients had average knowledge of hypertension and poor adherence to treatment, with no patients considered good adherents. The correlation analysis showed a negative relationship between information scores and adherence levels, indicating that patients did not adhere to treatment due to a lack of understanding of the benefits of long-term medication use.

Better hypertension control can help patients learn about the benefits of medicines and resolve their worries about taking them.

Research was conducted to explore how self-efficacy and illness perception interact. The research involved both sexes (51% men and 49% women). The participants' ages ranged from 25 to 65. Respondents were over fifty years old on average (mean age 50.24). Regression analysis and correlation were employed in the study. The findings demonstrate a constructive link between study variables (Abubakar et al. 2016).

Illness perception as well as self-efficacy were independent of gender. It affects both genders equally

Mohammadi et al. (2022) conducted research with T2DM the goal to figure out the relation of self-worth and illness perception. The study's findings demonstrated a strong positive association between participants' perceptions of their illness and their sense of self-efficacy. According to the findings, there is a favorable correlation between self-efficacy and how T2DM participants perceive their condition. A more upbeat attitude on how controllable their disease is displayed by diabetic patients who are able to handle the

stressful conditions and who are confident in their ability to carry out taking care of their duties.

The connection between self-efficacy, and how people perceive their illness and compliance to lifestyle modifications was investigated by Amer et al (2020) in 400 adults with T2DM. The results of the study showed that illness perception and self-efficacy significantly predicted adherence to lifestyle changes, with higher levels of adherence being associated with better disease perception and confidence.

A study was conducted to examined the association between disease perception, confidence, as well as quality of life. The results of the study showed that self-efficacy and illness perception substantially predicted quality of life, with higher levels of illness perception and confidence being linked to higher levels of quality of life.

The current research was aimed to explore illness perception, self-efficacy and perceived adherence to lifestyle modification in adults with type 2 diabetes. To explore this influence, numerous studies from both international and indigenous societies were cited in this chapter. These studies revealed that among Pakistani people with type 2 diabetes, illness perception and self-efficacy are significant determinants of adherence to lifestyle changes. These findings can help healthcare professionals develop more effective interventions to support patients in managing their diabetes and improving their overall health outcomes. Particularly in relation to western literature, illness perception was a significant aspect for self-efficacy and adherence to life style modification in adults. On the other hand, a few of them showed there is no significant gender differences for illness perception, self-efficacy and perceived adherence lifestyle modification. There wasn't a lot of in-depth indigenous literature research done to look at how the main study's connections and relationships were made.

2.2 Rationale

Illness perception, self-efficacy, and perceived adherence to lifestyle modification are all important factors in managing type 2 diabetes in adults. Studies have shown that how individuals perceive their illness can affect their health behaviors and outcomes. The current research provides the reason for being conducted in Pakistan.

Firstly, Pakistan one of those ten countries with the greatest incidence of diabetes, is affected by the condition. Therefore, understanding the factors that influence diabetes management in this population is crucial.

Secondly, illness perception can significantly impact their health-related behaviors. By exploring disease perception in adults with T2DM in Pakistan, we can identify specific beliefs and attitudes that may contribute to suboptimal diabetes self-management.

Thirdly, self-efficacy is a crucial factor in diabetes management. A low Self-worth feeling result in decreased motivation and adherence to lifestyle modifications, ultimately leading to poor diabetes control.

Finally, perceived adherence to lifestyle modifications is an essential aspect of diabetes management, as lifestyle changes, including diet and exercise, are critical in controlling blood glucose levels. By understanding the factors that influence perceived adherence in Pakistani adults with type 2 diabetes, healthcare providers can develop tailored interventions to promote better self-management.

In summary, studying these variables in Pakistan is crucial for identifying specific barriers to diabetes management and developing targeted interventions to improve outcomes in this population.

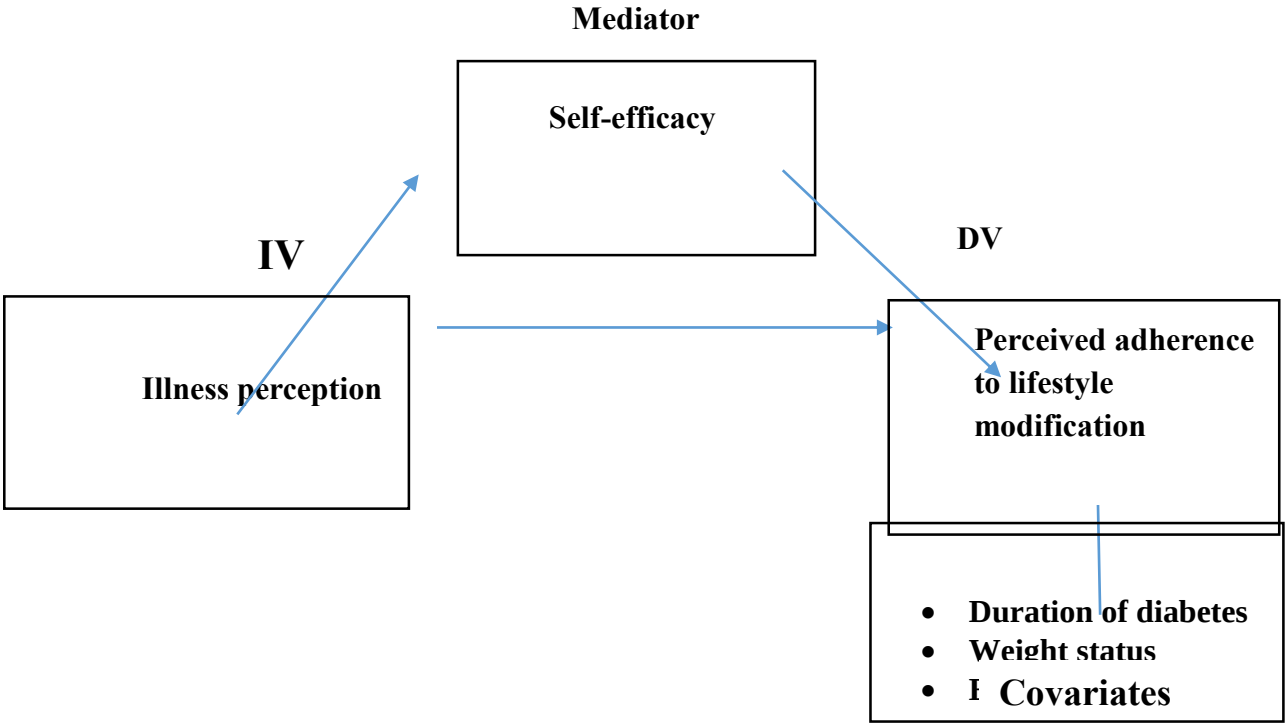
2.3 Hypotheses

- There is likely to be a positive relationship between illness perception, self-efficacy and perceived adherence to lifestyle modification in adults with type 2 diabetes.
- Illness perception and self-efficacy is likely to predict perceived adherence to lifestyle modification in adults with T2DM
- Study variables are varied on the basis of demographics of sample.

2.4 Aims and Objectives

The present study has following objectives

- The objective of the study is to find relationship between illness perception, self-efficacy and perceived adherence to lifestyle modificationtion in adults with type 2 diabetes.
- The objective of the study is to check the impact of illness perception and self-efficacy in perceived adherence to lifestyle modification in adults with type 2 diabetes.
- The objective of the study is to find out the demographic differences between study variables.
- 2.5 Hypothetical model proposed for current study



Method

3.1 Research Design

Cross sectional- correlational research design was used to find out relationship between illness perception, self-efficacy and perceived adherence to lifestyle modification in adults with T2DM.

3.2 Sampling Strategy

Non-probability sampling strategy was used for the recruitment of participants for the current study.

3.3 Sample

The estimated sample through G-Power calculator (N=140) was comprised of adults with type 2 diabetes. Sample was drawn from different outdoor patient (OPD) public and private hospital located in Lahore, depends on the study's goal and the characteristics of the population.

3.3.1. Inclusion Criteria

- Individuals (over 18 years old) having T2DM cases that have been clinically proven for at least six months.
- Adults with type 2 diabetes who came for their follow up in outdoor patient (OPD) took part in research.
- Participants from public and private hospital was included.
- Willingness to take part in the research.

3.3.2. Exclusion Criteria

- The study excluded patients with chronic problems such as kidney disease, heart disease, and infectious illnesses.
- Those adults who came for any emergency situation.
- Those type 2 diabetes adults who go through any amputation.
- Having no history or presence of any other / comorbid chronic medical or psychological health problems.

Table 3.1

Demographics showing sample characteristics (N= 140)

Characteristics	M	SD	F	%
Age (years)	51.19	11.38		
Gender				
Male			71	50.7
Female			69	49.3
BMI				
Underweight			3	2.1
Normal			67	45.0
Overweight			63	46.9
Obese			7	5.0
Occupation				
House wife			39	27.9
Business			7	5.0
Other			94	67.1
Monthly Income				
<50,000			79	56.4
51k-100k			41	29.3
101k-150k			11	7.9
150k-200k			9	6.4
Marital status				
Married			123	87.9
Separated			2	1.4
Widow\ Widower			15	10.7
Family system				

Nuclear	123	87.9
Joint	17	12.1
Number. of children		
0-5	89	63.6
6-10	51	36.4
Total family number		
1-5	20	18.6
6-11	88	62.9
12-more	32	22.5
Education		
No formal education	39	27.9
Primary school	11	7.9
Secondary school	40	28.6
College	29	20.7
University	21	15.0
Duration of Diabetes		
1-10	69	49.3
11-20	36	25.7
21-30	25	20.7
30-more	10	7.1
Is Diabetes Inherited		
Yes	134	95.7
No	6	4.3
Complications		
Neuropathy (effect on the nerves)	12	8.6
Retinopathy (affects vision)	128	91.4
Checking of BGL		
Last month	2	1.4
Last Week	112	80.0
Last 6 month	13	9.3
Last year	13	9.3

Note. M=Mean; SD=Standard Deviation; f=frequency; %=percentage

3.4 Operational Definitions of Variable

The considered variable was operational defined as:

3.4.1 Illness Perception

The illness perception emphasizes how a person feels and views having a sickness (Weinman and Petrie, 1997). It could involve both optimistic and pessimistic health views that may affect how well a person can manage their illness and whether they see it as controllable or dangerous (Bonsaksen et al., 2015).

3.4.2 Self-efficacy

A person's self-efficacy relates to their confidence in their ability to carry out the behaviors required to achieve particular performance goals (Bandura, 1977, 1986).

3.4.3 Perceived Adherence

It describes the degree to which an individual responds in connection with detrimental health instructions and suggestions offered by a healthcare practitioner (Noor, 2022).

3.4.4 Lifestyle Modification

Behavioral interventions that try to improve a variety of lifestyle health behaviors are referred to as lifestyle modification (Carlson, 2013).

3.5 Assessment Measures

The following assessment measures were employed in the current study:

3.5.1 Demographic Information Sheet

Demographic information sheet was consisted of information including age, gender (male/female), BMI, residence, occupation, monthly income, marital status (married/ unmarried), family system (joint/ nuclear), no. of children, total family members, education level.

3.5.2 Clinical Information Sheet

The clinical information sheet consists of information including, do you diagnosed with diabetes, duration of diabetes, is diabetes inherited, when you check blood glucose level last time, diabetes symptoms, complications.

3.5.3 Brief Illness Perception Questionnaire (Broadbent et al. 2006).

The nine items on this questionnaire assess patients' cognitive and emotional representations of their illness in terms of how they perceive its implications. The scale runs from 0 to 10. The responses on all eight scales were added up to create a total perception score, with possible results ranging from 0 to 80. A higher score reveals a more alarming perspective on diabetes, meaning the person believes the condition to be lethal and detrimental to one's survival. The Cronbach alpha (α) values for all the scale is .87

3.5.4 Diabetes Management Self-Efficacy Scale (Jason et. al, 2018).

The SED is a nine-item scale used to assess perceptions of self-assurance and management skills in relation to diabetes. It was developed by Jason et al, 2018. The tool is developed for diabetes population. The rating of a scale is 1-10. The scale range is 8-80. The Cronbach alpha (α) values for all the scale is .88

3.5.5 Perceived Adherence Life Style Modification Questionnaire (Nor et. al, 2022).

PALMQ measures the life style modification toward pro-health behaviours in population of diabetes participants. The 18 items on the PALM-Qs, which also include nutritional and PA components, address knowledge, obstacles, beliefs, and self-empowerment. In order to achieve long-term adherence, it would aid healthcare professionals in developing intervention plans for each patient that are unique and practical. It was developed by (Nor et. al, 2022) and contains statements reflecting life style modification of type 2 diabetes young adults. There are 18 items on the scale. A 4-point Likert scale is used to rate each item on the scale (1 = strongly disagree, 2 = disagree, 3 = agree, and 4 = strongly agree). The overall score is between 18 to 72. The scale's Cronbach alpha (α) value is.87.

3.6 Procedure

The authors were contacted via email for permission to use the scale. After getting permission from them, they were translated into Urdu language. The purpose of the translation into native language was to understand the questionnaire easily. After that a questionnaire was developed by simply combining BIPQ, Self-efficacy for diabetes and PALMQ. By getting it approved by the supervisor the data collection was started. Hospital was approached along with official permission letter from the institute to have a view regarding their ease and accessibility for data collection. The questionnaires were

administered individually. After obtaining permission from the institute, a copy of the permission letter was delivered to the head of the institute or academies where the data is collected. All information obtained was kept confidential, which was guaranteed to participants. As a sample approach, non-probability sampling was employed. The research explains the inclusion and exclusion criteria. After that, statistical techniques were used to analyse the data and discussed it.

3. 7 Statistical Analysis

The sample was organized and being put into software. To determine the reliability ratings of the scale, a reliability analysis was done. The following phase was computing descriptive statistics to look at the study variables' means, standard deviations, and actual and potential values. Correlational analysis was used to find relationship between variables. Predictors of the main research variables were revealed through multiple linear regression analysis. T-test and anova were also run to find out demographic differences. The results were drawn and reported and conclusions was drawn accordingly.

3.8 Ethical Considerations

- Prior permission for tools was obtained.
- Consent was taken from research participants.
- Participants were informed of their ability to discontinue participation in the study at any time.
- Confidentiality of data was maintained
- Data analysis and results was reported honestly.

Results

This research was conducted to find the relationship between illness perception, self-efficacy and perceived adherence to lifestyle modification in adults with type 2 diabetes. The research explores the direction of impact of illness perception and self-efficacy on perceived adherence lifestyle modification in adults with type 2 diabetes. The data analysis technique involved calculating descriptive statistics for demographic variables. For the study's variables, descriptive statistic as well as reliability coefficients were determined. Pearson product moment correlation analysis was run to explore the relationship between illness perception, self-efficacy and perceived adherence to lifestyle modification well as among participants characteristics. Multiple linear regression analysis was run for predictors of perceived adherence to lifestyle modification from illness perception, self-efficacy and participants characteristics. The mean difference across demographic parameters was then examined using a t-test for independent samples and one-way anova.

4.1 Reliability Analysis

Table 4.1

Descriptive Characteristics and Reliability Analysis of the Study Variables (N = 140)

Variable	K	M	SD	Range	A
Brief illness perception	08	39.22	14.93	0-80	. 87
Consequences	01	4.64	3.00	0-10	.88
Timeline	01	5.44	2.62	0-10	.85
Personal control	01	4.50	2.56	0-10	.85
Treatment control	01	4.61	2.58	0-10	.85
Identity	01	5.27	2.12	0-10	.84
Coherence	01	5.21	2.21	0-10	.85
Concern	01	4.57	2.58	0-10	.85
Emotional representation	01	4.98	2.63	0-10	.88

Diabetes management self-efficacy	08	38.21	14.25	8-80	.88
Perceived adherence lifestyle modification	18	44.96	10.90	18-72	.87

Note: α= reliability coefficient; k=no. of items in scale and subscale; M=mean; SD= standard deviation.

Alpha reliability of brief illness perception, diabetes management self-efficacy scale and perceived adherence to lifestyle modification questionnaire was evaluated using SPSS Version 23.00. The alpha reliability of brief illness perception and its subscale turned out to be good and acceptable. The diabetes management self-efficacy scale is good and above average. The perceived adherence lifestyle modification questionnaire is good and above average.

4.2 Correlation Analysis of Variables and Demographics

It was hypothesized that there is likely to be a positive relationship between illness perception, self-efficacy and perceived adherence to lifestyle modification in adults with type 2 diabetes. Pearson product moment correlation analysis was run to assess the relationship between study variables and results reported in Table 4.2

Table 4.2

Pearson Product Moment Correlation Indicating the relationship between study variables (N=140)

	Variables	1	2	3	4	5	6	7	8	9	10	11
1	**BIP**	-	.58***	.76***	.86***	.86***	.86***	.77***	.86***	.63***	.37***	.19*
2	**Consequence**		-	.63***	.40***	.39***	.48***	.37***	.38***	.30***	.07	.09
3	**Timeline**			-	.64***	.67***	.69***	.52***	.67***	.30***	.24***	.16
4	**Personal control**				-	.97***	.76***	.66***	.96***	.49***	.44***	.21*
5	**Treatment control**					-	.76***	.65***	. 90***	.47***	.42***	.21*
6	**Identity**						-	.89***	.76***	.69***	.36***	.17*
7	**Concern**							-	.65***	.76***	.29***	.05
8	**Coherence**								-	.47***	.41***	.21
9	**Emotional representation**									-	.19*	.03
10	**SED**										-	.08
11	**PLM**											-

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

Pearson correlation was run to find the relationship between the study variables. Assumptions (of interval ratio scale data and normality of distribution of variables) were fulfilled. Results indicated that illness perception is significant and positively correlated with self-efficacy and perceived adherence to lifestyle modification
Moreover, illness perception is significant and positively correlated with its subscales. Illness perception subscale consequences non-significant with self-efficacy and perceived adherence to lifestyle modification. While illness perception subscale is non-significant with timeline, concern, coherence, emotional representations.

Table 4.3
Pearson Product Moment Correlation Indicating the relationship between study variables and demographic variables (N=140)

Variables	BIP	Consequences	Timeline	Control	Treatment	Identity	Concern	Coherence	Emotional	SED	PLM
Gender	-.07	.03	-.13	-.17*	-.21*	-.05	-.03	**-.**21*	.05	-.02	**.**06
BMI	.07	.10	-.00	.08	.06	.02	.06	.06	.09	.07*	.06
Monthly Income	.05	.02	.08	-.00	.03	.03	.01	.02	-.13	-.00	.03
Marital Status	.08	.02	.02	.07	.06	.06	.06	.07	.08	.04	-.01
Family System	.02	.05	.08	.01	.03	.04	.02	.03	-.05	-.09	.01
Number of Children	-.03	.001	-.01	.02	.04	-.01	-.02	.04	-.03	.10	.16
Family Members	-.03	-.01	.04	-.03	-.03	-.01	.05	-.03	.01	-.10	-.00
Education Level	.21*	.09	.21*	.17*	.19*	.19*	.12	.19*	.07	.24*	-.07
Duration of diabetes	.16	.16	.17*	.12	.11	.13	.11	.10	.03	.19*	**-.11**
Blood Glucose Level	.08	-.03	.06	.04	.03	.13	.11	.03	.16	.05	.13
Complications	.07	.04	.02	.013	-.01	.02	.01	-.01	.03	.22*	-.02

Note. *p<.05

Gender is significant and negatively correlated with illness perception subscales i.e., personal control, treatment control and coherence. Body mass index of diabetes participants is positively correlated with self-efficacy. Education is significant and positively correlated with illness perception and its subscales i.e., timeline, personal control, treatment control, identity, coherence, as well as with self-efficacy. Duration of diabetes is significant and positively associate with timeline and self-efficacy of participants. Participants' diabetic complications had a favorable relationship with self-efficacy.

4.3 Regression Analysis

The hypothesis stated that illness perception and self-efficacy are likely to predict perceived adherence to life style modification in adults with type 2 diabetes. Regression analysis using the enter approach is shown in Table 4.4.

Table 4.4

Multiple Linear Regression Analysis for Predictors of perceived adherence to lifestyle modification with demographics and study variables (N=140)

Predictor	B	SE	Beta	95% CI		P
				LL	UL	
Intercept						
Gender	1.37	1.81	.063	-2.26	5.00	.45
BMI	.77	1.66	.04	-2.51	4.05	.64
Education	-.91	.67	-.11	-2.25	.42	.17
Duration of Diabetes	-1.66	.960	-.14	-3.56	.23	.08
Complications	-.54	3.50	-.01	-7.47	6.39	.87
Illness Perception	.158*	.06	.21	.02	.29	.02
Self-efficacy	.03	.07	.04	-.11	.18	.67
F 1.69						
R**2** .28						

Note: N=X, *p<.05, **p<.01; B= Unstandardized Coefficient; R2 =R Square; CI= Confidence Interval

A multiple linear regression analysis was run to find if gender, BMI, education, duration of diabetes, complications of diabetes, illness perception and self-efficacy would predict perceived adherence to lifestyle modification in adults with type 2 diabetes. Assumptions were fulfilled. Results showed that the model was non-significant. Analyses of beta values revealed that gender, BMI, education, duration of diabetes, complications of diabetes and self-efficacy were non-significant predictors of perceived adherence to lifestyle modification in adults with type 2 diabetes. Demographic variables like gender and BMI were positive and non-significant predictor of perceived adherence to life style modification while education, duration of diabetes and complications were negative and non-significant predictors of perceived adherence to life style modification in adults with T2DM. Illness perception were positive and significant predictor of perceived adherence to lifestyle modification in adults with T2DM. While self-efficacy was negative as well as non-significant predictors of perceived adherence to lifestyle modification. The model explained 28% variance in perceived adherence to lifestyle modification in adults with T2DM.

Table 4.5
Multiple Linear Regression Analysis for Predictors of perceived adherence to lifestyle modification (N=140)

Predictor	B	SE	Beta	95% CI		P
				LL	UL	
Intercept						
Gender	2.02	1.91	.09	-1.67	5.83	.29
BMI	1.59	1.67	.09	-1.72	4.90	.34
Education	-1.11	.67	-.14	-2.44	.20	.09
Duration of Diabetes	-1.45	.96	-.12	-3.36	.44	.13
Complications	.35	3.51	.01	-6.60	7.30	.92
Consequences	-.09	.41	-.02	-.91	.71	.81
Timeline	-.11	.63	-.03	-1.37	1.14	.85
Personal control	.48	1.45	.11	-2.39	3.36	.73
Treatment	-7.65	11.35	-1.80	-30.13	14.82	.50
Identity	3.00*	1.26	.58	.49	5.50	.02
Concern	-2.43*	1.03	-.49	-4.48	-.38	.02
Coherence	8.04	11.14	1.90	-14.01	30.10	.47
Emotional	-.41	.55	-.09	-1.51	.69	.46
Self-efficacy	-.02	.08	-.02	-.18	.13	.78
F 1.61						
R2 .39						

Note: N=X, *p<.05, **p<.01; B= Unstandardized Coefficient; R2 =R Square; CI= Confidence Interval

A multiple linear regression analysis was run to find if gender, BMI, education, duration of diabetes, complications of diabetes, illness perception subscale and self-efficacy would predict perceived adherence to lifestyle modification in adults with type 2 diabetes. These demographics were taken as covariates because these are significantly correlated with study variables, also these demographics were comparable. Assumptions were fulfilled. Results showed that the model as a whole was not significant. Analyses of beta values revealed that gender, BMI, complications of diabetes were positive and non-significant predictors of perceived adherence to lifestyle modification in adults with T2DM. While education, duration were negative and non-significant predictors of perceived adherence to lifestyle modification. While illness perception subscale personal control, coherence and emotional were positive and statistically insignificant predictors while consequences, timeline, treatment emotional representation and self-efficacy were negative and non-significant predictors of perceived adherence to lifestyle modification in adults with type 2 diabetes. Identity and concern were significant predictors of perceived adherence to lifestyle modification. Model explained 39% variance in perceived adherence to lifestyle modification with demographics and illness perception subscales.

illness perception and its subscale, Identity and concern, predicts perceived adherence to lifestyle modification but self-efficacy did not have significant relationship with perceived adherence to lifestyle modification. So, mediation analysis could not be run.

4.4 Independent Sample t-test

It was hypothesized that body mass index is likely to occur among Illness perception, self-efficacy and perceived adherence lifestyle modification in adults with type 2 diabetes. Table 4.6 shows analysis of Independent Sample t-test.

Table 4.6

An independent sample t-test to compare study variables in normal weight and overweight adults with type 2 diabetes (N=140)

Variables	Normal		Overweight		t(140)	P	95%CI		Cohen's d
	M	SD	M	SD			LL	UL	
Illness perception	34.38	14.91	43.49	13.39	-3.65	.00	-14.03	-4.17	.64
Consequences	4.35	2.98	4.77	2.95	-.80	.42	-1.45	.61	.14
Timeline	4.83	2.68	5.90	2.42	-2.37	.02	-1.95	-.17	.41
Personal control	3.98	2.47	5.66	2.22	-4.07	.00	-2.49	-.86	.71
Treatment control	4.14	2.51	5.66	2.22	-3.63	.00	-2.34	-.69	.64
Identity	4.58	2.18	5.77	1.86	-3.35	.00	-1.90	-.48	.58
Concern	4.41	2.15	5.82	2.01	-3.84	.00	-2.13	-.68	.67
Coherence	4.14	2.51	5.68	2.24	-3.65	.00	-2.36	-.70	.64
Emotional	4.22	2.57	5.38	2.49	-2.60	.01	-2.03	-.27	.45
SED	30.85	14.54	46.84	7.86	-7.72	.00	-20.08	-11.8	.64
PLM	44.43	10.34	45.23	10.84	-.43	.66	-4.48	2.87	.07

*p< .05; **p< .01; ***p< .000

A t-test for independent samples was performed to compare, as indicated in table 4.6. Illness perception, its subscales, self-efficacy and perceived adherence to lifestyle modification in normal and overweight adults with type 2 diabetes. Results showed significant differences found between both normal and overweight participants. Those participants who are overweight perceive their illness more as compared to normal weight participants. Cohen's d value indicates about the effect size.

Table 4.7 One Way Anova compare illness perception, self-efficacy and perceived adherence lifestyle modification

Measure	No formal education		Primary Education		Secondary Education		Collage		University		*F* (3,136)	η^2
	n =39		n=11		n=40		n=29		n=21			
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*		
Illness perception	33.56	14.75	45.27	19.39	38.72	14.81	42.93	12.81	42.38	13.25	5.90*	.07
Consequence	3.92	2.69	6.36	2.87	4.22	2.89	5.62	3.01	4.47	3.35	2.73*	.07
Timeline	4.61	2.34	6.27	2.79	5.15	2.70	6.06	2.46	6.23	2.73	2.95*	.06
Personal Control	3.92	2.42	5.90	2.80	4.92	2.73	5.41	2.30	5.04	2.45	5.74	.06
Treatment	3.94	2.41	5.90	2.80	4.97	2.71	5.44	2.27	5.38	2.49	4.66*	.06
Identity	4.48	2.05	6.00	2.75	5.32	2.24	5.79	1.80	5.52	1.80	6.28	.06
Concern	4.61	2.17	5.90	2.80	5.27	2.29	5.65	2.04	5.19	1.93	7.08	.03
Coherence	3.94	2.41	5.90	2.80	4.97	2.71	5.48	2.32	5.38	2.49	4.71*	.06
Emotional	4.25	2.43	5.72	3.00	5.30	2.74	5.10	2.79	4.71	2.34	4.12	.03
Self-efficacy	32.20	12.76	40.09	9.03	40.35	15.53	39.62	13.70	42.38	15.0	20.34*	.07
PLM	46.10	14.20	46.27	7.65	44.72	9.74	43.79	11.21	44.23	6.83	.88	.01

Table 4.8
Post Hoc Comparison for education on illness perception, self-efficacy and perceived adherence lifestyle modification (N=140)

Dependent Variables		Comparable	Men difference
Illness perception	no formal education	primary education	-11.70*
		sec education	-5.16
		College	-9.36*
		Uni	-8.81*
	primary education	no formal education	11.70*
		sec education	6.54
		College	2.34
		Uni	2.89
	secondary education	no formal education	5.16
		primary education	-6.54
		College	-4.20
		Uni	-3.65
	College	no formal education	9.36*
		primary education	-2.34
		sec education	4.20
		Uni	.55
	Uni	no formal education	8.81*
		primary education	-2.89
		sec education	3.65
		College	-.55
Consequences	no formal education	primary education	-2.44*
		sec education	-.30
		College	-1.69*
		Uni	-.55
	primary education	no formal education	2.44*
		sec education	2.13*
		College	.74
		Uni	1.88
	secondary education	no formal education	.30
		primary education	-2.13*
		College	-1.39
		Uni	-.25
	College	no formal education	1.69*
		primary education	-.74
		sec education	1.39
		Uni	1.14
	Uni	no formal education	.55
		primary education	-1.88
		sec education	.25
		College	-1.14
Timeline	no formal education	primary education	-1.65
		sec education	-.53
		College*	-1.45
		Uni*	-1.62

	primary education	no formal education	1.65
		sec education	1.12
		College	.20
		Uni	.03
	secondary education	no formal education	.53
		primary education	-1.12
		College	-.91
		Uni	-1.08
	College	no formal education*	1.45
		primary education	-.20
		sec education	.91
		Uni	-.16
	Uni	no formal education*	1.62
		primary education	-.03
		sec education	1.08
		College	.16
Treatment	no formal education	primary education	-1.96*
		sec education	-1.02
		College	-1.49*
		Uni	-1.43*
	primary education	no formal education	1.96*
		sec education	.93
		College	.46
		Uni	.52
	secondary education	no formal education	1.02
		primary education	-.93
		College	-.47
		Uni	-.40
	College	no formal education	1.49*
		primary education	-.46
		sec education	.47
		Uni	.06
	Uni	no formal education	1.43*
		primary education	-.52
		sec education	.40
		College	-.06
Coherence	no formal education	primary education	-1.96*
		sec education	-1.02
		College	-1.53*
		Uni	-1.43*
	primary education	no formal education	1.96*
		sec education	.93
		College	.42
		Uni	.52
	secondary education	no formal education	1.02
		primary education	-.93
		College	-.50
		Uni	-.40

	College	no formal education	1.53*
		primary education	-.42
		sec education	.50
		Uni	.10*
	Uni	no formal education	1.43
		primary education	-.52
		Secondary	.40
		College	-.10
Self-efficacy	no formal education	primary education	-7.88
		sec education	-8.14*
		College	-7.41*
		Uni	-10.17*
	primary education	no formal education	7.88
		sec education	-.25
		College	.47
		Uni	-2.29
	secondary education	no formal education	8.14*
		primary education	.25
		College	.72
		Uni	-2.03
	College	no formal education	7.41*
		primary education	-.47
		sec education	-.72
		Uni	-2.76
	Uni	no formal education	10.17*
		primary education	2.29
		Secondary	2.03
		College	2.76

Note. *p<.05

One-way anova was run to find the mean differences across the study variables between the educational level. Anova is significant for the illness perception, its subscale consequences, timeline, treatment, coherence and self-efficacy. Post Hoc indicated that adults with type 2 diabetes perceive their illness more in primary, college and university as compared to non-formal education participants. The diabetes participants who have more consequences of illness are primary and college as compared to non-formal education. The treatment and coherence are more in primary, college and university as compared to non-formal education. Moreover, self-efficacy is more in secondary education, college and university as compared to non-formal education.

4.5 Summary of the Findings

- Illness perception were significant and positively correlated with its subscales, self-efficacy and perceived adherence to lifestyle modification in adults with type 2 diabetes.
- Illness perception were positive and significant predictor of perceived adherence to lifestyle modification in adults with type 2 diabetes. While self-efficacy was negative and non-significant predictor of perceived adherence to lifestyle modification.
- There were significant differences between normal and overweight adults with type 2 diabetes for study variables.
- There were also significant differences between educational level across illness perception, self-efficacy and perceived adherence to lifestyle modification in adults with T2DM.

Discussion

T2DM, often known as type 2 diabetes mellitus, is a common chronic disease that affects millions of individuals worldwide. Effective management of T2DM requires individuals to adopt and maintain lifestyle modifications, such as adhering to a healthy diet, engaging in regular physical activity, and managing medications. However, the success of these lifestyle changes is often influenced by various psychological factors. The exploration of these interconnected constructs can provide valuable insights into understanding the drivers of adherence behaviors. The study's objectives were to find out the relationship between illness perception, self-efficacy, and perceived adherence to lifestyle modifications in adults with type 2 diabetes. The study also aimed at examining whether illness perception, and self-efficacy is related to perceived adherence to lifestyle modification in adults with type 2 diabetes.

The main hypothesis of this research is that there is likely to be positive relationship between illness perception, self-efficacy and perceived adherence to lifestyle modification. The association between the study variables evaluated using SPSS Version 23.00 was determined using the pearson product moment correlation analysis.

The study indicates that illness perception is positively related to its subscales, self-efficacy, and perceived adherence to lifestyle modifications. This is consistent with earlier studies. Rennie (2015) that has shown how an individual's perception of their illness can influence their behaviors and coping strategies.

Research was conducted by Griva et al. (2000) in which illness perception was positively correlated with self-efficacy and lifestyle modification. Research has shown that individuals' perception of their illness (how they understand and interpret their diabetes) can significantly influence their willingness and ability to adopt lifestyle modifications. Those who perceive diabetes as a serious and threatening condition are more likely to be motivated to make lifestyle changes to control their diabetes. Conversely, individuals with a more benign perception of the illness may be less motivated to adhere to lifestyle modifications.

The findings are consistent with research conducted by Zelber-Sagi et al. (2017) in which illness perception is positively correlated with self-efficacy. According to studies, those who have higher feelings of confidence are more inclined to make and maintain healthy lifestyle changes (Xiang, 2018). Therefore, this study substantiates the findings from the current research.

Another research was conducted and support the present research. The research was conducted by Liu (2018). According to the study's findings, self-efficacy was substantially correlated with illness perceptions. Self-efficacy was specifically linked to illness perception subscales.

Several theories and models have been developed to understand illness perception, and they have been found to be associated with illness perception and its subscales, self-efficacy, and perceived adherence to lifestyle modification.

According to Common-Sense Model of Self-Regulation of Health (2016) model, beliefs influence a person's coping and emotional responses to their illness. Adults with type 2 diabetes perceives their illness as severe and long-lasting (high consequence and long timeline), they may be more motivated to adhere to lifestyle modifications and treatment recommendations to gain a self-confidence. According to this idea, there is a connection between illness perception, self-efficacy, and perceived adherence to lifestyle adjustment.

The Health Belief Model (Becker, 1974) is another widely used theory to understand health-related behaviors. It implies that an individual's perceived vulnerability to the sickness, seriousness of the illness, perceived advantages of taking action, and perceived hurdles to taking action all have an impact on their probability of adopting measures to avoid or control an illness.

These beliefs may also affect their self-efficacy. Higher perceived confidence could result in greater adherence to lifestyle modifications and treatment recommendations.

Self-regulation theory (Bandura, 1986) proposes that individuals actively engage in goal-directed behavior to achieve desired outcomes. In the context of illness, an individual's illness perception influences their self-regulatory processes, including setting health-related goals, monitoring progress, and adjusting behavior accordingly. As adults with diabetes who perceives their illness as coherent and understandable may be more motivated to engage in manage their blood sugar, they must make lifestyle changes and follow treatment guidelines.

The Theory of Planned Behavior (1980) suggests that an individual's attitude, personal expectations (perceptions of what others think they should do), as well as perceived behavior regulation (perceptions of the ease or difficulty of performing the behavior) all have an impact on their intention to engage in a particular behavior (such as sticking to lifestyle modifications). Each of these elements can be impacted by how people perceive their illness, which can then have an impact on how likely they are to stick with lifestyle changes.

In summary, illness perception is a multifaceted construct that influences several facets of a person's behavior related to their illness, including adherence to lifestyle modifications.

The aforementioned ideas offer a framework for comprehending how illness perception is connected with self-efficacy and perceived adherence to lifestyle modification

The second hypothesis stated that illness perception and self-efficacy would likely to predict perceived adherence to lifestyle modification in adults with type 2 diabetes. The research showed that illness perception is a positive and significant predictor of perceived adherence to lifestyle modifications. This suggests that while there is a trend indicating that individuals with a greater comprehension of their condition, they may be more adhere to lifestyle changes, this relationship strong enough to be statistically significant.

As previously mentioned, the Common-Sense Model (2016) proposes that ideas about an illness's outcomes, how long it will take for its effects to manifest, personal control over managing the condition, and the effectiveness of treatment options. Positive illness perception, such as perceiving the diabetes as serious, controllable, and manageable through lifestyle modifications, may lead to a greater commitment to adhering to the recommended lifestyle changes.

The Health Belief Model (Becker, 1974) reveals that people's beliefs of their vulnerability to the illness, their impression of its severity, the advantages of acting, and the obstacles to acting are all factors that affect their related to health behaviors. Positive disease perception may influence people's perceptions of the seriousness of diabetes type 2, the advantages of lifestyle changes, and the obstacles to non-adherence. Even if their levels of self-efficacy are low, this may increase their motivation to stick with the suggested lifestyle adjustments.

Self-efficacy theory (Bandura,1997) proposes it could involve confidence in engaging in regular exercise, maintaining a healthy diet, and adhering to medication or insulin regimens. The finding that self-efficacy was a negative and non-significant predictor of perceived adherence to lifestyle modification might suggest that, although self-efficacy is important, it may not have as strong an impact on adherence compared to illness perception in this particular population. It is essential to consider that these findings are specific to the studied population (adults with type 2 diabetes) and the measures used to assess illness perception and self-efficacy. Different populations and measures might yield different results.

A study was carried out to support the aforementioned finding. The research was conducted by Moss-Morris et al. (2012) found that illness perception was significant predictor of adherence to lifestyle modification in patients with chronic illnesses, including diabetes. However, other studies also have reported weaker or non-significant associations between self-efficacy and adherence (Tan et al., 2019). It is essential to consider that various factors may influence the relationship between self-efficacy and adherence.

A study was conducted by Dobbie et al. (2017) that self-efficacy and adherence to lifestyle adjustments were not discovered to be significantly predictor of illness perception in patients with type 2 diabetes.

Similar findings were made by Lo et al. (2007) who showed that self-efficacy does not significantly predict adherence to lifestyle changes in people with type 2 diabetes. The fact that many diabetics in Pakistan do not have enough confidence to take preventative measures to control their diabetes. This is one of the reasons why self-efficacy does not predict perceived adherence to lifestyle adjustments. Inactivity, diet, and rising obesity are among the reasons contributing to the growth in diabetes in Pakistan. The problem is that there aren't enough public exercise spaces nationwide, especially in schools, and there aren't enough sporting facilities.

Previous studies have reported findings that are similar. For instance, a study by Hagger et al. (2017) indicated that illness perception significantly predicts self-care behaviors in people with chronic conditions. This implies that while the self-efficacy did not influence behavior, other factors may also be involved in adherence.

The third hypothesis stated the demographic differences across variables. One-way anova was run in order to find out the differences between educational levels assessed through SPSS Version 23.00. The findings revealed significant differences between educational levels concerning illness perception, self-efficacy, and perceived adherence lifestyle modification in adults with type 2 diabetes. This finding is consistent with previous research, Petrie (2001) which has shown that educational level can influence health-related beliefs and behaviors. Higher educational attainment is often associated with better health literacy, which, in turn, can impact illness perception and self-efficacy. Individuals with higher education levels have a better understanding of their condition and the importance of lifestyle modifications, leading to more positive illness perceptions and higher self-efficacy.

The association between higher educational attainment and better health literacy is well-documented in the literature. Individuals with higher education levels often have improved health literacy, enabling them to comprehend their condition, treatment options, and lifestyle modifications more effectively.

The research by Gonzalez et al. (2017) suggests that individuals with higher educational levels tend to have more accurate and comprehensive illness perceptions. This means they have a better understanding of their condition, its consequences, and its management. As a result, they may adopt a more positive outlook towards diabetes management, which can influence their overall well-being and adherence to recommended treatment plans.

The study was conducted by Lo et al. (2018) highlights that individuals with higher educational levels report higher levels of self-efficacy in managing their diabetes. Higher self-efficacy can lead to increased confidence and maintain lifestyle modifications effectively. This, in turn, can positively influence their adherence to treatment recommendations, resulting in better disease management.

The study conducted by Kim et al. (2015) demonstrates the practical implications of educational level on adherence to lifestyle modifications. Better adherence to dietary recommendations, physical activity, and medication management among individuals with higher educational levels suggests that educational interventions targeted at patients with lower education levels may be beneficial in improving their understanding of diabetes management and enhancing treatment adherence.

The t-test was run in order to find out the differences between normal and overweight diabetes patient which was assessed through SPSS Version 23.00. The identified risk factors included increasing obesity (measured by BMI). The results indicate the identification of significant differences between normal and overweight adults with type 2 diabetes suggests that weight status may play a role in how individuals perceive their illness and engage in lifestyle

modifications. Previous research has explored the impact of weight on illness perception and self-management in diabetes, often noting the challenges faced by individuals with overweight (Kugbey et al., 2018).

5. 1 Conclusion

In conclusion, these research findings suggest that illness perception plays a crucial role in shaping patients' attitudes and behaviors related to type 2 diabetes management. Healthcare providers should incorporate a patient-centered approach, taking into consideration individual illness perceptions, weight status, and educational levels. By addressing these factors and tailoring interventions accordingly, healthcare professionals can improve adherence to lifestyle modifications and enhance overall health outcomes for individuals with type 2 diabetes.

5.2 Limitations and Suggestions

The present study had several methodological limitations as well as likely suggestions. Tools used in this research were developed according to Western culture, although the tools were Urdu translated because it was considered that most of the Pakistani population is unable to comprehend English. Indigenous tools need to be constructed because illness perception and lifestyle modification are different in Pakistani adults. Questionnaire have to be built using local demographics, characteristics, and adult life habits as well as local adults' thought patterns. Scale development is beyond our scope due to limitations of resources in terms of time, money and expertise of researcher. Generalization of the finding could be limited due to the fact that this study was cross-sectional in nature. Longitudinal study may be able to provide more compelling evidence for this occurrence. The sample was relatively small and could not be very well represented. It is advised that additional, in-depth research is required to identify the variables that affect perceived adherence to lifestyle modification. Further research should be done on larger and more representative sample by employing longitudinal research designs, so the findings of the study can be massively generalized

5.3 Implications

Interventions that aim to enhance self-efficacy, modify illness perceptions, and strengthen perceived adherence can lead to better health outcomes for adults with type 2 diabetes. Health professionals should engage in open communication with patients, discuss their illness perceptions, and address any misconceptions or concerns to improve adherence to lifestyle modifications. Healthcare providers should recognize and address these differences to offer support and education for patients with different body weights. Patients with lower educational levels may face challenges in understanding their condition and the recommended lifestyle changes.

Health professionals should employ clear and simple communication strategies, provide educational materials at appropriate reading levels, and offer additional support to ensure that all patients, regardless of their educational background, have the knowledge and tools to manage their diabetes effectively. Healthcare providers and educators can develop patient education programs that cater to individuals with different educational backgrounds. These programs should be designed to deliver health information in a clear, accessible manner, considering varying literacy levels.

Initiatives aimed at enhancing health literacy should be prioritized, especially for patients with lower educational levels. This could involve providing educational materials in plain language, utilizing visual aids, and offering support for understanding complex medical terminologies. Encourage patients to be active participants in their treatment plans fosters a sense of control and empowerment. Engaging in collaborative decision-making with healthcare

providers can lead to more informed choices and better treatment adherence. Targeted community outreach efforts can be beneficial in reaching individuals with lower educational levels who might face barriers to accessing healthcare and educational resources. Community health workers and peer support programs can play a crucial role in delivering personalized assistance.

References

Abbas, A., Kachela, B., Arif, J. M., & Tahir, K. B. (2015). Assessment of medication adherence and knowledge regarding the disease among ambulatory patients with diabetes mellitus DM in Karachi, Pakistan. Journal of Young pharmacists, 7(4), 328.

Abubakari, A., Cousins, R., Thomas, C. W., Sharma, D., & Naderali, E. K. (2016). Sociodemographic and Clinical Predictors of Self-Management among People with Poorly Controlled Type 1 and Type 2 Diabetes: The Role of Illness Perceptions and Self-Efficacy. Journal of Diabetes Research, 2016, 1–12. https://doi.org/10.1155/2016/6708164

Adefolalu A. O. (2018). Cognitive-behavioural theories and adherence: Application and relevance in antiretroviral therapy. Southern African journal of HIV medicine, 19(1), 762. https://doi.org/10.4102/sajhivmed.v19i1.762

Aflakseir, A. (2012). Role of illness and medication perceptions on adherence to medication in a group of Iranian patients with type 2 diabetes. Journal of Diabetes, 4(3), 243–247. https://doi.org/10.1111/j.1753-0407.2012.00183.x

Alfian, S. D., Annisa, N., Perwitasari, D. A., Coelho, A., & Abdulah, R. (2022). The role of illness perceptions on medication nonadherence among patients with hypertension: A multicenter study in indonesia. Frontiers in Pharmacology, 13. https://doi.org/10.3389/fphar.2022.985293

Alharbi, S., Alhofaian, A., & Alaamri, M. M. (2023). Illness Perception and Medication Adherence among Adult Patients with Type 2 Diabetes Mellitus: A Scoping Review. Clinics and Practice, 13(1), 71-83. https://doi.org/10.3390/clinpract13010007

Ashur, S. T., Shah, S. A., Bosseri, S., Morisky, D. E., & Shamsuddin, K. (2015). Illness perceptions of Libyans with T2DM and their influence on medication adherence: a study in a diabetes center in Tripoli. Libyan Journal of Medicine, 10(1), 29797. https://doi.org/10.3402/ljm.v10.29797

Bean, D. J., Cundy, T., & Petrie, K. J. (2007). Ethnic differences in illness perceptions, self-efficacy and diabetes self-care. Psychology & Health, 22(7), 787–811. https://doi.org/10.1080/14768320600976240

Bilondi, S. S., Noghabi, A. D., & Aalami, H. (2021). The relationship between illness perception and medication adherence in patients with diabetes mellitus type II: Illness perception and medication adherence. Journal of Preventive Medicine and Hygiene, 62(4), E966. https://doi.org/10.15167/2421-4248/jpmh2021.62.4.2277

Broadbent, E., Petrie, K. J., Main, J., & Weinman, J. (2006). The brief illness perception questionnaire. Journal of psychosomatic research, 60(6), 631–637. https://doi.org/10.1016/j.jpsychores.2005.10.020

Carlson, J. (2013). Lifestyle, Modification. In: Gellman, M.D., Turner, J.R. (eds) Encyclopedia of Behavioral Medicine. Springer, New York, NY. https://doi.org/10.1007/978-1-4419-1005-9_1147

Chakrabarti S. (2014). What's in a name? Compliance, adherence and concordance in chronic psychiatric disorders. World journal of psychiatry, 4(2), 30–36. https://doi.org/10.5498/wjp.v4.i2.30

Griva, K., Myers, L. B., & Newman, S. (2000b). Illness perceptions and self-efficacy beliefs in adolescents and young adults with insulin dependent diabetes mellitus. Psychology & Health, 15(6), 733–750. https://doi.org/10.1080/08870440008405578

Holmlund, L., Hörnsten, C., Valham, F., Olsson, K., Hörnsten, Å., & Ängerud, K. H. (2023). Illness Perceptions and Health-Related Quality of Life in Women and Men With Atrial Fibrillation. Journal of Cardiovascular Nursing, Publish Ahead of Print. https://doi.org/10.1097/jcn.0000000000000995

Hsiao, C., Chang, C., & Chen, C. (2012). An investigation on illness perception and adherence among hypertensive patients. The Kaohsiung Journal of Medical Sciences, 28(8), 442-447. https://doi.org/10.1016/j.kjms.2012.02.015

Jason Van Allen, Amy E Noser, Andrew K Littlefield, Paige L Seegan, MA, Mark Clements, Susana R Patton, Measuring Self-Efficacy in the Context of Pediatric Diabetes Management: Psychometric Properties of the Self-Efficacy for Diabetes Scale, Journal of Pediatric Psychology, Volume 43, Issue 2, March 2018, Pages 143–151, https://doi.org/10.1093/jpepsy/jsx094

Johansson, A., Axelsson, M., Grankvist, G., Berndtsson, I. and Brink, E. (2018) Symptoms, Illness Perceptions, Self-Efficacy and Health-Related Quality of Life Following Colorectal Cancer Treatment. Open Journal of Nursing, 8, 591-604. doi: 10.4236/ojn.2018.89044.

Kim, H., Sereika, S. M., Lingler, J. H., Albert, S. M., & Bender, C. M. (2021). Illness Perceptions, Self-efficacy, and Self-reported Medication Adherence in Persons Aged 50 and Older With Type 2 Diabetes. The Journal of cardiovascular nursing, 36(4), 312–328. https://doi.org/10.1097/JCN.0000000000000675

Kim, H., Sereika, S. M., Lingler, J. H., Albert, S. M., & Bender, C. M. (2021). Illness Perceptions, Self-efficacy, and Self-reported Medication Adherence in Persons Aged 50 and Older With Type 2 Diabetes. The Journal of cardiovascular nursing, 36(4), 312–328. https://doi.org/10.1097/JCN.0000000000000675

Knowles, S. R., Apputhurai, P., O'Brien, C. L., Ski, C. F., Thompson, D. R., & Castle, D. J. (2020). Exploring the relationships between illness perceptions, self-efficacy, coping strategies, psychological distress and quality of life in a cohort of adults with diabetes mellitus. Psychology, health & medicine, 25(2), 214–228. https://doi.org/10.1080/13548506.2019.1695865

Konstadina Griva, Lynn B. Myers & Stanton Newman (2000) Illness perceptions and self efficacy beliefs in adolescents and young adults with insulin dependent diabetes mellitus, Psychology & Health, 15:6, 733-750, DOI: 10.1080/08870440008405578

Kucukarslan, S. N. (2012). A review of published studies of patients' illness perceptions and medication adherence: Lessons learned and future directions. Research in Social & Administrative Pharmacy, 8(5), 371–382. https://doi.org/10.1016/j.sapharm.2011.09.002

Kugbey, N., Oppong Asante, K. & Adulai, K. Illness perception, diabetes knowledge and self-care practices among type-2 diabetes patients: a cross-sectional study. BMC Res Notes **10**, 381 (2017). https://doi.org/10.1186/s13104-017-2707-5

Kugbey, N., Oppong Asante, K., & Adulai, K. (2017). Illness perception, diabetes knowledge and self-care practices among type-2 diabetes patients: a cross-sectional study. BMC research notes, 10(1), 381. https://doi.org/10.1186/s13104-017-2707-5

Leelacharas, S., Kerdonfag, P., Chontichachalalauk, J., & Sanongdej, W. (2015). Illness Perceptions, Lifestyle Behaviors, Social Support, and Cardiovascular Risks in People with Hypertension in Urban and Rural Areas of Thailand. Pacific Rim International

Journal of Nursing Research, 19(3), 245–256. Retrieved from https://he02.tci-thaijo.org/index.php/PRIJNR/article/view/17561

Leventhal H, Benyamini Y, Brownlee S, et al. Illness representations: theoretical foundations. In: Petrie KJ, Weinman J, editors. Perceptions of health and illness. Amsterdam: Harwood Academic; 1997. pp. 155–188.

Mahdavi, R., et al. (2018), "Contribution of barriers to dietary intake in female patients with type 2 diabetes", Nutrition and Food Science, Vol. 48 No. 3, pp. 510-519, doi: 10.1108/NFS-04-2017-0080.

Menti, D., Limbert, C. and Lyrakos, G. (2019), "Investigating the effectiveness of theory-based interventions for improving treatment adherence of patients with type 2 diabetes mellitus: a systematic review of randomised controlled clinical trials", Journal of Health and Social Sciences, (May), doi: 10.19204/2019/nvst9.

Miyazaki, M., Nakashima, A., Nakamura, Y., Sakamoto, Y., Matsuo, K., Goto, M., Uchiyama, M., Okamura, K., Mitsutake, R., Urata, H., Kamimura, H., & Imakyure, O. (2018). Association between medication adherence and illness perceptions in atrial fibrillation patients treated with direct oral anticoagulants: An observational cross-sectional pilot study. PLOS ONE, 13(9), e0204814. https://doi.org/10.1371/journal.pone.0204814

Mohammadi, F., Tehranineshat, B., Farjam, M., Rahnavard, S., & Bijani, M. (2022). The Correlation between Resilience, Self-efficacy and Illness Perception in Patients with Type 2 Diabetes: A Cross-Sectional Study. Clinical Diabetology, 11(3), 175–182. https://doi.org/10.5603/dk.a2022.0024

Mosleh, S. M., & Almalik, M. M. (2016). Illness perception and adherence to healthy behaviour in Jordanian coronary heart disease patients. European Journal of Cardiovascular Nursing, 15(4), 223-230. https://doi.org/10.1177/1474515114563885

Oyiela, O. S., & Kemunto, K. D. (2021). Illness Perceptions and Adherence to Medication Regimen among Hypertensive Patients Attending a County Referral Hospital in Kenya. Journal of Hypertension and Management, 7(1). https://doi.org/10.23937/2474-3690/1510059

Rennie, T. (2015). Psychology and adherence of tuberculosis patients: Do illness perceptions predict poor adherence to TB management? http://hdl.handle.net/11070/1420

Saarti, S., Hajj, A., Karam, L., Jabbour, H., Sarkis, A., Osta, N. E., & Khabbaz, L. R. (2016). Association between adherence, treatment satisfaction and illness perception in hypertensive patients. Journal of Human Hypertension, 30(5), 341–345. https://doi.org/10.1038/jhh.2015.86

Saleem, F., Hassali, M., Shafie, A., Awad, A., & Bashir, S. (2011). Association between Knowledge and Drug Adherence in Patients with Hypertension in Quetta, Pakistan. Tropical Journal of Pharmaceutical Research, 10(2). https://doi.org/10.4314/tjpr.v10i2.66552

Shakya, R., Shrestha, S., Gautam, R., Rai, L., Maharjan, S., Satyal, G., Kc, B., & Rai, M. K. (2020). Perceived Illness and Treatment Adherence to Hypertension Among Patients Attending a Tertiary Hospital in Kathmandu, Nepal Patient Preference and Adherence, Volume 14, 2287–2300. https://doi.org/10.2147/ppa.s270786

Ullah, S., Ali, S., Daud, M., Paudyal, V., Hayat, K., Hamid, S. M., & Ur-Rehman, T. (2022). Illness perception about hepatitis C virus infection: a cross-sectional study from Khyber Pakhtunkhwa Pakistan. BMC infectious diseases, 22(1), 74. https://doi.org/10.1186/s12879-022-07055-5

Wilski, M., & Tasiemski, T. (2016). Illness perception, treatment beliefs, self-esteem, and self-efficacy as correlates of self-management in multiple sclerosis. Acta neurologica Scandinavica, 133(5), 338–345. https://doi.org/10.1111/ane.12465

Yildirim, D., & Baykal, D. (2020). Evaluation of treatment adherence and illness perception in cardiology patients. Nigerian Journal of Clinical Practice. https://doi.org/10.4103/njcp.njcp_666_19

Zelber-Sagi, S., Bord, S., Dror-Lavi, G., Smith, M. L., Towne, S. D., Jr, Buch, A., Webb, M., Yeshua, H., Nimer, A., & Shibolet, O. (2017). Role of illness perception and self-efficacy in lifestyle modification among non-alcoholic fatty liver disease patients. World journal of gastroenterology, 23(10), 1881–1890. https://doi.org/10.3748/wjg.v23.i10.1881