

# FACTORS AFFECTING BLOOD GLUCOSE CONTROL AMONG TYPE 2 DIABETES MELLITUS PATIENTS: QUALITATIVE STUDY

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## ABSTRACT:

**Background:** Diabetes is one of the world's most critical health issues. The IDF estimates that the prevalence of T2DM among adults will rise from 9.3% in 2019 to 10.2% by 2030. This signifies an increase in the number of individuals with T2DM from 463 million in 2019 to 578 million in 2030. Globally, medical expenses related to diabetes are projected to reach USD 727 billion.

**This study aims** to understand patients' experiences with type 2 diabetes mellitus and the factors that affect blood glucose levels.

**Method:** A phenomenological research design was conducted at the Al-Najaf Center for Diabetes and Endocrinology from August 25, 2024, to March 2, 2025. The sample consisted of 11 participants. This qualitative study involved individual semi-structured interviews guided by open-ended questions.

**Results:** The thematic analysis resulted in the identification of six main themes and 26 subthemes. The findings indicate that the majority of participants reported physical, psychological, and social factors affecting their condition.

**Conclusion:** The most frequent source of elevated blood glucose levels identified in the study is a diet high in carbohydrates.

**Keywords:** blood glucose control, type 2 diabetes mellitus patients, qualitative study

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## INTRODUCTION

Diabetes is one of the world's most critical health issues {1,21}. The IDF estimates that the prevalence of T2DM among adults will rise from 9.3% in 2019 to 10.2% by 2030. This signifies an increase in the number of individuals with T2DM from 463 million in 2019 to 578 million in 2030. Globally, medical expenses related to diabetes are projected to reach USD 727 billion {2}. Several key factors contribute to the development of T2DM, including increasing urbanization, dietary changes, reduced physical activity, obesity, aging, a family history of diabetes, ethnicity, and lifestyle changes. So the management of diabetes should start with non-pharmacological therapies, such as lifestyle interventions {3}. Iraq is one of the nations with the highest prevalence of diabetes, making it a critical public health priority {4}. Over the last four decades, the prevalence of diabetes in Iraq has surged dramatically to approximately 20%. Additionally, diabetes is recognized as a leading cause of death in many developing countries, particularly in Iraq {5}. Recent research has highlighted key behaviors that DM patients should adopt to manage their blood glucose levels effectively. These behaviors include adhering to a healthy diet, maintaining physical activity, regularly monitoring blood sugar, and consistently taking medication. In addition, utilizing positive coping strategies, and engaging in risk-reduction behaviors are essential for blood glucose management. However, behavior alone does not ensure stable blood glucose levels. Several factors influence blood glucose stability, including age, sex, duration of illness, race, diabetes history, knowledge, diet, and physical activity {6}. Elevated levels of blood glucose (hyperglycemia) can lead to serious long-term complications such as cardiovascular disease, diabetic neuropathy, and diabetic retinopathy. Conversely, low blood glucose levels (hypoglycemia) may result in critical health fluctuations in the short

term, including confusion, shakiness, sweating, and even loss of consciousness, coma, or death. However, if diabetes is diagnosed early, it can often be managed effectively without becoming a severe issue. Therefore, tight and continuous glucose monitoring is crucial for patients with diabetes {7}. Self-management is one of the effective strategies used to maintain glucose levels and prevent these complications. Effective management of diabetes involves several key practices monitoring blood glucose levels, taking prescribed diabetic medication, following a structured diabetic diet plan, and engaging in regular physical activity to maintain healthy blood glucose levels. While these practices are essential for self-managing the disease, many patients face various obstacles that make self-management challenging{8}. Diabetes self-care and management are primarily the patient's responsibility. Adhering to diabetes self-care regimens can be challenging, especially with a greater focus on avoiding complications {9}. People with diabetes require a systematic approach and a skilled staff, complemented by well-organized health services. This includes nurses, nurse practitioners, physician assistants, primary care physicians, and diabetologists, either endocrinologists or diabetes specialists. Multiple studies have demonstrated the effectiveness of nurses in identifying individuals with poorly controlled diabetes and assisting them in managing the disease, ultimately reducing hospitalizations. Other research has highlighted the benefits of nurses as case managers for diabetes treatment, noting their positive impact on HbA1c levels and blood pressure control, particularly among high-risk patients with poor management of their condition {10}. Anyway, managing blood glucose levels is one of the significant challenges faced by individuals with diabetes, as these levels directly affect their quality of life. With the increasing prevalence of diabetes worldwide, it is essential to gain a deeper understanding of the factors that contribute to fluctuations in blood glucose. Therefore, this study aims to qualitatively identify the factors that influence blood glucose control.

## METHODS AND MATERIAL

**Study Design and Setting** A phenomenological research design was employed to explore the factors affecting blood glucose control among 11 participants (7 females and 4 males) with T2DM. The study was conducted at the Al-Najaf Center for Diabetes and Endocrine from August 25, 2024, to March 2, 2025. Unlike quantitative research, qualitative data is not typically represented by numerical values. The primary goal of qualitative research is to provide readers with a comprehensive and realistic description of the topic at hand. Therefore, the data collected should be insightful and reflect the opinions and experiences of the individuals involved as directly as possible.

**Study Sample** The target population for the study comprised T2DM patients at the Diabetes Center. The inclusion criteria were as follows participants had to be males or females over 30 years old, diagnosed with T2DM, living with or without complications, and attending the center for regular follow-ups, treatment, and testing during the data collection period. Patients who did not consent to participate in the study or were deemed mentally incapable of participating were excluded. Purposive sampling was employed to recruit the participants.

**Data Collection Instrument** A semi-structured open-ended questionnaire was utilized to guide the interviews. This questionnaire was developed based on a literature review and the research questions of the study. The sections included a structured questionnaire to collect demographic data, as well as open-ended questions to explore factors affecting blood glucose control. Data were gathered from participants through semi-structured interviews lasting approximately 30 to 40 minutes each. The researcher conducted interviews with eleven participants selected from the total study sample and reached a saturation point where no new information could be obtained. The Arabic language was used during the interviews, and questions were posed in various forms to elicit detailed responses. With the participants' consent, their responses were recorded on the researcher's mobile phone to help achieve specific themes and sub-themes.

**Data Management and Data Analysis**

The raw data were transcribed and coded by the researcher. The interviews were transcribed verbatim into a Word document by listening carefully to the recordings. Data analysis was conducted manually, without the use of software. Thematic analysis was employed, involving a close examination of the transcribed data to identify common themes that emerged repeatedly. This process included reviewing, identifying, and naming themes. According to Jowsey *et al.* (2021), the six stages of thematic analysis are: (i) familiarization, (ii) coding, (iii) identifying themes, (iv) reviewing the themes, (v) defining and naming the themes, and (vi) producing a report [11].

#### Ethical Considerations

The researcher first obtained permission from the Medical Ethical Committee of the University of Kufa's College of Medicine before starting data collection. This step is vital for protecting the rights and dignity of the participants. After being informed about the study's general objectives and significance, participants provided verbal consent. They were also assured that their information would remain confidential and would be used solely for scientific research.

#### RESULTS

The content analysis conducted on the data obtained from the qualitative study regarding the experience of living with T2DM revealed six main themes and 26 subthemes (see Table 1). The study found that the age group of 58-67 years accounted for the highest percentage at 45.5%. Additionally, the majority of participants (63.3%) were female, and 90.1% were married.

Table (1): Themes and Subthemes for the participants

Themes	Subthemes
Personal Experience	<ul style="list-style-type: none"> <li>• Emotional Stress</li> <li>• Genetic</li> <li>• Fear</li> <li>• Smoking</li> </ul>
Health Literacy about the disease	<ul style="list-style-type: none"> <li>• Fatigue</li> <li>• Hand Tremor</li> <li>• Numbness in the lower extremities</li> <li>• Weight Loss</li> <li>• Dizziness</li> <li>• Polyphagia</li> <li>• Polydipsia</li> <li>• Polyurea</li> </ul>
Health-related outcomes	<ul style="list-style-type: none"> <li>• Renal Problems</li> <li>• Eye Problems</li> <li>• Joint Pain</li> </ul>
Social norms	<ul style="list-style-type: none"> <li>• Use of herbs</li> <li>• Family conflicts</li> </ul>

Nutritional lifestyle factors	<ul style="list-style-type: none"> <li>• High Carbohydrates</li> <li>• Moderate fat</li> <li>• Moderate protein</li> <li>• Obesity</li> </ul>
Challenges in Diabetes Self-Control	<ul style="list-style-type: none"> <li>• No adherence to medications</li> <li>• Financial burden</li> <li>• Health system challenges</li> <li>• Stress</li> <li>• Physical activities</li> </ul>

Table (1) outlines the frequency distribution of factors influencing blood glucose control among the studied sample, categorized into six main themes: personal experience, health literacy about the disease, health-related outcomes, social norms, nutritional lifestyle factors, and challenges in diabetes self-control.

#### **Theme One: Personal Experience**

All interviewed participants talked about their experiences with diabetes, highlighting the key factors they believe contributed to the development of T2DM. Most of the participants explained through their experience that the factors that led to the development of diabetes were emotional stress, fear, smoking, and genetics.

##### ***Emotional Stress***

Many participants reported that they faced emotional stresses at home, such as family crises and death, and they believed these crises played a major role in the onset of their diabetes. For instance, participant No.2 stated, *"Diabetes happened as a result of a threat that I faced at home that made me terrified and made me lose consciousness."* In addition, participant No.6 denoted, *"I was shocked by a problem at home that made me feel tired which led to dryness in my mouth. Afterward, I went for tests, and the result was diabetes."*

Participant No.10 stated, *"I faced a psychological crisis due to the death of my younger brother. I felt exhausted and had pain throughout my body; after making tests, the doctor told me that I had diabetes."*

##### ***Genetics***

Most participants acknowledged that diabetes has a genetic component, but they emphasized that other factors, such as environmental and social conditions, contribute to its development. Participant No.3 stated, *"Diabetes is usually hereditary; my mother has it, and it leads to numerous health issues, especially when not managed well."* Participant No.7 added that *"type 2 diabetes is often hereditary or may result from pancreatic issues, which can lead to insulin secretion problems or the body's resistance to insulin, ultimately causing uncontrolled blood sugar levels"*.

##### ***Fear***

Many participants expressed fear about diabetes due to the potential complications and the challenge of managing blood sugar levels. Participant No.5 shared, *"I am afraid of diabetes because my father had it and suffered many complications before ultimately dying from the disease."*

##### ***Smoking***

Some participants identified smoking as an unhealthy behavior that poses additional risks to their health, particularly to their diabetes, yet they found it difficult to quit. High blood glucose and smoking can damage the artery walls, resulting in the buildup of fatty deposits that narrow blood vessels. This narrowing can hinder blood flow, especially to the heart, which increases the risk of heart attacks. For example, Participant No.2 said, *"I have been a smoker since childhood, influenced by my father's smoking habits. I smoke about two packs a day and feel unable to quit; it has become an essential part of my daily life."* Additionally, Participant No.8 remarked, *"I have been a smoker for a long time and wish to quit, but it is very difficult. I consider smoking a way to relieve my anxiety and stress."*

## Theme Two: Health Literacy about diabetes

Through interviews with participants, it was found that many do not have sufficient information about diabetes, including its main symptoms. They expressed that lack adequate knowledge to manage their diabetes effectively. Most of the study participants stated that they usually feel tired, numbness in the lower extremities, tremors in the hands, weight changes, dizziness, increased hunger, increased urination, and increased thirst.

**Fatigue** Most participants reported feeling tired, which interfered with their daily activities. Participant No.5 stated, "I always feel tired. I think a lot because of uncomfortable family matters, thereby I cannot sleep at night due to my thoughts." Another participant No.4 mentioned, *"I usually feel tired because of diabetes, and I also experience numbness in my feet."*

**Hand Tremors** Some patients reported they are experiencing tremors in their hands, which can occur for several reasons, associated significantly with neuropathy or damage to the peripheral nerves. Participant No.2 shared, *"I started to feel tremors in my hands and constant fatigue, especially when I am under family pressure or being nervous or tense."*

**Numbness in the Lower Extremities** Many participants stated experiencing numbness, particularly in the lower extremities. Although numbness is a less common symptom, many patients suffer from it, indicating nerve damage. Participant No.5 stated, *"I always have numbness and pain in my lower extremities, which bothers me a lot, and I constantly have fear of potential complications."* Additionally, participant No.6 expressed, *"I started to suffer from numbness in the tips of my fingers, which made me feel anxious, I delayed seeking medical attention."* Participant No.3 noted, *"I have numbness in my feet and have lived with the disease for 20 years without feeling any pain when I exposed to injury."*

**Weight Loss** Numerous participants indicated that diabetes can sometimes lead to weight loss or gain due to insulin therapy or other medications. This can affect body image, which may cause anxiety or psychological stress. Participant No.3 said, *"My weight started to gradually decrease after a family problem appeared at home. I felt tired, so I did some tests and found that I had high blood sugar."* Likewise, participant No.11 remarked, *"I lost weight for a while but didn't realize it was due to diabetes."*

**Dizziness** Dizziness is a less common symptom reported by several patients, typically linked to low blood sugar levels or the side effects of medications, particularly insulin. Participant No.2 stated, *"I sometimes feel dizzy, especially when I forget to take my medication or eat, as I usually have a loss of appetite."* Furthermore, participant No.4 mentioned, *"When I take my medication, I sometimes feel dizzy and lose feeling in my lower extremities. Later, I learned that these symptoms are indicative of low blood sugar."*

**Polyphagia** Only one patient reported feeling excessively hungry, despite polyphagia being a typical symptom of diabetes. Other participants may not feel hungry due to the disease's effects on glucose levels, disrupting the regulation of satiety and hunger hormones, such as insulin. Participant No.5 noted, *"I always feel hungry, and no matter how much I eat, I never feel full. Nonetheless, my weight continues to decrease."*

**Polydipsia** Several participants reported experiencing excessive thirst, which may result from long-term high blood sugar levels interfering with the brain's ability to regulate thirst. This, in turn, affects how the body responds to feelings of thirst. Participant No.1 mentioned, *"I drink a lot of water because I always have a dry mouth."* Participant No.2 added, *"I need to drink large amounts of water, and sometimes I experience increased urination."*

**Polyuria** Most individuals noted that they typically urinate more, especially when their blood sugar levels are elevated. This is a common symptom of diabetes. When blood sugar levels rise significantly, the body attempts to eliminate the excess sugar through the urine, leading to increased urine volume and frequency. Participant No.4 shared, *"When I had increased urination, I went to the doctor, who prescribed a special treatment for diabetes along with a specific diet. He told me to follow it for three days and then repeat the tests. I followed the diet, hoping to recover in those few days."* Additionally, Participant No.5 remarked, *"Some time ago, I experienced increased urination and weight loss, and because of these symptoms, I realized I had diabetes."* Furthermore, Participant No.8 mentioned, *"I suffer from increased urination, and I initially thought it was just because I drink a lot of water; I didn't know it was due to diabetes."*

**Theme Three: Health-Related Outcomes** During the interviews, most participants (9–10) expressed concern about the potential future complications of diabetes, particularly if their blood glucose levels remain uncontrolled. They said that most of the problems they had due to diabetes were eye problems, kidney problems, and joint pain. These findings emphasize the importance of addressing diabetes-related complications to improve overall management.

**Kidney problems** Some participants reported that their kidneys had been damaged as a result of the disease. Participant No.5 stated, "I feel that I have kidney pain and pain throughout my body, but I haven't gone to the doctor or health center for fear of receiving bad news." Moreover, Participant No.7 mentioned that "one of the most serious complications of diabetes is kidney problems, which can ultimately lead to kidney failure."

**Eye Problems** Many participants reported experiencing blurred vision and corneal issues related to diabetes. Participant No.4 mentioned, "I have a problem with the cornea, which is one of the many complications of diabetes, and I have undergone surgery for it." Similarly, Participant No.8 stated, "I have problems with my retina, which causes poor vision, and I have also had surgery to treat the problem." Participant No.7 highlighted that "diabetes impacts most of the body's organs, including the retina, leading to damage to the blood vessels in the eyes". Additionally, Participant No.10 shared, "I have eye problems due to diabetes, such as eye bleeding, and I have also had surgery on the cornea."

**Joint Problems** Some participants reported experiencing joint pain and shoulder pain, which are long-term complications of diabetes. Participant No.8 said, "I have pain in my joints and pelvis, which worsens because my job requires me to sit for long periods, even though I exercise when I can." Participant No.10 stated, "I am unable to walk or perform household activities due to joint pain."

**Theme Four: Social norms** Social norms include family disputes and the usage of herbs indicates the customs and unspoken laws that govern how members of a community behave. Based on inherited traditional knowledge, these apply to the medicinal or cooking applications of herbs. Participants explained that their blood sugar levels were usually high either due to family problems or due to the influence of certain practices such as the use of herbs.

**Use of Herbs** Several participants mentioned using herbs to alleviate their symptoms, although their condition worsened, potentially due to improper dosage or incorrect usage recommendations. Participant No.2 recounted, "My neighbor suggested I try a specific type of herb, claiming it would help improve my condition. However, after using it, my health deteriorated, and I returned to get a medical checkup to monitor my health condition." Furthermore, Participant No.9 shared, "A friend advised me to take herbs that were supposed to lower my blood sugar and alleviate symptoms, but the result was the opposite; my blood glucose levels increased."

**Family conflicts** Most participants indicated that they struggle to manage family conflicts or stress. Participant No.5 commented, "I have family problems and do all the housework. I do not feel cared about by my family, and I have started to feel overwhelmed by the many responsibilities on my shoulders." Furthermore, Participant No.3 noted, "We have family issues at home, and I was shocked when my weight started to decrease gradually. After that, I was diagnosed with diabetes after check-up."

**Theme Five: Nutritional Lifestyle Factors** Most participants stated that they do not adhere to a specific diet for managing diabetes. They also talked about consuming high amounts of carbohydrates with moderate amounts of fats and proteins, and some mentioned that they gained weight due to unbalanced and high-calorie diets. Following a special diet for diabetes is one of the most important factors that help us control blood sugar, but this poses a challenge for us because we cannot control or adhere to the restrictions of the diet. This underscores the importance of nutritional education and support for effective blood glucose control.

**High Carbohydrates** Most participants reported consuming high amounts of carbohydrates. Carbohydrates significantly influence blood sugar levels since the body breaks them down into sugars, which, in turn, raises blood sugar levels. Some carbohydrates may be healthier than others. For instance, Participant No.1 stated, "I do not follow a diabetes diet and eat almost all types of food, including bread, rice, fats, and some fruits that are high in sugar." Participant No.4 remarked, "I don't follow any diabetes-related diet, which has led to uncontrolled blood sugar and my reliance on insulin alone." Participant No.6 added, "I am not committed

to a diabetic diet and consume fats, sugars, rice, bread, and tea." Participant No.8 stated, "I eat a lot of sugars, fats, and tea, and even though I know the health risks, I find it difficult to give them up." Lastly, Participant No.10 shared, "I have a dietary plan for diabetic patients, but I failed to adhere to it because I didn't realize it would lead to many complications and health issues."

**Moderate Fats** Some patients have reported consuming saturated and trans fats found in fried and processed foods. These types of fats and starches can cause a sudden increase in blood sugar levels and contribute to weight gain, which poses significant challenges for diabetic patients. Participant No.7 mentioned that "my commitment to a diabetic diet is average, as they consume high amounts of protein along with moderate amounts of bread and rice". Participant No.11 also noted, "I am somewhat committed to the diabetic diet, for example, I eat brown bread with boiled or grilled foods and a little amount of tea."

**Moderate Protein** Several participants indicated that they eat moderate amounts of protein, such as meat since protein can help stabilize blood sugar levels by slowing the absorption of carbohydrates and sugars. Participant No.2 stated, "I am committed to the diet, as I eat a little amount of rice with brown bread, moderate amounts of grilled meat and boiled eggs, and I also enjoy moderate amounts of tea with sugar."

**Obesity** Participants pointed out that obesity can result from certain medications prescribed for diabetes or develop due to poor eating habits, including the consumption of fast food and other factors. For many individuals with T2DM, losing weight can aid in blood sugar control and provide numerous other health benefits. Adhering to a healthy eating plan allows patients to achieve their weight loss goals safely and effectively. Participant No.7 reported "an increase in weight after developing diabetes due to a combination of diabetes medications and irregular meal patterns".

**Theme Six: Challenges in Diabetes Self-Care** Most participants (8 to 10) in the current study reported that they face obstacles or challenges in controlling blood sugar due to stress, Health system challenges, their lack of commitment to treatment, and their poor economic situation. They also explained that not exercising is one of the most important factors that lead to high blood glucose.

**Lack of Commitment to Treatment** Many participants expressed a lack of commitment to their treatment regimens. This may be due to a lack of understanding regarding the importance of treatment and how diabetes can affect long-term health. Additionally, some felt that the medical information they received was insufficient or unclear. Participant No.5 noted, "I do not adhere to the treatment often because I feel a lack of support from my husband and children, even though my blood glucose levels are consistently high." Participant No.6 mentioned, "I often neglect to take my medication because I initially thought I could handle the disease on my own. However, after my health deteriorated, I started to commit to taking the medication." Further, Participant No.8 stated, "I am committed to treating my diabetes, but I am not controlling it. My doctor advised me to use insulin, but I refused and am continuing with oral medications only." Additionally, Participant No.11 revealed, "I have had diabetes for five years, but I have only taken medication for a very short time, which is why my blood glucose levels have always been high."

**Health system challenges** Some participants expressed their difficulty in reaching the diabetes center and suggested establishing additional centers in various districts and areas of the city. Participant No.5 stated, "I face difficulties in reaching the diabetes specialized center to monitor my glucose levels and follow up on my health condition because it is far away from my house. Furthermore, I do not have enough money to get to the center."

**Financial Status** Many participants reported that the costs associated with diabetes treatment, including medications and regular check-ups, impose a financial burden on them, leading to economic pressures that affect their quality of life. Participant No.6 mentioned, "I face difficulties at work because of diabetes, which has significantly impacted my financial situation and often makes me feel anxious and tense." Additionally, Participant No.9 mentioned how my poor financial situation and surrounding environmental conditions have heightened his psychological pressures and anxiety. He noted, "In my opinion, anxiety is the main factor that leads to irregular blood glucose levels." Participant No.10 added, "In many cases, I do not go to the diabetic center for checkups or follow-up on my health because I simply do not have enough money, and there are no other specialized diabetes centers available."

**Stress** Participants reported that trouble adhering to a diet and experiencing unstable or uncontrolled blood sugar levels are major sources of stress. Participant No.1 stated, "Stress and nervous excitement are

among the key factors that cause an increase in blood sugar levels." Participant No.6 also shared, "I often feel stressed and nervous due to difficult living conditions, which means my blood glucose remains consistently high."

**Physical Activities** All interviewed participants agreed that exercise, particularly walking, and adhering to a healthy diet are crucial for controlling blood glucose levels. Many participants indicated that they do not exercise due to various reasons, including lack of time, absence of suitable places to exercise, or other health conditions like joint pain. Participant No.4 mentioned, "I do not have the ability or enough time to walk or exercise, especially since I also have back pain." Participant No.7 acknowledged, "Exercise is very important for controlling blood sugar levels, and I noticed that during the times I do exercise, my blood sugar levels decrease significantly." Participant No.6 noted, "I used to walk regularly, but I stopped because I moved to a place that is not conducive to walking." Participant No.5 mentioned, "I move a lot at home due to my work, and I sometimes walk to the market; when I do walk, my blood sugar levels decrease." In contrast, Participant No.1 expressed, "I keep staying at home, move little, and do not engage in any kind of exercise."

## DISCUSSION

Several themes and subthemes are generated from qualitative data using a qualitative content analysis method. A thematic content analysis led to six major themes, based on the responses of 11 (7 females and 4 males) participants directly interviewed by the researcher. These themes were related to factors that affect blood glucose control in T2DM patients at the Al-Najaf Center for Diabetes and Endocrine. According to personal experience, all interviewed participants talked about their experiences with diabetes and explained through their experience that the factors that led to the development of diabetes are emotional stress, fear, smoking, and genetics. Similarly, Ramírez-Morros *et al.*, (2024) explain that some participants, especially women, attribute the beginning of the disease to stressful and highly emotional situations such as relatives' death and hospitalization. In addition, some participants linked the disease to external factors, while others considered inheritance and their negligence on health issues to be the cause [12]. In this regard, Bukhsh *et al.*, (2020); Lemos *et al.*, (2024) found that several participants reported that they feared chronic complications and low blood glucose, which motivated them to be healthy and that fear of pain related to the fingers pricking was one of an obstacle to frequent SMBG among some participants [13,14]. Concerning health literacy about the disease, through interviews with participants, it was found that many do not have sufficient information about diabetes, including its main symptoms. They expressed that lack adequate knowledge to manage their diabetes effectively. Most of the study participants stated that they usually feel tiredness, numbness in the lower extremities, tremors in the hands, weight loss, dizziness, polyphagia, polyurea, and polydipsia. In the same direction, Yilmaz *et al.*, (2019) reported that three-quarters of patients complained of burning, tingling, and feeling numbness in their feet, and said they experienced diabetes-related weakness, fatigue, and vision problems [15]. Other findings showed that the majority of respondents had general body weakness before the diagnosis of diabetes, frequent and excessive thirst associated with polyuria at about 5–6 nightly, and vertigo. ADA also reported that the common symptoms of DM are three ps, namely polyurea, polydipsia, and polyphagia. Other symptoms include extreme fatigue, visual impairment, weight loss, and pain or numbness in the hands and feet [16]. Regarding health-related outcomes during the interviews, most participants (9–10) expressed concern about the potential future complications of diabetes, particularly if their blood glucose levels remain uncontrolled. They said that most of the problems they had due to diabetes were eye problems, kidney problems, and joint pain. Yilmaz *et al.*, (2019) mentioned that individuals diagnosed with diabetes suffer more severely and added that patients diagnosed with diabetes have severe and work-limiting symptoms (e.g. neuropathy), hyperglycemia/ hypoglycemia /ketoacidosis may also occur due to inadequate drug compliance. Diabetic people often have negative views about their lives [15]. According to social norms, participants explained that their blood glucose levels were usually high either due to family problems or due to the influence of certain practices such as the use of herbs. Ramírez-Morros *et al.*, (2024) reveal that overall participants stressed the importance of maintaining positive attitudes towards disease to ensure effective self-management. Both men and women recognize the influence of mood on blood glucose. In women, the moods are associated with conflict and emotional



disturbance, while in men it is associated with stress [12]. Some patients admitted that they used herbal medicines for diabetes. The use of herbal medicines was widely spread among participants. Either it is taken as a supplement or as a replacement for medicines. Herbal medicine may be more disadvantageous than advantageous in terms of the frequency and dosage taken by patients [17]. Concerning nutritional lifestyle factors most participants stated that they do not adhere to a specific diet for managing diabetes. They also talked about consuming high amounts of carbohydrates with moderate amounts of fats and proteins, and some mentioned that they gained weight due to unbalanced and high-calorie diets. Following a special diet for diabetes is one of the most important factors that help us control blood glucose, but this poses a challenge for us because we cannot control or adhere to the restrictions of the diet. Likewise, Bukhsh *et al.*, (2020) showed that diet management is one of the most problematic self-care behaviors described by most participants. Among the various challenges faced in adopting a healthy lifestyle, the most frequent one is the difficulty in maintaining a healthy diet. Participants pointed out that when the food is presented at weddings and social gatherings, it is difficult to follow the recommendations for diabetes-related food [13]. Okurumeh *et al.*, (2022) reported that all respondents responded to managing their condition strictly by following medical instructions, modifying and regulating their diet, especially reducing carbohydrates and sugar beverages, and taking weight reduction measures to control weight [16]. Regarding challenges in diabetes self-control, most participants (8 to 10) in the current study reported that they face obstacles or challenges in controlling blood glucose due to stress, health system challenges for diabetes, their lack of commitment to treatment, and their poor economic situation. They also explained that not exercising is one of the most important factors that lead to high blood glucose. Peng *et al.*, (2022) reveal that the participants reported several reasons for non-compliance with the drugs. Fear of pain associated with medication therapy is the most common obstacle to medication compliance. Unsatisfactory effects on glucose reduction, insulin injection inconvenience, and occupational limitations and economic burdens are also mentioned as reasons for non-compliance [18]. Lack of financial resources is one of the most important and common limitations for the participants in the study. All patients interviewed said they suffered from high costs associated with the disease, including consultations and lifelong medications [19]. Bukhsh *et al.*, (2020) stated that many participants expressed that they did not need regular exercise because they believed that their daily life activities were a reasonable substitute for exercise [13]. A qualitative study done by Dey *et al.*, (2022) found that stress was one of the main barriers to controlling diabetes, and the narratives of all cases in the study suggested that stressful life events often affect diabetes in its exacerbation. Also found that most cases are related to hidden emotional burdens and concerns related to family or financial problems. Generally speaking, women were stressed due to family problems, and men due to financial concerns [20].

## CONCLUSION

The study identified that a diet high in carbohydrates is the most frequent source of elevated blood glucose levels. The results indicate also that many patients are not committed to compliance with physical activity guidelines, dietary recommendations, and medication, which contributes to their inadequate blood glucose control. Additionally, factors such as stress and family conflicts have been recognized as significant contributors to persistently high blood glucose levels.

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