

## Research Article

### Exploring the Experiences of Type 2 Diabetes Self-Management in Middle-Aged and Older Adults

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#### Abstract

**Objectives:** Type 2 diabetes continues to be a health challenge for older adults. The self-management of Type 2 diabetes which involves preventing complications associated with the illness consists of regularly monitoring one's blood sugar, adhering to a recommended medication plan, adopting a healthy lifestyle, reducing risk factors, having a support network and receiving education. The purpose of this study is to examine the experiences of health self-care among middle-aged and older adults with type 2 diabetes.

**Methods:** Phone interviews were conducted with 11 middle-aged and older adults who participated in a diabetes management program.

**Results:** Program participants explained that the support provided by the program motivated them to adhere to self-care activities, which involved changing their lifestyles. Specifically, they changed their dietary behaviors, incorporated exercise into their weekly activities, and regularly monitored their blood glucose levels. As for difficulties encountered during the management process, participants highlighted cravings, the high price of healthy food, personal stress, and mobility issues that restricted them from engaging in more phys-

ical activities. Coping mechanisms included self-will and determination to change, interacting with people, and going to therapy.

**Discussion:** Study findings suggest the need for policy to provide more resources and support to address the challenges faced by type 2 diabetes patients, especially in low-income communities.

**Keywords:** Lifestyle management; Older adults; Self-management; Type 2 diabetes

#### Introduction

Type 2 Diabetes (T2D) remains a significant global health challenge. The World Health Organization (WHO) defines diabetes as a long-lasting health problem in which the pancreas does not make enough insulin, which helps control blood sugar, or when the body does not use insulin properly [1]. In 2019, the global T2D prevalence was estimated to be 9.3% (463 million people) and is projected to rise to 10.2% (578 million) by 2030 and 10.9% (700 million) by 2045 [2]. Several factors may be influencing this increase, including increasing rates of obesity, a sedentary lifestyle, smoking, unhealthy dietary behaviors and genetic factors [3]. As T2D worsens over time, it can lead to various complications, such as vision problems, nerve damage, kidney problems, heart disease, amputation, and difficulties with thinking and memory [4]. Worldwide, around 1.5 million people died from conditions related to T2D in 2019.

Although an increasing number of teens and young adults are developing T2D, it is especially prevalent among older adults (65 years and older). It is estimated that 37.3 million Americans have T2D, of whom 40% are older adults [5]. Approximately 27.2 million older adults have prediabetes [6]. Increased insulin resistance, in addition to impaired insulin secretion and physical inactivity, puts older adults at high risk of T2D. Advanced age is also associated with a decline in pancreatic function and capacity. Among older adults, T2D is more prevalent among individuals aged 70-79 [6], and this rate is expected to increase by 35.0% by 2060 [7]. These projections constitute a public health challenge in the United States.

To avoid complications, diabetic patients must strictly control their blood sugar levels [8]. However, patients may experience challenges in adhering to their disease self-management plan. Environmental or mental stress is a common contributor to this challenge. Stress can impact diabetes control at the hormonal level and can cause practical interference with the patient's routine. For instance, glycemic control (blood sugar level) can be impacted due to experiencing stress or anxiety [9]. In addition, the hormones released during stressful events can interfere with insulin and prevent it from reducing blood sugar properly. Patients who experience high levels of stress are more likely to neglect their diabetes and fail to manage their symptoms [10]. However, the literature suggests that coping techniques can enhance patients' self-efficacy in managing diabetes [11] and improve patient outcomes. According to the American Diabetes Association (ADA), diabetes is a significant public health issue in Virginia, where approximately 733,302 individuals have T2D. In addition, over 180,000

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people in Virginia have the disease but are unaware of it [12], while around 33.3% of the adult population in Virginia have prediabetes. Individuals in rural areas such as Eastern Shore and Western Tidewater have the highest prevalence due to limited healthcare access, high poverty, dietary challenges, and physical inactivity [13].

Diabetes care is costly to the healthcare system in the United States. The total cost of care for diabetes combined was \$412.9 billion in 2022 [14]. This includes costs related to medical care, including doctor visits, hospitalizations, technology, treatments and costs due to loss of productivity. In Virginia, diabetes care in general cost the state approximately \$8.3 billion in 2017 [14]. Diabetes care among older adults contributes substantially to this cost because older adults aged 65 and older have a higher prevalence of diabetes [15]. To address these issues, a report from the University of Virginia (UVA) has recommended implementing preventive strategies and management interventions such as lifestyle changes, education, and support for self-management [16]. In 2017, the VDH created a strategic plan to reduce the incidence of chronic diseases, including T2D in Virginia. The plan's objectives include increased screening, increasing awareness among Virginians who may not be aware that they have prediabetes, and referring these individuals to lifestyle change programs [17].

The Virginia's plan for well-being outlines preventive actions for reducing the prevalence of diseases such as cardiovascular diseases, diabetes, dementia, cancer, liver disease and arthritis [13]. These actions include promoting an active lifestyle through the creation of more parks and recreation facilities, making healthy foods more accessible, expanding programs to eliminate food insecurity, and increasing the number of evidence-based wellness programs. The plan also recommends the adoption of collaboration between local partners to address many of the public health challenges that the state is facing. In 2016, in response to the call for a collaborative approach to addressing the increase in health conditions such as obesity and T2D in the city of Chesapeake, city leaders, the Chesapeake Health District, academic leaders, and local community organizations created a coalition called Healthy Chesapeake (HC) [18].

## Background and Program Description

HC serves as the designated population health manager for the Chesapeake Health District. It addresses challenges through community-driven approaches to implement projects and provides opportunities to positively impact individuals' health, especially in low Health Opportunity Index (HOI) areas [19]. The main focuses of the coalition are to improve access to and use of healthcare services and resources among individuals living with T2D and hypertension through the CARE program and to make healthy food accessible in Chesapeake's low HOI communities through the Food Connection program [20]. HUB, an umbrella program under CARE, brings together five community partners to provide individuals living with T2D and hypertension with clinical, social, and public health support to better control their condition and achieve desirable outcomes, such as improved quality of life, well-being, and life expectancy [21]. The program offers weekly, no-cost clinical monitoring, assessment, social support, and resources to individuals with uncontrolled diabetes/hypertension who have been referred by a healthcare provider. Clients attend at intervals that best meet their individual needs. Each partner provides a specific set of skills and services that are needed to support the coalition's goals [21]. Resources and services provided by the five community partners include health education, medication assistance,

health insights, preventative care, biometric data collection, support for clients' emotional and social needs, and free fresh produce, lean proteins, and other diabetic-/hypertensive-friendly grocery staples, enabling clients to utilize their funds for other things, such as medications and utilities.

Recently, the number of T2D management programs has increased; however, it is believed that only around one in three people with T2D can effectively self-manage their health condition [22]. Diabetes self-management, which is one of the main strategies for controlling T2D, consists of blood sugar monitoring, adhering to a recommended medication plan, adopting a healthy lifestyle, reducing risk factors, having a support network, receiving education, and regular monitoring to eliminate complications [23]. It allows individuals diagnosed with the disease to become more active in their health management, as the process builds their capacity for medication adherence, adopting healthy behaviors, and providing emotional support [24]. Self-Monitoring of Blood Glucose (SMBG) is mandatory for the disease management [25]. Research has indicated that SMBG is a cornerstone therapy for people with T2D [26,27] and is associated with a reduction in patients' HbA1c levels. Adhering to plans involving healthy lifestyle modifications and medication has been known to produce positive health outcomes and improve overall health, such as by reducing the risk of chronic diseases, reducing cholesterol levels, and lowering blood pressure. In addition, adhering to healthy dietary plans has positive mental health outcomes, including improved self-esteem, better overall quality of life, and increased self-confidence. Part of the success in maintaining lifestyle modifications can be attributed to social support. Having someone to help support the individual's responsibilities involving meal planning, cooking, and shopping reduces the stressors related to meal activities and helps to support healthy habits [28].

HUB provides educational support and resources to build program participants' capacity to self-manage their health conditions. In addition, diabetes educators foster participants' capacity for daily self-care, including medication administration, intake of appropriate servings of vegetables and fruits and other healthy eating behaviors, maintaining physical activity, and SMBG. Each year, HUB conducts an assessment to determine whether the goals and objectives of the program are being achieved. According to HC's 2023 annual report, HUB participants' A1C levels decreased by an average of 19% from January 2022 to January 2023 [21]. As studies have focused primarily on quantitative inquiries to assess the management of diabetes, there is a lack of qualitative studies specifically targeting self-management among low-income communities in Virginia. This study examined the experiences of participants in a T2D management program related to their disease management, lifestyle changes, any challenges they encountered while managing their health conditions, and the approaches they adopted to cope with these challenges. The objectives were to interpret the participants' stories (derived from interviews) and to make recommendations that may aid other community programs addressing T2D issues.

## Methods

### Study participants

The study population included individuals diagnosed with T2D who had sought care from HUB in the previous 12 months. Primary care providers refer individuals with high levels of A1C from low-income communities in Chesapeake, Virginia to the HUB program

for high-touch support and management (clinical, social and public health support). For this study, HUB program staff informed program participants that a research team wanted to explore participants' experiences regarding diabetes self-management and asked them if they would be willing to participate in the study. Individuals who agreed to be part of the study were referred to the research team for an interview. The interviews were scheduled based on the most convenient time for the participants. No monetary compensation was provided to the participants for taking part in this study. The Old Dominion University Institutional Review Board approved the study protocol.

### Study design and data collection

A qualitative design was used to gather data about participants' experiences and perspectives on managing their health conditions. The open-ended nature of the questions allowed participants to provide insights related to self-management, lifestyle changes, challenges and coping mechanisms. A purposive sample of 11 HUB program participants were interviewed between May and June 2023. To encourage the participants to speak freely, the interviews were conducted in person and in settings away from the program leaders. Each interview took approximately 35-45 minutes. The conversations were recorded with the permission of the participants. Participation was voluntary; before each interview, the principal investigator explained the purpose of the study and asked the interviewee to confirm their willingness to participate. This consent was recorded. The interviews were facilitated by the principal investigator, who is well trained in qualitative design. A second research team member took notes. The questions were reviewed by a panel comprising two researchers, a number of program staff members and a program participant. The question guide included general demographic questions and open-ended questions about the participants' experiences with HUB, lifestyle changes, social support, challenges and barriers to self-management, and coping mechanisms.

### Question guide used in the interviews

All interview participants were asked the following six questions:

- Q1. Can you explain what you do to take care of your health? This includes things you are doing differently to care for your health, what you eat and how often, how much exercise you do each week, and how frequently you test your glucose levels.
- Q2. Do you have people who help you manage your diabetes? If you do, who are they, and how do they support you?
- Q3. Are you facing any difficulties while trying to manage your diabetes? If yes, can you explain what they are?
- Q4. How have these challenges affected your ability to self-manage your health condition?
- Q5. How do you deal with these challenges?
- Q6. How would you describe your experience with the HUB program in general? This includes the support received and your satisfaction with the program.

### Data analysis

Each conversation was recorded and transcribed verbatim, and descriptive thematic analysis was used to make sense of the data. Members of the research team listened to the recordings to ensure that the transcripts were accurate. Any transcription errors were corrected. The qualitative data analysis was conducted independently by

two members of the research team who were trained in qualitative design. Each individual read and reread the transcripts and assigned codes, which were organized into themes. A third member reviewed the codes and themes. The team collectively examined the codes and themes to ensure accuracy and to address discrepancies. The coding and categorization process was aided by the use of NVivo 12.0 software. A summary of the codes and themes was forwarded to the HUB staff to seek their input regarding the accuracy of the results.

## Results

### Demographic characteristics of interview participants

Of the HUB participants, 11 agreed to participate in the study and were interviewed. The interviewees self-identified as African Americans ( $n = 7$ ) and Caucasians ( $n = 4$ ). About 27% ( $n = 3$ ) were male and 73% ( $n = 8$ ) were female. Their mean age was 61.45 years ( $SD = 6.22$  years). The duration of diabetes diagnosis ranged from four to 15 years, and most had lived with the condition for at least five years before starting the HUB program.

### Lifestyle management

Adopting healthy lifestyle behaviors is critical to effectively manage T2D and to benefit from diabetes self-management support. Participants were asked to explain what they do to take care of their health-specifically, the things they were doing differently for better health. Although the study participants brought up other ideas as they related to their lifestyle management, the summary below-which provides descriptions and inclusive quotes from participants-describes the most commonly occurring themes.

### Dietary behavior changes

Given the notable impact of diabetes on weight and metabolic regulation, adopting healthy dietary behaviors is critical to effectively manage T2D. When participants were asked about the types of changes they made to their diet to care for their health, they described eating more vegetables, cutting back on sugary foods, reducing portion sizes, and generally avoiding unhealthy foods. Many participants had adjusted their diets and stated that they were eating more fruits and vegetables. For example, Participant 11, age 62, stated, "I eat vegetables all the time. I eat vegetables like three times a day; I eat fruit throughout the day." Participant 2, age 72, noted, "I'm basically eating fruits and vegetables, fresh fruits and vegetables, and doing nuts and seeds. When money allows, I might have shellfish, but other than that, basically that's all I'm eating now."

Some participants were concerned about the sugar in fruit and were therefore cautious regarding their fruit intake, only occasionally consuming fruits such as apples, pears and bananas. Participant 3, age 67, stated:

- I'm still scared of the sugar. I'll grab an apple or a pear every now and then. I eat a banana every once in a while. I have grapes... So that's what I consume in the fruit. Like I say, I don't venture having too much of the fruit. It's too much.

Participant 7, age 63, stated, "The fruit cups run my sugars up, so I don't mess with them no more."

Some participants indicated that they had reduced their consumption of unhealthy foods or were avoiding unhealthy foods in general. Participant 7, age 63, said, "My diet, I've changed where I drink more

water, no fried foods, no pork and no red meat. Basically, it's fish or chicken. More green vegetables ... I like potato chips, but I've cut way down." Participant 4, age 52, stated, "I try to cut the bad stuff and try to eat more good stuff. More vegetables, grains. I try to incorporate them when I can." Participant 11, age 62, reported:

- I used to drink soda, just like my mind was going bad. I used to drink Pepsi just like ... When I would open my eyes, I would grab a Pepsi from beside the bed and drink it, but I'm not like that now.

Some participants knew how to incorporate frozen vegetables into their diet. They also indicated that they were knowledgeable about how to use canned foods—that is, they rinsed and drained the canned food before consuming it, which helps to substantially reduce the concentration of sodium. Participant 1, age 89, said, "Now I know how to go to frozen, but a lot of people don't. They just do can and they don't realize, and they don't rinse it off because I've done that also." Other participants had learned how to read ingredient lists and made purchases based on the caloric content of various foods. Participant 8, age 53, stated, "I learned here how to read the ingredients, and now I buy food based on the low calories."

Participants also reported controlling their diet by reducing portion sizes, being intentional about eating a balanced meal, and not eating the same way they used to. Participant 5, age 57, reported:

- I cut down on my eating. Before, I would eat two plates of dinner, and now I'm trying to focus on cutting down. And I'll have one piece of meat, like a piece of chicken, maybe a little bit of potatoes, and a vegetable.

Participant 6, age 60, echoed this:

- I shifted my diet. I used to be a real starch person. I love pasta. Pasta and noodles. And now it's just like, it's not that I don't want it. I do eat it when I have it, but I don't eat it like I used to

### Active lifestyle behaviors

Engaging in physical activity is a key component in preventing and managing T2D. Physical activity aids with weight loss, improves insulin sensitivity, and helps in controlling blood glucose. When asked about their lifestyle and how much exercise they did each week, many participants indicated that they engaged in only limited physical activity. They reported incorporating some exercise, such as walking. For example, Participant 8, age 53, said, "I walk as much as I can ... I don't do it as often as I wanted to." Some participants reported walking their dogs for exercise. Participant 6, age 60, reported: "I have a dog that I try to walk. I don't walk far, but I try to do a little walk in front of my house." Other participants reported doing some seated/chair-based exercises frequently. Participant 11, age 62, said, "I be doing the exercise that you sit in the chair, and you take the ball and put it between your legs and squeeze the ball." Participant 3, age 67, stated:

- I do exercises, and I do a lot of that at night. When I lay down or sit on the side of my bed, I do twist a little sitting on the side of my bed, like that. Nothing where I get up and do the exercise. Nothing like that now.

Some participants reported doing these activities more than once each week. Participant 5, age 57, stated, "I try to walk every three days, and plus when we go to Walmart, and I like to walk inside." Participant 7, age 63, stated, "We walk around the track twice a week."

### Glucose monitoring

Regular blood glucose monitoring is essential in T2D management. When asked how often they checked their blood glucose level, most participants responded that they checked it regularly, in many cases multiple times per day. They reported monitoring it regularly to ensure that it stayed within a target range. Participant 3, age 67, said, "I can check them three to four times a day. I'm always checking on it to make sure it is where it's supposed to be." Some participants reported checking their blood glucose level before every meal and before going to bed. For example, Participant 1, age 89, said, "I check my glucose before every meal. In the morning before every meal and at nighttime." Although most interviewees monitored their glucose level many times daily, some reported checking it only once a day, and some reported not checking it daily. Participant 2, age 72, reported, "I check my sugar once a day." Participant 5, age 57, stated, "I don't do it every day. I check my sugar every couple of days."

### Support System

A support system is pivotal in helping people with diabetes manage their condition effectively. Having a support system can benefit those living with diabetes, as it can provide day-to-day assistance in preparing healthy meals, motivate them to adhere to their treatment plans, and provide emotional support. When asked about their support system, participants mentioned support from family members, friends, their health providers and the HUB staff. The involvement of spouses, children, and friends was of paramount importance to participants, providing them with assistance, encouragement to exercise, and accountability in various respects, such as meal preparation, health monitoring, and motivational support. For example, Participant 9, age 60, stated, "I have my husband's side of the family; they're still checking on me and making sure I'm doing okay." Participant 8, age 53, said:

- My daughter and my best friend are my best support system. My daughter brings me healthy food to try and she encourages me to try different food options. She calls and says [it is a nice day, let's go walk]... My best friend and I, we are walking partners.

Participant 6, age 60, stated, "My son is staying with me. He helps me a lot. So, and it just works." Participant 10, age 60, stated, "Yes, my family. I have a big family, nice support system."

While some participants reported having a support system, others were socially isolated and lacked a strong support system to assist them with their disease management. Participant 4, age 62, said, "I do it on my own. They ask me these questions sometimes about how I'm doing, but I'm pretty much by myself." Participant 2, age 72, indicated that they had no social support to help with their care outside of the program: "Other than HUB? Here, and that's about it."

Some participants reported receiving support from their health professionals and HUB staff, who helped monitor participants' health status, provided them with guidance regarding their diet and lifestyle, and answered their questions. Participant 7, age 63, reported, "Between my doctor and HUB, they help me keep it right. If I have a question, I call [name] and she'll call the lady for me." Participant 3, age 67, stated, "They do a good job of keeping everything checked, keeping my A1C checked. I have a diabetes doctor I go see every so often. He is very helpful. I've been doing pretty good so far." Participant 1, age 89, reported, "They are very helpful, and they are really concerned about your diet and your weight." Participant 6, age 60,



said, “The nurse and the therapist, they’ve gone over and above to help me.”

### Challenges with diabetes self-management

Often, the inability of individuals diagnosed with diabetes to adhere to the recommended health guidelines is related to difficulties in adopting lifestyle changes, financial constraints, stress and physical limitations. When the participants in this study were asked to discuss the difficulties they faced while managing their health condition, they reported challenges related to diet, exercise, and their emotional lives.

#### Dietary challenges

Participants reported having occasional cravings for, and impulses to eat, unhealthy food items such as soda and sweets. However, they acknowledged that they tried to eat healthily the rest of the time. Participant 9, age 60, said, “I started ice creaming again, my sweets and cravings and all.” Participant 2, age 72, stated, “Sometimes I binge, and I eat garbage. But mostly it’s just fresh fruits and vegetables and nuts and seeds.” Experiencing a traumatic event caused some participants to start binging on sweets as a coping mechanism. Participant 10, age 60, reported: “My [name] passed, so it threw me off and I’ve been binging with ice cream and sweets and stuff like that.”

Additionally, most participants cited the high and rising prices of healthy foods as a challenge they faced in their attempts to maintain a healthy diet. Some participants expressed a desire for fresh produce but noted that it was too expensive. Participant 1, age 89, mentioned the food shortage and the price of foods and fresh vegetables and things going up. I walked in and I saw the watermelons. Do you know watermelons are almost \$9 at the store? I wanted one so bad, but I was like I can’t pay \$9 for a watermelon.

A number of participants expressed frustration that the healthy foods they needed to manage their health conditions were becoming pricey. Participant 8, age 53, noted, “The food that is good is not affordable.” Many participants faced financial challenges and economic barriers, finding it difficult to afford healthy food on a fixed or limited income. Some participants mentioned that the stimulus checks they received during the pandemic helped them through the month. However, such additional support having ended, some participants struggled to eat healthily for an entire month. For example, Participant 4, age 52, said, “And the pandemic is over now, so [inaudible] back. So, it’s kind of challenging sometimes towards the end of the month to eat healthy.”

Participants also acknowledged the necessity of food support. They indicated that this support helped them stretch their limited budgets and promoted food security. Participant 1, age 89, reported: “The food that we get from here always comes in the nick of time, so it saves me money, especially on the fruits and the vegetables.” Participant 7, age 63, stated, “I look forward to getting my vegetables when my money or my food stamps run out. That box helped carry me through until the next time for me to get food stamps.” Participant 4, age 52, said, “It helps fill the void from the reduction in my food stamps. So that’s a big help.”

### Challenges with physical activity

Some participants reported limited engagement in physical activity due to mobility issues. For example, Participant 9, age 60, stated:

- I don’t exercise right now. I had a knee replacement and it’s healing. And [name] said scar tissue is causing it to heal slowly and [name] just recommended that I go back into physical therapy to help break up some of the scar tissue because by now I should be walking better and feeling better.

Participant 4, age 52, said, “Right now, I have foot problems. I can’t say the word. Nerve damage in my feet. I have limited exercise.” Participant 2, age 72, mentioned a similar challenge: “I don’t exercise at the moment. I have [an] arthritic hip that gives me trouble, so I stopped going to the gym, I stopped running and that type of thing.”

#### Emotional challenges

Some participants mentioned dealing with emotional challenges, such as stress and depression, that interfered with their self-care. For example, Participant 6, age 60, stated, “I have a lot of stress in my life ... Trying to get my daughter help and off the streets.” Participant 9, age 60, reported, “I’ve been fighting depression all my life.”

Some participants reported feeling overwhelmed due to complex self-care routines and worries about the continuous use of prescription medications. Participant 11, age 62, stated:

- I’m scared to take it. I mean, I am not trying to get my [inaudible] and stuff messed up. I know two people that were in the hospital, they said because of the Metformin, and I’m not trying to be the third.

Some participants expressed frustration with delays in obtaining medical appointments and referrals. Participant 2, age 72, stated:

- I saw my cardiologist and their office say that [we’ll call you and make an appointment]. That was back in March, I think. They haven’t made the appointment yet ... I’m still waiting for some referrals that they have made, and I haven’t heard from anybody yet.

Some participants visited their healthcare providers at appropriate intervals to have their health status monitored. To optimize glucose control and prevent complications, timely appointments can also help providers adjust treatment plans based on the patient’s progress.

#### Coping mechanisms

Adopting effective coping mechanisms is also important in minimizing the barriers to T2D self-management. These mechanisms may include educational, emotional, and practical aspects. When asked what they did to cope with the difficulties they faced in managing their health conditions, some participants reported that having self-discipline was very helpful. For example, Participant 2, age 72, stated, “You just sit long enough, [the cravings] go away. And then if you fall into them, then you beat yourself up and you feel guilty.” Participant 3, age 67, stated, “I just watch what I eat, and it wasn’t hard for me to do that. I just decided it has to be done. I have to manage it.” Participant 8, age 53, noted, “It is a mind thing. When I started, it was difficult to eat wheat bread, now I like them.”

Other participants stated that going to therapy was an important coping mechanism as it helped them to improve their stress management skills and learn to manage mental health challenges. For example, Participant 6, age 60, said, “I have a therapist and she gives me techniques and stuff on how to deal with stress.” Others stated that sharing their experiences with others helped them feel better. For example, Participant 8, age 53, said, “Some of my coworkers also

have diabetes; we talk and exchange ideas, meal ideas.” Participant 9, age 60, said, “Talking to people sometimes makes other people feel better.” Some participants reported that having a longstanding relationship with their doctors helped them with personalized guidance and enabled them to manage their health conditions effectively. Participant 1, age 89, said, “I have been going to my doctors so long, I just say, and they keep me on a regular regimen, so we’re good.”

### Overall experience and perceptions of the HUB program

To understand the overall impacts of HUB on the participants, interviewees were asked to discuss their overall experiences with the program. Participants described the comprehensive support received, the caring support from the staff, health monitoring, and the sense of community they experienced through the program. Participant 1, age 89, stated, “They are very helpful. They are really concerned about your diet, and your weight, and stuff.” Participant 11, age 62, said:

- Well, for one, if there is anything that I need I know they will get it. If you need any diabetic equipment or if I need to reach out to a doctor or anything, or anything for my medicine or whatever, the ladies will reach out to the people or whatever.

Participants also reported HUB to be an accessible health monitoring site, with the staff willing to have conversations with participants and to help them with any health-related problems they may encounter. Participant 3, age 67, reported:

- It gives you a place you can come and get your blood check, your sugar check. You can come for conversations. You have a problem, you can talk to somebody and somebody here is going to say, “Let me see what I can do for you.”

Participants also acknowledged that the frequency of appointments, health tracking sheets, and the care provided by staff motivated them to adhere to self-care activities. For example, Participant 10, age 60, reported:

- It keeps me on the right track because I know I have to come weigh in, I know I’m going to get my A1C done ... They give me the track sheet to do my blood sugars and stuff at home. It keeps me on my toes.

Participant 9, age 60, stated:

- Something to keep me motivated. In my opinion, it’s very important. And like I say, having a nice family support group to keep me motivated, keep me going because I was spiraling down to a little mild under grade depression.

Overall, all participants had very favorable opinions of the HUB program and expressed their appreciation for the support the program provided in managing their health conditions. Participant 2, age 72, reported, “I think this is an ideal program, so I’m glad I found it.” This sentiment was also expressed by Participant 3, age 67, who said, “All I can say is it is an excellent program. I enjoy coming here. I’m glad that my doctor introduced me to this group, and it’s good. It’s good.” Participant 1, age 89, said, “I appreciate the program. I love it.”

## Discussion

Adherence to a healthy diet is the first diabetes management tool suggested to patients with T2D. The study population discussed their achievements and their challenges in this regard. According to

the CDC, diabetic patients in general can benefit from the Diabetes Self-Management Education and Support (DSMES) provided by local healthcare providers or community-based organizations [3]. The study participants were able to incorporate healthy food choices into their daily routines. The interviews also revealed different barriers to healthy eating that align with the nationwide factors with which people struggle when attempting to adopt healthy eating habits. Craving inappropriate food on which one used to binge was one of the most challenging issues in adhering to the new healthy nutrition plan. Another direct barrier to healthy eating was the high cost of adopting the new lifestyle. Many Americans are forced to choose unhealthy food due to the higher cost of fresh produce [29].

Exercise is the main component of a healthy lifestyle, and T2D patients should incorporate it into their lives to manage their condition and its complications. Although patients understand the critical role of physical activity for their health, and some of them exercise regularly, most patients often find it challenging to adhere to an activity routine [30]. The literature suggests that only 30 percent of T2D patients reach their exercise goals [31]. Mobility issues were mentioned as a barrier to exercise among the study participants—a common issue among older adults, specifically overweight patients. More than 17 percent of American adults whose weight falls within an unhealthy range suffer from arthritis [32]. Arthritis can impair physical activity and joint movement, as 30 percent of Americans with joint problems experience disability [33]. Of those diagnosed with diabetes (including type 1 and type 2), 47 percent also suffer from arthritis [34].

The participants reported that daily glucose monitoring was a sustainable tool for managing their blood sugar. Daily home monitoring of glucose levels and regular measurement of H<sub>A1C</sub> can help patients and their providers personalize treatment plans that will help each patient based on their unique needs [35]. Stress was also identified as a barrier to managing T2D, which aligns with the literature indicating that stress can increase blood sugar levels due to the release of stress hormones in the bloodstream [36]. Along with the possible emotional impact of stress on patients’ healthy behavior, a biochemical effect could result in insulin resistance and high blood glucose. The interviewees identified different coping factors. A support system was mentioned as a critical success tool, with some explaining how family and friends helped them to cope with their condition. As noted by the CDC, some people identified their healthcare provider and local community support system as supportive parties. Self-discipline and willpower were also recognized as coping mechanisms to manage diabetes and adhere to a healthy lifestyle [3]. Participants benefited from therapy sessions to deal with the daily burden of diabetes. As reported by Dos Santos Mamed et al., [37], access to therapy interventions and participation in such sessions positively determine diabetes self-management. Stress management is also an effective approach to managing diabetes, as stress reduction techniques could help to reduce levels of hemoglobin A<sub>1C</sub> [38].

### Implications for policy and practice

To assist low-income diabetic patients with diabetes self-management, community-based stakeholders and federal entities could provide them with financial aid, including vouchers or incentives to purchase fresh fruits and vegetables and lean proteins. Assistance with people’s diets could also be implemented by directly distributing fresh produce among identified patients in need. Educational interventions to teach T2D self-management skills positively impact

patients' lives. To remove the barriers to self-managing techniques, such as food cravings and stress, patients could use accessible therapy sessions and group support. The availability of such services in existing programs could be beneficial.

Physical therapy is suggested to facilitate daily activity for patients struggling with movement. Also, accessible community recreational centers that provide water aerobics, yoga, walking trails, and local gathering events could be an engaging approach to assist diabetic patients control their blood glucose levels. Online fitness programs with technology training, including Zoom sessions, can be convenient for patients who prefer to exercise at home. Incorporating point systems and considering rewards could be motivational approaches that might help patients combat the challenges that prevent them from being active.

## Conclusion

The aim of this qualitative study was to examine participants' experiences with diabetes self-management. To manage their condition, many participants made positive changes to improve their overall health. These changes included eating a well-balanced diet and self-monitoring their blood glucose levels, ranging from multiple times per day to once every couple of days. However, many participants engaged in only limited weekly exercise. Support systems outside of the program were reported, while others dealt with social isolation, and some relied on healthcare providers and the program for their support needs. Challenges include struggles with cravings, affordability, and the high cost of fresh produce in maintaining their healthy diets. In terms of physical activity, participants' mobility issues were the result of pain, nerve damage, and recent surgery, all of which made it difficult to exercise more. Further research should focus on addressing the challenges that interfere with diabetes self-management, providing practical interventions and identifying available resources to support individuals with diabetes to improve their health outcomes.

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