ISSN: 2581 – 3633

International Journal of Medical Science and Advanced Clinical Research (IJMACR)

Available Online at: *https://www.ijmacr.com*

Volume – 9, Issue – 6, November – 2026, Page No.: 01 – 09

Barriers and Facilitators to Achieving Glycaemic Targets Among Adults with Diabetes: Insights from a Qualitative Study

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How to citation this article: Roselin Mohandas, Rajesh Kumar Konduru, Prahankumar R, Velavan Anandan, Manikandan Mani, Anil Jacob Purty, "Barriers and Facilitators to Achieving Glycaemic Targets Among Adults with Diabetes: Insights from a Qualitative Study", IJMACR– November – 2026, Volume – 9, Issue – 6, P. No. 01 – 09.

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Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Diabetes is one of the major causes of premature deaths globally which occurs on account of its complications due to uncontrolled diabetes. According to International Diabetes Federation (IDF) Diabetes Atlas (2025) reports, approximately 590 million adults (11.1%), worldwide are living with diabetes, this number is projected to reach 853 million by 2050.[1] The ICMR-INDIAB study, further highlights a disproportionately high burden of diabetes and prediabetes in southern regions of India [2].

Glycated haemoglobin (HbA1c) investigation is crucial in deciding the diabetes management and reducing its related complications for adults with type 2 diabetes mellitus (T2DM) [3]. HbA1c is approached as the reference standard for assessing long-term glycaemic

control. Studies have reported that those individuals with elevated HbA1c levels are associated with increase in intensity of cardiovascular risk events and chronic disease mortality [4]. Despite advancements in treatment modalities, achieving optimal glycaemic control remains a major challenge due to multiple influencing factors.

The compliance of people with diabetes as recommended by the physician is essential for effective management of diabetes which requires tailor-made intervention for each individual. Hence, regular patient-centred counselling and family involvement is essential to improve long-term adherence and to achieve better glycaemic outcomes. Henceforth, this study addresses to identify the hindering and facilitating factors in achieving good glycaemic control by exploring the experiences associated with diabetes from the perspectives of adults with Type 2 Diabetes mellitus residing in Puducherry district.

Materials and Methods

A line list of individuals undergoing HbA1c estimation by high pressure liquid chromatography using variant II Turbo machine (BIORAD, Hercules, California) method was obtained prospectively since May 2019 at the biochemistry laboratory (NABL accredited) of a tertiary care hospital. Participants (aged 21 years and above) with Type 2 Diabetes Mellitus for the past 6 months and above were were contacted and visited at their residences. Convenient sampling was used and participants were subjected to in-depth (face-face) interview using a semi-structured interview guide. The questions were open-ended allowing the interviewer to adapt the flow and ask probing and follow up questions to explore unique perception of every participant. The interviews were conducted in the local language (Tamil) from May 2019 to January 2020 both in rural and urban areas of Puducherry district. Each interview lasted for about 30 to 40 minutes.

Interviews were audio recorded, transcribed verbatim, and after appropriate translation to English, thematic analysis was carried out by comparing the transcripts constantly. After reading the transcripts repeatedly, the analysts transformed the direct quotations into condensed meaning units. Next the condensed meaning units in the transcripts were independently coded. Finally, the related codes were grouped together to form categories to identify the facilitators and barriers to achieve good glycaemic control.

The data collection was carried out till the data saturation was attained, that is, until when no new information was generated from the interviews. All transcripts were checked independently and data analysis was done. Any discrepancies in the formulated codes and categories between the analysts were rectified through discussion until consensus was achieved. Post interview structured health education was given to each of the study participants on symptoms of uncontrolled diabetes, hypoglycaemia and its management and emphasising the screening for complications. The study was approved by the Institute Research Committee and ethical clearance was obtained from the Institute Ethics Committee. Written informed consent was obtained from all participants prior to data collection.

Results

Among the 22 participants interviewed, 16 (72.7%) participants were those having poor glycaemic control. Many were unaware about level of good glycaemic control and about screening for complications of uncontrolled diabetes. Some stopped their medications once their blood investigation reports showed controlled

blood sugar levels. The most common barriers faced by majority of the participants in achieving good glycaemic control were lack of knowledge regarding risk factors, occurrence of complications and treatment continuation; poor treatment adherence, lack of time in following lifestyle modifications and financial constraints. Adequate knowledge about diabetic diet, importance of treatment adherence and availability of free medical services provided by the government hospitals were major facilitators for achieving good glycaemic control.

Table 1: In-depth interview guide
1. What do you think are some of the reasons for your good glycaemic control/ poor glycaemic control?
2. What do you think is the role of lifestyle modifications on glycaemic control?
3. Can you mention some important lifestyle interventions which you follow for glycaemic control?
4. Reasons for not following any/other lifestyle modifications.
5. What do you think is the role of drugs/ insulin in keeping your blood sugars in control?
6. What is your opinion about regularity in taking medications?
7. Reasons for not taking medications/ insulin regularly.
8. Reasons for selecting government/private hospital for your treatment.
9. Is it important to monitor blood sugars and follow up to screen for complications?
10. Reasons for not monitoring sugars and not going for follow up?

The data analysis of the in-depth interview formulated the following categories.

1. Barriers to achieve good glycaemic control
2. Facilitators to achieve good glycaemic control

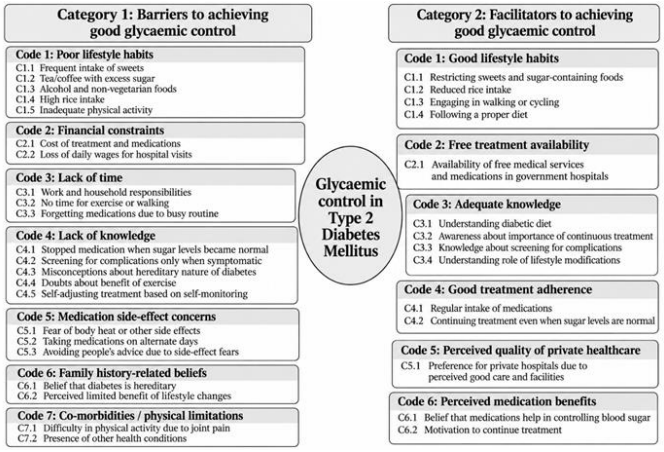


Figure 1: Coding Tree depicting the factors influencing glycaemic control

The responses obtained from the participants are mentioned below and the statement in italics is verbatim from the participants.

Category 1: Barriers to achieve good glycaemic control

Code 1: Poor lifestyle habits

From the in-depth interview conducted, participants followed poor lifestyle habits like intake of sweets, taking tea or coffee with excess sugar, liquor intake along with non-vegetarian foods, consuming more quantity of rice, lack of physical activity. The responses given by some of the respondents are given below

"Since I take lot of liquor along with non-vegetarian foods and I am very fond of

sweets"

"I eat lot of sweets, I like sweets, so didn't follow diet."

"I eat a lot of sugar containing food items and I take coffee or tea with excess sugar in it"

"Rarely I go for walk, I do walk only when I am free and when I don't have work"

"I take proper diet, But recently I stopped going for walking"

"I was lazy, so I didn't go for cycling"

Code 2: Financial constraints

Participants said that economic burden like cost of treatment and medications and loss of

wages on visit to hospital were hindrances in achieving good glycemic control. The following

were their responses.

"I can't and go to get medicines as an when I think, I have to earn every day for my children's

education and for daily meals"

"I don't go to hospital for blood sugar monitoring because I will lose my daily wages"

Code 3: Lack of Time

From the in-depth interview, lack of time due to work at employment or household were

major reason for not following any measures for lifestyle modification. The responses given

by them are mentioned below.

"I don't follow any life style modifications like yoga, meditation etc, because I don't
have time"

"I don't have no time to dedicate and go for walking"

"I have no time for physical activity"

"I am busy with continuous work to follow lifestyle modifications"

"Being very busy with household activity, I forget to take medications at times"

Code 4: Lack of knowledge

It was evident that lack of knowledge was an important factor leading to poor glycemic
control. The following are the responses given by them.

"When blood sugar values were were normal in test reports, I stopped taking medications"

"To get screening done for diabetes complications, one should have episodes of giddiness or fainting, I don't have any such symptoms to do screening for complications."

"Doctors say diabetes is due to gene inherited from parents. I did exercise for 10 years
and walking for 20 years, so as to prevent getting diabetes from my parents, But I happened
to become a diabetic pateint. So, I doubt whether exercise will help"

"I monitor blood sugar by myself at home and accordingly I myself manage my treatment"

Code 5: Side effects

Participants expressed their views that fear of medication side effects was one of the
important cause of poor treatment compliance. Their responses are listed below.

"Taking medications regularly will cause body heat. So i take medications on alternate
days"

"I didn't take because it might cause bodily side effects, so at times i grind fenugreek and
and consume one spoonful instead of medications".

"Then it pains on administering insulin injection. Thighs pain like anything"

"They asked to administer insulin twice a day I cry, it will be very difficult, Will feel
like even dying and that this diabetes itself is taking away my life"

"I took medicines regularly for one month and blood sugar levels was found to be 270,
they increased the dosage of medicines. Then i started urinating frequently at night, so i
stopped taking medications"

Code 6: Family history

Participants felt that family history can cause Diabetes mellitus which cannot be controlled.

"I have inherited diabetes from my parents, nothing can be done. We can prevent to some
extent but not completely"

Code 7: Co-morbidities

Associated ailments was one of the reasons in preventing the participants in involving
themselves in physical activity like walking. Following are the responses given.

"Since i have heart problem, i will have breathing difficulty on walking"

"On going for walk my foot turns red and painful, which i realise only on removing my
shoes. So I don't go for walking"

"I am not able to go for walking after retirement because of ageing"

Categories 2: Facilitators to achieve good glycemic control

Code 1: Good lifestyle habits

Some of the individuals practiced dietary habits like eating less rice and more wheat based foods, restricted intake of sweets, non-vegetarian foods, fruits and sugar cut down in tea, coffee, physical activity like walking, exercise. The responses given by some of the respondents are given below.

"Taking diabetic diet like eating more vegetables, less rice, two times tiffin and afternoon rice, eating more vegetables, avoiding junk foods, eating less spicy foods, less oil consumption, millets and sprouts to be taken, taking tea or coffee with half sugar, fruits containing less sugar can be consumed. Papaya, banana, mangoes and watermelon to be avoided. Vitamin c rich fruits to be taken."

"I go for cycling for 40 minutes every day"

"Lifestyle modifications like proper diet intake like i avoid eating sweets, I eat less rice and eat more wheat-based foods, walking and avoiding alcohol helps in controlling blood sugars "

"I quit smoking beedi, cigarettes and chewing betel leaves"

Code 2: Free Treatment

Participants said that treatment provided free of cost in government hospital helps them in overcoming their financial issues pertaining to treatment adherence.

"Private hospital is expensive. So, I go to government hospital, where i get same medicines at free of cost"

"Government hospital is near my residence; treatment is available free of cost"

"I go to government hospital because it is free of cost and there the doctor givesmedicines, which i take regularly"

Code 3: Adequate knowledge

Participants had adequate knowledge about diabetes like importance of maintaining and monitoring blood sugars, screening for complications and physician consultation. Their responses are mentioned below.

"Yes, it is important, to keep blood sugar under control, if not some problem will arise like heart problem or BP problem"

"Yes, it is important. If, not it might lead to heart problem, kidney problem etc"

"Yes, blood sugars to be checked and should consult the doctor with reports"

Code 4: Good treatment adherence

Participants gave the following responses for their good adherence to treatment which includes taking medications regularly, routine blood sugar monitoring, screening for complications and following physician's advice.

Participants gave the following responses.

"Since I take insulin regularly and follow diabetic diet my sugar levels are in control"

"I follow as per instructions of doctor like taking medications regularly and following diabetic diet"

"I go for blood sugar check up, get consulted with the test reports and follow doctors advice"

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Code 5: Quality of care in private hospitals

Participants express their views that they prefer private hospital because it has all

medications that are effective in adequate quantity and provides appropriate treatment

without delay.

"Medicines from private hospital is effective, it has more power"

"Initially I went to government hospital for treatment because it is free of cost. But now I

go to private hospital as the new medications prescribed to me is available there."

"In private we can pay and get medicines once a month, they have medicines with them"

"I go to private hospital for treatment because we can get consultation done on time"

Code 6: Medications facilitate diabetic control

Participants are aware that medications help in achieving good glycemic control and also

about treatment adherence, screening and complications of uncontrolled diabetes.

"Medication and insulin plays an important role controlling blood sugar."

"Medications and insulin help to some extent when taken alone. But when exercises are

also done along with it, there is chance to prevent further increase in blood sugar levels."

Discussion

Achieving glycaemic control in type 2 diabetes mellitus (T2DM) is influenced by patient, treatment, socioeconomic and healthcare-related factors. In this qualitative study of 22 adults with T2DM in Puducherry, 16 (72.7%) had poor glycaemic control. Glycaemic control depended not only on pharmacological treatment but also on diabetes knowledge, lifestyle practices, treatment adherence, competing responsibilities, financial circumstances, family support and access to healthcare. Similar multilevel influences on medication adherence and self-management have been reported in Qatar and Nigeria.[5,7]

Lifestyle practices and competing responsibilities

Participants with poor glycaemic control described frequent consumption of sweets and sugar-containing beverages, high rice intake, alcohol use and inadequate physical activity. Those reporting better control described reducing sweets and rice, choosing healthier foods and undertaking activities such as walking or cycling. Previous qualitative studies have likewise identified misconceptions about diet and exercise, cultural influences and the affordability of healthy food as barriers to lifestyle modification.[8,10] Patients have also described diabetes self-management as physically, emotionally and socially demanding, with generic dietary advice sometimes difficult to implement.[9] Occupational and household responsibilities further limited time for exercise and contributed to missed medication. These findings support practical, individualized counselling that fits patients' routines, food preferences and socioeconomic circumstances.[8-10]

Knowledge, illness perceptions and medication adherence

Knowledge gaps and misconceptions were prominent. Some participants stopped medication when glucose levels improved or believed that complication screening was needed only when symptoms appeared. Others questioned the need for exercise or perceived diabetes as largely predetermined by heredity. Such beliefs may weaken long-term self-management and preventive care. Similar barriers—including inadequate knowledge, misconceptions, medication side effects and financial or

family difficulties—have been reported in Indian and international qualitative studies.[6,8,12]

Participants also described altering or discontinuing medication because of perceived adverse effects and expressing fear or discomfort about insulin injections. These experiences are consistent with studies identifying treatment concerns, communication difficulties, cost and healthcare organization as contributors to non-adherence.[5-8,11] Medication non-adherence should therefore not be interpreted simply as unwillingness to follow advice. Healthcare professionals should ask about patients' concerns, explain the need for continued treatment even when symptoms are absent or glucose improves, and discuss insulin administration and adverse effects in a supportive manner.

Financial circumstances, family support and physical limitations

Treatment costs, glucose-monitoring expenses and lost wages during hospital visits created financial difficulties, particularly for participants dependent on daily earnings. Affordability also influenced the feasibility of recommended dietary changes. Similar socioeconomic barriers have been reported among people with T2DM in Türkiye, Nigeria and South Africa.[10-12] In contrast, participants valued free medicines and treatment at government facilities, suggesting that reliable access to essential medicines may support continuity of care.

Family and social support could help patients maintain medication routines and diabetes-related activities. Previous studies have described practical, financial, informational and emotional support from relatives as facilitators of adherence.[7,10,11] Where acceptable to patients, family members may therefore be included in education and counselling. Comorbidities, painful lower-limb symptoms, cardiac symptoms and age-related limitations also restricted physical activity in the present study. Lifestyle recommendations should consequently be adapted to each person's functional capacity and clinical circumstances rather than delivered uniformly.[13]

Healthcare accessibility and implications for care

Healthcare services acted as both facilitators and barriers. Although free treatment was valued, some participants preferred private facilities because they perceived medicines to be more readily available and consultations to involve less waiting. Previous qualitative research has similarly highlighted the influence of communication, medicine availability, clinic organization, access and continuity of care on adherence.[5,7,10] These findings suggest that glycaemic control requires attention to the delivery of care as well as individual behaviour.

The findings support structured, ongoing and patient-centred diabetes self-management education rather than one-time information provision. Education should address misconceptions, medication concerns, diet, physical activity, hypoglycaemia and complication screening, while considering daily routines, financial constraints, family support and physical limitations. Culturally appropriate, individualized and continuing support is consistent with the American Diabetes Association's recommendations for diabetes self-management education and support.[13] The post-interview education provided in this study addressed symptoms of uncontrolled diabetes, hypoglycaemia with its management and importance of complication screening; integrating similar support into routine care may help patients translate knowledge into sustainable self-care behaviours.

Strengths and Limitations

The qualitative design and Tamil-language, face-to-face semi-structured interviews enabled participants to describe their experiences in depth. Independent coding and consensus between analysts strengthened the thematic analysis, and data collection continued until saturation. However, convenience sampling at a tertiary-care hospital may limit transferability to the wider population of people with T2DM in Puducherry. Recall and social-desirability bias are possible, and the perspectives of healthcare providers and family members were not separately explored. Despite these limitations, the findings broadly align with qualitative studies from India and other settings, highlighting the interaction of personal, social, economic and healthcare-related influences on diabetes self-management.[5-12]

Conclusion

This qualitative study indicates that glycaemic control among adults with T2DM is shaped by lifestyle practices, knowledge and illness perceptions, medication adherence, financial constraints, competing responsibilities, physical limitations, family support and healthcare accessibility. Improving control requires a multidimensional approach combining ongoing diabetes education, individualized lifestyle counselling, discussion of treatment concerns, appropriate family involvement and reliable, accessible healthcare services. Patient-centred support that reflects patients' routines, resources and capabilities may help sustain self-management and reduce the risk of diabetes-related complications.

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