Perceived Dietary Restrictions and Lifestyle Modification Challenges among Patients with Type 2 Diabetes Mellitus: A Qualitative Evaluation in Rural Mangaluru

Revathi TM

Department of Community Medicine, KS Hegde Medical Academy, Nitte (Deemed to be University), Mangaluru, India

Corresponding author: Dr Revathi TM, Assistant Professor, Department of Community Medicine, KS Hegde Medical Academy, Nitte (Deemed to be University), Mangaluru, India.

E-mail: tmrevathi3@gmail.com

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Abstract

Background: Type 2 Diabetes Mellitus (T2DM) demands extensive behavioral changes, which are viewed subjectively among individuals with diabetes. Treatment compliance, though only a part of the treatment strategy is considered to aid in complete cure irrespective of whether other modifiable risk factors are accounted for. **Material & Method:** A qualitative study was conducted from August to September 2025 in rural Mangaluru, Karnataka. The primary investigator conducted in-depth interviews among 22 study participants who were recruited by purposive sampling until thematic data saturation was obtained utilizing the probing technique. Data was analyzed using Gale et al.'s framework method using an inductive-deductive approach. The Quality of Life in Diabetes (QOLID) framework, modified after pilot testing, was used as an a priori coding frame. **Results:** While treatment compliance was perceived as a low-stress routine facilitated by extensive utilization of the free health care system, modifying traditional eating habits introduced psychological distress, resultant societal stigma and food-related isolation during local and cultural festivities. **Conclusions:** Chronic diabetes care in rural settings is driven by the psychological demands of lifestyle modification rather than access to medication or financial constraints. The scope of integrating culturally tailored nutritional programmes as a standard of care in the primary healthcare system may benefit long-term behavioral change communication strategy among diabetic patients.

Keywords: Type 2 Diabetes Mellitus; Quality of Life; Purposive Sampling; Diet advice tolerance; QOLID

Introduction

Diabetes mellitus represents an escalating chronic crisis characterised by baseline metabolic dysfunction and progressive multi-system complications.[1] As per the IDF Atlas reports 2024, the prevalence of diabetes in adults aged 20 to 79 years in South east Asia is 9.7 percentage with 0.33 million mortality estimates in India. Globally, epidemiological transitions project that the collective burden of diabetes mellitus will progressively position India as the second leading country to have maximum diabetes burden next to China by 2050.[2] Developing nations like India are situated at the apex of this epidemiological surge, currently tracking an estimated 101 million individuals living with active diabetes, with rural-to-urban migrations and changing lifestyle structures rapidly shifting the rural landscape.[3,4] This transition challenges rural healthcare systems that have been tailored to treat acute communicable diseases more than chronic non-communicable diseases.

The control measure of diabetes focuses on lifestyle modification and a shift of attention from pure clinical parameters.[5,6] The World Health Organization defines Quality of life (QoL) as an individual's distinct perception of their life status embedded within local cultural norms and value frameworks.[7] In Type 2 Diabetes Mellitus (T2DM), QoL varies based on how an individual manages his or her disease status along with the modifiable lifestyle factors.[8] Robust monitoring of these patients is crucial to pinpoint the non-clinical barriers such as psychological burnout, dietary pattern, and treatment satisfaction, which also play an important role in diabetes control.[5] While quantitative analysis captures absolute

numbers, a qualitative framework explains the structural "why" behind patient compliance, identifying unique gaps between clinical advice and realistic patient-centered QoL.[9] There are previous studies assessing the quality of life in diabetes in different geographic locations around the world.[10-13] There is limited evidence of similar qualitative studies done in India[14], particularly in rural Mangaluru. This paper evaluates the behavioral, and lifestyle modification challenges of diabetic individuals within rural Mangaluru to give suggestions aiding primary health care support structures. It aims to explore the dietary and psychosocial determinants, specifically perceived dietary restrictions that affect diabetes management, alongside treatment compliance.

Material & Methods

All primary qualitative interactions, data collection protocols, and analyses were carried out by the primary investigator. The investigator possesses a postgraduate MD degree in Community Medicine with advanced training in qualitative research methodology and she works in a medical college as Assistant Professor. Though the study setting belonged to rural field practice area of the teaching institution, prior to the study's commencement, the research investigator had no pre-existing personal or health care provider relationship with any of the selected participants. Though an implicit clinician–institution power relationship cannot be overlooked, the study was conducted in neutral community settings. The participants were detailed that their participation would not affect the routine treatment or health services they receive. Participants were informed about the researcher's clinical background, academic research credentials, and the objectives for evaluating the non-pharmacological determinants in diabetes care.

Study Design and Setting

A community-based, qualitative study was conducted in 2 rural villages, Ira and Mudipu, between August and September 2025, which are rural field practice areas of the teaching institution. Most of the families rely on agriculture, daily wage labor or beedi rolling in this study setting. The in-depth interviews were recorded one-to-one in private, mutually convenient, neutral settings without the presence of a third party.

The open-ended descriptions regarding long-term therapy, dietary modifications, socio-cultural and economic influences among individuals with established Type 2 Diabetes Mellitus were obtained.

Participant Selection and Sampling Criterion

A purposive sampling strategy was employed to select individuals capable of providing meaningful insights into the behavioral needs for chronic diabetes management. The recruitment of study participants was guided by the principle of thematic data saturation—the point beyond which subsequent participant interactions yielded redundant codes and no new sub-themes emerged regarding lifestyle modification. Though an interview guide was used, the primary investigator RT adopted a conversational style throughout the interview to have more clarity on patients' insight and perspectives on the disease burden and its management utilizing the probing technique.

Participants aged 30 years and above, diagnosed with Type 2 Diabetes Mellitus for at least one year (ensuring adequate exposure to long-term compliance and understanding of the disease), and residing permanently in the designated rural areas were selected for the study. Individuals presenting with acute cognitive impairment, known psychiatric conditions, or medical complications that limit speech or comprehension were excluded from the study. The potential participants were identified and screened through non-communicable disease (NCD) registers of the Primary Health Centre in the study setting. A total of 28 eligible individuals were shortlisted and initially approached for data collection with the help of local Accredited social health activist (ASHA worker), out of which 6 individuals declined to participate due to seasonal domestic commitments. A total of 22 participants were interviewed; saturation was reached at the 16th interview, beyond which 6 additional interviews were completed to confirm the consistency of the themes and sub-themes obtained.

Data Collection Tool and Framework

Primary qualitative data collection was guided by a semi-structured questionnaire derived from the thematic parameters of the validated eight-domain Quality of Life in Diabetes (QOLID) tool.[15] The interview guide was pilot-tested among three diabetic patients to ensure the linguistic feasibility, who were excluded from the final analytical dataset. The QOLID questionnaire, which consists of eight domains (treatment satisfaction, general health, symptom botherness, financial worries, emotional and mental health, diet advice tolerance, physical endurance and role limitation due to physical health), was used as an initial conceptual framework for data collection by in-depth interviews. For example, diet advice tolerance deals with restrictions while choosing food during eating out, choice over meals/ snacks when away from home and general avoidance of dining out, in view of their glycemic status. It reflected their general diet satisfaction.[15] The original domain on treatment satisfaction was modified as treatment compliance. Financial worries were reframed as low financial burden, while social role limitations and general health barriers were classified under societal isolation. Similarly, physical endurance and role limitation (generally viewed as tiredness), symptom botherness, emotional and mental health were integrated into effect on mental health. The modified domains after the pilot study were

incorporated from the broader eight QOLID domains based on the local needs and considering Indian context. The data assessment focused on collecting descriptive narratives and direct participant extracts on how the Quality of life of diabetic patients was altered due to the disease status. It included (a) Dietary pattern, (b) Societal isolation, (c) Treatment compliance, (d) Effect on mental health and (e) Low financial burden. The domains obtained were utilized as an a priori coding frame. Each interview lasted for 25 to 30 minutes. To protect patient data privacy and ensure confidentiality, all interviews were audio-recorded using a dedicated digital recorder after obtaining written informed consent from each participant. The audio recordings were transcribed entirely into Kannada, translated to English and then back-translated by an independent bilingual language expert. No personal identifiers were mentioned during the recording or entered in the data tracking sheets. All digital audio files were instantly transferred to a standalone, password-protected system accessible exclusively to the primary investigator, and the original files were safely encrypted. Hard copies of field notes and signed consent forms were maintained in secure, locked cabinets to safeguard the identity of the participants throughout the study.

Data Analysis and Findings

The primary investigator analyzed the data using Gale et al.'s framework method.[16] Following this, open coding was done manually and inductively to capture the raw participant expressions. These codes and common patient statements were then grouped into sub-themes based on their conceptual similarity and finally merged into the deductive framework. To ensure accuracy and reduce bias, the coding system, sub-themes, and final themes were reviewed and verified by two independent subject experts, holding a postgraduate MD degree in Community medicine and who were not involved in primary data collection. Any coding disagreements were resolved by discussion and consensus. Data source triangulation was done by comparing participant narratives across varying age groups and gender. Transcripts and synthesized themes were presented back to a subset of three participants for member-checking, though it resulted in no modifications in the primary deductive framework or emergent sub-themes. The consolidated criteria for reporting qualitative studies (COREQ) checklist was used for reporting the study findings.[17]

Ethical Considerations

The study protocol was approved by the Institutional Ethics Committee of KS Hegde Medical Academy on 17th July, 2025. (Clearance Number: INST.EC/EC/170/2025). The informed consent and participant information sheet were provided to each participant before the commencement of the study. The informed consent covered publication of quotations while retaining the anonymity of the study participants.

Results

Out of the 22 participants with Type 2 Diabetes Mellitus (T2DM) included in this qualitative evaluation, it was observed that 13 participants were males. Among the study participants, 4 individuals were aged 60 years and older, 5 study participants belonged to the age group of 45 to 59 years, and the remaining 13 participants were aged between 30 and 44 years. It was observed that 15 individuals reported a formal education level up-to high school. The baseline socio-demographic characteristics are summarized in Table 1.

Table 1: Socio-demographic details of the study participants (N=22)

Sociodemographic variable	Frequency (n)
Age group (in years)	
30-44	13
45-59	5
60 and above	4
Gender	
Male	13
Female	9
Educational level	
Up to high school	15
High school and above	7
Health care-seeking behavior for diabetes	
Primary health care	22
Others	0

In the present qualitative study, the coding process outlined five major themes of pre-specified QOLID domains that characterize the subjective well-being and self-care barriers in this study setting. The modified themes included (a) Dietary pattern, with a reflection on perceived dietary restrictions (b) Societal isolation, with a reflection on lifestyle modification challenges(c) Treatment compliance, (d) Effect on mental health and (e) Low financial burden. Within these broader domains, the inductive coding process led to three new emergent sub-themes- societal separation during harvest season, intentional dose manipulation to preserve a family bond and a shift to unverified online sources as an alternative measure to seek knowledge on disease management. Also, an additional theme on consultation time rationing was obtained. **Figure 1 shows the qualitative theme matrix generated after inductive-deductive coding of revised QOLID domains, with a few relevant verbatim quotations.**

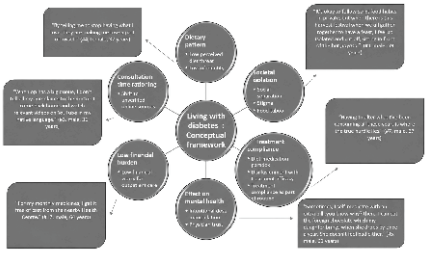


Table 2 shows the core themes, sub-themes, and participant verbatim quotations generated after the in-depth interview.

Theme 1: Dietary pattern

- Low perceived threat of poor diet

The struggle with changing eating habits was evident in the in-depth interviews. The study participants reported that they did not intend to change their food habits completely. One male patient explained this clearly:

"I don't care what I eat. As long as I am alive." (#17, male, 64 years)

Diet advice tolerance meant controlling diet and reducing the quantity of food intake by the participants. The participants felt that glycemic control through other measures were more feasible.

"I manage...manage but food is liberal." (#22, male,45 years)

- Loss of self and identity

The participants mentioned that adhering to a strict diet daily is very hard when you live in a family and society at large. They felt it was much more convenient to just take a pill or two every day than to constantly agonize over food.

"By telling me to stop having what I love, they making me lose a part of myself." (#4, female, 37 years)

Theme 2: Societal isolation

- Social separation during familial and neighborhood festivities

Meals are deeply connected to family customs and seasonal agricultural routines; rejecting standard family food disrupted interpersonal harmony. This created a sense of social isolation, as individuals felt separated from community life due to their dietary restrictions.

"It's okay to follow strict food habits in private, but when there is this harvest festival when we all gather together to have a feast, I feel so isolated..so cut off, sitting in front of the hot payasa."(#1, male, 59 years)

- Stigma for the disease

Th participants felt that the disease itself created a stigma in society. One participant revealed that others in the neighborhood or distant family members showed sympathy when confronted about the disease.

"My neighbors look at me like I have an incurable disease when I talk of my sugar." (#8, female, 41 years)

"This can happen to them (family member) also." (#8, female, 41 years)

- Food taboo

The very fact of not being able to consume all kinds of foodstuffs was considered a major setback for the participants. The dilemma was in not knowing how to replace and what to replace in the diet.

"They (doctor) say don't eat this, dson't eat that. I end up remaining always hungry." (#14, female, 40 years)

Table 2: Qualitative Thematic Matrix of Diabetes Quality of Life (QOLID) Domains

CORE THEME	SUB-THEMES	VERBATIM QUOTATIONS
Theme 1: Dietary pattern	Low perceived threat of poor diet Loss of self and identity	"I don't care what I eat. As long as I am alive." (#17, male, 64 years) "I manage...manage but food is liberal." (#22, male,45 years) "By telling me to stop having what I love, they are making me lose a part of myself." (#4, female, 37 years)
Theme 2: Societal isolation	Social separation during familial and neighborhood festivities Stigma for the disease Food taboo	"It's okay to follow strict food habits in private, but when there is this harvest festival when we all gather together to have a feast, I feel so isolated and cut off, sitting in front of the hot payasa." (#1, male, 59 years) "My neighbors look at me like I have an incurable disease when I talk of my sugar." (#8, female, 41 years) "This can happen to them (family member) also." (#8, female, 41 years) "They (doctor) say don't eat this, don't eat that. I end up remaining always hungry." (#14, female, 40 years)
Theme 3: Treatment compliance	The paradox of medication and diet Disillusionment with treatment efficacy Treatment compliance is seen as a day-to-day routine; diet alteration feels like a punishment because of diabetes.	"I'm worried I can't eat as much quantity as before. I can take the medicine though it causes mild stomach discomfort some days." (#2, female, 38 years) "The worst part is...even if I consume tablet regularly, I get bad reports." (#4, female, 37 years) "Having to alter what I've been consuming all these years is where the true hurdle lies." (#7, male, 67 years)
Theme 4: Effect on mental health	Intentional dose manipulation to preserve a family bond Trust in the treating physician	"Sometimes, I self-medicate with an extra pill..you know why? then, I can eat the foreign chocolate which my daughter brings when she drops by once a year. She doesn't feel bad either." (#5, male, 60 years) "My sugar doctor knows what I need. I don't have to worry much." (#8, female, 41 years)
Theme 5: Low Financial burden	Low financial worry for outpatient care	"For my monthly medicines, I get it free of cost from the nearby Health Centre." (#17, male, 64 years)"For my monthly medicines, I get it free of cost from the nearby Health Centre." (#17, male, 64 years) "Simple treatment and tests, I can afford through health Centre and college training Centre. Things may get hard if I need admission later on in life." (#21, female, 42 years)

Theme 3: Treatment compliance

- The medication diet paradox

The participants were willing to adhere to the medicines. This was considered a part of their daily routine. Having been diagnosed with diabetes just added an extra effort of swallowing a pill, which did not affect their day-to-day lifestyle in any other serious way.

"I'm worried I can't eat as much quantity as before. I can take the medicine though it causes mild stomach discomfort some days." (#2, female, 38 years)

- Disillusionment with treatment efficacy

The fact that diabetes management requires long term care was not convincing for the participants. They wanted quick resolution of symptoms which bother them, like any acute disease condition.

"The worst part is...even if I consume tablet regularly, I get bad reports." (#4, female, 37 years)

- Dietary modification feels like a punishment because of diabetes

The participants reported that altering the diet and following certain specifications in the cooking menu was easier said than done. Additi

on of new food to the regular diet and deletion of old

ones, which have been practised since childhood, felt difficult for almost all the participants.

"Having to alter what I've been consuming all these years is where the true hurdle lies." (#7, male, 67 years)

Theme 4: Effect on mental health

- Intentional dose manipulation to preserve a family bond

A study participant revealed that having diabetes has taken a toll on his mental health. The common human instincts like validation seeking, social desirability and family obligations are the common reasons why diabetes couldn't be controlled.

"Sometimes, I self-medicate with an extra pill..you know why? then, I can eat the foreign chocolate which my daughter brings when she drops by once a year. She doesn't feel bad either." (#5, male, 60 years)

- Trust in the treating physician

The participants felt assured that regular consultation with the treating physician helped them in controlling diabetes.

"My sugar doctor knows what I need. I don't have to worry much." (#8, female, 41 years)

Theme 5: Low financial burden

- Low financial worry for outpatient care

The study participants reported that they relied on the public health system for most of the outpatient care. This reduced their out-of-pocket expenditure for medicines to a great extent.

"For my monthly medicines, I get it free of cost from the nearby Health Centre." (#17, male, 64 years)

The participants utilized health services from primary Health Centre and rural training Centre of adjacent medical colleges which offered free outpatient care and diagnostics at a subsidized rate. As they didn't have to get admitted due to the complications of diabetes, health expenditure was minimal.

"Simple treatment and tests, I can afford through health centre and college training centre. Things may get hard if I need admission later on in life." (#21, female, 42 years)

Theme 6: Consultation time rationing

- Shift to unverified online sources

The participants also relied on YouTube or other social media platforms to seek more awareness on preventive and control measures for diabetes.

When op has a big queue, I don't tell all my complaints to the doctor. I come back home and watch relevant videos on YouTube in my native language." (#3, male, 36 years)

Though the participants felt the urge to clear their doubts regarding disease management in the health centre itself, it felt difficult owing to the shortage of time of the treating physician.

"The sir seems busy, some days not there because that monthly conference." (#22, male, 45 years)

Table 3 shows themes, sub-themes and demonstration of data saturation.

Discussion

The majority of participants aged between 30-44 years (59%) in this study reflects a shifting rural disease landscape, possibly driven by rural-to-urban migration. Easy accessibility to high-glycemic index convenience foods, likely drives the early onset of type 2 diabetes observed in this young workforce. This qualitative analysis shows that following a strict diet serves as one of the challenges for diabetes management in rural Mangaluru, highlighting a need to prioritize practical dietary counselling in health care settings. These findings align closely with behavioral evaluation by L Low et. al in South east Asia and Manjunath K et. al in South India which confirm that dietary restrictions and lifestyle adjustments often play a significant role on a patient's daily well-being.[5,10] The desire for social validation and belonging during family meets, cultural festivities and seasonal feasts were also observed in similar studies done elsewhere.[10,12,18] The present study also highlights the participants' perspective on how they manage to restore familial relationships through intentional dose manipulation or self-medication strategies during occasional family visits, exchange of ritualistic pleasantries and catching up over treats.

In this study, the participants reported incidents of waiting in long queues and limited outpatient time that they receive similar to Asharani PV et. al study.[11] A novel finding in the present study is utilization of online sources like YouTube as an alternative measure to seek knowledge on diabetes management whenever consultation time gets rationed during outpatient care.

As a large segment of the rural population in the present study utilized government facilities, similar to Lakshmi et al. study[14] for their medication needs, direct out-of-pocket expenses were low. Consistent findings were noted in L Low et. al study, highlighting the importance of patients' quality of life and overall satisfaction over affordability or accessibility.[10]

While national programmes resolve the financial barriers to an extent, they do not address the behavioral and socio-cultural determinants of the disease.[19] The struggle to adopt a diabetes-friendly lifestyle highlights a key gap in current diabetes management: the current standard of care is focused on clinical indicators and medicine supply, leaving patients to cope with complex behavioral modifications on their own.[9,19]

The participants reported they could not always compromise on the quantity of food as they were busy working in the farms. Similar observations were observed in a study on perceptions of diabetes management in rural India regarding difficulty with consumption of a selective diet and avoidance of staple diet (rice) as a diabetic control measure.[14]

The participants in the present study reported that the perspective of society had a vital role to play in how they coped up with the disease. While positive feedback and support were present within the family, there were instances of mockery and stigmatization by others, consistent with previous study findings.[13]

Managing chronic diseases effectively requires moving beyond a simple medicine-prescription and distribution approach. To truly support patient well-being, the scope of incorporating dietary, behavioral and social aspects aiding in better QoL of diabetic patients into primary care systems, specifically within the expanding network of Ayushman Bharat Arogya Mandir may need further research.

Table 3: Themes, sub-themes and demonstration of data saturation

ID	Dietary Pattern		Societal Isolation			Treatment Compliance			Effect on mental health		Low financial burden	Consultation time rationing
	Low thr eat	Lost iden tity	Social separ ation	Stig ma	Food taboo	Medi cation para dox	Disbe lief of low drug efficacy	Part of routin e	Internti onal additio nal doss	Physici an trust	Low worry for OPD care	Online search
1			√					√			√	
2	√		√			√						
3			√			√				√		√
4	√		√			√	√	√				
5				√	√				√			
6			√					√			√	
7		√				√		√				
8		√		√	√	√	√			√		
9					√	√						
10				√	√							
11	√										√	
12			√						√			
13		√						√				
14					√			√				
15		√			√					√		
16				√			√					
17	√	√			√					√	√	
18		√					√					√
19			√							√		
20			√		√							
21	√						√				√	
22	√		√	√								√

Conclusion

The functional quality of life among diabetic individuals in rural Mangaluru is affected by the daily psychological struggles of dietary modification as a salient feature. As the patients remain vulnerable to behavioral burnout and dietary distress, health care settings may move beyond a purely therapeutic approach and aim at the inclusion of lifestyle modification focused awareness and counselling sessions aiding in long term diabetes management.

Strength & Limitations

The underlying fieldwork used an inductive-deductive approach in exploring the dietary, social and behavioral determinants of quality of life of diabetic patients in a rural community of Mangaluru. Though the sample size was small and the study could not rank the domains by magnitude, a few emergent extracts on the harvest festival isolation, the extra tablet taken for a daughter's chocolate and the YouTube consultation address a clear and understudied gap in Indian studies.

It must be acknowledged that the low financial burden finding was partly built in by design and the six individuals who declined to participate due to seasonal domestic commitments would have potentially underrepresented the findings from them. The self-reported nature of the study may have introduced a social desirability bias and potential interpretive bias. Also, there is restricted data on the clinical parameters of the study participants and limited transferability owing to the localized nature of the study setting.

Conflicts of Interest: The author declares that there are no conflicts of interest.

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