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Why are women with gestational diabetes in Kerala at higher risk for T2DM? A qualitative study on sociocultural factors

Uma Vadassery Sankar[a,*], Maya Chacko[a], Adshya Jeya Sekhar[a], Sunu C. Thomas[b], Shameema Anvarsadath[a], Santhosh Kumar Nochikattil[a]

[a] Aster Medcity, Kochi, Kerala, 682027, India
[b] Amritha Institute of Medical Science, Kochi, Kerala, 682041, India

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ABSTRACT

Aim: Gestational diabetes mellitus (GDM) is a significant risk factor for type 2 diabetes mellitus (T2DM). In India, where Kerala has a high diabetes prevalence, GDM management becomes complicated by sociocultural factors. This qualitative study aims to explore the sociocultural factors that drive the risk of T2DM in mothers with GDM in Kerala.

Methods: This qualitative study combined in-depth interviews (n = 17) with mothers with GDM (n = 6), accredited social health activist (ASHA) workers (n = 4), and healthcare professionals (n = 7), along with three focus group discussions (FGDs) involving junior public health nurses (JPHNs) (two FGDs with 12 participants each) and mothers with GDM (one FGD with eight participants each). Data were collected using semi-structured guides transcribed in Malayalam, translated into English, and thematically analyzed. Triangulation and peer debriefing ensured the validity of the results.

Results: Thematic analysis revealed four major themes. (1) Gender and power dynamics influence health prioritization; (2) cultural and traditional dietary practices, including high-calorie-rich postpartum diets; (3) knowledge gap regarding postpartum care; and (4) practical barriers and social perceptions regarding lifestyle modifications. Collectively, these factors hinder postpartum lifestyle modifications among women with GDM, thereby increasing the risk of T2DM in Kerala.

Conclusion: Postpartum health behaviors among women with GDM are largely shaped by sociocultural factors that significantly elevate the risk of T2DM. GDM should be considered an early indicator of T2DM, rather than a temporary pregnancy complication. This study highlighted the importance of sociocultural factors in effective postpartum lifestyle interventions. Addressing these challenges involves culturally sensitive, socially acceptable, community-based interventions combined with regular follow-ups with healthcare providers. Such approaches are essential to reduce the risk of T2DM and the corresponding burden on the health system and to improve long-term maternal health outcomes.

1. Introduction

Gestational diabetes mellitus (GDM), defined as glucose intolerance during pregnancy, complicates approximately one in six live births worldwide.[1] Women with a history of GDM are 8–10 times more likely to develop type 2 diabetes mellitus (T2DM).[1] The progression to T2DM following GDM varies widely, ranging from 2% to 70% within six weeks to 28 years postpartum.[2] The first five years after childbirth have the highest incidence of T2DM, after which the risk typically stabilizes after 10 years.[2]

Globally, more than 199 million women live with diabetes, a substantial proportion of whom are of reproductive age.[3] In India, prediabetes and diabetes impact an estimated six million births annually. The prevalence of diabetes among women is 10.1%[4]; however, the presence of GDM is 90%.[5] The state of Kerala in southern India has reported that the prevalence among females to be 17.8%,[6] and this rate is likely to

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* Corresponding author.
E-mail addresses: umasanthosh23@gmail.com (U.V. Sankar), mayachacko123@gmail.com (M. Chacko), adshyasekhar99@gmail.com (A.J. Sekhar), sunusarathomas@gmail.com (S.C. Thomas), shameemadr72@gmail.com (S. Anvarsadath), dr.santhosh82@gmail.com (S.K. Nochikattil).

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increase further due to the increasing incidence of GDM. However, the screening rate for postpartum diabetes in women with a history of GDM is low (29%).[7] Furthermore, 61% of postpartum women experience obesity, which is a crucial and avoidable risk factor for T2DM. Moreover, 61% of postpartum women have obesity, which is a crucial avoidable risk factor for T2DM.[8]

It can be difficult to maintain a healthy life after a pregnancy complicated by GDM. Many mothers stated that their new maternal roles interfered with their own health, as they put their families first. Moreover, women face shortfalls in time, energy, resources, information, and social support.[9] Women as wives, mothers, and family members, burdened by culture, have to juggle competing demands, emotional stress, social pressures, and everyday responsibilities that deprive them of their own health-seeking behaviors because of a lack of sufficient support.[10] Additional barriers include limited knowledge about healthy behaviors, inadequate screening reminder systems, and suboptimal risk communication by clinicians.

In Kerala, weight retention is encouraged by postpartum customs, such as 40-day activity restrictions and calorie-rich diets.[11] New mothers, burdened by infant care and family expectations, often delay weight management until six months postpartum, by which time metabolic risks may already be established.[11] Alarmingly, only 6% of women receive appropriate postpartum advice and management to prevent future T2DM.[7] Despite these challenges, the sociocultural and psychological influences on the lifestyle behaviors of women with a history of GDM during the postnatal period remain poorly understood. This qualitative study, therefore, aimed to explore the sociocultural factors that influence the risk of T2DM among women with GDM in Kerala.

2. Methodology

2.1. Research team and reflexivity

This study adhered to the consolidated criteria for reporting qualitative research (COREQ) guidelines. Vadassery Sankar U and Chacko M were the female investigators for the study. Vadassery Sankar U holds a PhD in public health research, and both investigators hold master's degrees in public health (MPH) and are well-trained in qualitative research methods. Vadassery Sankar U served as the research administrator, and Chacko M served as the project scientist.

2.2. Relationship with subjects

This qualitative study was conducted among mothers diagnosed with GDM in Kerala to explore sociocultural factors that contribute to the risk of T2DM. Mothers with GDM were identified in the community through Accredited Social Health Activists (ASHAs), who are community-level health workers operating at the grassroots level who maintain records of maternal and child health activities within the community. The researchers were known to a few participants through a community survey conducted by the principal investigators the previous year. Additionally, some participants had attended community health awareness programs conducted by ASHA workers at Integrated Child Development Services Scheme (ICDS) Centers. The interview process involved project assistants (BJ and AT) independently taking field notes to minimize confirmation bias. Participants included stay-at-home mothers, information technology employees, schoolteachers, and tailors, thereby representing women with GDM from diverse socioeconomic sectors. Each interviewee was asked to suggest a convenient time and location for the interview. Four participants chose their homes; the remainder selected either their workplace or hospital setting.

2.3. Study design

2.3.1. Theoretical framework

The socio-ecological model (SEM), which considers influences on health at the individual, interpersonal, community, and societal levels, was the study's framework. This framework was chosen to adopt a broader perspective in which we could link the personal experiences of women with GDM, ASHA workers, and healthcare professionals associated with family health centers (FHCs) to broader cultures in Kerala, including dietary customs, level of daily activities, infant feeding, and family roles in health-related decision-making.

2.3.2. Participant selection

This qualitative study used purposive sampling and a combination of data collection methods, including in-depth interviews (IDIs) and focus group discussions (FGDs). The number of participants and their characteristics are presented in Table 1. Women aged 18 years or older who were diagnosed with GDM during pregnancy or the postpartum period, currently residing in the catchment areas of FHCs, and able to communicate in Malayalam were included in the study. The exclusion criteria were having pre-existing T2DM, severe psychiatric illness, or serious obstetric complications.

Healthcare providers involved in caring for women with GDM were also included to obtain a comprehensive perspective. These included ASHA workers, junior public health nurses (JPHNs), medical officers (MOs), dietitians, and gynecologists with a minimum of six months of experience in caring for women with GDM. Face-to-face interviews were conducted with all participants.

In March 2025, we conducted 17 in-depth interviews until data saturation, defined as the point at which at least two consecutive in-depth interviews or focus group discussions did not generate new codes or required any changes to the codebook. Of the mothers with GDM interviewed, three were from rural areas, whereas the others lived in semi-urban areas. Most participants had completed education up to the degree level, and 25% were employed. Half of the women were primigravidas, and the other half were in the postpartum period.

Each interview lasted between 35 and 84 min. The participants were assured that they were not being assessed for their GDM understanding and that they had the right to withdraw at any time, with confidentiality maintained at each step of the data collection and analysis. FGD and in-depth interview guides were developed based on existing literature on GDM experiences and postpartum diabetes risk after pilot testing. After the interview, each woman selected a pseudonym to anonymize the data and disseminate the results.

We obtained informed consent from all participants for their involvement, including permission to audio-record the sessions. The FGDs (70–108 min) in Malayalam, with audio recording, field notes, pilot-tested guides, pseudonym use for de-identification, and thematic analysis for data interpretation, emphasize confidentiality and subject withdrawal rights.

2.3.3. Prompts of IDI (in-depth interview)

We explored several areas, such as dietary patterns, physical activity, and stress during pregnancy and the postpartum period in mothers with GDM. The areas of discussion and prompts used for the in-depth interviews are explained in Table 2.

Table 1
Participants' number and characteristics.

Study design	Method	Role and number of participants in each group	Age range	Total
Qualitative study	In-depth interview	GDM mothers ($n = 6$), ASHA workers ($n = 4$) and healthcare professionals–gynecologist ($n = 3$), MO ($n = 2$) and dietician ($n = 2$)	24–56 years	17 IDIs
Qualitative study	Focus group discussion	Two FGDs among JPHNs, with 12 participants each. One FGD among GDM mothers with 8 participants.	19–52 years	3 FGDs

Table 2
Description of the areas of discussion of IDI and FGD for pregnant women.

Areas of discussion	Prompts
Impact of GDM and awareness	Please share your understanding of gestational diabetes. Do you think GDM status may continue after delivery?
	How did the gestational diabetes diagnosis affect your pregnancy?
	Are there any additional risks associated with your current GDM status? If yes, what are they?
	During pregnancy, did you receive any special advice on a healthy lifestyle from healthcare professionals involved in your antenatal care? If yes, what are they?
Lifestyle and habits	Please share your understanding of a healthy lifestyle.
	What do you think about your current lifestyle? Would you consider it healthy?
	How can healthy habits be incorporated into daily life? What strategies or suggestions would you like to adopt?
	Do you regularly check your blood sugar?
	If yes, could you describe the process of screening for blood sugar, and what are the challenges you face in GDM management, and who supports your diabetes care?
	Who in your family or friend group motivates you the most to maintain a healthy lifestyle?
Postpartum practices	Do you follow any postpartum traditions or routines? How strictly do you adhere to them? Why?
	Who encourages these practices? Whom would you prefer to receive health information from?
Intervention preferences	Do you use Google, YouTube, health apps, or fitness trackers?
	What advice would you give to a newly diagnosed GDM mother?
	Who is your best companion for maintaining a healthy lifestyle in daily life?
Diet and nutrition	Have you made any post-GDM diet changes? What helped you implement these changes?
	Challenges you faced and how you overcame them?
	Who decides meals in your household?
	How did pregnancy cravings affect your diet? Who does the cooking?
	How often do you eat out? Do you try to change family meals? If so, how?
	Do you set diet goals? What helped you achieve them?
	Is healthy eating easy or difficult for you? How confident are you in maintaining healthy eating habits? Who takes responsibility for meal planning?
	How do you feel when eating healthy? What role does diet play in diabetes prevention? What advice have you received about diet?
	Do you believe in “eating for two”? Why or why not? How does stress affect your eating habits?
Physical activity	Have you made any post-GDM exercise changes? What helped you implement these changes?
	Challenges you faced and how you overcame them? How do you decide when to exercise? What role does exercise play in diabetes prevention?
	What exercise advice have you received? What workplace or home barriers affect your ability to exercise?
	How important is staying active to you? Are you able to exercise as much as you'd like? Is exercising easy or difficult for you?
	How confident are you in maintaining an exercise routine? Who takes responsibility for scheduling exercise? How do you feel after exercising?
Sleep and mental health	What helps you sleep longer? What barriers (work or home-related) affect your sleep?
	Do you experience any sleep issues? Has anyone commented on your sleep patterns? What does “good sleep” mean to you? How important is good sleep to you?
	What do you do when you can't sleep or wake up too early? How do you feel after poor sleep? What coping strategies do you use? Do you have any long-term concerns if sleep issues persist?
	Is getting good sleep easy or difficult for you? How confident are you in maintaining good sleep habits?
	Who takes responsibility for ensuring good sleep? How do you feel after getting good sleep?

2.3.4. Prompts of FGD

Subjects were assured that their participation was voluntary. The discussions were conducted at a time and place practical for each FGD. A neutral place, such as the family health center, was considered for venue selection to avoid personal bias. At every location, the notetaker cum-moderator and facilitator performed the FGD. Prompts used for the FGD are explained in Table 3.

2.4. Data analysis

All IDIs and FGDs were transcribed verbatim in Malayalam by the principal investigator and the project scientist using audio recordings and handwritten field notes. Transcript quality was assessed by two senior researchers using random reviews. The verbatim transcripts were translated into English for analysis. Following familiarization with the data, a coding framework was developed. Peer debriefing was employed to enhance analytical rigor and data reliability. Open coding was initially conducted, after which the codes were grouped and categorized. Themes and subthemes emerged through an iterative analytical process. To ensure the validity of the findings, the data were independently cross-verified, and discrepancies were resolved through discussion until a consensus was reached. Data triangulation was used to strengthen interpretation and draw meaningful inferences.

2.5. Ethics and consent

The Institutional Ethics Committee of Aster Medcity (reg No: ECR/737/InstKL/2015/RR-21) approved this study (AM/EC/367-2023). We followed the recommendations on ethical principles in human research described in the Declaration of Helsinki.[12] All participants were informed verbally and in writing of the nature of the study. Participation was voluntary, and individuals retained the right to withdraw at any stage before publication. The data were treated with strict confidentiality, meaning that no unauthorized person had access to the study material.

Although the interview topics were non-controversial, the study considered the inherent risks of any conversation, including the potential burden on the participants' time. To mitigate this issue, the interviews were scheduled at convenient times and locations for each participant. On balance, the benefits of the study were judged to outweigh the potential risks.

3. Results

Thematic analysis of the interview data revealed four major themes that captured key sociocultural influences.

3.1. Gender and power dynamics

3.1.1. Family prioritization over self-care

Many women's narratives revealed a strong sense of fulfilling family responsibilities as a duty, often at the cost of their own health. In the sociocultural context, women are viewed as primary caregivers, and strong expectations are placed on them to prioritize family needs over personal well-being. Attempts to prioritize self-care were frequently seen as socially inappropriate, particularly by women whose spouses lived away. In addition to caring for their babies, participants reported expectations of in-law care in joint family settings and contributed to the financial management of the household, leaving little time for self-care.

Table 3
Areas of discussion of FGD for ASHA workers and health care professionals—JPHNs, MOs, and Gynecologists.

Areas of discussions	Prompts
Current healthcare services for GDM mothers	(1) How would you describe the current standard of care for GDM mothers in our healthcare system? (2) What types of healthcare services are currently available to GDM mothers in your facility? (e.g., screening, monitoring, education) (3) How is care typically coordinated between different specialists (OB-GYNs, endocrinologists, dietitians, etc.) for GDM mothers? (4) What protocols or guidelines inform your current GDM management approach? **Gaps & Challenges:** (5) What significant gaps exist in current GDM services that concern you most? (6) What are the biggest challenges in providing optimal care for GDM mothers? (7) How adequate are our current resources (staff, equipment, educational materials) for GDM care? **Patient Experience:** (8) What barriers do GDM mothers typically face in accessing or adhering to care? (9) How effective are our current patient education approaches for GDM management? **Technology & Innovation:** (10) What role does technology currently play in your GDM services? (e.g., telehealth, glucose monitoring apps) (11) What technological solutions could potentially improve GDM care?
Family and sociocultural influences on GDM management	Is the family environment supportive of healthy lifestyle changes for GDM mothers? What family practices hinder healthy habits (e.g., dietary restrictions, lack of encouragement)? What difficulties do women encounter in maintaining a healthy lifestyle due to family dynamics?
Diabetes screening practices and barriers	Was a regular screening provided for the women during and after pregnancy? What encourages women to get tested? What prevents women from undergoing regular diabetes checks? Whether women will be able to adopt regular diabetes screening in the future?
Postpartum care differences between GDM and non-GDM mothers	Do mothers with GDM and mothers without GDM have different postpartum care strategies? If no differences exist, how can awareness be improved? What obstacles hinder tailored postpartum care for GDM mothers?
Capabilities of mothers with GDM for a healthy lifestyle	What abilities help mothers with GDM adopt healthier lifestyles? What external factors (family, community, healthcare) best support these mothers?

"*I always prioritize family needs over my needs. I can only choose to delay my needs. That's the essence of being a mother; that's what I learned.*" (Woman 2)

3.1.2. Lack of autonomy-food decisions

Women's dietary practices during pregnancy and the postpartum period are mostly dictated by family members, especially older adults, with limited consideration of the women's own decisions or medical histories. This shows layered power dynamics among the women, wherein the daughters-in-law have no choice in food decisions, and mothers-in-law are the decision makers regarding food preparation. These internal gendered hierarchies reinforce the traditional roles that affect a woman's ability to make food decisions and meet their health needs. Many Keralan households hire domestic workers to prepare traditional postpartum meals based on customs during the postpartum period, and the meals frequently exceed the suggested dietary requirements.

3.2. Cultural and traditional dietary practices

3.2.1. High-calorie diet despite diabetes risk

The traditional postpartum diet includes carbohydrate-rich foods, such as bananas. Women are expected to consume three bananas daily during the postpartum period despite the associated risk of diabetes. Additionally, the consumption of high-fat ghee and a traditional medicinal preparation known as lehyam is encouraged for postpartum recovery and strength, without considering the diabetes risk. Normal calorie intake for lactating women ranges from 2500 to 2800 kcal/day; however, traditional dietary practices substantially exceed the recommended levels, thereby increasing the risk of diabetes among mothers with GDM.

"*Despite having gestational diabetes, my sister-in-law had no problems using lehyam and other traditional postpartum medicines. After consulting with her, I am likely to adopt similar postpartum care practices myself.*" (Woman 11)

3.2.2. Elders and society myths (eating for two)

Societal beliefs, particularly the notion that mothers should eat more, irrespective of appetite, strongly influence postpartum dietary practices. This belief, reinforced by older adults and broader social norms, pressures women to consume large portions, especially carbohydrate-rich diets such as rice-based meals, even when they experience discomfort. The underlying assumption is that women are not eating solely for themselves but also "for the child," commonly referred to as eating for two. In addition, there is a widespread misconception that once gestational diabetes resolves after childbirth, women can return to their prepregnancy dietary habits without considering the risk of future diabetes.

"*I don't believe food alone causes diabetes. Elders say we need to eat more than necessary, as the baby only gets about one-fifth of what we eat. Despite feeling breathing difficulties, I push myself to eat as much as I can for both my own well-being and the baby's.*" (Woman 6)

3.3. Knowledge gaps

3.3.1. Poor awareness among GDM women

Despite having GDM, many women are unaware of the increased risk of developing T2DM. The participants commonly reported that GDM would resolve after delivery and that there was no perceived need for long-term lifestyle modifications or regular postnatal screening.

3.3.2. Limited counselling from healthcare providers

Many women reported that antenatal consultations were brief and primarily focused on routine screening and dietary management during pregnancy, with minimal guidance regarding postpartum care. Participants indicated that healthcare providers often did not communicate the increased long-term risk of T2DM associated with GDM. Blood glucose screening is typically conducted once at approximately 45 days postpartum; however, no further routine screening is reported during the postpartum period.

"*My doctor never warned me that diabetes might set in eventually. All she said was that after the delivery, my gestational diabetes would go away.*" (Woman 5)

3.4. Practical barriers and social perceptions towards lifestyle modifications

3.4.1. Misunderstanding around exercise

Many women reported being advised to engage in physical activity; however, cultural norms that emphasize rest during and after pregnancy, fear of pregnancy loss, particularly among women who conceived after prolonged periods of infertility, and symptoms such as dizziness and fatigue contributed to limited physical activity during pregnancy. Walking was the most commonly reported form of physical activity, and was often combined with routine household work.

3.4.2. Sleep barriers

Women frequently described challenges in achieving adequate sleep, particularly during the postpartum period, owing to caregiving and household responsibilities that led to sleep deprivation. Although daytime rest may theoretically be possible, the participants reported that it was rarely achievable in practice because of household duties and frequent visits from relatives. Sleeping during family visits is perceived as culturally disrespectful. Many women attributed poor sleep quality to limited family support. In addition, sleep-related issues are rarely addressed during medical consultations.

3.4.3. Stress

The participants reported experiencing considerable emotional stress during and after pregnancy, which has seldom been addressed in the healthcare settings they attended. Sources of stress include limited family or spousal support, the burden of managing household responsibilities, and sleep disruption. Despite the significant impact of stress on mental health, the participants noted that emotional well-being was rarely discussed during routine medical care.

"*Since the onset of my pregnancy, I have been overwhelmed with anxiety about the challenges of delivery. When I share my concerns with my doctor, she offers little reassurance, merely providing a consultation without addressing my emotional distress.*" (Woman 13)

3.4.4. Financial constraints for a healthy lifestyle

Women, particularly those from low-income and middle-income households, reported that their ability to make healthy dietary choices was often constrained by financial limitations. Such families frequently prioritize affordable carbohydrate-rich foods such as rice over nutritionally balanced meals. These financial constraints represented a major barrier to adopting and sustaining healthy lifestyle practices among women from low- and middle-income backgrounds.

"*Strictly following dietary guidelines is difficult. As an ordinary individual, I can only follow the food options available to me, rather than sticking to a precise plan.*" (Woman 14)

3.4.5. Lack of digital cultural context

Some women who explored dietary solutions through digital platforms reported being unable to follow the recommended lifestyle modifications because they were not culturally tailored.

"*I subscribed to an app for a month, but didn't use it much because the recipes were not from Kerala cuisine. I found the dishes challenging to follow and not aligned with my preferences. However, it was helpful in controlling my blood sugar levels.*" (Woman 5)

4. Discussion

4.1. Gender and power dynamics

Within and outside the home, Kerala women continue to occupy subordinate positions and have restricted access to financial resources, freedom of mobility, and decision-making power.[13] Strong status indicators for women, such as longevity and high literacy, do not alter deeply ingrained patriarchal norms, which are maintained by both men and women.[13] The increasing employment of women is gradually changing the dynamics of nuclear families, in which decisions are often made by the primary breadwinner, whereas joint families tend to make decisions collectively.[14] Gender roles are rigidly defined by interwoven sociocultural, economic, and religious factors that exacerbate these disparities in patriarchal South Asian contexts.[15]

Keralite women often prioritize the well-being of their families over their own health, making decisions that compromise their autonomy to conform to the prevailing social norms.[16] Similar to broader South Asian tendencies in which self-care is neglected,[17] certain Indian customs uphold this devalued status.[18]

4.2. Cultural and traditional dietary practices

Traditional folk medicine in Kerala plays a central role in postpartum and newborn care. Traditional birth attendants (*vayattatties*) supervise maternal nutrition and employ herbal remedies, practices that are generally accepted in families.[19] The continuity of postpartum care across generations is ensured by maternal dietary practices based on oral traditions passed down by mothers, midwives, and the elderly.[20] Indian mothers still adhere to traditional practices despite advancements in education and socioeconomic status.[21]

In extended multigenerational families, elderly women transmit sociocultural norms that shape maternal and child nutrition, which is consistent with previous studies, although families often lack proper guidance.[22] Ancestral knowledge is often valued over medical advice, and new mothers diligently adhere to traditions because of their inexperience and limited health knowledge.[20] Men's involvement is typically limited to food procurement based on their elders' advice.[23]

Social environments have a significant impact on health behaviors, either facilitating or impeding changes.[24] In India, excessive concern from friends and family about pregnant mothers and their babies causes confusion, because different viewpoints make it difficult to follow medical advice.[25] Increased maternal awareness can assist women in overcoming social barriers and disseminating health knowledge within their communities.

4.3. Knowledge gaps

Many Keralite women perceive progression to diabetes and long-term medication as inevitable because of strong family and cultural influences, resulting in limited perceived personal control.[26] Diabetes risk is often poorly understood or underestimated[27] and is inadequately communicated by healthcare providers.[28] Physicians rarely tailored dietary advice to patients' lifestyles, largely due to limited consultation time and minimal opportunities for one-to-one counselling, with consultations often lasting no more than 10 min. Reluctance among women to raise questions or seek clarification suggests suboptimal patient-provider communication, which may foster misconceptions and misunderstandings.[29]

The lack of structured postnatal counselling or follow-up further contributes to the risk of long-term maternal diabetes. Despite the availability of clinical guidelines, Indian physicians and healthcare providers have a limited consensus regarding the management of gestational GDM during pregnancy and the postpartum period.[25] South Asian Postpartum women often report receiving little clear guidance or finding traditional advice incompatible with the practical challenges they face.[30]

4.4. Barriers to healthy behaviors

Both women and healthcare providers tended to prioritize lifestyle changes during pregnancy because of immediate neonatal risks,[31] consistent with South Asian studies in which many women believed that dietary modifications were necessary only during that time. Dietary guidance was typically provided only during early visits or when glycemic control deteriorated. Prevailing myths—such as the beliefs that exercise may harm the baby or that women should "eat for two"—discourage pregnant women from adhering to healthcare advice regarding diet and physical activity.[25] In South Asian and resource-limited settings, culturally inappropriate dietary guidance can lead to confusion and poor compliance among participants.[32] Managing food cravings, controlling portions, and eating in a variety of social environments while being aware of blood sugar levels causes significant stress for pregnant women, which continues into the postpartum phase.[33]

In Kerala and across India, traditional postpartum customs frequently require women to remain indoors for the first six weeks following childbirth, thereby limiting opportunities for physical activity.[34] More broadly, South Asian women often deprioritize exercise due to deeply rooted cultural beliefs and the prioritization of family responsibilities over self-care.[32]

Environmental factors—such as accessibility, availability, and prevailing cultural norms—are closely interconnected and reinforce personal barriers, including low self-efficacy, within strong family-based decision-making structures.[26] Consequently, targeting individual or environmental determinants in isolation is insufficient. Effective and sustainable behavioral change requires interventions that simultaneously address family dynamics, community influences, and entrenched gender roles.[26]

These findings illustrate that a careful two-part strategy is needed to apply Kerala's insights in other places. In other Indian states, programs must be profoundly local. This involves studying local power and family dynamics. This also means working with trusted community members. Healthcare plans should be redesigned to work within limited time and resources. Local myths and customs must be addressed directly.[34] This strategy differs for South Asian communities living abroad. The goal is to help them blend old traditions with the new healthcare systems. Digital tools can update the support networks and provide good advice. New social groups can combat loneliness. Therefore, women should be trained to guide their families' health decisions. Most importantly, all programs must work on all three levels simultaneously. They must help individuals, change family and social interactions, and improve the wider environment. This multilevel approach could revolutionize the deep-rooted cultures that affect women's health.[35]

4.5. Strengths and limitations

This qualitative study is strong in its not-too-generic literature rather than focusing on the relevant Kerala context, such as *vayattatties*, specific postpartum lehyam/ghee practices, and patrifocal dynamics. Multi-perspective triangulation from mothers with GDM, ASHAs, and HCPs via IDIs and FGDs ensured the credibility of the analysis. Moreover, the rigour of the methodology (saturation, peer debriefing, pseudonym de-identification, and COREQ reporting) ensures transparency.

The study had limitations, as it included a small sample of GDM mothers with IDI, which did not include their male partners or any non-GDM women for comparison. The study responses may also be subject to social desirability bias.

5. Conclusion

This study explored how sociocultural norms, gender roles, and structural constraints that are deeply rooted in society influence women's health in the context of mothers with GDM in Kerala. The key barrier findings from the study were a lack of autonomy, a lack of family support, traditional postpartum dietary practices, financial constraints, and limited risk communication from healthcare providers. Many of the women were unaware of the need to continue lifestyle modifications after pregnancy, which is one of the key factors contributing to the increased incidence of T2DM in mothers with GDM.

Moreover, the key barriers increase the conditions. Gestational diabetes mellitus should not be viewed solely as a temporary condition during pregnancy; it should also be seen as a critical indicator of future health risks among mothers. The risk of T2DM among mothers with GDM can be reduced by prioritizing healthy lifestyle interventions, which will eventually improve maternal health outcomes and reduce the burden on the healthcare system. Addressing these challenges requires culturally sensitive, community-based interventions. Healthcare providers must focus on long-term diabetes prevention through addressing knowledge gaps and facilitating the implementation of enduring lifestyle changes after pregnancy. Leveraging ASHA workers for follow-ups and utilizing immunization visits for screening reminders could enhance adherence. Culturally sensitive interventions addressing familial and societal influences are essential for reducing long-term diabetes risk in GDM survivors.

CRediT authorship contribution statement

Uma Vadassery Sankar: Writing – review & editing, Writing – original draft, Supervision, Project administration, Methodology, Formal analysis, Data curation, Conceptualization. **Maya Chacko:** Writing – original draft, Project administration, Data curation. **Adshya Jeya Sekhar:** Writing – review & editing, Writing – original draft, Methodology. **Sunu C. Thomas:** Validation, Formal analysis. **Shameema Anvarsadath:** Supervision, Project administration, Investigation, Data curation. **Santhosh Kumar Nochikattil:** Writing – review & editing, Validation, Supervision.

Informed consent statement

Patient consent forms are now available in Malaysia and English.

Ethical approval statement

Research study approved by the Institutional Ethics Committee of Aster Medcity. Ethics committee registration No: ECR/737/Inst/KL/2015/RR-21.

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Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Uma V Sankar reports financial support was provided by Indian Council of Medical Research. UMA V SANKAR reports a relationship with Indian Council of Medical Research that includes: funding grants. Given his/her/their role as, had no involvement in the peer review of this article and had no access to information regarding its peer review. Full responsibility for the editorial process for this article was delegated to another journal editor." If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

1. Wang H, Li N, Chivese T, et al. IDF diabetes atlas: estimation of global and regional gestational diabetes mellitus prevalence for 2021 by international association of

diabetes in pregnancy study Group's criteria. *Diabetes Res Clin Pract*. 2022;183:109050.
2. Kim C, Newton KM, Knopp RH. Gestational diabetes and the incidence of type 2 diabetes: a systematic review. *Diabetes Care*. 2002;25(10):1862–1868.
3. Sadikot S, Purandare CN, Cho NH, Hod M. FIGO-IDF joint statement and declaration on hyperglycemia in pregnancy. *Diabetes Res Clin Pract*. 2018;145:1–4.
4. Ranasinghe P, Jayawardena R, Gamage N, Sivanandam N, Misra A. Prevalence and trends of the diabetes epidemic in urban and rural India: a pooled systematic review and meta-analysis of 1.7 million adults. *Ann Epidemiol*. 2021;58:128–148.
5. Unnikrishnan R, Mahalakshmi M, Bhavadharini B, et al. Current practices in the diagnosis and management of gestational diabetes mellitus in India (WINGS-5). *Indian J Endocr Metab*. 2016;20(3):364.
6. Kalra S, Tandon N, Gupta Y. Postpartum screening after gestational diabetes mellitus: aiming for universal coverage. *Indian J Endocr Metab*. 2015;19(1):1.
7. Sakeena K, Sundari Ravindran TK. The "missing window of opportunity" for preventing diabetes: a mixed method study on postpartum screening for diabetes among women with gestational diabetes mellitus in Kerala, India. *Int J Noncommunicable Dis*. 2017;2(3):78–84.
8. Chopra M, Kaur N, Singh KD, et al. Population estimates, consequences, and risk factors of obesity among pregnant and postpartum women in India: results from a national survey and policy recommendations. *Int J Gynecol Obstet*. 2020;151(S1):57–67.
9. Dennison RA, Ward RJ, Griffin SJ, Usher-Smith JA. Women's views on lifestyle changes to reduce the risk of developing type 2 diabetes after gestational diabetes: a systematic review, qualitative synthesis and recommendations for practice. *Diabet Med*. 2019;36(6):702–717.
10. Neven ACH, Lake AJ, Williams A, et al. Barriers to and enablers of postpartum health behaviours among women from diverse cultural backgrounds with prior gestational diabetes: a systematic review and qualitative synthesis applying the theoretical domains framework. *Diabet Med*. 2022;39(11):e14945.
11. Kaur D, Ranjan P, Kumari A, et al. Awareness, beliefs and perspectives regarding weight retention and weight gain among postpartum women in India: a thematic analysis of focus group discussions and in-depth interviews. *J Obstet Gynaecol India*. 2022;72(2):168–174.
12. World Medical Association. World medical association declaration of helsinki: ethical principles for medical research involving human subjects. *JAMA*. 2013;310(20):2191–2194.
13. Jeffrey R. *Politics, Women, and Well-Being*. Basingstoke: Macmillan Press; 1992.
14. Pillai RK, Premaletha N, Saradamma R, et al. Changing families and its effect on the health of family members in Kerala: a qualitative exploration. *Clin Epidemiol Glob Health*. 2022;16:101094.
15. Pigg SL. Inventing social categories through place: social representations and development in Nepal. *Comp Stud Soc Hist*. 1992;34(3):491–513.
16. Eapen M, Kodoth P. Family structure, women's education and work: re-examining the high status of women in Kerala. In: *Tracking Gender Equity Under Economic Reforms: Continuity and Change in South Asia*. Kali for Women; 2002. Available from: https://ideas.repec.org/p/ind/cdswpp/341.html.
17. Bandyopadhyay M. Gestational diabetes mellitus: a qualitative study of lived experiences of South Asian immigrant women and perspectives of their health care providers in Melbourne, Australia. *BMC Pregnancy Childbirth*. 2021;21:500.
18. Bandyopadhyay M, MacPherson S. *Women and Health: Tradition and Culture in Rural India*. Routledge; 2019.
19. Beegam A, Nayar TS. Plants used for natal healthcare in folk medicine of Kerala, India. *Indian J Tradit Knowl*. 2011;10(3):523–527.
20. Abdul Ghani R, Salehudin S. Traditional belief and practice on postpartum recovery among mothers in east coast of peninsular Malaysia. *MATEC Web Conf*. 2018;150:05067.
21. Venkateswarlu M, Mushtaq Pasha MA, Fatima A. Assessment of cultural beliefs and practices during the postnatal period in an urban field practice area of SRMC, Nandyal, kurnool, Andhra Pradesh. *Int J Community Med Public Health*. 2019;6(8):3378–3383.
22. Safiee L, Rough D, George P, Mudenha R. Baseline perceptions of women with gestational diabetes mellitus and health care professionals about digital gestational diabetes mellitus self-management health care technologies: interview study among patients and health care professionals. *JMIR Hum Factors*. 2023;10:e51691.
23. Aubel J. The role and influence of grandmothers on child nutrition: culturally designated advisors and caregivers. *Matern Child Nutr*. 2012;8(1):19–35.
24. Lie MLS, Hayes L, Lewis-Barned NJ, May C, White M, Bell R. Preventing Type 2 diabetes after gestational diabetes: women's experiences and implications for diabetes prevention interventions. *Diabet Med*. 2013;30(8):986–993.
25. Morampudi S, Balasubramanian G, Gowda A, Zomorodi B, Patil AS. The challenges and recommendations for gestational diabetes mellitus care in India: a review. *Front Endocrinol*. 2017;8:56.
26. Daivadanam M, Absetz P, Sathish T, et al. Lifestyle change in Kerala, India: needs assessment and planning for a community-based diabetes prevention trial. *BMC Public Health*. 2013;13:95.
27. Eades CE, France EF, Evans JMM. Postnatal experiences, knowledge and perceptions of women with gestational diabetes. *Diabet Med*. 2018;35(4):519–529.
28. Kapur K, Kapur A, Ramachandran S, et al. Barriers to changing dietary behavior. *J Assoc Phys India*. 2008;56:27–32.
29. Ghaffari F, Salsali M, Rahnavard Z, Parvizy S. Compliance with treatment regimen in women with gestational diabetes: living with fear. *Iran J Nurs Midwifery Res*. 2014;19(7 suppl 1):S103–S111. PMCID: PMC4402984; PMID: 25949244.
30. Murray-Davis B, Grenier L, Atkinson SA, et al. Experiences regarding nutrition and exercise among women during early postpartum: a qualitative grounded theory study. *BMC Pregnancy Childbirth*. 2019;19(1):368.
31. McCloskey L, Sherman ML, St John M, et al. Navigating a 'perfect storm' on the path to prevention of type 2 diabetes mellitus after gestational diabetes: lessons from patient and provider narratives. *Matern Child Health J*. 2019;23(5):603–612.
32. Bandyopadhyay M, Small R, Davey MA, Oats JJN, Forster DA, Aylward A. Lived experience of gestational diabetes mellitus among immigrant South Asian women in Australia. *Aust N Z J Obstet Gynaecol*. 2011;51(4):360–364.
33. Hui AL, Sevenhuysen G, Harvey D, Salamon E. Food choice decision-making by women with gestational diabetes. *Can J Diabetes*. 2014;38(1):26–31.
34. Nagraj S, Hinton L, Praveen D, Kennedy S, Norton R, Hirst J. Women's and healthcare providers' perceptions of long-term complications associated with hypertension and diabetes in pregnancy: a qualitative study. *BJOG*. 2019;126(S4):34–42.
35. Hari Sankar D, Thekkumakara Surendran A, Gaitonde R, Nambiar D. Health in Kerala: exploring achievements and remaining challenges of health systems reform using an equity lens. *Int J Equity Health*. 2025;24(1):89.