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ORIGINAL RESEARCH

Understanding the Experiences of Women with Gestational Diabetes in Singapore: A Qualitative Study

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Purpose: Gestational Diabetes Mellitus (GDM) is common in Southeast Asian countries. In Singapore, GDM affects approximately one in five pregnancies. Women diagnosed with GDM are at greater risk of developing type 2 Diabetes Mellitus. Little is known about how women with GDM manage the complex interactions between provider demands, personal responsibility, and family relationships. Accordingly, this study aimed to explore how women and their spouses experience GDM, from diagnosis to long-term management.

Patients and Methods: Individual semi-structured interviews were conducted with 19 women who had GDM in the past five years (2019–2023). Five spouses were interviewed for this study. The interviews were audio-recorded, transcribed, and analyzed using Braun and Clarke's reflexive thematic analysis.

Results: We report three themes: diagnosis, management, and long-term experience. During the GDM diagnosis, women described feeling blindsided and emotionally overwhelmed. In GDM management, women struggle to find information and healthcare support. Some women's families were sources of support whereas other women must navigate family attitudes toward GDM that may be counterproductive. Postdelivery, women are unclear about follow-up procedures, feel neglected by the healthcare system in terms of their history of GDM, and struggle to make sustained changes to their individual and family health.

Conclusion: Women with GDM face emotional and informational challenges that begin at diagnosis and persist after delivery. Better GDM education and follow-up care encouraging family-centered support will improve long-term outcomes.

Keywords: gestational diabetes, health belief model, women, spouses, qualitative research

Introduction

Gestational Diabetes Mellitus (GDM), defined as glucose intolerance resulting from hyperglycemia that occurs during pregnancy, is the most common medical disorder during pregnancy.[1] Southeast Asia has the highest global GDM prevalence.[2,3] In Singapore, GDM prevalence is above the global average of 13.8%,[4] with GDM affecting approximately 20% of pregnancies.[5] GDM is linked to immediate obstetric complications such as preeclampsia and elevated cesarean delivery rates, as well as neonatal morbidities including fetal overgrowth (macrosomia) and neonatal hypoglycemia.[6] Although GDM often resolves postpartum, women who experience hyperglycemia during pregnancy face higher long-term risks, including recurrent GDM in subsequent pregnancies, an increased likelihood of developing type 2 Diabetes Mellitus and a predisposition to cardiovascular disease.[6,7] A recent review found that women with GDM have a nearly 10 times higher risk of developing type 2 Diabetes Mellitus than those with normoglycemic pregnancy.[8] The same dataset showed that 43% of the women with GDM developed prediabetes or type 2 Diabetes Mellitus over 5 years.[9] In Singapore,

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a combination of GDM, being overweight or obese before pregnancy, and retaining significant postpartum weight led to the highest risk of prediabetes 4–6 years postpartum.[10]

GDM is a "significant psychological burden" for women and may require specialized counseling for management.[10] This is problematic because current GDM management models are "fetal-centric" and do not place enough emphasis on women's struggles.[11] The physical and psychological difficulties associated with GDM begin at the time of diagnosis and can be lifelong. During diagnosis, women may experience emotional shock and feel a duty to educate themselves,[12] even when they lack an educational background to do so.[13] During pregnancy, women must balance their typical cravings for food or feelings of fatigue, which inhibit proper management and navigate cultural expectations.[11] Long-term, women still struggle with the lingering threat of type 2 Diabetes Mellitus, increased food costs, time constraints, difficulty exercising, and poor follow-up care from providers.[10,14,15] We aimed to understand both the physical and psychological experiences of women with a history of GDM at all phases of management, from diagnosis to the long-term postnatal period.

Managing GDM can be a "lonely" experience for women,[16] and supportive spouses are important enablers of its successful management. For example, spouses can act as partners in helping women adjust their health expectations, and are critically important in creating conditions for long-term management.[15] Given the cultural factors cited in previous research that likely influence spousal and family relationships,[11] and the multicultural nature of the local population, Singapore presents an ideal place to further our understanding of the GDM experience, especially the perspectives of spouses, which are limited in the current literature. Thus, we also aimed to explore the experiences of spouses of women with a history of GDM to capture the nuances of family relationships.

Material and Methods

Study Design

This study adopted an exploratory descriptive qualitative methodology which is well-suited for capturing the personal and social aspects of GDM management. Individual semi-structured in-depth interviews were conducted with women with a history of GDM to explore their experience of GDM, from diagnosis during pregnancy to long-term management. Along with brainstorming discussion topics with expert colleagues, the Health Belief Model (HBM) was used to develop the interview guide (Table S1) and for the analysis.[17] This model is one of three commonly used theoretical models to assess the risk perceptions, health beliefs, and health behaviors of postpartum women.[18] We also adhered to the Standards for Reporting Qualitative Research (SRQR) (Table S2).

Participants and Recruitment

Study participants were purposefully recruited based on ethnicity to capture Singapore's diverse demographics. Recruitment occurred from local primary care polyclinics and private General Practice (GP) clinics in the community, and from the SMART-GDM cohort at the National University Hospital (NUH).[19] Inclusion criteria for women were being Singaporean or a Singapore Permanent Resident between 21 and 45 years of age, having a history of GDM in the past five years, and ability to communicate in English. The exclusion criteria included a pre-existing diagnosis of type 1 or type 2 Diabetes Mellitus, cognitive impairment with psychotic disorders, hearing and/or visual impairment, and pregnancy at the time of recruitment and/or interview. This study complies with the ethical standards outlined in the Declaration of Helsinki. Ethical approval was obtained from the Domain Specific Review Board of the National Healthcare Group, Singapore (NHG DSRB Ref: 2021/00477). Nineteen women met the inclusion criteria and provided their informed consent. Spouses were approached for recruitment after the women had completed the interviews. Five spouses who met the inclusion criteria completed the interviews after obtaining informed consent. Informed consent for all study participants included consent for the publication of anonymized responses and direct quotes. While more spouses were welcomed to join, willingness to participate was a limitation; thus, we included these five interviews to illustrate spousal viewpoints without aiming for saturation in this subgroup. Interviews were conducted either in person, over the phone, or via Zoom.

Data Collection

ML, a researcher with a master's degree in Public Health and experience in qualitative research, conducted the interviews between July 2022 and October 2023. ML had no prior or clinical relationships with the participants, minimizing social desirability bias. Ten interviews were conducted in person, eight over the phone, and six over Zoom. The interview guide used for the interviews was piloted with three participants, and the pilot interviews were not analyzed. The interview guide was iteratively modified during data collection. Interviews with women lasted between 35.05 and 78.36 minutes, while interviews with spouses ranged from 25.40 to 53.24 minutes. Participants were encouraged to provide feedback at the end of the interviews. Data collection ceased when data saturation was reached (ie when additional interviews did not yield substantially new information).[20] Study participants received SGD 50 as reimbursement for participation. All interviews were audio-recorded with permission from study participants to facilitate verbatim transcription and coding.

Data Analysis

This analysis was guided by Braun and Clarke's reflexive thematic approach.[21] Transcripts were de-identified and checked for accuracy before analysis began. Each transcript was read at least twice before coding to ensure adequate data familiarization. Five transcripts were initially coded by ML and the coding process was discussed with VL. The codes (semantic and latent) and domains of interest were discussed by the research team. Subsequent transcripts were independently coded by ML using NVivo Release version 1.7.1. Coding was inductive and deductive, using concepts from the HBM and an open coding system to allow for flexibility and deeper data engagement. After coding, regular peer debriefing sessions were held with the team to discuss emerging codes and potential biases. We also kept a reflexive journal to document our assumptions and monitor potential biases throughout the analysis. Codes were subsequently organized into subthemes and themes, with continued discussions among the study team members and reflexive notetaking. Themes were developed primarily from women's experiences, with spouses' perspectives enriching these findings where relevant.

Results

The analysis revealed three main themes corresponding to the key phases of GDM experience: diagnosis, management, and long-term experience. Supporting quotes are verbatim and include expressions commonly used in Singaporean English (Singlish) such as "lah" for emphasis.[22,23] Demographic data of the study sample are presented in Tables 1 and 2.

Table 1 Demographics of Women with a History of GDM (n = 19)

	Total (N=*19*)
Age, mean (SD)	35.3 ± 2.1
Ethnicity, n (%)	
Chinese	10 (21)
Indian	5 (53)
Malay	4 (26)
Education, n (%)	
Secondary (PSLE)	1 (5)
Post-secondary (A-Levels, ITE)	1 (5)
Polytechnic	1 (5)
University First Degree	12 (63)
University Postgraduate	4 (21)

(*Continued*)

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Table 1 (Continued).

	Total (N=*19*)
Working status, n (%)	
Working (full-time)	7 (37)
Working (part-time)	4 (21)
Self-employed	3 (16)
Housewife	4 (21)
Unemployed	1 (5)
Housing type, n (%)	
3-Room Flat (HDB)	1 (5)
4-Room Flat (HDB)	7 (37)
5-Room Flat (HDB)	9 (47)
Executive Flat (HDB)	1 (5)
Condominiums and Other Apartments	1 (5)
Marital status, n (%)	
Currently married	19 (100)
Monthly family income (SGD), n (%)	
< 2,999	2 (11)
< 3,000–5,999	4 (21)
< 6,000–9,999	3 (16)
> 10,000	9 (47)
Not sure	1 (5)
Number of children, n (%)	
1	6 (32)
2	8 (42)
3	2 (11)
4	2 (11)
5	1 (5)
Method of delivery for most recent GDM pregnancy, n (%)	
Vaginal delivery	10 (53)
Emergency caesarean	4 (21)
Planned caesarean	5 (26)
GDM management, n (%)	
Diet	17 (89)
Insulin	2 (11)

(*Continued*)

Table 1 (Continued).

	Total (N=*19*)
6-week OGTT test attendance, n (%)	
Yes	15 (79)
No	3 (16)
Not sure	1 (5)
GDM diagnosis more than once, n (%)	
> 1	7 (37)
> 2	2 (11)
Family history of GDM, n (%)	
Yes	2 (11)
No	14 (74)
Not sure	3 (16)
Family history of T2DM, n (%)	
Yes	14 (74)
No	5 (26)
Smartphone use, n (%)	
Yes	19 (100)
Smartphone used for, n (%)	
Phone calls	19 (100)
Messaging	19 (100)
Social media	19 (100)
Browsing internet	19 (100)
Reading news	19 (100)
Email	19 (100)
Playing games	8 (42)
Health apps	18 (95)
Wearable technology, n (%)	
Smart watch (ie, Fitbit)	9 (47)

Diagnosis

Diagnosis Feels Like a Lasting Curse with Temporal Demands

Participants reported experiencing a range of emotions when learning about their GDM diagnosis, with surprise and fear being the most common. "So, uh, first of all, I was shocked (P12)" was a common refrain among participants. One of the spouses mentioned that he was "quite worried because [he] knew nothing about GDM. That was the first time [he] came across [it] and… it was something new (PH01)". Our choice of quotes featuring shock was not coincidental; 14 participants used this word in their interviews to describe some part of the GDM experience, most commonly to describe the diagnosis.

Table 2 Demographics of Spouses of Women with a History of GDM (n = 5)

	Total (N=5)
Age, mean (SD)	35.4 ± 2.1
Ethnicity, n (%)	
Chinese	1 (20)
Indian	2 (40)
Malay	2 (40)
Education, n (%)	
Post-secondary (A-Levels, ITE)	1 (20)
Polytechnic	1 (20)
University First Degree	9 (60)
Working status, n (%)	
Working (full-time)	4 (80)
Unemployed	1 (20)
Housing type, n (%)	
4-Room Flat (HDB)	4 (80)
5-Room Flat (HDB)	1 (20)
Marital status, n (%)	
Currently married	5 (100)
Monthly family income (SGD), n (%)	
< 2,999	1 (20)
< 3,000–5,999	2 (40)
< 6,000–9,999	1 (20)
> 10,000	1 (20)
Number of children, n (%)	
1	2 (40)
2	2 (40)
4	1 (20)
Family history of GDM, n (%)	
Yes	1 (20)
No	4 (80)
Family history of T2DM, n (%)	
Yes	2 (40)
No	3 (60)

(*Continued*)

Table 2 (Continued).

	Total (N=*5*)
Smartphone use, n (%)	
Yes	5 (100)
Smartphone used for, n (%)	
Phone calls	5 (100)
Messaging	5 (100)
Social media	4 (80)
Browsing internet	5 (100)
Reading news	5 (100)
Email	5 (100)
Playing games	4 (80)
Health apps	4 (80)
Wearable technology, n (%)	
Smart watch (ie, Fitbit)	2 (40)

However, surprise was concentrated among women who experienced GDM for the first time. Prior pregnancies with GDM made women expect another, "The third [pregnancy] (two prior GDM pregnancies), I was like, yeah obviously I'm gonna get it again lah (P10)". Defusing the surprise of diagnosis allowed participants to immediately refocus on their health goals, "I think I wasn't surprised because I had GDM with my previous, um, I was just wondering how to manage it (P02)". Though prior experience diminished surprise, it did not simplify the emotional experience, as the needle subtly shifted from shock to reflective sadness,

> I wasn't surprised because I already had it the first time. So, [I felt] just more of like 'I wish [GDM] wasn't [there]'… I wasn't surprised but I was a little bit disappointed. (P04)

Diagnosis Saddles Women with Undeserved Burdens

The negative emotions of a diagnosis are often accompanied by confusion regarding the cause of the diagnosis. Addressing our study's aim of understanding psychological responses to GDM, one participant reflected on the cause of her GDM, "So, what I was told is that it was probably because of genetics, maybe because my parents had it (P01)". Another participant was frustrated because healthcare professionals pegged the reason for her diagnosis to her ethnicity (Malay) "because of the type of food [she] eats". This mother felt that the comment "was a bit harsh" and it "turned [her] off to the extent that [she] doesn't want to listen" to the healthcare professional because she was "already so depressed" to hear about GDM (P06).

Nevertheless, the women recognized that GDM was not a fault of their own. One woman, in a group information session with other GDM patients, recalled hearing many questions from attendees, "'What did I do?' 'Is there anything I did…to make myself have GDM?' and I was like, 'Relax dear, it's not you' [laughs] (P05)". Participants expressed a sense of being burdened, perhaps cursed by GDM, and a genetic or racial curse; participants were largely able to avoid the trap of self-blame. Some coped by reassuring themselves that the curse is only temporary, "GDM will go away after you deliver, and so it's more of a 9-month jail sentence… (P05)".

Diagnosis Involves Confusion and Comprehension

As women came to terms with their GDM diagnoses, they sought more information to help them look ahead. Reflecting our aim to explore informational challenges during GDM, many were unable to find help from healthcare providers. One woman described her experiences meeting with dietitians,

> They just gave me a list of food I should eat and should not eat. That's it. So, most of my information… came from the Internet… Most of the things I find out on my own. (P11)

The following quote from a spouse echoed a similar sentiment: "…even if you want to go see a doctor… the fees [are] very expensive. So, to be frank, there was no support. So, we were doing things all by ourselves (PH03)". These quotes extend beyond a mere critique of providers' guidance; they reflect a broader narrative of self-advocacy and empowerment, as expecting mothers (and couples) – faced with the unknown – are driven to fill the gaps in the healthcare system. This experience is captured by another participant who describes the banality and routine frustration inherent in the system,

> We didn't know how to go, we didn't know why this happened. The doctors didn't really explain to us, so we asked the nurses. They just tell us to look for the doctor. We are really quite upset and lost. So, we have to do a lot of reading up on our own. (P06)

Management

Pressure from the Self

Following their initiative to learn about GDM post-diagnosis, the same sentiment was applied to GDM management. One participant recalled, "I had to find [out about diet] on my own. I had to portion control, of course. Meaning my carbs were really my enemy.… (P11)". In line with this, another participant elaborated,

> So these are major changes where I have to crack my mind to think about what, what kind of food I am placing into my mouth on a daily basis and this habit has to persist…. (P07)

Both women in these quotes described the challenge of management, but their approach was compelling: both created an adversary that must be fought. For one, the challenge was externalized through the identification of carbohydrates as a dietary opponent. For the other, the struggle was internal, recognizing the need to "crack" deeply rooted personal habits and cravings.

The struggle against both external and internal challenges encompasses a larger theme of the intense pressure that participants place on themselves during GDM management. Participants identified the self as a key pivot point for GDM management, "…the first change has to be with yourself first then… you can worry less. But if you yourself don't control, then you have to start worrying… (P10)". Failing this personal standard can lead to disappointment,

> I'm so calculative. I do not exceed 30g of carbs in my meal. So, I know that with that [meal], I probably ate like 55 g of carbs. I'm like, oh my goodness, what have I done with my body?. (P11)

These pressures are compounded by the pressure that expecting mothers already put upon themselves to ensure the health of their children. As shared by one participant,

> … not only you have to be careful for yourself, you have to be careful for your children. So, it's only when you change your lifestyle for yourself…it will change the lifestyle for your children right?. (P10)

Nevertheless, pressure is not always negative; meeting personal goals provided some participants with an emotional boost to soothe their pregnancy difficulties,

> …on some days [I feel like I am] just gonna die. But I think at the end of the day… you feel very satisfied and contented that you actually made an effort without medication to protect yourself and your child. (P11)

Therefore, when considering the self as a source of pressure in GDM management, we observe it as a motivating force, which, while nobody is perfect, can be managed with the right expectations and being sure to recognize one's own strengths and successes.

Pressure from Providers

The participants also sensed pressure from their healthcare providers to successfully manage GDM. This pressure can act as an alerting call to action, "Part of [making changes] was, [my cardiologist] telling me that you need to make some changes (P05)", and others appreciated that pressure was applied with a soft touch,

> …there are days that [the blood sugar readings] are a little bit higher, but my gynae… didn't really scold me, or make me feel really bad about it… The sugar level might be a higher, but you know what? It's okay. (P16)

This was further elaborated by a spouse who attended gynecologist appointments with his partner,

> [the provider] didn't come across as having that mindset about very clear boundaries… you can eat but don't take so much… he came across as very… grandfatherly. (PH01)

In the previous theme, we outlined some disappointments with healthcare providers, with patients feeling lost, uninformed, or overly burdened by systematic constraints. However, providers have found some redemptions in GDM management. Consistent with our aim of understanding provider-patient interactions, providers are more often discussed as a source of relief rather than being a source of daunting pressure. One participant even went as far as finding a silver lining in having GDM, that she was able to see her provider more, "the good thing that came out of it was if you have GDM, the doctors see you more frequently" (P06).

Pressure from Family and Peers

Family and peer relationships have emerged as critical factors in the management of GDM. Participants often struggled to convey GDM severity to their families, which resulted in challenging situations. Faced with a husband who believed that advice from doctors was "just trying to scare" her, "I had to just shut everyone out and manage it myself", said one woman. She went on to describe a typical family dinner: "…my mom would just cook you know, um, very stereotypical Chinese dinner, which is heavy on starch and so all I can do is pick out the starch (P05)".

While in different family members made management more difficult, some families were disbelieving or ignorant of GDM, placing pressure on expecting mothers. One participant faced consternation from her family as if GDM was a fault of her lifestyle, "…there is always guilt mongering… I already gained some weight before pregnancy, so that was always under scrutiny… there's a lot of judgment… especially in the family (P12). On top of that, participants reported feelings of frustration about the ignorance towards GDM, My parents never really have a very good understanding. For them, the knowledge is more of hearsay, so they hear from that friends that oh GDM is nothing serious…. (P02)

Supportive families do exist, however, and a minority of participants favorably discuss their families or peers. Nobody in my family belittled the idea of having GDM (P06)". Spouses were supportive in providing "emotional support" (PH05), "comfort" and "taking care of the kids [so that his wife can] do her own stuff…go out with her friends (PH2)". Spouses also tried to be present when their wives performed the routine blood sugar testing at home: "I help her with everything…the testing on the finger and standby the wet tissue all these things just to make, to support her (PH2)". However, providing support was difficult, and required adjustments, "…it didn't help that I also have cravings. So, I tried, at least, I tried not to have those in front of her." Illustrating our aim to capture family dynamics around GDM management, these results are a reminder that much pressure is placed on the expecting mother, but family members can also feel the pressure of helping. Ultimately, these narratives suggest that families and peers can be sources of both pressure and relief, with the difference between the two being as complex as human relationships themselves.

Long-Term Experiences

Long-Term Systemic Oversight

The transition to postnatal care varies. Many participants reported returning to the clinic and completing follow-up oral glucose tolerance tests (OGTT). Even in the case of a good test result, some participants still found the framing of post-GDM life by providers off-putting,

> …they just kept on harping on about how the likelihood of that happening is very high, so I really need to watch my diet, I need to watch what I feed my kids etc that kind of thing. So, a lot of scare mongering…. (P05)

Several participants were unaware of the importance of the OGTT, forgetting their appointments, or being too overwhelmed in the postpartum period to think about attending the OGTT appointment, which is typically scheduled six weeks after delivery. Some women were reminded of the OGTT appointment by other providers that they were followed up for non-pregnancy-related conditions. However, many participants mentioned that their GDM history was forgotten by the healthcare system. Asked if any providers - ranging from their gynecologists to their primary care providers - ever inquire about GDM, "Never, never" (P02), said one participant, another saying "No, nobody asks" (P01). One described her GP, "…I don't really think they asked anything about GDM (P12)", although providers' failure to inquire is also related to patients' reluctance to bring it up, "Because my assumption with polyclinic is that there is no maternal health, I guess. And I think I was just wanting… to have a quick appointment as well". (P04). It is unclear what comes first in this sequence; providers' disinterest in GDM discourages patients from discussion, or vice versa. Nevertheless, this bidirectional dynamic contributes to the feeling that the healthcare system largely overlooks the GDM history.

Long-Term Personal Imprints

While the healthcare system may not consistently prioritize patients' GDM history, the experience often leaves a lasting impression on the individual, resulting in lifelong changes. "It's like the moment you are diagnosed with GDM… you have to start taking care of yourself until the end… even though you are clear of it (P10)". Other participants were more specific in how their health management has changed for good,

> One of the things that I'm also very mindful about…after this pregnancy, making sure my iron levels are okay and… I have enough calcium and everything (P04),

or how their awareness about diabetes is heightened,

> It changed our life. It changed our lifestyle; the short period of having it, is a learning lesson for me lah, really. I realized that you know, it's really hard when you have diabetes. (P01)

Changes caused by GDM can exert enduring pressure on patients. When looking forward to future pregnancies, one participant shared,

> I know there are people who say that they started a healthier lifestyle then they didn't get it the second time. They were careful about the diet from the beginning. So… I'm obviously a little scared because I really don't like the fact that pressure of, okay, you shouldn't be eating this. (P12)

These changes also extend to the family. One participant described how she felt pressure to be more active with her family, "So I literally put their swimming lessons on a midday Sunday so that I will have to force myself out. It's tough lah, but we have to do it (P06)". Our participant here is not saying "have to" in a casual sense: participants feel they must carry on with permanent, and sometimes burdensome lifestyle changes. We end with an encapsulating quote describing the strong emotional experience of GDM and how it can clearly make lifelong changes.

> I think [my GDM experience] will never go away for [my] lifetime…I think it traumatized me to the point where I had sleepless nights, like, is my child moving inside me. Is she OK? There was once where I didn't feel much movement. I rushed to the emergency and all. Uh, then they tested my blood because whenever I see a dark-colored urine and my baby's inside me, I get really worried… If I'm on my own [then] it's different… but there's a life in me, dependent on me. I cannot afford to make mistakes. (P11)

Discussion

This study aimed to illuminate the experiences of women with a history of GDM in Singapore. Our specific interests included understanding their knowledge of GDM, how they interact with their family and the healthcare system, and the enablers and barriers to GDM management. Consistent with the HBM, participants' behavior was influenced by perceptions of diabetes severity, distinct enablers and barriers, and guided by cues to action and self-efficacy.[17] Given our aim to understand women's interactions with family, providers, and their personal experiences managing GDM, we structure the discussion around three

key types of relationships - interpersonal, intrapersonal, and systemic. Each relationship type aligns with our study aims and carries distinct practical implications, strengths, limitations, and avenues for future research, which we address in turn.

Interpersonal Relationships in GDM Management

Our results show that relationships with (1) individual healthcare providers and (2) family members act as key enablers or barriers for women with GDM. First, we observed several positive reports of individual healthcare providers (eg, obstetricians/gynecologists and dietitians) that demonstrated attentiveness, took GDM seriously, or actively encouraged follow-up care. On the other hand, participants felt some healthcare providers did not provide sufficient information regarding GDM. Therefore, patients feel left on their own to seek information from other sources (eg, the Internet and peers). This finding aligns with previous research on Singaporean healthcare providers' perceptions of responsibility for reducing the risk of type 2 Diabetes Mellitus among women with GDM. Providers in that study acknowledged a shared responsibility but they believed that women should have the greatest responsibility for their own health.[24]

Second, beyond healthcare professionals, interpersonal relationships within the family context significantly shaped women's experiences of GDM. Our results highlight the importance of spousal and parental/in-law support in easing the burden of managing GDM. However, our data illustrate the negative effects of an unsupportive family. When faced with family members who doubted the seriousness of GDM, women needed to be defensive against family members who questioned dietary decisions or worse: pressured women to eat unhealthy foods. Our participants reported different ways of dealing with unsupportive family or friends, be it "shutting them out", responding with a firm no, appealing to the unborn baby's health, or even enlisting other family members to do the talking for them. Given participants' receptiveness to information from healthcare providers, offering practical communication strategies during GDM education sessions may empower women to navigate these difficult conversations more confidently. From the HBM standpoint, such an initiative could be seen as an additional step towards self-efficacy, giving women confidence in addressing sensitive topics with family members.[17]

Intrapersonal Relationships in GDM Management

In addition to external interactions, our findings highlight an intrapersonal component: the self-relationship experienced by women managing GDM, which was consistently present across our themes. The intrapersonal dimension provides a window into informants' self-motivation, self-discipline, and self-efficacy.[17] Self-perception is an important yet often overlooked aspect of diabetes management, and our findings suggest that this is particularly true for women with GDM. Participants frequently identified their unborn children as the reason for engaging in healthy behaviors. Communicating internally about the health of their babies frames GDM management as something done primarily for others rather than oneself, a perspective consistent with the Health Belief Model's concept of increasing perceived severity.[17] One participant's reflection was particularly meaningful, as she discussed the satisfaction of struggling but succeeding in eating healthy, expressing pride about being a good mother *and* being good to herself. (P11).

Our results emphasize that managing GDM is a constant challenge involving physical, interpersonal (eg, family), and psychological dimensions. Several participants personified their challenges, explicitly naming dietary components or internal cravings as adversaries to overcome. This personification highlights that, just as women identify motivating factors (such as protecting their baby's health), they also make specific challenges tangible. This phenomenon can be viewed as a variant of HBM's "cues to action" concept, where informants have cues reminding them of what to do as well as cues to remind them of what not to do.[17]

GDM Patients' Relationship with Healthcare Systems

Our findings also emphasize a third critical domain of relationships: those between women with GDM and the healthcare system itself. With few exceptions (eg, the trusted providers discussed above), informants reported a range of experiences with both private and public healthcare systems. In Singapore, women are typically diagnosed with GDM between the 24th and 28th week of pregnancy. Upon delivery, they are scheduled for a follow-up 6-week OGTT in either their obstetrician/gynecologist's office or in a primary care setting. If the results are normal, guidelines recommend continued screening every one to three years from then on,[25] but we observed notable discordance between the recommended guidelines and women's experiences.

Participants frequently reported frustration starting at diagnosis. Initially, many women were in a state of "shock" about the GDM diagnosis and felt they received insufficient information from providers. Thus, many participants had to educate themselves on GDM and how to manage it. Some reported feeling "lost" in the system or disappointed with the limited scope of information provided during appointments (eg, dietitian consultations only covered basic nutrition principles). Subsequently, the participants turned to the internet for their answers. Frustration with healthcare systems persisted after delivery: for example, participants reported confusion in terms of whether specialists or general practitioners would lead follow-up or long-term care. In sum, our findings suggest that the relationship between women with GDM and the healthcare system is characterized by a sense of neglect or inadequate care, leaving women feeling unsupported throughout their GDM journey.

Clinical and Practical Implications

Our findings on interpersonal relationships suggest that there is an opportunity to equip women with GDM with communication tips or arm them with simple, layperson-friendly explanations that may defuse difficult conversations. Additionally, our study highlights that women with GDM need someone they trust to successfully manage GDM; providers who can strike a balance between clinical care and soft touch can be key enablers. From the systemic relationships perspective, participants' confusion about primary responsibility for long-term GDM follow-up care illustrates a key gap in continuity of care. Prior research among Singaporean healthcare providers has similarly documented confusion and unclear role boundaries among prenatal and primary care providers regarding long-term GDM management.[24]

Future Research Directions

Considering the intrapersonal relationships highlighted in our findings, future research should explore the nature and characteristics of the perceived challenges that women with GDM experience in the context of their condition. Such research can serve as a foundation for understanding people with diabetes more broadly and provide avenues for providers to frame information (eg, the language of avoidance versus the language of resistance). Additionally, our findings uniquely highlight the emotional impact on women of feeling neglected or forgotten by the healthcare system during postnatal transitions. While prior studies have noted obstacles among healthcare providers—such as a lack of resources and time constraints during prenatal care,[24] future investigations should specifically explore women's emotional and psychological responses related to these discontinuities in care, identifying critical time points at which clearer communication from providers would be most impactful. Finally, large-scale studies are needed to address who should be the touchstone for women with GDM—their obstetrician/gynecologist or primary care provider. Several participants in our study reported variations in feelings that were unnoticed by the healthcare system. For them, it is understandable that they feel they have fallen through fissures between specialist care and the primary care system. Future studies could empirically evaluate the effectiveness of clearly assigning responsibility for care continuity either within specialist or primary care settings, focusing specifically on women's experiences and health outcomes.

Strengths and Limitations

One strength of our study is its focus on the interpersonal relationships within Singaporean families. For instance, it is common for families to live in multigenerational households in Singapore, thus allowing this study to examine unique family dynamics specific to Singapore. Nevertheless, understanding the experiences of the local population is essential for designing effective and relevant interventions. In line with co-design thinking, the current study sought to understand GDM in the eyes of women and to establish a varied representation of experiences.[26] While the majority of women are highly educated, this mirrors the high level of education obtained by the general population of Singapore.[27] Furthermore, we were able to include a wide diversity of participants to provide a representation of the Singaporean population (ie, variation in ethnicity, socioeconomic status, and age). However, while representative of Singapore, findings may not be generalized internationally due to the local cultural context and the relatively high education level of participants. The limited number of spouse interviews limits broader conclusions about spousal roles in GDM management.

Conclusion

Overall, the current study illustrates women's perceived knowledge of GDM, their interaction with their family and healthcare system, and the enablers and barriers to GDM management. Taken together, the findings address our aim of understanding how women and their spouses experience GDM from diagnosis to the long-term postpartum period. Throughout their GDM journey, women struggle to find balanced support from the family and healthcare providers and are often left navigating the management aspect (during pregnancy and post-birth) alone or with their spouses. Given the potential long-lasting impact of GDM on women's health, this presents an opportunity to intervene and fill gaps that are currently missing in GDM management. Despite the transient nature of GDM, continued efforts need to be made to bring GDM into the forefront of conversations between women and their support systems and facilitate a better understanding of patient and provider roles during a woman's GDM journey.

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Disclosure

The authors report no conflicts of interest in this work.

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