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Attendance for Postpartum Glucose Tolerance Testing Following Gestational Diabetes among South Asian Women in Australia: A Qualitative Study

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Abstract

Objective: To conduct an in-depth exploration of the experiences of and perspectives on postpartum Glucose Tolerance Test (GTT) screening of South Asian women diagnosed with GDM in Melbourne, Australia.

Design: Using an exploratory qualitative methodology, this study was carried out in two phases: the first phase involved face-to-face in-depth interviews with 17 recent immigrant women from South Asia. In the second phase 23 GDM diagnosed women were interviewed.

Setting: All interviews were conducted at a place and time of the women's choice.

Participants: Thirty-three of 40 South Asian women who were interviewed antenatally after GDM diagnosis also participated in telephone interviews conducted between nine and 52 weeks postpartum.

Findings: Women were aware that they had an increased risk of developing Type 2 diabetes but a number of barriers caused them not to attend, or to postpone their postpartum GTT screening, such as: lack of physical and emotional support after birth, busyness of daily life, and traveling overseas after birth. Women found it difficult to maintain dietary and exercise recommendations after birth, largely because health messages were not conveyed in a culturally appropriate manner, which led to discontinuation of lifestyle adopted in pregnancy after GDM diagnosis.

Key Conclusions: Despite difficulties, South Asian women with previous GDM eventually presented for postpartum GTT screening and follow-up care within six-nine months of birth. Although awareness of follow-up and risk of Type 2 diabetes was high, some women found it extremely difficult to continue with the changes to diet and exercise they had adopted in pregnancy.

Implications for Practice: Women and their families should be provided with culturally appropriate advice in pregnancy relating to lifestyle modification and again at discharge after birth so that they are able to maintain and continue with the changes after birth.

Keywords: Gestational diabetes, Postpartum screening, South asian women, Indian Sub-Continent, Glucose tolerance test

Abbreviations: GDM: Gestational Diabetes Mellitus; GTT: Glucose Tolerance Test; OGCT: Oral Glucose Challenge Test

Introduction

Gestational diabetes mellitus (GDM), defined as glucose intolerance first recognised during pregnancy, affects approximately 7% of all pregnancies [1], and up to 14-19% of all pregnancies in some population groups such as Indian, Vietnamese, Chinese, Arab and African [2,3]. This means that these groups of women experience higher than average risk of adverse pregnancy outcomes, such as increased birth weight, caesarean delivery, and neonatal hypo glycaemia, [4]. Although GDM usually resolves after birth, women with a history of GDM are up to seven times more at risk of developing type 2 diabetes, and are also at high risk of developing GDM in subsequent pregnancies [5]. Recent research also indicates an association with the later development of cardiovascular disease [6].

Despite the elevated risk for type 2 diabetes and the recommendation for postpartum screening, attendance for screening at six weeks postpartum is less than optimal [7-12]. Previous studies have shown that after GDM diagnosis, pregnant women are highly motivated to improve their health and to have a healthy baby, which enables them to take control of their GDM [13,14]. However, after childbirth many women do not present for postpartum glucose tolerance test (GTT) screening despite this recommendation [9,10,15,16]. Studies of women with GDM have shown rates of postpartum screening to fall well short of targets [15-18].

Postpartum follow-up is important because of the well-documented future health risks to women and their babies [19], therefore screening rates need to be improved. The Glucose Tolerance Test (GTT) is the most robust test for detection of impaired glucose tolerance and type 2 diabetes postpartum and for this reason it is recommended six-weeks after childbirth. This postpartum follow-up also provides an opportunity to assess the health of the mother and the newborn, and to identify any other health issues. Identifying women at high-risk of type 2 diabetes in the immediate postpartum period is likely to present an opportunity to counsel the woman about changes to lifestyle to prevent the development of type 2 diabetes [20-22]. Preventing or delaying the onset of diabetes in women of child bearing age is also likely to be beneficial in protecting future children from the harmful in-utero effects of hyperglycemia, which is associated with birth defects, and a risk of obesity and diabetes later in life [23,24].

Although a number of studies illustrate low rates of presentation at postpartum GTT screening [10,11,15,16], it is neither well documented nor understood why particular groups of women fail to attend. In Australia, women with GDM are reminded by treating hospitals to attend for GTT at six weeks postpartum. The group of

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interest in this study, women from the Indian sub-continent (South Asia), are disproportionally represented in GDM statistics in Australia [**25**,**26**] and are a high risk group for developing GDM. Yet little is known about their attendance rates for postpartum screening.

South Asian women constitute a sizeable and growing group of childbearing women in Australia [**27**] and according to the most recent data, India is one of the top three countries of overseas born populations in Australia – 343,070, that is, 5.7% of the total population [**28**]. To our knowledge, no qualitative studies in Australia have explored the postpartum GTT experiences of this group of women with GDM. Greater understanding of South Asian women's experiences could provide insights into the optimum care needed for prevention of future Type 2 diabetes in these women. Therefore, the objective of this study was to conduct an in-depth exploration of the experiences of, and perspectives on postpartum GTT screening of South Asian women diagnosed with GDM.

Materials and Methods

Sampling and recruitment

Using an exploratory qualitative methodology, this study was carried out in two phases. Sampling was strategically focused to collect the most appropriate and "rich" data to gain a deeper understanding of South Asian women's experiences and perspectives on postpartum GTT screening. The first phase involved face-to-face in-depth interviews with 17 recent immigrant women from the Indian sub-continent (April-December 2009), diagnosed with GDM, attending a tertiary level metropolitan maternity hospital in Melbourne, Victoria, Australia. In the second phase, a more socio-economically diversified sample of 23 GDM diagnosed women from the Indian sub-continent attending two other tertiary level maternity hospitals in Melbourne was conducted (June - December 2011) to broaden the range of the study.

Routine screening with an oral glucose challenge test (OGCT) and diagnosis of GDM at the study hospitals usually occurs between 24 and 28 weeks' gestation. Recruitment for the study occurred in the following way: Women from the Indian sub-continent (South Asia) aged 18 years and over, diagnosed with GDM, were recruited to the study from the diabetes clinic at each study site. The diabetes nurse educators at each site mentioned the study to the South Asian women and with their permission introduced them to MB, who explained the study, invited them to participate and obtained written consent.

Data collection

Women were interviewed antenatally after GDM diagnosis, and then again after the birth, 9weeks to 52 weeks postpartum. All interviews were conducted by MB at a place and time of the women's choice.

The interview conducted in pregnancy focused on women's experiences of living with GDM diagnosis and management [**14**]. The postpartum interview, the primary focus of this paper, was conducted over the telephone between 9 and 52 weeks of childbirth, and lasted for about 20-30 minutes. MB is fluent in English, Bengali and Hindi, so the interviews were conducted in the woman's preferred language: English (17), Bengali (4), and Hindi (12).

An interview guide was used, and the interviews were digitally recorded with the permission of interviewees. Important issues and themes emerging in early interviews were explored in all subsequent interviews. MB began by asking each woman a general question: 'Tell me about your recent birthing experience and about your current health'. As a fluent tri-lingual researcher well-versed in conducting sensitive interviews, MB translated and transcribed all the 16 interviews conducted in Bengali and Hindi. The remaining 17 interviews conducted in English were transcribed verbatim by professional transcribers. All the translated and transcribed transcripts were reviewed for accuracy and completeness by comparison with the digital recording by MB, who also read and re-read the transcripts to identify primary themes and sub-themes.

Data analysis

Concurrent data analysis was carried out alongside the data collection to facilitate the identification of new emerging and important issues that could be addressed during subsequent interviews. Field notes were also included in the data analysis. QSR International NVivo 9.0 software was used for data storage, analysis, and management. Data analysis was guided by the general principles of qualitative content analysis [**29**,**30**] and Lincoln and Guba's criteria of rigour in qualitative research [**31**] were applied.

Data analysis commenced with multiple reading of the transcripts by MB. This facilitated identification of analytical categories. These were then organised based on emerging themes and sub-themes. Themes were discussed with co-authors, facilitating final interpretation of the data. Interpretation of the themes and sub-themes are presented as findings in this paper, which contain direct quotes from participants to report their experiences in their own words. To protect participants' identities, pseudonyms have been used throughout.

Ethics

Approval was obtained from the Human Research Ethics Committees at all participating hospitals and from La Trobe University's Human Ethics Committee. All research participants were informed that participation in the study was voluntary and that neither participation nor non-participation in the research would affect their care or treatment.

Results

Participants

After GDM diagnosis in pregnancy, 65 women from three study hospitals were approached to participate, of whom 40 consented. The women who declined to participate in the study gave various reasons, including: partners did not want them to participate (n=6); they did not have time (n=10); they were on multi-dose insulin injections (n=3) or they were not interested in the study (n=6). All 33 postpartum participants were married, and came from various countries such as Bangladesh (3), Fiji (1 ethnic Fiji Indian), India (21), Pakistan (5), and Sri Lanka (3). Their general level of education was high as reflected in their varied occupations, including: doctors, dentists, accountants, information technology personnel, public servants, and self-employed (Table 1). At the postpartum stage of the study only 33 women completed interviews, as contact could not be established with six women despite trying various methods, such as email, land telephone, mobile, and also checking with hospital diabetes clinic if they were able to establish contact with these women for their postpartum

screening. One woman had had a stillbirth and was excluded for ethical reasons (Table 1).

Marital Status	
Married	33
Migration	
after marriage	33
Age range	
24-38 years	Median 28 years
Length of residence in Australia	
Less than a year - 18 years	Median 3 years
Occupation	
Homemaker	19
Full-time employment	14
Educational level	
Year 10	1
Year 12	6
Bachelor's degree	19
Master's degree	7
Country of birth	
India	21
Bangladesh	3
Pakistan	5
Sri Lanka	3
Fiji	1

Table 1: Socio-demographic profile of South Asian women

Of the 33 postpartum women, 16 had had a previous pregnancy, and of those eight had had GDM in their previous pregnancy. Twenty-three women had a family history of diabetes and 27 women had required insulin in the index pregnancy for this study (Table 2).

First pregnancy	17
Previous pregnancy	16
Previous GDM diagnosis	8
Women requiring Insulin in current pregnancy	27
Family history of Type 2 diabetes	23
Delivery information	
Unassisted vaginal birth	21
Emergency caesarean section	8
Elective caesarean	3
Vacuum birth	1
Gestation at birth	
≤35 weeks	4
36-38 weeks	17
38.1-41 weeks	12
Birth weight of new-born	
Range 2040 to 3850 g	Median 2950 g
Postpartum Glucose tolerance test (GTT)	
Normal range	21
Impaired glucose tolerance	7
Type 2 diabetes	1
Yet to present for a GTT at 12 months	4

Table 2: Pregnancy related information

More than half (18 women) had presented for their GTT screening within 6-12 weeks postpartum, and almost another quarter (10 women) had completed their GTT screening within a year of childbirth. Four women stated that they would do the test later, and one woman had already developed Type 2 diabetes.

Themes

Analyses revealed four main themes: (1) an awareness of risk and perceived inevitability of developing Type 2 diabetes mellitus; (2) postponement of postpartum GTT screening: (3) resistance to continue with diet and exercise recommendations postpartum; and (4) desire for a healthy family life and for diabetes to be 'gone'.

Theme 1: Awareness of risk and perceived inevitability of developing Type 2 diabetes

The majority of participants were clearly aware of the risk of developing Type 2 diabetes later in life and most also had a sense of inevitability because of a family history of diabetes. Women expressed at length their worries and concerns for themselves and their children. A number of participants were health professionals themselves (nurses/doctors) which heightened their awareness of the disease and the consequences of neglecting to follow up in the postpartum period. Balwinder, Katrina and Lola explain:

"You know, my family has a very strong diabetic history. Both my like my maternal and father side, both have diabetes. Yeah, so I know at one stage, I know we are going to be diabetic... Because my father, my grandfather were diabetic. I am planning to do the yearly tests too so that I can know when I get diabetes. I know I am bound to have it.… It like runs in our family" [Balwinder, from Punjab]

"Of course, I did [do the test]… being a doctor I know that I should"… [Katrina, from Pakistan]

"You already know that I am a nurse, so I know that I should do the test. I did the test as soon as I got my reminder from the hospital"... [Lola, from South India]

This awareness of Type 2 diabetes risk resulted in two things for most participants: either attending the six week glucose tolerance test (GTT) appointment; or ignoring the appointment. Women concerned

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about their risk were eager to have the GTT screening to rule out Type 2 diabetes to enable them to resume their normal life, as Donna describes:

"The day we got the reminder letter in the mail, my husband said we must do the test... I rang the hospital and made an appointment for my test. We all wanted to know the result so that we could all be sure that I had no diabetes! When I got the result, I was so-so happy, I can't tell you that feeling"... [Donna, from Sri Lanka]

Women who did not attend for their GTT at six weeks postpartum appeared to clearly understand their risk of Type 2 diabetes, but chose to disregard their appointment due to their personal circumstances. These participants however, often kept a personal check on their diabetes risk by testing their blood glucose levels (BGL) at home. Most women were aware that in order to minimize their risk of type 2 diabetes, they were required to modify their diet, lose weight if overweight and continue with their exercise regime. Sneha's account is illustrative:

"…I checked my glucose levels after each meal after delivery for a fortnight and the levels were good, that means that I do not have diabetes… (even now) sometimes, like when I do eat a big meal, or go to a party or have something like sweets etc., then I check to see how my levels are.... I am exercising at home almost 4 times a week for about 30 minutes walking on the treadmill.... but my diet is back to normal like before GDM... it is hard to control my diet, I like our kind of food too much to give it up. But I am walking as I have to lose the 20 kilos that I put on in pregnancy, but now I am finding it very difficult to lose it... see it is almost 3 months since my baby is born and I have lost only 4-5 kilos since delivery..... I know I am overweight and I have to lose it"... [Sneha, from Punjab]

Although the majority of the women were very much aware of their future risk of Type 2 diabetes, this was however, not a universal finding. Winnie was disbelieving and upset about her GDM diagnosis, and the need for postpartum follow-up:

…. I am so surprised that I had GDM, because with my 2 children, born in Pakistan I didn't have any problems! … I am not following anything…. Even in GDM I did not…. I just do not know/understand what they say… because I was taking insulin. Now as usual I eat my roti and sabji and meat and there is no problem [Winnie, from Pakistan]

Theme 2: Postponement of GTT

Participants who had not attended for testing at six weeks postpartum presented a number of reasons for their inability to comply with their appointment. The most typical explanations included the busyness of their lives as new mothers, a lack of family and other support, and the fact that they were travelling overseas very soon after the birth. Issues related to time and postpartum adjustment were especially common, including adjusting to the newborn's erratic schedule, managing the home and other children. These tasks were described as exhausting, which left them precious little time to prioritize their own health or think of GTT screening. Madhumita explains:

"You know, I have a son… who is three years, and now this new baby. My husband is a chef and like works odd hours, like doing various shifts. My relatives could not … come… So…I am …all alone trying to juggle …everything. My husband is really-really good and helps out even though he is …very tired! … I feel exhausted when my husband is working I have to look after both the kids, and the new baby keeps crying all the time like! Breastfeeding is painful and like time-consuming... My son is … demanding and naughty too… so running after him…leaves me …no time for myself, or to … think of diet control or exercise, or to go to the hospital with these two on my own" [Madhumita, from Eastern India].

Women had high expectations of postpartum support, consistent with their ethnic and cultural backgrounds, where the new mother is customarily supported and assisted by female relatives for a considerable time after birth. As migrants in Australia, women in this study often had little support at home other than their husbands, and they described their feelings of isolation and loneliness and about missing home and the support of their family members. This situation consequently impacted on attendance for GTT postpartum, as Neelima describes:

"No, I did not do a GTT yet… I have no help or support with any of the chores here at home and at work ... I run a catering business from home you know for the income.... one income is not enough to survive here........, yeah, so, I am tired of doing all this and then I have to look after my 2 children..... you tell me where's the time to go for a test now?... I am so tired and exhausted always and.... you see the problem is that I cannot go out during the day, as I have to run my business, look after my children... because my husband , he does night shift so that's another problem....... I can't leave them with him and go for the test.... you know how much time we have to wait at the hospital........even during my pregnancy, I had to wait sometimes for 4-5 hours..........so right now it is not possible for me to go, so this is my problem" [Neelima from Punjab].

Even for women who had the support of a visiting family member, some still felt that they did not have sufficient time to think about attending for screening. Many also planned to return to their home country for continued postnatal/family support and decided to postpone their GTT until their return to Australia or have the test done in India/Pakistan. Theresa explains:

"See, I knew that I would be, you know, going back to India, you know, with my mother and the baby. We made these plans before the baby was born, when I was pregnant and not yet diagnosed you know. At that time you know we didn't know about glucose testing after childbirth and all that. I am testing almost every day now, and everything looks good you know. So, I will do it when I come back in six to eight months' time."(Theresa, from South India)

For a small number of participants, the fear of a positive GTT acted as a deterrent against attending for a postpartum testing. These women were aware of their risk of developing Type 2 diabetes in the future, but nonetheless disregarded their GTT, as they did not wish, at present, to face their possible diagnosis and the resultant restrictions of diabetes self-management. Soha explains:

"See, I am only 24 years now. I know my mother and grandfather have diabetes, so I am likely to get it too. Right now, I don't want to know about my result. I had to control so much in my pregnancy. I could not eat what I wanted. Now I want to enjoy my life, and eat and be carefree. I will worry about diabetes and diet control in my 40s" [Soha, South East India]

Three women, all from Bangladesh–Munira, Mumtaz and Asma indicated that they had no intention of having a GTT. These were the only three women in the sample who strongly rejected the idea of attending for GTT screening when interviewed at 12 -16 weeks

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postpartum. These women were in their early twenties and had developed a fatalistic attitude to developing Type 2 diabetes. They felt unwilling or unable to change their current diet or lifestyle, and therefore, felt it was unnecessary to know and worry about Type 2 diabetes, especially at their age:

"I will continue to live my life the way I always did. I did not enjoy my pregnancy experience as it was very restrictive. I do not want to know the test result. I do not want to live my life worrying about what to eat, how much to eat. I know I will not be able to control my diet, or change my lifestyle, so why should I know the result and live in fear? I am quite young to stop doing what I enjoy most – food. I will think about this after I am 35 years" [Mumtaz, from Bangladesh]

However, these same women when contacted at around 32-36 weeks for follow-up said that they intended attending a GTT screening later in the year at the urging of their general practitioner.

Theme 3: Resistance to continue with diet and exercise recommendations postpartum

The majority of women indicated their difficulties in continuing with the diet and exercise regimen adopted in pregnancy, although they understood that making lifestyle changes would probably help prevent or delay development of Type 2 diabetes in the future. The main explanations given were: difficulties finding food alternatives; too busy or tired to do the extra work associated with modifying their diet or exercise, and wanting to indulge in favorite foods after pregnancy restrictions. Women expressed a number of difficulties understanding how to modify their diet, while continuing to cook and eat commonly consumed South Asian foods. Much of the available health information was focused on food substitutions within a western diet, and contained food examples such as multi-grain bread, which were not part of the South Asian diet. Lola describes the challenges:

You know I am trying, but the diet part is just too difficult for me right now. I really do not like all this 'English Foods', the way they tell us to cook and all.... I just can't have and what to eat and what to prepare and all that..... I asked you earlier too, could you develop something like this for us? You know it will be very helpful as our diet is so different from the foods here, and I just cannot switch to another kind of diet, because I know I cannot continue it for a long time, as I will be craving for our kind of foods"... [Lola, South India]

Most participants felt extremely busy and stretched and unable to take on the extra tasks associated with diet control. Several were too tired to contemplate exercise in the evening and most felt unable to walk outside the home during the day, because of child care and household chores, their concerns about exercise when breastfeeding, the cold/hot weather, and a lack of childcare. Balwinder and Theresa explain:

"Where is the time you tell me to worry about diet control and exercise? Like my mother has gone back to India….I am working full-time, have to look after my son. I have no support other than my husband, and he too works full-time, and we are like so tired and exhausted when we come home. Who has the time to think of diet control? Running after my son and attending to stuff at home takes all my energy. So there is no diet control now and not much exercise either"... [Balwinder from Punjab]

"I am honestly not doing any exercise at all… I feel tired and it is so cold, I don't feel like going for walks. But I do walk inside the house like they said [Theresa from South India]

Although many participants felt unable to follow dietary and exercise recommendations closely, most were nonetheless conscious of the need to make lifestyle changes and described feeling guilty and attempting to do whatever they felt was possible. For example:

"I am still trying to continue with my controlled diet as I was doing when I was pregnant with her; but I am not walking much, as I am still breastfeeding. It is all so hard to do everything. I don't know what I will do when my mother goes back to India."…. [Sonal, from S.E. India]

"My diet is under control, but walking is irregular, but I do quite a lot of household chores to keep me active... Oh, [the treadmill] is still there… my husband is using it now… I will start using it soon… but right now, with no help, I have to do everything at home, and the kids, and then I help my husband in his business… you know that we run our own grocery store… so the timings are long….and I get tired by the time we close shop and come home to bother with walking…. I am happy that at least I am able to maintain my diet"... [Ritu, from Punjab]

Some women had been willing to tolerate restrictions during pregnancy, for the sake of the baby and to maximize fetal health. However, they found it difficult after the birth and some were not in control of the family cooking. Katrina explains:

"Diet is sort of in control, in the sense that I have reduced my carb intake…. But I am unable to give up carb altogether…. Because in our cooking you cannot just have say for example, chicken curry on its own without rice or chapatti…. It is quite difficult….. also my Mum's still here and she's cooking, and she says that I should eat more to regain strength….! I know she means well… and I feel bad telling her that I cannot eat what she is cooking…. Even in pregnancy, you know that I had to give up most of our foods, because of the GDM, and I feel so deprived really… This is supposed to be the most joyous moment in our culture, pregnancy and childbirth, and I feel I am deprived"... [Katrina from Pakistan]

Theme 4: Desire for a healthy family life and for diabetes to be 'gone'

Although there was a general trend of resistance to continue with the lifestyle changes adopted in pregnancy, a small number of women were motivated to continue, based on a desire for a healthy family life. This motivation was facilitated when the husband was also similarly motivated.

"You know my husband is a 'health-nut'. He eats only grilled and steamed food, goes to the gym every day, doesn't eat sweets and is into body-building. I have to cook separately for him all the time. But since my GDM, I realised that it was a healthy alternative and I have started doing the same. I do not want to end up having diabetes so I am changing my lifestyle, it is difficult, you know, but it is for the best. My husband reminds me of all my check-up dates and appointments, so I can't really miss them."[Smita, India]

For some women and their family it was 'just impossible' to ignore the reminder that was sent from the hospital post childbirth. These women were grateful that they had been diagnosed and were cared for and given appropriate treatment and advice to control their condition. They felt it was a 'wake-up call' to take control of their health and life. Furthermore, they wanted to make sure that their 'diabetes had truly gone' so they could start living their lives and make appropriate changes for a disease-free healthy life.

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"I was unable to ignore the 'Reminder' from the hospital and the desire to know that 'diabetes is gone'." [Rita, from Sri Lanka]

"I just wanted to know that my diabetes was gone, and when the reminder came, I had to go for the test to find out for sure. I feel better now since getting the test result! It is like a load off my chest really. Now I can plan my family's life and try to incorporate all the things they told us during pregnancy."[Ankita, from SW India]

Discussion

This qualitative exploratory study of postpartum screening for glucose tolerance testing (GTT) in South Asian women with GDM reveals four key findings with obvious overlaps: first, despite an awareness of future Type 2 diabetes risk, many women described multiple barriers in presenting for screening at six weeks postpartum; second, as a result, some women postponed their GTT screening, but indicated that they would attend when convenient; third, despite the elevated risk of Type 2 diabetes, women resisted continuing with their changed lifestyle adopted in pregnancy after GDM diagnosis; and lastly women desiring a healthy life promptly presented for their GTT appointment.

Contrary to prior studies, our findings suggest that the majority of the women were aware of their increased risk of Type 2 diabetes [**32**,**33**], and did ultimately present for their GTT (85% of the postpartum women).

The most important finding of this study is that women from South Asia struggled with a lack of emotional and other support in the immediate postpartum period, and many felt unable to attend for routine GTT screening at six weeks postpartum as a result. However, the majority of the women was aware of the importance of GTT screening and had plans to attend when the busyness of their lives as new mothers abated. Our interviews with women confirmed that the majority had indeed attended for GTT within six-nine months after birth. This is a significant finding as prior studies have shown that women with a history of GDM often failed to present for postpartum GTT screening and follow-up care [**10**,**11**,**15**,**16**].

Women who postponed their postpartum screening and follow-up care described feeling unable to find time to fit in a screening test six weeks after childbirth. Moreover, in keeping with their customs, South Asian women in the study expected a high level of support after childbirth. Childbirth and motherhood are regarded as especially significant life events, and attaining motherhood is a major milestone for a woman in South Asia. Women are normally secluded and confined after childbirth to protect them as they are considered to be particularly vulnerable to poor health. These rituals aim to protect the physical, mental and spiritual health of the mother and her infant [**34**,**35**]. Although seclusion is widely practiced across South Asia, the confinement and seclusion period varies significantly – from 21-40 days [**36**,**37**]. Special diets and massages are given to the new mother to help her to recover from childbirth, and to support breastfeeding [**38**]. The family is generally involved in providing this support in relieving the new mother of all her domestic responsibilities. Women from South Asian backgrounds, who did not have this traditional support in Australia, felt isolated and lonely after childbirth [**39**]. This was also a contributing factor which prevented women from attending the six weeks postpartum GTT screening in this study, despite being aware of their risk of developing Type 2 diabetes.

Women who were keen to learn if their diabetes had disappeared were more likely to attend postpartum GTT. Conversely, women who were fearful of a positive GTT result were unlikely to attend postpartum GTT screening, as also found in a previous study [**40**]. The reminder letter from the treating hospital was effective at prompting women to attend their postpartum GTT visit, similar to findings reported in other studies [**41-43**]. Similarly, women who were encouraged by their husband and/or the family general practitioner were also likely to attend for postpartum GTT screening.

It has now been well established that people at high risk of developing type 2 diabetes can significantly ameliorate their risks by adopting a healthy lifestyle [**22**]. Likewise, women with a history of GDM should be encouraged to maintain healthy lifestyle changes [**44**] to prevent development of Type 2 diabetes. But, encouragement may not be enough, as both motivation and a capacity to overcome the barriers to incorporating healthy lifestyle change into their daily lives is required. This study suggests that despite being aware of the elevated risks of developing Type 2 diabetes, women were resistant to continuing with lifestyle changes after childbirth, due to the additional workload involved and also because of the feeling of deprivation, and inevitability of developing Type 2 diabetes in the future [**45**]. Earlier studies have similarly found that women were highly motivated to change their lifestyle during pregnancy for the sake of the baby's health and most indicated that they would like to continue with lifestyle modification post birth [**13**,**14**,**46**,**47**]. Nonetheless, this proved very difficult for women in the present study that cited barriers including lack of time, child care duties, exhaustion, and overall problems in sustaining lifestyle changes that were at odds with their traditional dietary and exercise practices.

Previous studies have shown that follow-up of patients during and after pregnancy and postpartum postal reminder to patients, physicians, or both increased follow-up postpartum screening rate [**11**,**42**]. Both these studies demonstrated that patients are more likely to return for follow-up care when they are better educated on its importance. This study too demonstrates that a postal reminder from the treating hospital appeared to increase attendance for postpartum GTT screening; and a majority of the South Asian women in this study did present for a postpartum GTT within a year of giving birth. Despite their high risk for subsequent Type 2 diabetes and awareness of this risk, women with GDM faced a range of contextual barriers to changing their lifestyle after birth.

Strengths and Limitations

A noteworthy strength of this study is that it is the first study on South Asian women in Australia, who are at high risk for both GDM and subsequent Type 2 diabetes, about their lived experiences and understanding of diabetes and lifestyle related issues, filling an important gap in the literature. An additional strength is that it followed women up to 12 months postpartum, and therefore contributes to knowledge and discussion around participation in postpartum GTT screening over the first postpartum year. The study sample included immigrant women from several South Asian countries and found a good deal of congruence of experience among these women from across the Indian sub-continent. Generalizability of the study findings may however be limited due to recruitment of women from just three tertiary maternity hospitals and uncertainty about whether the experiences of the women who were lost to follow-up were similar or different in any way to those retained in the study.

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Implications for Practice

This study has a number of important implications for practice, as rates of GDM continue to rise. Women from South Asia constitute a growing group of parturient women in Australia, and are at particularly high risk of developing GDM and subsequently developing Type 2 diabetes. It is therefore important to support South Asian women to attend for the six weeks postpartum GTT, as this will provide an opportunity for counselling about lifestyle changes to prevent/delay onset of GDM in a subsequent pregnancy, and to delay or prevent the onset of Type 2 diabetes.

Factors, in this study, that promoted timely postpartum testing were encouragement from family members, receipt of reminder letters from the treating hospitals and verbal reminders from general practitioners (family doctors). With this in mind, involvement of significant others and family members in education sessions during pregnancy and at hospital discharge will encourage the family to view follow-up GTT screening as important. Family members are then more likely to provide the necessary encouragement and practical assistance to allow the woman to attend her postpartum GTT visit. Additionally, as many women with newborn babies are frequent attendees at GP surgeries, reminders via the family doctor are feasible and likely to encourage the mother to participate in GTT screening. The feasibility of opportunistic GTT screening at GP surgeries could also be explored.

The long term maintenance of recommended lifestyle changes will be the greatest challenge, as these were perceived as onerous and required ongoing commitment. A particular additional difficulty for South Asian women is the limited information available on culturally appropriate modifications of their usual diet. These difficulties could be best addressed by targeted educational resources, which are culturally adapted and include acceptable exercise recommendations and dietary modifications to usual South Asian foods eaten. This information should be provided in simple and clear language and format so that women can easily understand how best to incorporate change into their busy daily lives. South Asian women are motivated to maximize their children's health, and for this reason, educational messages should focus on the importance of healthy diet and exercise for the health of the current and future children and to prevent childhood obesity and Type 2 diabetes. Repeated information and advice which targets not only women, but includes their family is likely to be the most successful [48].

Conclusion

A significant finding of this study is that majority of the women with previous GDM ultimately presented for postpartum GTT screening within 6-12 months of birth, despite difficulties. Additionally, although awareness of risk of Type 2 diabetes was high, some women were resistant to continue with lifestyle changes adopted in pregnancy, in part due to diabetes advice that was not culturally adapted to accommodate their traditional dietary and exercise practices. These cultural issues need to be addressed and it is important that partners and family members are involved in education during pregnancy and at discharge, and family general practitioners engaged in reminding women to attend for routine postpartum GTT screening.

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