



Factors affecting attendance at postpartum diabetes screening in women with gestational diabetes mellitus

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Introduction

Gestational diabetes mellitus (GDM) is glucose intolerance that is first detected during pregnancy.¹ GDM can affect up to 14% of pregnancies each year,² with estimates in Australia ranging between 3.6% and 5.1%.^{3,4} In the majority of cases GDM resolves following delivery. However, GDM significantly increases the risk of postpartum diabetes, particularly type 2 diabetes mellitus (T2DM), such that 5–14% of women with GDM will be diagnosed within 20 weeks after delivery,⁵ and up to 50% will develop T2DM within five years.⁶

Timely detection of diabetes via screening after delivery has the potential to benefit the health of the mother and her future offspring. Early diabetes management can protect the mother from the increased morbidity and mortality associated with diabetes.⁷ Also, blood glucose control in the early weeks of subsequent pregnancies can protect the offspring from harmful in-utero hyperglycaemia, which is associated with adverse fetal outcomes⁸ and predisposes offspring to obesity and diabetes later in life.⁹

The oral glucose tolerance test (OGTT) is considered the most sensitive screening test available to detect postpartum hyperglycaemia,¹⁰ and is recommended at six to eight weeks following delivery in Australia.¹¹ However, rates of attendance are generally low, with only 48–56% of women with GDM returning for postpartum diabetes screening.^{10,12} Such poor attendance contrasts with the 98% reported attendance for GDM

ABSTRACT

Up to 50% of women diagnosed with gestational diabetes mellitus (GDM) will be diagnosed with type 2 diabetes within five years. Attendance rates at postpartum screening are only 48–56%. As the barriers or facilitators to screening attendance among women diagnosed with GDM have not previously been determined, this study aimed to examine the barriers and facilitators to attendance at postpartum diabetes screening as reported by women following a recent history of GDM.

This study was a cross-sectional telephone survey of Australian women diagnosed with GDM in a Queensland hospital during the period July 2006 to June 2007. Rates of attendance at postpartum diabetes screening were assessed, and reported barriers and facilitators to postpartum screening were grouped into themes.

Of 187 eligible participants, 88 women were surveyed (aged 33±6 years, parity 1 [0–5]). Half (53.4%) of respondents attended postpartum diabetes screening. Barriers to screening included a lack of awareness of the need to attend screening, the inconvenience associated with the two to three hour length of the OGTT, and the need to attend screening with infants and young children. Reported facilitators included improved awareness of the need for screening, multiple reminders, and a more pleasant and convenient test.

Facilitation strategies aimed at increasing the awareness of postpartum diabetes risks and promoting the provision of accurate and consistent screening advice from medical providers may assist in improving attendance at postpartum diabetes screening. A more acceptable screening test and establishment of a national database for routine screening reminders may also encourage women to attend postpartum diabetes screening. Copyright © 2011 John Wiley & Sons.

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KEY WORDS

postpartum diabetes; screening; attendance; barriers; facilitators

screening during pregnancy,¹³ and the 94% attendance at the six-week postpartum cervical screen.¹⁴

A recent review has highlighted the need to explore the patient determinants to attending postpartum diabetes screening.¹⁵ However, most factors identified to date have largely been speculative, as women with previous GDM have not been consulted. Predicted characteristics of women failing to attend postpartum screening include older age,¹⁶ greater parity^{12,17} and more severe GDM.¹⁸ Medical providers have suggested doctors' unfamiliarity with screening

guidelines,¹⁹ fragmentation of care,¹⁴ and the inconvenience of the OGTT as potential barriers to diabetes postpartum screening.¹³ Women may also lack awareness of their increased risk of diabetes, which may reduce screening attendance rates.²⁰ Screening reminders may be a useful strategy; however, postal reminder interventions to date have had limited success^{17,21} suggesting that barriers may exist beyond screening awareness.

The barriers and facilitators to postpartum screening are not well known, and such understanding may be critical to the development

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of effective strategies to increase postpartum screening attendance. Therefore this study aimed to examine the barriers, facilitators, and potential facilitators to attendance at postpartum diabetes screening, as reported by women following a recent history of GDM.

Materials and methods

Subjects

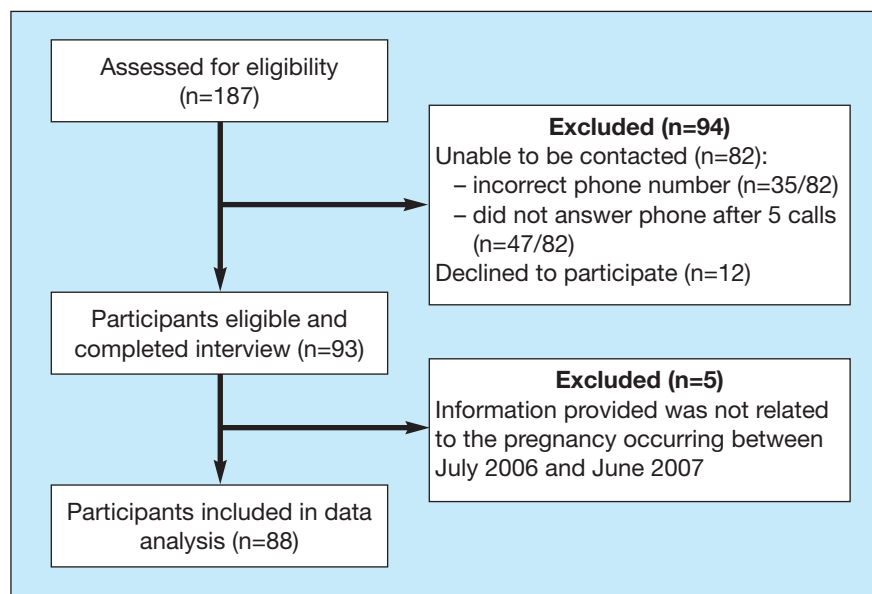
This study was a cross-sectional survey of Australian women who had received an outpatient service for GDM at Logan Hospital, Meadowbrook, Queensland, from the period July 2006 to June 2007. Women were excluded if they were aged <18 years during data collection or had been diagnosed with either type 1 or type 2 diabetes mellitus prior to pregnancy. This study was approved by the Metro South Health Service District Human Research Ethics Committee, Princess Alexandra Hospital, Queensland.

An eligible participant list was generated from the appointment scheduling database at Logan Hospital. Hospital identification numbers provided on the participant list were used to access name, address, telephone number(s), maternal date of birth, and parity during the pregnancy of interest from the electronic medical record.

A letter outlining the study and inviting participation in a telephone interview was mailed to each participant in January 2009. Between January and July 2009 telephone contact with participants was attempted on five separate occasions, using available home and mobile telephone numbers. The study was briefly described to the participants using a standard script. Each interview took approximately 10 minutes to complete. All responses, including consent, were documented on a standard interview form. Interviews were recorded via audio-tape and erased immediately after responses were transcribed and checked. All surveys contained a participant number so that responses could remain confidential.

Participants who verbally consented to the study were asked 14 demographic and clinical history-related questions. Questions verified maternal and child date of birth, inquired whether GDM occurred in

Figure 1. Flow diagram of recruitment



the pregnancy of interest, whether diabetes was diagnosed prior to pregnancy, use of insulin during pregnancy, number of previous pregnancies, postpartum screening attendance, postpartum screening result, time from delivery to first postpartum screen, any prior history of GDM, and family history of diabetes.

Women who reported receiving postpartum diabetes screening only in a subsequent pregnancy were recorded as not attending postpartum diabetes screening. This is because obtaining an OGTT during a subsequent pregnancy represents a screen for recurrent GDM and not a screen for postpartum diabetes.

Three open-ended questions were then asked. The researcher first inquired about barriers to attending screening, then inquired about facilitators to screening, and finally about potential facilitators to attending postpartum diabetes screening. Barriers such as: 'I forgot'; 'I didn't know I needed to'; 'I felt fine'; 'I didn't think it was important'; 'GP said blood was normal'; 'I was too busy with the baby'; 'I was afraid I might have diabetes'; and 'I thought I would only have it while pregnant' were listed on the survey and were ticked by the researcher when the respondent's suggested barrier matched the tick box suggestion and no further information was provided. Prompts were provided to respondents if they could not think of a potential facilitator and included: reminder in the mail;

follow-up phone call; follow-up email; follow-up appointment; pathology request on discharge; and babysitting.

Statistical analysis

Survey responses were entered into SPSS (version 18.0.0, 2009) and checked twice for accuracy. Chi-squared analyses were performed to determine whether insulin use during pregnancy, prior history of GDM, and family history of diabetes were associated with postpartum diabetes screening attendance. Independent samples t-tests were also performed to compare age and parity of those respondents who did and did not attend postpartum diabetes screening, and between responders and non-responders. Non-responders included those who could not be contacted, were able to be contacted but did not agree to participate, and those who were subsequently excluded because inaccurate responses were provided. Reported barriers, facilitators, and potential facilitators to postpartum screening attendance were grouped into themes independently by two authors.

Results

One hundred and eighty-seven women were eligible to participate; 105 eligible women could be contacted, and 12 women declined an interview. Five participants were subsequently excluded as they provided information regarding a GDM pregnancy that occurred after June 2007.

**Table 1.** Comparison of the characteristics of women who did or did not attend postpartum diabetes screening

Characteristic	Attended (n=47)	Did not attend (n=41)	p-value
Age (years) at interview, mean±SD	33±5	33±6	0.64
Parity, median (range)	1 (0–5)	1 (0–5)	0.212
Insulin used during pregnancy, n (%)	25 (53.2)	23 (56.1)	0.79
Prior history of GDM reported, n (%)	16 (44.4)	15 (45.5)	0.93
Family history of DM reported, n (%)	29 (61.7)	22 (53.7)	0.45

GDM = gestational diabetes mellitus; DM = diabetes mellitus; SD = standard deviation.

This resulted in 88 eligible participants (Figure 1).

Respondents' median parity (1 [0–5]) and average age (33±6 years [mean±standard deviation]) when first phoned for an interview were not different from non-respondents (1 [0–8], 33±6 years, $p>0.05$). The average duration from infant delivery to interview was 2.1±0.2 years. This was the first child for 25% (22/88) of respondents. Following delivery, 53% (n=47/88) of respondents reported attending diabetes screening (Table 1), and only 23% (20/88) attended screening within six to eight weeks postpartum. The average time from infant delivery to attendance at postpartum diabetes screening was 21±22 weeks. Five women who attended postpartum diabetes screening (11%) were diagnosed with T2DM. Only one of these women had attended screening within two months of delivery. Three of these five women required insulin during pregnancy, one of whom also required insulin to manage postpartum diabetes. Two of the five women reported GDM in a previous pregnancy, while it was the first pregnancy for two other women. Four of the five women also reported a family history of diabetes.

There was no significant difference in age, parity, insulin use during pregnancy, history of GDM, or family history of diabetes between those who did and did not attend postpartum screening (Table 1).

Perceived barriers and facilitators to screening

Several themes emerged from the interviews conducted.

Awareness. A lack of awareness of the need for postpartum diabetes screening was identified as a barrier to attendance by 28% of respondents (Table 2). Women reported believing that diabetes would only be present during pregnancy and were not aware of the need to attend postpartum diabetes screening. Respondents suggested that this lack of awareness was due to inadequate communication from medical providers, which included hospital doctors, midwives, and general practitioners (GPs). Common responses included 'No one has followed it up, hospital or GP' and 'My GP didn't mention the test at the six-week check'. Also, communication regarding the need for screening was inconsistent with comments such as 'I was told I didn't need to worry about testing my blood any more after having the baby' and 'I was told 99% of cases would be gone after the baby was born'.

Furthermore, 31% of respondents suggested that greater awareness of the need for postpartum diabetes screening would facilitate screening attendance (Table 2). Some women requested communication regarding the need to attend screening from medical providers, particularly their GP. Suggestions included 'more information during pregnancy and admission'

and 'if my GP had requested it, would have had the test done'. Women who reported that awareness had actually motivated screening attendance made comments such as 'I knew I needed to', or 'I understood the importance of having it done'. Having a family member with diabetes or having GDM in a prior pregnancy was also suggested to have raised screening awareness for some women.

Forgetting and reminders. Forgetting to attend postpartum diabetes screening was a reported barrier for 6% of respondents and 39% reported that a reminder may facilitate screening attendance (Table 2). The majority of these women requested a reminder be sent in the mail and/or a pathology request form on discharge from hospital. Other requested reminders included a phone call, email, and a follow-up appointment with the diabetes team.

Test convenience. The inconvenience associated with the OGTT was a reported barrier for 36% of respondents (Table 2). Women suggested that the test duration was too long particularly when attending with infants and young children. Responses included 'because it took two hours of my time I kept putting it off' and 'way too hard to drag the kids to pathology for two hours'. Respondents also reported the inconvenience of attending the test while caring for infants and young children, with comments including 'I'm too busy with the baby, I haven't had time to go and do one' and 'the busy life I have with three children'. Another barrier was the difficulties in accessing babysitting in order to attend testing, with comments such as 'I had no one to leave baby with' and 'finding babysitters difficult with a newborn and a one year old'. Other reported barriers included the need to breast feed at testing facilities and mobility difficulties following a caesarean section.

A more convenient test was suggested to facilitate screening attendance by 16% of respondents (Table 2). A shorter test duration was suggested with requests for a 'shorter, more convenient test'. Respondents reported that babysitting or amenities including a 'separate room to facilitate breast feeding, toys for kids, nappy changing facilities' at the testing centres may

also facilitate screening attendance. Others suggested home testing and combining OGTT with other postpartum checks for convenience.

Dislike of the screening procedure. The OGTT procedure was identified as a barrier by 10% of respondents (Table 2). Respondents reported disliking the glucose drink, for example, 'I just can't stomach the sugary drink'. Others reported being afraid of needles and disliking the overnight fast. A more pleasant screening procedure was suggested to facilitate screening attendance for 7% of respondents (Table 2). Women requested 'another way of doing it instead of the drink', or to 'make the stuff taste better', and 'not a fasting test'.

Fear of diabetes. The fear of being diagnosed with diabetes following delivery was a reported barrier for one respondent (Table 2). Conversely, this fear was reported to facilitate screening attendance for 15% of respondents. Responses included 'the fear of having diabetes and wanting to have the all clear' and 'to make sure it was just gestational diabetes and nothing after'.

Discussion

This is the first study to report barriers and facilitators to postpartum diabetes screening attendance by women with a recent history of GDM. The main themes included awareness of the need to attend screening, remembering to attend, test convenience, the screening procedure and the associated fear of diabetes.

Awareness of increased risk for disease is suggested to be an important determinant of health behaviour,²² including screening attendance.²⁰ While GDM is a well-established risk factor for T2DM the reported lack of awareness of the need to attend postpartum screening suggests that many respondents were unaware of their increased risk. Considering the serious health consequences of diabetes, particularly within such a young population of women with the potential for future pregnancies, interventions are needed to raise postpartum diabetes risk awareness. The fear of having diabetes postpartum was reported to promote attendance at postpartum screening for a number of

Table 2. Key themes of reported barriers and facilitators to postpartum diabetes screening

Barriers	Facilitators
<p>Lack of awareness n=25 (28%)</p> <ul style="list-style-type: none"> • Unaware of need for test • Inadequate medical provider communication 	<p>Awareness n=27 (31%)</p> <ul style="list-style-type: none"> • Aware of need for test • Aware via family history of diabetes • *Improved medical provider communication
<p>Forgetting n=5 (6%)</p> <ul style="list-style-type: none"> • Forgetting test 	<p>Reminders n=34 (39%)</p> <ul style="list-style-type: none"> • Medical provider reminders • *Increased medical provider reminders[†] • *Follow up with diabetes team member
<p>Test inconvenience n=32 (36%)</p> <ul style="list-style-type: none"> • Test takes too long • Too busy with baby • Need for babysitting to attend • Need to breast feed at testing centre • Too busy with other issues • Lack of transport • Too soon following caesarean section 	<p>More convenient test n=14 (16%)</p> <ul style="list-style-type: none"> • *Shorter test • Babysitting availability • *Babysitters • *Child-friendly facilities at testing centres • Available breast feeding facilities • *Home testing service • *Combining test with other postpartum checks
<p>Unpleasant screening procedure n=9 (10%)</p> <ul style="list-style-type: none"> • Dislike of drink • Dislike of fasting for test • Fear of needles 	<p>More pleasant screening procedure n=6 (7%)</p> <ul style="list-style-type: none"> • *A more palatable drink • *A non-fasting test
<p>Fear of diabetes n=1 (1%)</p> <ul style="list-style-type: none"> • Fear of diabetes 	<p>Fear of diabetes n=13 (15%)</p> <ul style="list-style-type: none"> • Need for reassurance that diabetes not present postpartum

*Potential facilitators. [†]Requested reminders included: mail; phone call; email; follow-up appointment; pathology request form. Respondents who did not suggest a barrier were those who had attended postpartum screening. The majority of respondents who did not provide a facilitator or potential facilitator were those who did not attend postpartum screening.

women in this study. Future studies could investigate whether women's perception of diabetes risk influences motivation to attend screening.

The reported lack of awareness of the need for postpartum screening was further compounded by reports of inadequate and inconsistent screening advice from hospital and primary care medical providers. Two reasons identified in the literature for inadequate medical provider advice were knowledge deficit,^{14,19} and fragmentation of care.¹⁴ Obstetricians and gynaecologists are reportedly unfamiliar with current postpartum

diabetes screening guidelines,^{14,19} and little is known about screening knowledge and guideline adherence in the primary care setting. Furthermore, the fragmentation of care that occurs postpartum when women move from hospital to the care of the GP may lead to confusion over provider responsibility for postpartum diabetes screening, resulting in inadequate rates of screening attendance.^{14,18,19} While the provision of consistent and accurate screening advice from all relevant health professionals may improve screening attendance, a clear delineation of



medical provider responsibility for postpartum diabetes screening has also been suggested.¹⁴

The pressures of childcare commitments, particularly with higher parity, have previously been a suggested barrier to postpartum screening attendance.^{12,17} Although childcare commitments were reported as a barrier in this study, the two to three hour length of the OGTT may pose a major barrier and contribute further to childcare concerns. Such inconvenience associated with the OGTT has been discussed previously² but as the OGTT is considered to have greater sensitivity compared to the fasting plasma glucose test (FPG) the OGTT remains the preferred diagnostic test for postpartum diabetes.¹⁰ However, the FPG is faster and more convenient and these practical advantages may improve patient acceptability and increase screening attendance, which may offset the greater sensitivity observed with the OGTT.²³ Although not yet validated for postpartum diabetes screening, the American Diabetes Association has recently suggested HbA_{1c} be used as a diabetes screening tool.²⁴ The HbA_{1c} test is also a faster, more convenient test that does not require a glucose drink or overnight fasting, and may potentially address many of the postpartum barriers associated with the OGTT. Future studies could compare screening attendance rates for the FPG or the HbA_{1c} test with the traditional OGTT to confirm whether increased screening attendance at the FPG or HbA_{1c} tests offsets the greater sensitivity observed with the OGTT.

A reminder, particularly a letter in the mail or a pathology form on discharge from hospital, was reported in our study as a potential facilitator to postpartum screening attendance. However, postal reminders sent previously to women,¹⁷ plus their GPs,²¹ did not improve attendance rates above 60%. Other barriers and facilitators, as identified by respondents in this study, may also need to be addressed in future interventions. Also, the majority (57%) of respondents who attended screening were unable to do so within the recommended two months postpartum. As barriers to postpartum screening may be greater

Key points

- Up to 50% of women diagnosed with gestational diabetes mellitus (GDM) will be diagnosed with diabetes within five years
- Attendance rates for postpartum diabetes screening are poor (48–56%), particularly when compared to postpartum cervical screening rates (94%)
- Barriers to postpartum diabetes screening attendance as reported by women with recent GDM included: a lack of awareness of the need to attend screening, the inconvenience of the oral glucose tolerance testing procedure, and the difficulty associated with attending this screen with infants and young children
- Improved awareness of the need for screening, multiple reminders and a more acceptable and convenient screening test may assist with attendance
- A national database could be used to provide consistent screening advice and routine reminders to women in the postpartum period

during the initial months following delivery, sending reminders at later stages postpartum, rather than only within the first three months,^{17,21} may increase screening attendance further. A national database established from the National Diabetes Services Scheme could be used for routine reminders to GDM patients, similar to the very successful cervical cancer screening programme.²⁵ This service could also provide consistent postpartum screening advice to women that are aligned with national screening guidelines.

This study had a number of limitations. The sample size (n=88) was small and 44% of eligible participants could not be contacted. Also, while mobile phone numbers were used, and calls made at different times and days, they were only made during working times. This, along with sampling mothers attending one hospital, limits generalisability to wider GDM populations. However, our screening attendance rates (53%) and incidence of diabetes postpartum (11%) were consistent with other reports.^{5,10,12} While survey tick-boxes may reduce the collection of in-depth qualitative data, respondents often provided short answers, and short interviews may reduce participation barriers. Also, time between delivery and our interview was up to two years and eight months. Some women may have had difficulty recalling postpartum screening details, particularly timing of screening attendance. However, the long time between delivery and interview highlighted that many women attend screening well after three months postpartum.

Recommendations that improve postpartum diabetes screening are critical given that postpartum diabetes screening attendance rates are consistently low and that screening may protect these women and their future pregnancies from diabetic complications. Common barriers to postpartum diabetes screening included a lack of awareness of the need for screening, forgetting to attend, and the inconvenience of attending a two to three hour test with new infants and young children.

More accurate and consistent postpartum screening advice from medical providers may promote greater attendance at postpartum screening. Minimum standards of communication between hospitals and GPs may need to be established, including greater clarification of providers' roles in the postpartum period. A more acceptable diagnostic screening test may encourage more women to attend postpartum diabetes screening. A national diabetes service providing accurate screening information along with routine reminders may also be effective.

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Declaration of interest

There are no conflicts of interest.

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References are available in *Practical Diabetes International* online at www.practicaldiabetesinternational.com.



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