PEER-REVIEWED ARTICLE

Postpartum Glucose Tolerance Screening in Women with Gestational Diabetes in the State of North Carolina

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Abstract

Objective: *To determine how frequently health care providers taking care of women with gestational diabetes mellitus (GDM) are screening for postpartum glucose tolerance and what practice approaches they are using to care for women with GDM.*

Methods: *A mailed survey assessed health care providers' knowledge of GDM and practice patterns. Factors influencing practice protocols for measuring glucose tolerance postpartum were identified.*

Results: *Of 1,002 eligible North Carolina health professionals, 399 responded (40%); 327 of these (82%) were providing prenatal and postpartum care and returned the completed surveys. Almost all providers (98%) screen for GDM, and the majority (97%) use the 50-gram one-hour glucose challenge test. Only 21% of respondents always screen for diabetes mellitus (DM) postpartum. The most common method for screening was the 75-gram two-hour glucose tolerance test (54%). The factors most commonly associated with failure to screen were patients lost to follow-up, patient inconvenience, and inconsistent screening guidelines. A majority (59%) stated that increased reimbursement would have little to no impact on their consistency in providing diabetic counseling.*

Conclusions: *The rate of postpartum glucose tolerance testing is low in this study of providers of postpartum care. Several modifiable barriers to screening were identified. There is a need for improved screening practices and early intervention that could help prevent the complications of DM and benefit subsequent pregnancies in this high risk population.*

Keywords: *gestational diabetes mellitus; diabetes mellitus; pregnancy*

The worldwide rise in the prevalence of diabetes mellitus (DM) has substantially affected women's health care. Up to 70% of women diagnosed with gestational diabetes mellitus (GDM) develop DM later in life.[1] Less than half of women with GDM will have a normal glucose tolerance test 24 months after delivery.[2] This has a substantial impact on future pregnancies in this high risk group, as rates of poor neonatal outcome are three to nine times higher in infants born to mothers with diabetes.[3] Not unexpectedly, there are signs that both the rate of GDM and postpartum DM are also on the rise.[1,4,5] Women diagnosed with GDM have a 36-70% risk of developing GDM in subsequent pregnancies.[6] Identifying this high-risk population sooner and providing closer follow-up care could have a positive impact on their long-term health.[7] Assessing glucose tolerance postpartum provides an opportunity to target individuals that would benefit from interventions such as exercise plans and dietary modifications with the goal of stopping or delaying the progression of diabetes.[8] In fact, a recent large randomized trial showed a significant reduction in progression to diabetes in patients with glucose intolerance with either lifestyle modifications or metformin compared to placebo.[9]

Postpartum glucose tolerance testing is supported and recommended by the American Diabetes Association (ADA)

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in women whose pregnancies are complicated by GDM.[10] The American College of Obstetricians and Gynecologists (ACOG) recognizes the importance of such testing but does not endorse any specific recommendations for follow-up.[11] Despite this fact, there continues to be a large proportion of women with GDM that fail to be screened for glucose tolerance in the postpartum period. In addition, the women that are screened are not always tested with the optimum methods.[12,13] In this study, we will determine how often health care providers are screening for postpartum glucose tolerance in women with GDM and identify potential barriers to screening.

Methods

A list of 1,085 active, in-state practitioners (who provided prenatal care) was compiled from public access state licensure files and primary care association membership rolls in the state of North Carolina. After excluding those who had retired, moved out of state, or had an incorrect address, a final list of 1,002 practitioners was made. In 2005-2006, we mailed a questionnaire to this group that included physicians and practitioners in obstetrics and gynecology, family practice, and midwifery who had a complete address. Based on a review of the literature, the lead author developed a questionnaire that sought to determine screening status for patients with GDM. Items were then reviewed by coauthors for face validity. The finalized three-page, 28-item questionnaire required approximately 10 minutes to complete. We remailed the survey to each eligible practitioner that did not reply to the first request. Questionnaires were excluded from analysis if the answers were incomplete or if the practitioner was not currently providing prenatal and/or postpartum care. A cover letter stressed the importance of accurate reporting for the purpose of improving the GDM screening process in North Carolina women's health clinics and private practice centers and to potentially increase the number of perinatal services provided to all women in North Carolina. No incentive was offered for completion of the survey.

The University of North Carolina Institutional Review Board approved the study. The survey was endorsed by the North Carolina chapter of the American College of Nurse-Midwives, the North Carolina Academy of Family Physicians, the North Carolina section of the American College of Obstetricians and Gynecologists, and the North Carolina Department of Health and Human Services.

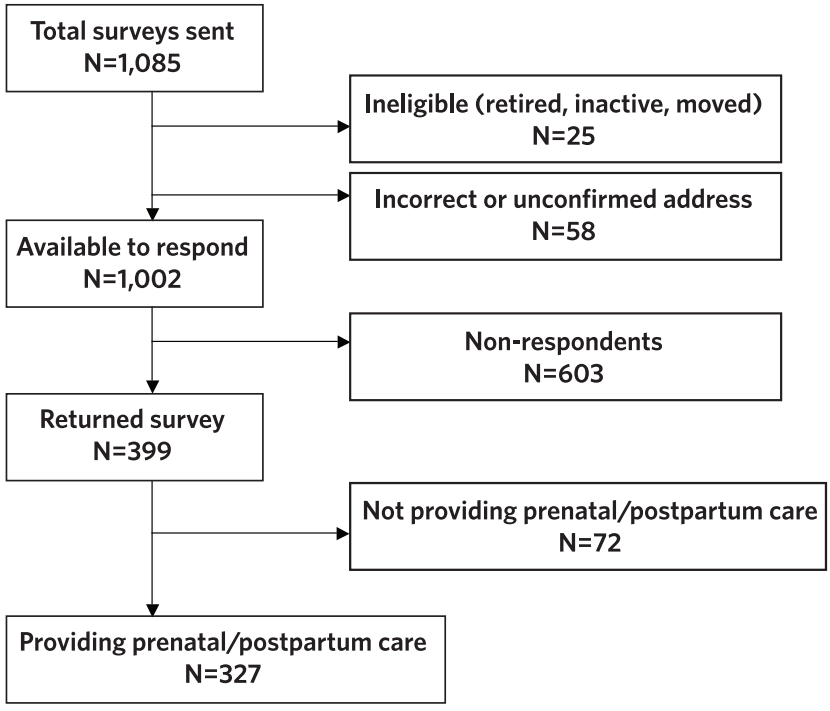
The first part of the survey consisted of questions regarding the demographics of the practitioners, practice type, and the patient population. Providers estimated both the proportion of their patients diagnosed with GDM and the average number of postpartum patients seen monthly. The goal of the survey was to assess how frequently providers screened for DM in the postpartum period in women diagnosed with GDM in their practice. This was assessed utilizing a Likert scale from 1 (never) to 5 (always). The rest of the survey had to do with how providers cared for their patients with GDM. Specific areas addressed in these questions concerned basic knowledge of GDM and its long-term risks, screening methods for GDM and for postpartum glucose tolerance, its impact on future health, and factors influencing the follow-up care.

Returned surveys were coded and double-entered by staff, and patterns in the missing observations were assessed. We performed descriptive statistics and univariate analysis. The chi-square test assessed bivariate associations for the main outcome.

Results

Of the 1,002 eligible practitioners to whom surveys were mailed, 399 were returned completed for an overall response rate of 40% (see Figure 1). When asked whether or not they provide prenatal and/or postpartum care, 327 (82%) answered yes and were asked to complete the remainder of the survey. If respondents replied no, they were instructed

Figure 1.
Participation in the North Carolina Collaborative Survey on Gestational Diabetes Mellitus



to return the survey, leaving the remaining questions unanswered. The average age of all respondents was 48 years with 51% being male. Most respondents were white (90%). On average, they completed their residency or clinical training 17 years ago. When asked about their practice specialty, just over one-half (55%) stated it was obstetrics and gynecology. The next most common answers were midwifery (20%) and family practice (20%). The remaining 5% that responded included maternal fetal medicine specialists, family planning providers, and other women's health-related clinicians. About one-half (58%) of respondents stated their practice consisted of 2-10 providers. Within this subset, 87% report that their practice is single specialty only. Table 1 summarizes descriptions of the patient load for each practitioner.

An overwhelming majority of respondents (98%) report screening all pregnant women for GDM. Out of this number, 97% use the 50-gram one-hour glucose challenge test (50 grams of glucose administered in 150 mL of fluid with blood sugar checked at one hour; cutoff ≥ 130 mg/dL). Other methods included fasting and postprandial blood sugar, urine glucose, and glycosylated hemoglobin (HgA1c). Almost all respondents (96%) that screen for GDM do so between 25-29 weeks. Half of those surveyed (48%) indicated that 6-10% of their patients were diagnosed with GDM. When asked from whom their patients with GDM received care, 49% stated that it was their usual prenatal care provider. One-fourth (25%) obtained a consultation from a specialist before resuming care of their patients. Other common answers included transfer of care to either a specialist within their practice or referral to a specialist outside of their practice. Additionally, 20% use a nutritionist or diabetes care team within their own practice to assist in management.

When asked about postpartum care of patients with GDM, only 21% of respondents always screen for DM. Another 43% usually screen, and 20% reported only screening sometimes. Sixteen percent rarely or never screen. Primary specialty did not have an impact on the likelihood of postpartum DM screening.

Of those that do screen for DM in women with a history of GDM, the most common time to screen was four to six weeks postpartum (45%) followed by seven to eight weeks (29%). Only 54% of those who screen for DM postpartum use the 75-gram two-hour glucose tolerance test to screen patients in the postpartum period that had GDM (75 grams of glucose with blood sugar checked fasting and then at two hours; cutoff ≥ 126 mg/dL for fasting and ≥ 200 at two hours). The other common screening methods reported included random blood glucose (19%), postprandial glucose (11%), and the 50-gram one-hour glucose challenge test (8%).

Table 1.
Patient Demographics Reported by Respondents

	Frequency (N)	Percent (%)
Postpartum patients seen each month		
<5	43	13
6-10	130	40
11-20	118	36
21-30	24	7
>30	12	4
Proportion of postpartum patients on Medicaid		
<20	114	35
21-40	78	24
41-60	69	21
61-80	43	13
>80	23	7
Proportion of African American postpartum patients		
0	3	1
<10	50	15
10-25	128	39
26-50	104	32
51-75	33	10
76-95	6	2
96-100	3	1
Proportion of Latino postpartum patients		
0	1	<1
<10	165	50
10-25	117	36
26-50	25	8
51-75	8	2
76-95	11	3
96-100	0	0

After the postpartum period in patients with GDM, 35% of providers assess for glucose tolerance every year, and 14% screen every three years. A high number of respondents (47%) indicated that they do not perform any routine screening.

Respondents were also asked what systematic approach they use for postpartum follow-up of patients with GDM. Just over half (55%) responded that they primarily depend on counseling by physician. Other approaches included a method for documenting screening in the medical record (21%) and counseling by staff (14%). One-fifth (20%) reported that they did not have a specific approach.

When asked what proportion of women with a history of GDM develops GDM in a subsequent pregnancy using pre-set categories, a plurality (44%) believed it to be between 31-60%, which was followed by 1-15% (23%). Another 21% believed that the number is greater than 60%. Respondents were also questioned as to what percentage of patients with GDM will develop overt DM later in life. A majority (58%) believed this number to be anywhere from 31-60%, with 13% stating the number was greater than 60%.

Finally, we identified factors that respondents felt influenced practice protocols for assessing glucose tolerance postpartum (see Table 2). Respondents were asked to list all of the factors that affected their practice of screening women with a history of GDM. The most commonly reported factor was that patients were lost to follow-up (50%); the next most common factors were patient inconvenience (32%) and inconsistent guidelines (27%). Other responses included patient refusal (18%), patient cost (17%), and reimbursement (16%); 9% of those responding stated that assessing glucose tolerance postpartum was not considered necessary. When asked if increased reimbursement would affect the consistency with which providers would provide diabetic counseling, 59% said it would have little to no impact while 19% said it would have a substantial to very substantial impact.

Table 2.
Factors Influencing Practice Protocols for Assessing Postpartum Glucose Tolerance

Factor	Responding Providers (N)	Percent (%)
Lost to follow-up	165	50
Patient inconvenience	104	32
Inconsistent guidelines	87	27
Patient refusal	59	18
Patient cost	56	17
Reimbursement	53	16
Practice too busy	43	13
Inadequate prenatal/ delivery information	42	13
Collaboration with specialists	42	13
Availability of continuing medical information on subject	37	11
Not considered necessary	31	9
Breast-feeding	8	2

Discussion

We found that in a diverse group of North Carolina practitioners responsible for managing women with GDM, only one-fifth routinely screen for glucose tolerance postpartum. Of those that do screen, only one-half do so with the 75-gram two-hour glucose tolerance test, the method recommended by the ADA and supported by ACOG. These organizations also state that postpartum testing is best performed at least six weeks after delivery to allow the effects of pregnancy on glucose metabolism to resolve.[10,11] Approximately three-fourths of the respondents in our survey indicated that they screen between four to eight weeks postpartum. This low screening rate conflicts with the acknowledgement by a majority of the providers that the recurrence rate for GDM is high and a large number of patients will go on to develop overt diabetes.

The low rate of postpartum glucose tolerance assessment in patients with GDM noted in our study is consistent with several other recent studies.[12-14] Smirnakis and colleagues reported that 67% of the women with GDM in their observational cohort study received some form of screening postpartum. However, only 37% of this population had the method of testing recommended by the ADA (75-gram two-hour glucose tolerance test). In a retrospective cohort study by Russell and colleagues, only 45% of women had postpartum glucose tolerance testing consisting of a 75-gram two-hour glucose tolerance test or a fasting plasma glucose. Finally, Kim and colleagues reported that only 38% of patients with GDM reported some form of glucose testing, with only 23% tested with the current recommended methods.

Despite the low rate of postpartum glucose tolerance screening in women with GDM reported by our respondents, an overwhelming majority (98%) screen for GDM in pregnancy. This is consistent with the finding of a study by Gabbe and colleagues that found that 96% of their survey population endorsed universal screening for GDM. In their study, 95% used the 50-gram glucose challenge test, which is recommended by both the ADA and ACOG.[15] Our respondents indicate that they use this test 97% of the time. In addition, almost all of those surveyed screen at the correct time of 25 to 29 weeks gestation.

There are several factors noted in our study that influence postpartum glucose tolerance testing. The reason most frequently given by our respondents was that patients did not return for their follow-up visit. This is supported by another one-third of those surveyed stating that patient inconvenience was an

important factor. This is in keeping with other studies that have noted that attendance at the postpartum visit is a major factor in glucose testing.[13,16] Employing strategies that improve attendance at the postpartum visit may increase testing rates and provide another opportunity to counsel and educate women concerning the implications GDM can have on their future health.

Inconsistent guidelines with respect to assessing glucose tolerance postpartum is also a significant barrier to testing. The ADA provides recommendations and gives clear guidelines as to methodology of screening and long-term follow-up in these women.[10] In ACOG's current practice bulletin concerning GDM, no specific endorsement of such testing and follow-up is given.[11] Other studies have called for ACOG to make formal recommendations in this matter in hopes of increasing the rates of testing.[12] However, there is evidence to suggest that this may not help as much as one would think. Clark and colleagues showed that even after the Canadian Diabetes Association published specific guidelines for postpartum glucose tolerance assessment, the rate of testing did not improve in subsequent years.[17] Despite this conflicting evidence, it seems reasonable that clearer guidelines could have a measurable impact on testing rates.

We specifically addressed concerns regarding provider reimbursement in our study to assess its impact on postpartum glucose testing. Only 17% of respondents felt it was a significant factor, and over one-half stated that increasing reimbursement would have minimal to no impact on the consistency with which they provide diabetes counseling. Only one-fifth commented that this would have a significant impact with respect to providing this service. From the results of this survey, it is difficult to conclude whether or not increased reimbursement would have a beneficial effect on postpartum glucose testing rates.

This study has several potential limitations. Our response rate is somewhat low at slightly less than 40%, and our findings may not reflect actual practice patterns of providers in the state of North Carolina. The characteristics of nonresponders were not available to this project, and these practitioners' practices may differ from those that responded. The responses in this self-reported data may reflect the desire to provide the correct and accepted answer and may therefore actually overestimate the true rate of screening for DM in the postpartum state. Also, we decided to include all providers responsible for providing care to women with GDM, including family practitioners and midwives. However, despite the diversity of our respondents, the high rate of screening for GDM in pregnancy with the guidelines recommended by ACOG and the ADA was similar to a large survey that only included obstetricians.[15] The low rates of postpartum glucose tolerance screening that we report are also noted in several other studies.[12-14] The consistency of our findings with these other studies indicates that our results may reflect actual practice patterns.

The increasing rate of both GDM and DM poses a significant threat to the health of both pregnant and nonpregnant women. There is growing evidence that women with GDM are not receiving optimum follow-up after delivery. Strategies to improve postpartum glucose tolerance testing are needed. Further investigation is warranted given that an earlier diagnosis of DM could reduce the complications of this disease in women. In addition, there is potential benefit to the future pregnancies in this high-risk population. **NCMJ**

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