Published in final edited form as:
Am J Perinatol. 2010 October ; 27(9): . doi:10.1055/s-0030-1253102.

Barriers to Follow-up for Women with a History of Gestational Diabetes

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Abstract

Objective—Women with gestational diabetes (GDM) are at increased risk for type 2 diabetes (T2DM), but many do not receive recommended follow-up. We sought to identify barriers to follow-up screening.

Study design—We surveyed primary care (PCPs) and obstetric and gynecology care providers (OBCPs) in a large health system. We also assessed documentation of GDM history in the health care system's electronic medical record.

Results—478 clinicians were surveyed, among whom 207 responded. Most participants (81.1%) gave an accurate estimate of risk of progression to T2DM. PCPs were less likely than OBCPs to ask patients about history of GDM (OR 0.43, 95% CI 0.20–0.90), but they were far more likely to indicate that they order glucose screening for women with a known history (OR 4.31, 95% CI 2.01–9.26). Providers identified poor communication between OBCPs and PCPs as a major barrier to screening. Fewer than half (45.8%) of 450 women with GDM by GTT criteria had that history documented on their electronic problem list.

Conclusions—Clinicians are aware that women with GDM are at high risk of developing type 2 diabetes, but they do not routinely assess and screen patients, and communication between OBCPs and PCPs can be improved.

Keywords

gestational diabetes; evidence-based practice; electronic medical record; type 2 diabetes

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Preliminary results presented at Endo 09, Washington, DC, June 10–13 2009.

The authors have no conflicts of interest to report.

Introduction

Gestational diabetes affects from 2.2 to 8.8 percent of pregnant women, depending on the population studied[1]. Gestational glucose intolerance identifies a group of women at high risk of type 2 diabetes, and the American Diabetes Association[2] and the American College of Obstetricians and Gynecologists (ACOG)[3] recommend glucose screening in the early postpartum period. ACOG recently revised their recommendations to underscore the importance of follow-up testing[3]. Following the early postpartum period, women with normal glucose tolerance should be re-screened every three years, and those with impaired glucose tolerance should be screened annually, with a fasting blood glucose or 2-hour oral glucose tolerance test.

Population data suggest that appropriate screening is a major public health priority. In a meta-analysis, Cheung et al[4] estimated that one third of women with type 2 diabetes have previously been diagnosed with GDM. Data from prevention studies suggest that early detection and intervention for glucose intolerance can reduce progression to type 2 diabetes by more than 50 percent[5–8]. Collectively, these data suggest that lifestyle interventions for women with a history of gestational diabetes could delay or prevent one sixth of type 2 diabetes cases in the female population.

Despite the public health importance of follow-up screening, recent studies have reported that less than 40 percent of women receive appropriate screening at the post-partum visit[9,10], and few studies have evaluated subsequent screening in primary care. This lack of appropriate screening and follow-up may reflect both lack of communication between obstetric and primary care providers as to pregnancy diagnoses and lack of knowledge of appropriate screening guidelines. We sought to measure the effect of these barriers through a survey of OB care providers (OBCPs) and primary care providers (PCPs) within a large health care system in Boston, MA. In addition, we assessed how frequently a history of GDM was routinely documented in the health care system's electronic medical record.

Materials and Methods

We surveyed obstetrician-gynecologists, certified nurse-midwives, primary care physicians and nurse-practitioners who provide care through outpatient clinics affiliated with Massachusetts General Hospital and Brigham and Women's Hospital in Boston, MA. All participating providers are part of the Partners Healthcare System, and they utilize the Longitudinal Medical Record[11], a fully-functional electronic medical record (EMR). Both BWH and MGH have utilized electronic records for prenatal care since the mid-1990s, although during the study period, both the MGH and BWH electronic prenatal records operated independently of the primary care EMR.

Survey development

The authors developed survey questions based on previous surveys conducted at our institution[11] and evidence from the literature on barriers to guideline implementation[12]. Topics covered included general knowledge regarding screening for diabetes, structural features of the office practice, such as patient intake forms and patient educational materials, perception of communication between OB and primary care providers, and routines regarding assessment of reproductive and metabolic risk history. In addition, we assessed providers' opinions regarding potential barriers to follow-up of women with GDM, and attitudes regarding patient response to preventive health counseling and use of electronic medical records. The survey was pilot tested among a small group of physicians who were not in the survey target population.

Survey distribution

We obtained lists of providers from the departments of obstetrics and gynecology and internal medicine at the two institutions. The survey was administered via email using Survey Monkey. Participants who responded were provided with a $5 coffee card as an incentive. Three reminder emails were sent over a one-month period to encourage participation.

Data analysis

We reported descriptive characteristics of our population using median and interquartile range to describe age and year that participants completed training. We compared categorical responses among OBCPs vs. PCPs using chi square tests. A p value < 0.05 was considered statistically significant. We used logistic regression to test whether differences in age or level of training modified associations between type of provider and likelihood of screening for GDM. All analyses were performed using SAS 9.2 (Cary, NC).

Assessment of Electronic Medical Record Documentation of GDM

Glucose tolerance test results for women who received obstetric care at Brigham and Women's Hospital are available for research and quality tracking through the Partners Clinical Data Warehouse. We queried this data set to identify women with a history of gestational diabetes from 1995 to 2008. Using Carpenter-Coustan Criteria for the 100g 3-hour Glucose Tolerance Test[13], we identified women with GDM who delivered at BWH and had laboratory values recorded in the clinical database. We then examined the electronic medical record problem list. The LMR uses a concept code of "Diabetes of Pregnancy" for women with a history of GDM. Because some clinicians use free text to enter diagnoses in the problem list, we used a free text search algorithm (If [text matches 'diab' or 'dm'] AND [text matches 'preg' or 'gest'] OR [text matches 'gdm'] then text for GDM=true) to identify women whose providers had indicated a history of GDM. Among women with GDM by Carpenter-Coustan Criteria who had at least one entry on their problem list, we calculated the percent for whom a concept code for "Diabetes of Pregnancy" or a free text entry indicating GDM was recorded.

The Institutional Review Board of Partners Healthcare approved the study and informed consent was provided through participants' completion of the survey.

Results

We sent email invitations to 478 providers, among whom 207 responded (total response rate: 43.3%; 55.6% of OBCPs and 37.6% of PCPs). The median age of respondents was 41 [Interquartile range 35–50] and the median year they completed medical or nursing school was 1994 [IQR range 1985–2000]. Among participants, 103 were internists, 77 were obstetrician-gynecologists, 3 were midwives, 2 were family practice physicians, 12 were pediatric or adolescent medicine specialists, and 10 did not specify a specialty. PCPs were older, completed medical or nursing school earlier, and were almost entirely attending physicians, whereas a third of OBCPs were residents, and 16.2% of OBCPs were nurses or midwives (Table 1).

Most participants (81.1%) gave an estimate of risk of progression from GDM to type 2 diabetes within the range of 17–63%, which was reported in a recent meta-analysis of the literature[14]. OBCPs were more likely than PCPs to correctly state ADA guidelines for the recommended type of postpartum screening (91.3% vs. 72.4%, $p = 0.001$) and were less likely to report that they were not sure what screening to order (6.3% vs. 31.5%, $p < 0.0001$). Few providers (12.8%) knew the ADA recommends routine screening beginning at

age 45, and few (18.9%) knew the recommended interval for follow-up glucose testing among women with a normal screen at the six week post-partum visit. PCPs were 4 times as likely as OBCPs to indicate they would order glucose screening for women with a known history of GDM (OR 3.86, 95% CI 2.11–7.09). Adjustment for provider characteristics strengthened this association (OR 4.31, 95% CI 2.01–9.26).

Similar percentages of PCPs and OBCPs reported having both diabetes educators (81.0 vs. 81.3%, p>0.05) and nutrition materials (80.8 vs. 87.2%, p>0.05) available in their office practice. Primary care providers were more likely to report having handouts on weight loss (84.6 vs. 53.2%, p < 0.0001), exercise (80.7 vs. 61.5%, p=0.002) and diabetes risk factors (65.3 vs. 39.7%, p < 0.001) available for patients. OBCPs were more likely to report not knowing about the availability of educational materials than PCPs (40.5 vs. 10.4%, p< 0.001).

We also found differences in OB and primary care provider routines for assessing obstetric and GDM history (Table 2). OBCPs were much more likely to use a standard intake form for new patients than PCPs (95.0 vs. 54.0%, p < 0.0001). Among those using an intake form, OBCPs were more likely than PCPs to include questions about both obstetrical history (96.1 vs. 72.7%, p < 0.001) and GDM history (74.3 vs. 21.5%, p < 0.001). Overall 11.4% of PCPs (N=14) and 70.5% of OBCPs (N=55) used an intake form that assessed for history of gestational diabetes. PCPs and OBCPs also differed with respect to whether they routinely asked patients of reproductive age about pregnancy history and complications. OBCPs were more likely to ask about interval pregnancies (94.9 vs. 72.3%, p < 0.0001) or gestational diabetes history (60.3 vs. 43.7%, p =0.02), but PCPs were more likely to order glucose screening for women with a GDM history (72.9 vs. 41.0%, p < 0.0001).

PCPs in our population were older and more likely to have completed residency and fellowship than OBCPs. We therefore modeled the association between provider type and screening practices, using logistic regression to adjust for age and year of completing medical or nursing school (quartiles), level of training (attending vs. resident or fellow), professional training (nurse or physician) and having a Master's in Public Health (yes or no). In the unadjusted models, PCPs were half as likely as OBCPs to ask a woman of reproductive age about gestational diabetes history (OR 0.51, 95% CI 0.29–0.92), and adjustment for provider characteristics modestly strengthened this association (OR 0.43, 95% CI 0.20–0.90). We asked prenatal care providers to report how often they entered a diagnosis of gestational diabetes in to the health system's electronic medical record; 40.4% of providers reported updating the EMR problem list to include GDM less than half of the time. Most PCPs (61.5%) reported receiving information about a patient's pregnancy outcome or complications less than 25% of the time. Consistent with these results, the majority (54.6%) of OBCPs and PCPs identified lack of communication between providers as a major barrier to follow-up of women with GDM. Other major barriers included lack of familiarity with guidelines (50.0%), lack of screening for a GDM history (43.0%), and lack of patient understanding about the long-term risks associated with GDM (41.5%). OBCPs and PCPs opinions were similar regarding barriers (p>0.2 for all comparisons) with the exception of follow-up for abnormal glucose screening results:13.9% percent of OBCPs identified difficulty of follow-up as a major barrier compared with 3.4% of PCPs (p=0.01).

Documentation of GDM in the Electronic Medical Record problem list

In the survey, 93.3% of PCPs and 81.8% of OBCPs reported using the EMR problem list to manage patient care. To explore whether existing problem list data about gestational diabetes history could be used to improve clinical care, we queried the electronic medical record and laboratory databases for the Partners Healthcare System. We identified 772 women with documentation of a birth at Brigham and Women's Hospital and a GTT result

diagnostic for gestational diabetes by Carpenter-Coustan criteria[13]. Among these women, 450 had at least one entry on their electronic problem list, and of these, only 141 (31.3%) had a concept code for "Diabetes of Pregnancy." An additional 65 women had a free text entry on their problem list that appeared to indicate a history of gestational diabetes, for a total of 206 women (45.8%) with some indication of a GDM history in the electronic medical record problem list. Documentation rates were unchanged when we limited our analysis to women with a non-emergency room outpatient visit > 60 days after their last delivery (N=373, 31.4% with concept code for GDM, 45.8% with any documentation of GDM), We did not find an association between documentation rates and year of last birth (Mantel-Haenszel trend test $p > 0.05$).

Comment

In a survey of providers in a northeastern academic health care system, we found that most clinicians knew that women with GDM were at high risk of developing type 2 diabetes, but knowledge of follow-up guidelines was poor. Survey participants identified limited communication between OB and primary care providers, and to a lesser extent lack of provider awareness of guidelines, as major barriers to screening. Although this healthcare system uses an advanced electronic medical record, documentation of GDM history in the electronic problem list was poor.

Our findings must be interpreted within the context of the study design. Overall, 43% of providers completed the survey, and individuals who completed the survey may differ from those who did not; however, our response rate is similar to the 37 to 50% response rate for other surveys in the literature[15–18]. Our survey was administered to providers within a single academic health care system in Massachusetts, and therefore may not be generalizable to other regions or practice models. Moreover, Partners Health Care uses a fully functional EMR, and such electronic records are available in a minority of practice settings in the US[19], although their use appears to be rapidly increasing[20]. However, this setting allowed us to compare survey responses with documentation in the electronic medical record. Moreover, we found poor documentation of GDM history in the Partners System EMR. This result suggests that even a fully-functional EMR is not sufficient to ensure continuity from pregnancy to primary health care if prenatal documentation is not integrated into the primary care record. Results in settings that do not use fully-functional EMRs might be even less satisfactory.

Our survey assessed screening practices based on provider self-report, and we found that both primary care providers and OB care providers were familiar with data regarding the risks of progression to type 2 diabetes and were aware of recommendations for screening at the postpartum visit. Consistent with our results, Gabbe et al[18] reported that 74% of respondents in a survey of ACOG members report routinely order postpartum glucose screening. However, when authors have used medical records to determine whether patients complete screening, they have found low utilization rates. Smirnakis et al[10], in a study that included one of the sites we studied, reported that only 37% of women with GDM received appropriate glucose screening following pregnancy, with a median time to follow-up of 428 days, while 94% received a pap smear a median of 49 days after childbirth. Other authors have similarly documented poor follow-up screening in the first postpartum year.[9,21–23] These findings suggest that physicians may overestimate the rate of screening in clinical practice.

In our survey, PCPs reported that they were unlikely to assess a woman's GDM history, and OBCPs reported that they were unlikely to order screening for women with a known history of GDM, suggesting that few women receive recommended screening. Kauffman reported

low rates of follow-up screening in a longitudinal study of 66 women with a history of GDM[24]. All women in the Kauffman study had normal results on a postpartum 2-hour oral glucose tolerance test, and each participant and her primary care physician received a letter recommending annual screening for diabetes. Five years later, authors contacted participants and found that only 30% had received the recommended annual screening. Of those who had been screened, the physician initiated testing in 62%, whereas the patient requested screening in 38%. Rates of screening were similarly low among obstetrician-gynecologists, family practice physicians, and internists.

These low rates of screening are an important quality problem. Interventions for women with GDM could substantially delay progression to type 2 diabetes[25]. In a functional healthcare system, what matters most is not how individuals perform with regard to identification of GDM in the record but rather how well the system performs at identifying women with this issue and ensuring that women with a GDM history get the subsequent care they need. OBCPs are focused for good reasons on issues related to pregnancy, so it is perhaps not surprising that OBCPs performed better in this area, yet many women receive their ongoing care with PCPs, who were unlikely to assess a woman's pregnancy history. The post-pregnancy transition between providers represents yet another example of "dropping the ball" as patients make transitions within the healthcare system[26]. In particular, our results suggest that communication between obstetric and primary care providers is a major barrier to follow-up of women with GDM. In addition, we found that existing structures and processes, such as patient intake forms, do not adequately capture a woman's history of gestational diabetes. OBCPs also identified follow-up for abnormal glucose results as a major barrier to screening.

Finally, we found that most women who gave birth at BWH and had a laboratory result diagnostic of gestational diabetes did not have this history documented in their electronic problem list. Of note, during the study period, BWH used an electronic prenatal record that operated independently of the primary care EMR. Both BWH and MGH have recently taken steps to improve integration of prenatal and primary care records. In future studies, we plan to test whether integration of obstetrical problems with the primary care record will influence screening for and prevention of health conditions after pregnancy. Such documentation may, in turn, increase the probability of appropriate follow-up testing. For example, EMR-based decision support tools could alert providers to a woman's GDM history and include recommendations for screening. Further studies should address the effectiveness of such interventions.

In conclusion, we found that clinicians were generally aware that women with GDM had a high risk of developing type 2 diabetes, but they did not routinely assess and screen patients. Key opportunities for improvement include facilitating communication between OBCPs and PCPs and integrating obstetrical and primary care problem lists, as well supplying decision support around testing. Further studies are needed to measure the effectiveness of such interventions to improve follow-up of women with a history of GDM.

Acknowledgments

This study was supported by the Partners IS Research Council.

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Table 1

Characteristics of survey respondents (N=207)

	All providers	OB providers	Primary care providers	P*
N	207	80	127	
	Median [IQR]	Median [IQR]	Median [IQR]	
Age (years)	41 [35–50]	38 [32–45]	43 [38–53]	<0.001
Year completed professional school	1994 [1985–2000]	1998 [1989–2004]	1992 [1983–1997]	<0.001
	% (n)	% (n)	% (n)	
Professional training				
Nurse or midwife	7.3 (15)	16.2 (13)	1.6 (2)	<0.001
Physician	92.7 (192)	83.8 (67)	98.4 (125)	
Level of training among MDs				<0.001
Resident/fellow	13.6 (25)	34.9 (23)	1.7 (2)	
Attending	84.8 (156)	65.1 (43)	95.8 (113)	
Missing	1.6 (3)	0 (0)	2.5 (3)	
Master's in public health				0.96
Yes	11.1 (23)	11.3 (9)	11.0 (14)	

*Wilcoxon rank sum test p value for continuous variables and chi-square p value for categorical variable, OB vs. primary care providers.

Table 2

Routine assessment of diabetes risk factors and history of gestational diabetes by obstetric care providers and primary care providers.

	All providers	OB providers	Primary care providers	
	% (N)	% (N)	% (N)	P*
N	207	80	127	
Does your practice use a standard intake form for new patients?				
Yes	69.9 (144)	95.0 (76)	54.0 (68)	<0.001
If yes, does this form include questions about:				
Risk factors for Diabetes	78.6 (110)	81.3 (61)	75.4 (49)	0.39
OB history	85.2 (121)	96.1 (73)	72.7 (48)	<0.001
GDM history	49.6 (69)	74.3 (55)	21.5 (14)	<0.001
Consider women of reproductive age that you have seen for office visits in the past month. At least 50% of the time, did you:				
Ask about interval pregnancies	81.2 (160)	94.9 (74)	72.3 (86)	<0.0001
Ask about gestational diabetes history	50.3 (99)	60.3 (47)	43.7 (52)	0.02
Order glucose screening for patients with a GDM history	60.2 (118)	41.0 (32)	72.9 (86)	<0.0001

* Chi-square test, OB providers vs. primary care providers.