

Teens with Diabetes Mellitus: Promoting Preconception Care to Prevent Adverse Pregnancy Outcomes

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Introduction

Women with pre-pregnancy diabetes mellitus are at high risk for poor reproductive outcomes. Major congenital malformations are the leading cause of mortality and serious morbidity in infants of mothers who have uncontrolled diabetes prior to pregnancy. Anomalies of all types are more likely to occur in babies born to women with pre-pregnancy diabetes.¹ According to 2006 Michigan PRAMS data, about 9% of women experienced problems with high blood sugar either before or during their pregnancy, and of those, about 9% had problems with high blood sugar prior to pregnancy.² Fortunately, there is little or no increased risk for birth defects when blood glucose is well controlled prior to conception and throughout pregnancy.

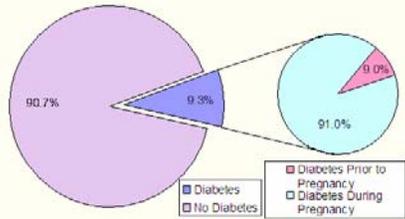


Figure 1 The prevalence and type of diabetes reported by women reporting diabetes during pregnancy, 2006 MI PRAMS.

Purpose

The purpose of this study was to estimate the effects of selected variables on affected teens' and their parents' awareness of the reproductive risks associated with having diabetes prior to pregnancy, in order to identify potential needs and strategies for increasing awareness.

Methods

Source of data and study design: This is a cross-sectional study using data from the parent and teen surveys, "Teens with Diabetes Mellitus: Promoting Preconception Care to Prevent Adverse Pregnancy Outcomes" collected from Michigan families in November and December, 2008. The MDCH IRB reviewed the study to determine that human subjects were adequately protected.

Source population and subject selection: Eligible participants were residents of Michigan, teen women, age 15 to 20 years, and enrolled in Children's Special Health Care Services (CSHCS) for diabetes mellitus, and their parents. Surveys were mailed to 609 teens and 609 parents. Completed surveys were returned to the Birth Defects Program and respondents were eligible to receive a gift card upon completion of the survey and were enrolled in a raffle for an iPod shuffle.

Data and variables: Awareness of risks was defined as those reporting that they were aware of medical problems related to pregnancy and diabetes. Help from providers was defined as reporting that their provider talked with them about how to plan for pregnancy while having diabetes. Other covariates included: routine diabetes care location, frequency of provider visits, age, race, and age of teen at diagnosis.

Statistical analysis: Logistic regression was used to estimate the crude and adjusted associations (odds ratios and 95% confidence intervals) between exposure variables and the outcome. SAS v. 9.1 was used for statistical analysis.

Results

Teens

Table 1. Frequency of awareness of risks by category of demographic variables.

Variable Category	N. Subjects	% of Total	% Aware of Risks
Age			
15 years	39	19.0	30.8
16	38	18.5	42.1
17	32	15.6	53.1
18	41	20.0	48.8
19	33	16.1	39.4
20	22	10.7	72.7
Race			
White	152	78.8	48.7
Black	27	14.0	29.6
Other	14	7.3	28.6
Diagnosis Age			
<5 yrs old	27	13.0	63.0
5-9 yrs old	62	30.0	37.1
10-14 yrs old	95	45.9	47.7
15-20 yrs old	23	11.1	39.1

Table 1:

- Survey responses were obtained from a total of 207 teens, for a response rate of 34%.
- About 45% of teens were aware of risks associated with diabetes during pregnancy.
- For teens, prevalence of awareness of risks was *highest* among those who were:
 - 20 years old
 - White
 - Younger than 5 years old when diagnosed.

Parents

Table 2. Frequency of awareness of risks by category of demographic variables.

Variable Category	N. Subjects	% of Total	% Aware of Risks
Age of Parent			
<40 yrs old	47	22.9	57.5
40-44	55	26.8	55.6
45-49	57	27.8	60.7
50 or older	46	22.4	40.9
Race of Parent			
White	151	78.7	59.7
Black	32	16.7	38.7
Other	9	4.7	37.5
Teen's age at Diagnosis			
<5 yrs old	32	15.5	67.7
5-9 yrs old	58	28.0	60.7
10-14 yrs old	96	46.4	43.3
15-20 yrs old	21	10.1	57.1

Table 2:

- Survey responses were obtained from a total of 208 parents (91% moms, 5% dads, and 4% other relation), for a response rate of 34%.
- About 55% of parents were aware of risks associated with diabetes during pregnancy.
- For parents, prevalence of awareness of risks was *highest* among those who were:
 - <50 years old
 - White
 - Had teens who were younger than 5 years old when diagnosed.

Table 3. Estimated crude and adjusted effects (OR and 95% CI) of care location, visits, and help from provider on awareness of risks: Teen Survey, Michigan, 2008.

Variable Category	Number of Subjects	% of Total	Aware of Risks (%)	Crude OR	Adjusted* OR	95% Confidence Interval
Diabetes Care Location						
University-Based Clinic	41	20.5	56.1	reference	reference	
Hospital Setting	85	42.5	41.2	0.55	0.53	(0.23, 1.2)
Community Center	17	8.5	35.3	0.43	0.28	(0.073, 1.1)
Private Office	57	28.5	43.9	0.61	0.43	(0.17, 1.1)
Total [†]	200					
Frequency of Provider Visits						
2 or less times per year	33	15.9	44.5	reference	reference	
3-4 times per year	138	66.7	45.2	1.0	1.4	(0.56, 3.3)
5 or more times per year	36	17.4	50.0	1.2	1.3	(0.43, 3.9)
Total	207					
Help from Provider						
No	132	64.3	33.3	reference	reference	
No, but given information	17	8.1	52.9	2.3	1.8	(0.53, 6.2)
Yes, once	29	13.8	69.0	4.4	5.2	(2.0, 13.3)
Yes, more than once	29	13.8	72.4	5.3	7.5	(2.5, 22.2)
Total	207					

[†]Totals are less than 207 (the total sample size) because of missing data.
 *Adjusted for age, race, and age of diagnosis.

Table 3:

- For teens, prevalence of awareness of risks associated with having diabetes during pregnancy was *highest* among those who had routine diabetes care at university-based medical clinics, those who had visits to their provider 5 or more times per year, and those who were given information about risks more than once.
- Prevalence of awareness of risks was *lowest* among those who had routine diabetes care at community centers, those who had 3-4 visits to their provider per year, and those who did not receive information from their provider.
- When adjusted for age, race, and age at diagnosis, teens who were given information about risks from their provider were more likely than teens who were not given information to be aware of risks in pregnancy (given information once: OR=5.2, 95% CI: 2.0, 13.3, given information more than once: OR=7.5, 95% CI: 2.5, 22.2).

Table 4. Estimated crude and adjusted effects (OR and 95% CI) of care location, visits, and help from provider on awareness of risks: Parent Survey, Michigan, 2008.

Variable Category	Number of Subjects	% of Total	Aware of Risks (%)	Crude OR	Adjusted* OR	95% Confidence Interval
Diabetes Care Location						
University-Based Clinic	40	19.4	62.5	reference	reference	
Hospital Setting	76	36.9	55.4	0.75	0.70	(0.30, 1.7)
Community Center	12	5.8	41.7	0.43	0.44	(0.08, 2.3)
Private Office	70	34.0	52.9	0.68	0.52	(0.21, 1.3)
Total [†]	206					
Frequency of Provider Visits						
2 or less times per year	28	13.5	55.6	reference	reference	
3-4 times per year	147	70.7	55.2	0.99	0.69	(0.27, 1.7)
5 or more times per year	33	15.9	53.1	0.91	0.70	(0.22, 2.3)
Total	208					
Help from Provider						
No	161	77.4	47.8	reference	reference	
Yes	47	22.6	78.7	4.0	4.0	(1.7, 9.3)
Total	208					

[†]Totals are less than 208 (the total sample size) because of missing data.
 *Adjusted for age, race, and age of teen at diagnosis.

Table 4:

- For parents, prevalence of awareness of risks associated with diabetes during pregnancy was *highest* among those who had teens with routine diabetes care at university-based medical clinics, those who had teens with 2-4 visits to their provider per year, and those who received risk information from providers.
- Prevalence of awareness was *lowest* among those who had teens with routine diabetes care at community centers, those who had teens with 5 or more visits to their provider per year, and those who did not receive information from providers.
- When adjusted for age, race, and age at diagnosis, parents who were given information about risks were more likely than parents not given information to be aware of risks in pregnancy associated with diabetes (OR=4.0, 95% CI: 1.7, 9.3).

Discussion

- We found that teens were significantly more aware of the risks if a provider discussed the issue. Providers have an important role in preconception care and should talk to patients with diabetes about how to plan for pregnancy.
- Because receiving help from providers was found to be the strongest predictor for awareness of risks, we wanted to get a better idea of who was not receiving help.

- Prevalence of receiving help was *lowest* in those who were:
 - 15-17 years old,
 - of a race other than white or black,
 - diagnosed when 5-9 years old, and
 - receiving care in a hospital setting.

- Because about *half* of all pregnancies are unintended, it is all the more important for women of childbearing age with DM to maintain target blood glucose levels. Women who do so significantly reduce the relative risk for major anomalies.³

- There are limited materials directed at teens available. Our program is supporting teen education and provider action by development of a fact card for teen women with diabetes and a provider toolkit of teen-oriented prevention resources.

Limitations

- The results may be biased because those who did not respond to the survey may have different experiences than the responders.
- The study population was limited to teen women enrolled in CSHCS and their parents; results may not apply to those not enrolled in CSHCS.

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