



Screening for Gestational Diabetes

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Principal Author

Liz Darling, B.H.Sc. (Midwifery), R.M., Ottawa, ON

AOM Clinical Practice Guideline Working Group

Kathi Wilson, R.M., Chair, London, ON
Lynne-Marie Culliton, R.M., Owen Sound, ON
Kathelijne Keeren, R.M., Mississauga, ON
Tasha MacDonald, R.M., Toronto, ON
Andrea Robertson, R.M., Hamilton, ON
Lisa Wishnefsky, R.M., Thornhill, ON

GUIDELINE EVALUATED

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INTRODUCTION

Clinical practice guidelines are detailed statements developed by an organization, using a formal process, to assist clinicians and patients/clients in making decisions about appropriate health care for specific clinical circumstances. They are a means of translating the evidence from the current scientific literature into recommendations for clinical practice with the goal of improving outcomes. Many groups in Canada are now engaged in developing clinical practice guidelines for health care providers.

In order to assist and support registered midwives in Ontario to provide evidence-based care, and to provide informed choice to women and their families, the Association of Ontario Midwives reviews, evaluates and endorses, where applicable, existing clinical practice guidelines. Guidelines from other professional

organizations are evaluated and graded by midwives. authors utilizing the Appraisal of Guidelines Research and Evaluation (AGREE) Instrument. This tool provides a systematic framework for assessing key components of clinical practice guideline quality, with the goal of assessing quality, validity, the method of guideline development and identifying bias. The evaluation of clinical practice guidelines for the AOM includes discussion of issues which are specifically related to the midwifery model of care and scope of practice.

The goal of the Association of Ontario Midwives in evaluating current clinical practice guidelines is to provide for midwives a set of comprehensive and accessible guidelines. These guidelines, along with those developed by the AOM, will guide midwives in clinical practice, assist with informed choice discussions and aid midwives with practice protocol development. When using these guideline reviews, midwives are advised that the review cannot be used in isolation, but must be read in conjunction with the guideline in order to achieve a full understanding of the recommendations.

EVALUATION

This is the link to the SOGC Guideline that is the subject of this review:

<http://sogc.medical.org/guidelines/pdf/ps121.pdf>

This guideline review reflects information consistent with the best practice as of the date issued and is subject to change. The information is not intended to dictate a course of action. Local standards may cause additions to or modifications of this guideline. Such changes should be well documented by practice groups.

The Association of Ontario Midwives respectfully acknowledges the financial support of the Ministry of Health and Long-Term Care in the development of this guideline. The views expressed in this guideline are strictly those of the Association of Ontario Midwives. No official endorsement by the Ministry of Health and Long-Term Care is intended or should be inferred.

This current review examines a clinical practice guideline that was developed by the SOGC to outline recommended options for gestational diabetes mellitus (GDM) screening in Canada. The SOGC guideline's recommendations are based on a review of the evidence pertaining to the effect of the diagnosis of GDM and to the different screening and diagnostic practices for GDM. The goals of this current review are to provide midwives with a framework for an evidence-based approach to screening for gestational diabetes mellitus (GDM), and to support a current understanding of the topic.

The guideline was evaluated by the principal author using the AGREE instrument, and found to be of moderate overall quality. Strengths of the guideline include the process and methods used to evaluate relevant evidence, and the clarity with which the research evidence and arising recommendations are presented. Weaknesses of the guideline relate to other aspects of the guideline development process, and include the lack of statements regarding potential conflicts of interest, the lack of patient involvement in the process, and the lack of information regarding the expertise of all those involved in developing the guideline.

OVERALL EVALUATION OF CLINICAL PRACTICE GUIDELINE: RECOMMENDED

The recommendations contained in the SOGC Clinical Practice Guideline "Screening for Gestational Diabetes" should be applied to midwifery practice.

SUMMARY OF RECOMMENDATIONS

1. A single approach of testing for GDM cannot be recommended at the present time as there is not enough evidence-based data proving the beneficial effect of a large screening program. Until a large prospective RCT shows a clear clinical benefit for screening and consequently treating GDM, recommendations will by necessity be based on consensus or expert opinion. Each of the following approaches is acceptable.
 - a. Routine screening of women at 24-28 weeks of gestation may be recommended with the 50 g glucose challenge test (GCT), using a threshold of 7.8 mmol/L (140 mg/dL), except in those women who fulfill the criteria for low risk, which includes the following:
 - Maternal age <25
 - Caucasian or member of other ethnic group with low prevalence of diabetes

- Pregnant body mass index of < or =27
- No previous history of GDM or glucose intolerance
- No family history of diabetes in first-degree relative
- No history of GDM-associated adverse pregnancy outcomes.

The diagnostic test can be the 100 g oral glucose tolerance test (OGTT), as recommended by ACOG, or the 75 g OGTT, according to the American Diabetes Association (ADA) criteria. Use of the World Health Organization (WHO) criteria will approximately double the number of women diagnosed with GDM without an apparent clinical benefit. (III-C)

- b. A small but significant number of Canadian obstetricians and centres have a policy of non-screening for GDM. Until evidence is available from large RCTs that show a clear benefit from screening for glucose intolerance in pregnancy, the option of not screening for GDM is considered acceptable. Conversely, there are no compelling data to stop screening when it is practiced. (III-C)
 - c. The clinician should consider the recommendation of the Fourth International Workshop-Conference that women considered at high risk for GDM should undergo a diagnostic test as early in pregnancy as possible and that testing should be repeated at 24-28 weeks if initial results are negative. (III-C)
 - d. If GDM is diagnosed, glucose tolerance should be reassessed with a 75 g OGTT 6-12 weeks postpartum in order to identify women with persistent glucose intolerance. (III-C)
2. A large RCT is needed to quantify the advantages and disadvantages of routine screening for GDM. Furthermore, the need for universally accepted, outcome-based diagnostic criteria for GDM is emphasized. (III-C)

CURRENT RESEARCH

A literature search was conducted in March 2005 using OVID Medline, EMBASE, and CINAHL to identify relevant research published after the evaluated guideline. (A detailed search strategy is available upon request). No new clinical trials investigating the effect of the diagnosis of GDM or the impact of different screening and diagnostic practices for GDM were identified. The following discussion summarizes the findings of other clinical research and identifies continuing gaps in knowledge.

Possible Effects of GDM Diagnosis And Management:

Those in favour of screening for GDM usually cite three potential benefits from the diagnosis and treatment of GDM: reduction in perinatal morbidity, identification of women at increased risk of future Type II diabetes mellitus (DM) and subsequent opportunity for beneficial lifestyle changes, and diagnosis of pre-existing DM in a very small portion of screened women,¹ but there is limited evidence to support the first two claims.

No new evidence from RCTs was identified to support claims about a reduction in perinatal morbidity. Two trials investigating treatment strategies that compared use of glycemic targets alone to the use of glycemic targets in combination with ultrasound measurements of fetal abdominal circumference to determine when women with GDM were given insulin were identified^{2,3}. The results of one of these trials provide further indirect evidence that the identification and treatment of GDM can decrease the incidence of macrosomia². In order to provide more meaningful information about the effects of treatment on GDM, future research investigating treatment options should also examine the impact of treatment on outcomes such as caesarean section, neonatal hypoglycemia, and birth trauma.

Survey data from Denmark suggest that the identification of GDM will not necessarily lead to beneficial lifestyle changes. In a mail survey of 121 women conducted 11-42 months post-delivery, researchers found that the majority (85%) were concerned about developing overt diabetes, but few had made lifestyle changes and/or lost weight after pregnancy⁴. Participants in the study had been counselled both in pregnancy and postpartum about the future risk of overt diabetes with GDM and about lifestyle factors (diet and exercise) that they could modify, and those with a BMI of ≥ 25 kg/m² were asked to lose weight postpartum. If women are to benefit from long-term lifestyle changes as a result of diagnosis of GDM there is a need for further research into interventions to promote and support such changes.

Another area of research related to long-term health outcomes is the investigation of the health of children whose mothers had GDM during pregnancy. Data from an American survey of 14 881 adolescents found an association between being born to a mother with GDM and being overweight as an adolescent⁵. Adjustment for both birth weight and maternal BMI attenuated the association between GDM and adolescent overweight, but the association remained. Hypothesized explanations for this association include a casual role of altered maternal-fetal glucose metabolism, a programmed risk for a postnatal insult leading to obesity, or risk marker not causal pathway⁵. Both the

management of maternal glycemic levels in pregnancy and positive modifications to maternal lifestyle are considered to have the potential to mitigate future health risks to the offspring of women with GDM – the need to confirm these hopes through clinical research remains.

In summary, there is a need for a large, well-conducted randomized controlled trial to establish whether or not screening for GDM leads to meaningful improvements in maternal and neonatal/child health outcomes, in both the short and the long term.

Universal Versus Selective Screening: Several recent cohort studies comparing universal screening with risk-based or selective screening approaches were identified^{6,7,8}. While the quality of these studies is reasonable, their findings are difficult to apply to a Canadian context because they were conducted in different populations (Turkey, Italy and Denmark). The findings and interpretations of these studies highlight some issues to be considered in selecting a screening approach. Risk-based screening will reduce the number of women screened while increasing the number of missed diagnoses. Variations between different populations in the prevalence of GDM and in the frequency of risk factors will lead to variation in the implications of selective screening in different settings. Decisions about acceptable rates of screening and missed diagnoses are value-laden, and may be made on the basis of several factors, including economics. However, until there is good evidence about the effect of screening and diagnosis of GDM on meaningful outcomes, any decision regarding which women to screen in a particular setting or population will remain somewhat arbitrary.

Screening alternatives: Several prospective cohort studies investigating screening alternatives were identified^{9,10,11}. One study of 3616 Swedish women compared the use of risk factors to random blood glucose (RBG) levels as an initial screen prior to the 75 g OGTT⁹. Using RBG levels of ≥ 8.0 mmol/L as an indication for testing had a sensitivity of 47.5% and a specificity of 97%. In other words, when RBG is used to screen for GDM, 52.5% of cases of GDM will go undetected. While this sensitivity was similar to that of risk factor screening, it is much lower than the sensitivity of the GCT (cited to have a sensitivity of 79% and a specificity of 87% when introduced by O'Sullivan in 1973.) Consequently RBG does not appear to be an ideal alternative to the GCT.

Two studies (one American and one Canadian) investigating the use of fasting plasma glucose as a screening tool were identified^{10,11}. While the finding of

these two studies varied slightly, both concluded that there would be no advantage to the use of FPG over the GCT due to the high false positive rates (30-57%) that would result from using cut off values low enough to achieve a sensitivity of at least 80%. In other words, in order to detect the same number of cases of GDM, more women would undergo diagnostic testing following screening based on FPG than if they were screened using the GCT.

Diagnostic criteria for GDM: One large retrospective cohort study investigating the relationship between adverse outcomes and 2 h 75 g OGTT glucose levels was identified¹². This study of 3260 Danish women concluded that the risk of macrosomia, spontaneous preterm delivery, hypertensive complications and neonatal hypoglycaemia all increase with an increased threshold for 2 h glucose. The authors conclude that while current thresholds seem acceptable in the interim, there is a need for large-scale blinded studies to clarify the question of a clinically meaningful diagnosis of GDM. An earlier Ontario-based retrospective study¹³ found that the introduction of universal screening in most of the province in the mid-1980s led to an increase in the incidence of gestational diabetes and a corresponding decrease in the portion of women diagnosed with gestational diabetes who experienced complications (e.g., polyhydramnios, preeclampsia, caesarean section, amniotic cavity infection.) This suggests that the existing diagnostic criteria may lead to the diagnosis of some women with clinically non-significant hyperglycemia as diseased. The authors of this study hypothesize that broader screening increases the proportion of diagnosed cases of gestational diabetes that are "milder," and they reiterate the need for more research¹³.

Fortunately, research into this issue is currently underway. The Hyperglycemia and Adverse Outcome in Pregnancy (HAPO) study is a 5 year prospective study being conducted in 16 centres (in 10 countries) that is intending to recruit about 25 000 women^{14,15}. The study aims to examine glucose tolerance in a large, heterogeneous cohort of women during the third trimester of pregnancy. A central lab is being used, and caregivers are blinded to the results of glucose tests unless predefined cutoff values are exceeded. The study will assess the relationship between maternal glycemia and cesarean delivery, increased fetal size (macrosomia/LGA/obesity), neonatal morbidity (hypoglycemia), and fetal hyperinsulinism. This information will be used to derive internationally acceptable criteria for the diagnosis and classification of GDM.

Another large retrospective cohort study was identified that investigated the level at which elevated results on the GCT can be used to diagnose GDM without further testing¹⁶. Records of 16 898 patients over an 11 year period at one hospital in Virginia were reviewed. 1972 of 2770 patients with positive GCT results (>140 mg/dL; >7.8 mmol/L) had results available for the 3 h 100g OGTT. The authors found that even using a relatively high cutoff of 200 mg/dL (11.1 mmol/L) would only predict 47-54% of GDM cases correctly. They conclude that the GCT should not be used for diagnosis as it may lead to over diagnosis. The Canadian Diabetes Association (CDA) guidelines recommend that GDM can be diagnosed without further testing based on a GCT result of ≥ 10.3 mmol/L (≥ 185 mg/dL). While further prospective research in this area is needed, the findings of this study suggest that this recommendation may need reconsideration.

Summary of Canadian Diabetes Association (CDA) Guideline: Subsequent to the publication of the SOGC clinical guideline that is the subject of this review, the CDA released a clinical practice guideline entitled "Gestational Diabetes Mellitus"¹⁷. In contrast to a previous recommendation of selective screening¹⁸, the 2003 guideline recommends screening of all pregnant women between 24-28 weeks using the GCT. The CDA also recommends that women with multiple risk factors undergo first trimester screening using the GCT, and reassessment in the subsequent trimesters if initial results are negative. It further suggests that in populations at high risk of GDM, a single 75 g OGTT can be used as a definitive screen.

The recommendations about screening and diagnosis in the CDA clinical guideline are based on a less rigorous critical appraisal of the research evidence about benefits than the SOGC guideline. The primary rationale for universal screening is potential rather than confirmed benefit, that is, to maximize the identification of women who might benefit from interventions to reduce the risk of future diabetes and cardiovascular disease. The authors also claim that treatment of GDM has been shown to reduce perinatal morbidity, and then provide an extensive list of morbidities for the baby that includes many conditions which the treatment of GDM has not been shown to affect. Despite these weaknesses, the authors do acknowledge the continued controversy surrounding the diagnosis and management of GDM.

Summary of Research Needs: The need for a randomized, controlled trial of screening for GDM that examines the impact on important maternal and neonatal health outcomes is echoed in several high quality systematic reviews of the evidence^{19,20}. It seems reasonable that the pending results of the HAPO study

be taken into consideration in designing such a trial, in which case we will have to wait several years before we have high-quality evidence upon which to base screening policies.

ADDITIONAL MIDWIFERY IMPLICATIONS

Given the available evidence, it is reasonable for midwives to recommend to women either the approach of selective screening or of non-screening. Midwifery practice groups should consider developing a practice protocol that defines what approach they will offer. Like any other prenatal screening test, glucose testing is offered to clients within the context of informed choice. Clients should be informed of the practice group's approach to GDM screening and informed of alternatives. Clients should also be informed of what is known about the possible effects of GDM diagnosis and management (the SOGC guideline provides a useful summary of this information), as well as community standards. Clients at high risk for GDM should be offered diagnostic testing early as possible in pregnancy and offered repeat testing at 24-28 weeks if initial results are negative. All informed choice discussions should be appropriately documented.

When screening results are abnormal, the midwife should promptly offer and arrange diagnostic testing. If GDM is diagnosed, consultation with a physician is required. The organization of services available for women with GDM varies between communities. Appropriate referral may involve any of the following health care professionals: obstetrician, endocrinologist and/or dietician. The recommendations arising from consultation, including care plans and shared care arrangements should be documented.

Midwifery practice groups should also consider developing a practice protocol to address the intrapartum and postpartum management of the increased risk of neonatal morbidity in infants born to women with GDM. Clients diagnosed with GDM should be offered a 75 g OGTT to reassess their glucose tolerance with their final midwifery visit at six weeks postpartum, or be recommended to request follow-up testing from their family physician. With the consent of the client, the client's family physician should be informed of the original diagnosis as well as treatment details and the results of any subsequent testing.

CONCLUSION

After evaluation using the AGREE instrument and assessment of the current literature, the Association of Ontario Midwives recommends the application of the

SOGC Clinical Practice Guideline "Screening for Gestational Diabetes Mellitus" to midwifery practice.

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