

Pregnancy

Window into women's future cardiovascular health

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The doctor of the future will give no medicine but will interest his patients in the care of the human frame, in the cause and prevention of disease.

Thomas Edison

I was assessing a 70-year-old woman for increased leg swelling and shortness of breath when I was struck by her statement that she had not been this swollen since she had had toxemia during her first pregnancy 45 years ago. She was certainly not pregnant today! I was acutely aware that I knew nothing of her history of preeclampsia or gestational diabetes mellitus (GDM). At age 50, she had had preexisting diabetes mellitus (DM) and hypertension when we first met, after her first myocardial infarction. I asked myself, "If we had known then of the increased cardiovascular risks associated with GDM, preeclampsia, and eclampsia, might her outcome have been different?"

Primary care providers have the difficult task of identifying modifiable risk factors for cardiovascular disease and assisting patients in successfully modifying those risk factors with the goal of reducing future risk of cardiovascular disease. The INTERHEART epidemiologic study¹ identified common risk factors that increased the risk of myocardial infarction. They include hypertension, hypercholesterolemia, DM, abdominal obesity, poor diet, smoking, and lack of exercise. Cardiovascular disease is the leading cause of death in women in developed countries, and the benefits of prevention in this population cannot be overstated. The costs associated with cardiovascular disease are staggering in a health care system struggling to contain costs.

The number of family physicians providing antenatal, intrapartum, and postpartum care has unfortunately declined steadily since 2000. Obstetricians and midwives attend most births.² Women might be receiving excellent antepartum and intrapartum care from their obstetric care providers, but their pregnancy histories might not be readily or easily available to their primary care providers. Gestational DM, gestational hypertension, obesity, and excessive maternal weight gain are on the rise along with maternal age, which further increases the likelihood of concurrent morbidities. The notion of intervening early to prevent or modify disease is an attractive one, given that cardiovascular disease is the leading cause of death in both men and women in North America. Strategies designed to reduce long-term risk are ideally suited to primary care. This is especially

important given what we now know of the intergenerational risk associated with excessive maternal weight gain, GDM, preeclampsia, and obesity. The health of future generations is also at risk.

Gestational diabetes mellitus

Gestational diabetes mellitus—glucose intolerance first diagnosed in pregnancy—has increased substantially over time. The diagnosis of GDM is associated with an increased risk of developing type 2 DM, hyperinsulinemia, hypertension, and dyslipidemia. A previous diagnosis of GDM is associated not only with later diagnosis of type 2 DM but also with increased cardiovascular risk without concurrent diagnosis of type 2 DM.^{3,4} Randomized clinical trials have demonstrated a sustained benefit of lifestyle interventions in the prevention of type 2 DM in selected groups of middle-aged adults.^{5,6} We know from American literature that doctors might not be aware of the American Congress of Obstetricians and Gynecologists guidelines on the safety of exercise in low-risk pregnancy, and even when they are aware of the guidelines, they are not counseling women on the benefits of exercise or assisting them in meeting those recommendations.^{7,8} There is good evidence that blood glucose control in GDM is improved with diet and exercise counseling in pregnancy.⁹

One limitation of research about GDM is that interventions are often delivered late in pregnancy after the positive screening results at 24 to 28 weeks. If we look at those patients whose pregnancies have been complicated by GDM, the literature suggests that the number of women who complete the 75-g oral glucose tolerance test (OGTT) at 6 weeks to 6 months postpartum is low.⁹ This is often arranged through endocrine clinics, and primary care providers might not be aware of either the diagnosis of GDM in pregnancy or whether the patient has completed the test. Women with GDM also have higher rates of hypertensive disorders during pregnancy.¹⁰ Those women with GDM have a 10% to 20% risk of developing type 2 DM over the next 10 years. Their children are potentially at higher risk of childhood obesity and its consequences.¹¹ A randomized controlled postal



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reminder study in Ottawa, Ont, notifying primary care providers and patients of the diagnosis of GDM and the need for a follow-up 75-g OGTT, demonstrated significant improvement in patient completion of the OGTT ($P < .05$), highlighting the positive effect of education.¹² Women often do not perceive themselves to be at increased risk of DM despite their diagnosis of GDM and frequent interactions with the health care team,¹³ potentially resulting in women not disclosing this information to their primary care providers. This information is relevant to both future pregnancies and the woman's long-term metabolic health.

Obesity and pregnancy

Canada has experienced an increase in obesity, with the proportion of overweight and obese women rising from 34% in 1978 to 40% in 1992, and to 53% in 2004.¹⁴ Currently, almost half the women of childbearing age are overweight or obese.¹⁵ This is associated with increased rates of GDM, type 2 DM, preeclampsia and eclampsia, thromboembolic disease, and congenital anomalies. Breastfeeding rates are also reduced in this population, further compounding the risks to future generations. Rates of delivery complications such as shoulder dystocia and cesarean section are also increased. Research from the United Kingdom examining maternal mortality noted that obesity complicated a substantial percentage of these cases.¹⁶

Women with normal prepregnancy body mass indexes also need to be mindful of new weight gain recommendations. Those women who exceed the new Institute of Medicine guidelines for weight gain in pregnancy are at risk of complications to both themselves and their unborn children.¹⁷ This preventable and modifiable risk factor needs to be addressed with every pregnant woman, and every effort needs to be made to assist them in meeting those goals. This is where access to an interdisciplinary team would greatly assist both women and their obstetric care providers, given the potential to substantially affect future pregnancy outcomes and the long-term health of both mother and baby.

Hypertensive disorders and pregnancy


Hypertensive disorders complicate up to 10% of pregnancies and are the second leading cause of maternal mortality in developed countries. We now know that preeclampsia and eclampsia identify women and children at future risk of vascular disease including hypertension, coronary artery disease, stroke, peripheral vascular disease, DM, and renal disease.^{18,19} This risk is especially substantial for women with early-onset (before 34 weeks) preeclampsia or eclampsia. The American Heart Association updated its cardiovascular disease prevention guidelines for women in January 2011 to recognize preeclampsia

and other pregnancy complications as risk factors for cardiovascular disease.

The glimpses into a woman's future cardiovascular health during pregnancy should neither be missed nor ignored, as it provides opportunities for cardiovascular disease prevention. It is essential that doctors ask about pregnancy history to identify increased risk in a timely manner for health during future pregnancies and for women's and children's future cardiovascular health.

Conclusion

We have seen many changes with primary care reform in Canada, with care being delivered more and more frequently by teams. Comprehensive management and interdisciplinary models of care have already been demonstrated to be effective in chronic illness management. Primary care providers and policy makers need to look at models of care that identify markers for future disease and empower women to make changes for their own and their children's long-term health. It behooves us to look at current models of care and advocate better access to prevention programs that target the unique needs and barriers faced by both pregnant and postpartum women in our communities.

The ability to identify and modify risk in not 1 but 2 generations should not be ignored. 

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Competing interests

None declared

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References

1. Yusuf S, Hawken S, Öunpuu S, Dans T, Avezum A, Lanas F, et al. Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (the INTERHEART study): case-control study. *Lancet* 2004;364(9438):937-52.
2. College of Family Physicians of Canada, Canadian Medical Association, Royal College of Physicians and Surgeons of Canada. *National Physician Survey 2007*. Mississauga, ON: College of Family Physicians of Canada; 2007. Available from: www.nationalphysiciansurvey.ca. Accessed 2013 Aug 21.
3. Canadian Diabetes Association Clinical Practice Guidelines Expert Committee. Canadian Diabetes Association 2003 clinical practice guidelines for the prevention and management of diabetes in Canada. *Can J Diabetes* 2003;27(Suppl 2):S1-163.
4. Kim C, Newton KM, Knopp RH. Gestational diabetes and the incidence of type 2 diabetes: a systematic review. *Diabetes Care* 2002;25(10):1862-8.
5. Tuomilehto J, Lindström J, Eriksson JG, Valle TT, Hämäläinen H, Ilanne-Parikka P, et al. Prevention of type 2 diabetes mellitus by changes in lifestyle among subjects with impaired glucose tolerance. *N Engl J Med* 2001;344(18):1343-50.
6. Knowler WC, Barrett-Connor E, Fowler SE, Hamman RF, Lachin JM, Walker EA, et al. Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. *N Engl J Med* 2002;346(6):393-403.
7. Entin PL, Munhall KM. Recommendations regarding exercise during pregnancy made by private/small group practice obstetricians in the USA. *J Sports Sci Med* 2006;5:449-58.
8. Bauer PW, Broman CL, Pivarnik JM. Exercise and pregnancy knowledge among healthcare providers. *J Womens Health (Larchmt)* 2010;19(2):335-41.

9. Davenport MH, Mottola MF, McManus R, Gratton R. A walking intervention improves capillary glucose control in women with gestational diabetes mellitus: a pilot study. *Appl Physiol Nutr Metab* 2008;33(3):511-7.
10. Carr DB, Utzschneider KM, Hull RL, Tong J, Wallace TM, Kodama K, et al. Gestational diabetes mellitus increases the risk of cardiovascular disease in women with a family history of type 2 diabetes. *Diabetes Care* 2006;29(9):2078-83.
11. Simmons R. Perinatal programming of obesity. *Exp Gerontol* 2005;40:863-6. Epub 2005 Oct 10.
12. Clark HD, Graham ID, Karovitch A, Keely EJ. Do postal reminders increase postpartum screening of diabetes mellitus in women with gestational diabetes mellitus? A randomized controlled trial. *Am J Obstet Gynecol* 2009;200(6):634.e1-7.
13. Morrison MK, Lowe JM, Collins CE. Perceived risk of type 2 diabetes in Australian women with a recent history of gestational diabetes mellitus. *Diabet Med* 2010;27(8):882-6.
14. Torrance GM, Hooper MD, Reeder BA. Trends in overweight and obesity among adults in Canada (1970-1992): evidence from national surveys using measured height and weight. *Int J Obes Relat Metab Disord* 2002;26(6):797-804.
15. Statistics Canada [website]. *Adult obesity in Canada: measured height and weight*. Ottawa, ON: Statistics Canada; 2005. Available at: www.statcan.gc.ca/pub/82-620-m/2005001/article/adults-adultes/8060-eng.htm. Accessed 2010 Jan 6.
16. Lewis G, editor. *Saving mothers' lives: reviewing maternal deaths to make motherhood safer—2003-2005. The Seventh Report of the Confidential Enquiries into Maternal Deaths in the United Kingdom*. London, UK: Confidential Enquiry into Maternal and Child Health; 2007.
17. Institute of Medicine. *Weight gain during pregnancy: reexamining the guidelines*. Washington, DC: National Academies Press; 2009.
18. Ray JG, Vermeulen MJ, Schull MJ, Redelmeier DA. Cardiovascular health after maternal placental syndromes (CHAMPS): population-based retrospective cohort study. *Lancet* 2005;366(9499):1797-803.
19. Yinon Y, Kingdom JC, Odutayo A, Moineddin R, Drewlo S, Lai V, et al. Vascular dysfunction in women with a history of preeclampsia and intrauterine growth restriction: insights into future vascular risk. *Circulation* 2010;122(18):1846-53. Epub 2010 Oct 18.
