Diagnosing gestational diabetes during the COVID-19 pandemic: a glimpse into the future?

Dev AS Kevat[1,2,3]

Gestational diabetes (GDM) affects about one in six pregnant women in Australia; the incidence is higher among women in socio-economically disadvantaged areas.[1] Diagnosis in Australia is based on a 75 g oral glucose tolerance test (OGTT) at 24–28 weeks of pregnancy, and an additional earlier test for women with certain risk factors. GDM is associated with increased risks of large for gestational babies, shoulder dystocia, pre-eclampsia, need for caesarean delivery, and neonatal jaundice and hypoglycaemia. Managing GDM is demanding for women and their clinicians, requiring finger prick monitoring four times a day, advice from dietitians and diabetes educators, and review by physicians or obstetricians, as well as pharmacotherapy (insulin or metformin) for a substantial proportion of the affected women. Several international studies have found that the psychosocial effects for women are considerable.[2,3] The burden was especially heavy during the recent coronavirus disease 2019 (COVID-19) pandemic[4] and for those at particular risk of adverse health outcomes.[5]

The incidence of diagnosed GDM increased after the adoption of new diagnostic criteria in most countries from 2013, following the large multicentre observational HAPO study conducted twenty years ago.[6] The study identified a continuous relationship between maternal glucose levels and adverse outcomes, rather than a specific level that indicated increased risk; the threshold for diagnosis was set at that associated with 1.75-fold greater risk of primary adverse outcomes.[6]

Concerns about overdiagnosis of GDM and the lack of interventional evidence for this threshold are periodically expressed. A two-step glucose load approach (50 g and, if required, 100 g) was compared with the standard Australian one-step approach to diagnosing GDM in a large pragmatic randomised control trial; about twice as many women were diagnosed using the standard approach (16.5% *v* 8.5%), but differences in outcomes between the two groups were not statistically significant.[7]

In this issue of the Journal, Meloncelli and colleagues provide a valuable insight into an alternative diagnostic strategy.[8] During the COVID-19 pandemic, professional societies in Australia recommended a new two-step approach: fasting blood glucose assessment for initial screening, with oral glucose tolerance tests undertaken only in women with intermediate results (4.7–5.0 mmol/L glucose).[9] Some women with fasting levels below this level might have been diagnosed with GDM had they undergone a traditional OGTT; such women could be considered cases of "missed" GDM at risk of adverse outcomes.

Taking the Queensland Perinatal Data Collection as their starting point, Meloncelli and colleagues evaluated pregnancy outcomes during the first twelve months of the COVID-19 pandemic, when some centres switched to the modified two-step diagnostic approach, and during the twelve months preceding the pandemic. The authors compared pre-pandemic outcomes for women not diagnosed with GDM (glucose data were available for 6297 women) with those for women in whom GDM was excluded on the basis of low fasting blood glucose levels during the pandemic (glucose data available for 1660 women). Although the latter group is likely to have included some women with "missed" GDM, differences between the two groups in most key outcomes were not statistically significant, including rates of large for gestational age and small for gestational age babies, hypertensive disorders, neonatal hypoglycaemia, and pre-term delivery. However, the caesarean delivery rate was higher during the pandemic period (173 *v* 166 per 1000 births), and that of neonatal respiratory distress marginally higher.[8]

The chief limitation of the study by Meloncelli and her colleagues is that glucose data were not available for about 75% of women, raising the possibility of selection bias. For example, data were available for a smaller proportion of women who received private antenatal care than of those who received public antenatal care.[8] Pregnant women who receive private care are more likely to have caesarean deliveries, and their mean pre-pregnancy body mass index is lower and mean age higher than for women receiving public care.[10] Outcomes stratified by socio-economic disadvantage, geographic remoteness, and ethnic background (including groups at particular risk, such as Aboriginal and Torres Strait Islander women) would also be of interest.

Some Queensland centres continued to use the OGTT method during the first twelve months of the pandemic. In a second analysis, Meloncelli and colleagues compared outcomes for women screened during the pre-pandemic or pandemic periods with the standard diagnostic approach and not diagnosed with GDM, providing insights into the effects of the pandemic on perinatal outcomes at the population level. Mean birthweight was about 1% higher during the pandemic period, as were rates of caesarean delivery, large for gestational age babies, neonatal respiratory distress, and admission to special care or neonatal intensive care units.[8] These findings suggest that the higher rate of caesarean delivery for women screened by fasting blood glucose assessment, and the higher rate of neonatal respiratory distress, were pandemic rather than screening strategy effects. Increased caesarean delivery rates during the COVID-19 pandemic were also reported in Melbourne.[11]

Together with other research findings,[12] the report by Meloncelli and colleagues suggests that fasting blood glucose assessment may be appropriate as an initial screening test for GDM, with reasonable negative predictive value because of the relatively consistent relationship between fasting and post-glucose load blood glucose levels. Their article provides a tantalising glimpse into an alternative future, although the clinical robustness and economy of the modified two-step screening strategy should be examined further in interventional and cost-effectiveness studies.

[1]Western Health, Melbourne, VIC. [2]Monash Health, Melbourne, VIC. [3]The University of Melbourne, Melbourne, VIC. dev.kevat@wh.org.au • doi: 10.5694/mja2.52143 • See Research (Meloncelli)

Competing interests: No relevant disclosures.

Provenance: Commissioned; not externally peer reviewed. ■

1 Australian Institute of Health and Welfare. Diabetes: Australian facts (Cat. no. CVD 196). Updated 30 June 2023. https://www.aihw.gov.au/reports/diabetes/diabetes/contents/total-diabetes/gestational-diabetes (viewed Sept 2023).

2 Craig L, Sims R, Glasziou P, Thomas R. Women's experiences of a diagnosis of gestational diabetes mellitus: a systematic review. *BMC Pregnancy Childbirth* 2020; 20: 76.

3 Muhwava LS, Murphy K, Zarowsky C, Levitt N. Perspectives on the psychological and emotional burden of having gestational diabetes amongst low-income women in Cape Town, South Africa. *BMC Womens Health* 2020; 20: 231.

4 Wilson CA, Gómez-Gómez I, Parsons J, et al. The mental health of women with gestational diabetes during the COVID-19 pandemic: an international cross-sectional survey. *J Womens Health (Larchmt)* 2022; 31: 1232-1240.

5 Delanerolle G, Phiri P, Zeng Y, et al. A systematic review and meta-analysis of gestational diabetes mellitus and mental health among BAME populations. *EClinicalMedicine* 2021; 38: 101016.

6 HAPO Study Cooperative Research Group; Metzger BE, Lowe LP, Dyer AR, et al. Hyperglycaemia and adverse pregnancy outcomes. *N Engl J Med* 2008; 358: 1991-2002.

7 Hillier TA, Pedula KL, Ogasawara KK, et al. A pragmatic, randomized clinical trial of gestational diabetes screening. *N Engl J Med* 2021; 384: 895-904.

8 Meloncelli NJL, Barnett AG, Cameron CM, et al. Gestational diabetes mellitus screening and diagnosis criteria before and during the COVID-19 pandemic: a retrospective pre–post study. *Med J Aust* 2023; 219: 467-474.

9 Australasian Diabetes in Pregnancy Society. Diagnostic testing for gestational diabetes mellitus (GDM) during the COVID-19 pandemic: antenatal and postnatal testing advice. Updated 30 Apr 2020. https://www.adips.org/documents/RevisedGDMCOVID-19GuidelineFINAL30April2020pdf_000.pdf (viewed Sept 2023).

10 Callander E, Shand A, Ellwood D, et al. Financing maternity and early childhood healthcare in the Australian healthcare system: costs to funders in private and public hospitals over the first 1000 days. *Int J Health Policy Manag* 2021; 10: 554-563.

11 Rolnik DL, Matheson A, Liu Y, et al. Impact of COVID-19 pandemic restrictions on pregnancy duration and outcome in Melbourne, Australia. *Ultrasound Obstet Gynecol* 2021; 58: 677-687.

12 D'Emden M, McLeod D, Ungerer J, et al. Development of a fasting blood glucose-based strategy to diagnose women with gestational diabetes mellitus at increased risk of adverse outcomes in a COVID-19 environment. *PLoS One* 2020; 15: e0243192. ■