

Commentary: Evidence-based Gestational Diabetes Mellitus Screening – The Next Lap for Singapore

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ABSTRACT

From 1 January 2016, KK Women's and Children's Hospital (KKH) and Singapore General Hospital (SGH), started to offer gestational diabetes (GDM) screening to all pregnant patients at their 24 to 28 weeks gestation. Screening is done by the Oral Glucose Tolerance Test (OGTT) with fasting, 1 and 2 hour glucose levels using the new International Association of the Diabetes and Pregnancy Study (IADPSG) criteria, a switch from the old WHO criteria. The changes are in line with recommendation in the several local studies (including GUSTO studies) and international evidence studies, calling for universal screening of pregnant women for GDM and consideration of evidence from international HAPO (The Hyperglycemia and Adverse Pregnancy Outcome) study of which KKH was one of the 15 participating centres in the world. The next lap for Singapore is to enhance practice-based evidence and further accelerate evidence-based practices into GDM screening.

INTRODUCTION

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The prevalence of Gestational Diabetes Mellitus (GDM) has been steadily increasing worldwide. In Singapore, the prevalence is more than 10 percent, which means it affects at least about 40,000 women annually.¹

GDM increases the health risks for mothers and their babies and is associated with higher rates of both maternal and fetal mortality. Babies of GDM mothers are at risk of macrosomia and may suffer from shoulder dystocia, birth trauma, and deficiency of glucose in the bloodstream, which could lead to long-term negative health effects. During pregnancy, the mother may develop preeclampsia, go into preterm labour, and may require a caesarean section. These substantial risks for the mother and baby highlighted the importance of proper screening and treatment for women at risk of GDM. Medical interventions for GDM patients reduce complication rates, giving both the mother and her baby a better prognosis in the long-term.²⁻⁴

PAST PRACTICE

Targeted or high risk selective screening has been practiced in Singapore for more than 3 decades, when advantages and benefits of screening for GDM became established.⁵⁻⁶ Our hospitals have been offering targeted GDM screening to high-risk pregnant women, in line with the Ministry of Health's clinical guidelines for GDM screening. A pregnant woman who is at high risk for GDM include those with a body mass index of more than 25 kg/m², first-degree relatives with diabetes, a personal history of previous GDM, previous large babies of more than 4 kg, and previous poor obstetric outcomes usually associated with diabetes. However a local birth cohort study (GUSTO cohort of 1000 or more pregnant women who completed their entire pregnancy at KKH and the National University Hospital (NUH) in 2009 and 2010) in 2014 showed that ethnic differences translate to inadequacy of high-risk screening for gestational diabetes mellitus in an Asian population.

NEW PRACTICE

Chen et al⁷, analysed and compared the patient benefits of conducting universal GDM screening versus targeted GDM screening, and no GDM screening for pregnant patients, using the GUSTO database. The study found that universal GDM screening is a cost-effective approach to reduce the complications of GDM in Singapore as compared to the targeted screening or no screening approach.

This local study has validated what some international studies have shown, which is that universal screening is key to better detection rates for GDM in pregnant women, leading to better health outcomes for these pregnant women and that it is cost effective.⁸⁻⁹ In addition Asian women have higher risks of gestational diabetes. This finding is significant as it will influence the GDM screening practice locally and regionally, improving the health outcomes of many women and their future generations. This study used local data from KKH & GUSTO to look at cost effectiveness of universal, target and no screening. The result favoured universal screening, especially in Singapore where gestational diabetes rates are high and treatment can be effectively pursued to achieve good outcome.

KKH O&G Division & SGH O&G Department units, as part the SingHealth-Duke NUS OBGYN Academic Clinical Programme & SingHealth-Duke NUS Academic Medical Centre, has started offering GDM screening to all

pregnant patients in their 24 to 28 weeks gestation using the IADPSG screening criteria from 1 January 2016.¹⁰⁻¹¹ This shift to universal screening (routine screening for all) follows similar recommendations recently in Oct 2015 International Federation of Gynaecology and Obstetrics (FIGO).⁸

In addition KKH & SGH have adopted the International Association of Diabetes and Pregnancy Study (IADPSG) criteria, as it is a more sensitive screening marker for OGTT. IADPSG criteria is based on evidence from international HAPO (The Hyperglycemia and Adverse Pregnancy Outcome) study of which KKH was one of the 15 participating centres in the world.¹² These changes will help to enhance patient care by ensuring that pregnant women who develop GDM are promptly identified and provided with timely interventions for better health outcomes. A previous local study¹³ showed that the prevalence of gestational diabetes mellitus among Asian females is lower using the IADPSG criteria which was newly adopted by WHO in 2013.¹⁴

Currently our hospitals have been using manual preparation of the drink with glucose powder and boiled water. A change to a pre-mix 75g OGTT beverage drink provides easier consumption, and a more palatable taste and also makes the handling of estimated OGTT load increase easier and more productive.

THE NEXT LAP

The next lap for Singapore is to enhance practice-based evidence and further accelerate evidence-based practices into GDM screening. It behooves us in practice to implement universal screening effectively so that our patients can benefit optimally. It is important to audit our GDM screening and management to ensure that the evidence based standard of process and practice are achieved and to derive practice-based evidence.

There has been national interest in early detection of diabetes as well as worldwide interest. According to Singapore Saw Swee Hock School of Public Health, 34 per cent of people aged 24 to 35 in Singapore 2016 can expect to be diabetic by the time they are 65, based on projections. In Singapore, diabetes rates have risen, from 8.6 per cent of the adult population in 1992 to 11.3 per cent in 2010 and projected to 12.9 per cent in 2015.¹⁵

The availability of data from routine screening of mothers for GDM will be a boon for our health service

improvement and research. It will help us to better define our pregnant population for any pregnancy studies and allows us to embark on the next level of research to tackle the challenges of diabetes. These include determining

the best follow-up strategy for patients with GDM, prevention of diabetes in our population starting from the womb and use of biomarkers in GDM.

REFERENCES

1. Yap-Seng Chong, Shirong Cai, Harvard Lin, Shu E Soh, Yung-Seng Lee, Melvin Khee-Shing Leow, Yiong-Huak Chan, Li Chen, Joanna D Holbrook, Kok-Hian Tan, Victor Samuel Rajadurai, George Seow-Heong Yeo, Michael S Kramer, Seang-Mei Saw, Peter D Gluckman, Keith M Godfrey and Kenneth Kwek on behalf of the GUSTO study group. Ethnic differences translate to inadequacy of high-risk screening for gestational diabetes mellitus in an Asian population: a cohort study. *BMC Pregnancy and Childbirth* 2014; 14:345
2. Karlsson K, Kjellmer I. The outcome of diabetic pregnancies in relation to the mother's blood sugar level. *Am J Obstet Gynecol.* 1972 Jan 15;112(2):213-20.
3. Metzger BE, Buchanan TA, Coustan DR, de Leiva A, Dunger DB, Hadden DR, et al. Summary and recommendations of the Fifth International Workshop-Conference on Gestational Diabetes Mellitus. *Diabetes Care.* 2007 Jul;30 Suppl 2:S251-60.
4. Tee CS, Wang KW, Tho CK, Heng TL, Rajasoorya C, Vengadasalam D, Tan YT. Management and outcome of gestational diabetes in Alexandra Hospital, Singapore. *Ann Acad Med Singapore.* 1990 Jul;19(4):459-62.
5. World Health Organization. Definition, diagnosis, and classification of diabetes mellitus and its complications: report of a WHO consultation. Geneva: World Health Organization, 1999.
6. MOH Clinical Practice Guidelines on Diabetes Mellitus. Published: Mar 2014. https://www.moh.gov.sg/content/moh_web/healthprofessionalsportal/doctors/guidelines/cpg_medical/2014/cpgmed_diabetes_mellitus.html
7. Pin Yu Chen, Eric A. Finkelstein, Mor Jack Ng, Fabian Yap, George S. H. Yeo, Victor Samuel Rajadurai, Yap Seng Chong, Peter D. Gluckman, Seang Mei Saw, Kenneth Y. C. Kwek, and Kok Hian Tan. Incremental Cost-Effectiveness Analysis of Gestational Diabetes Mellitus Screening Strategies in Singapore. *Asia Pac J Public Health* October 28, 2015 1010539515612908. doi:10.1177/1010539515612908
8. Hod M, Kapur A, Sacks DA, Hadar E, Agarwal M, Di Renzo GC, Roura LC, McIntyre HD, Morris JL, Divakar H. The International Federation of Gynecology and Obstetrics (FIGO) Initiative on gestational diabetes mellitus: A pragmatic guide for diagnosis, management, and care. *Int J Gynaecol Obstet.* 2015 Oct;131 Suppl 3:S173. doi: 10.1016/S0020-7292(15)30007-2.
9. Moyer VA; U.S. Preventive Services Task Force. Screening for gestational diabetes mellitus: U.S. Preventive Services Task Force recommendation statement. *Ann Intern Med.* 2014 Mar 18;160(6):414-20. doi: 10.7326/M13-2905.
10. BY Seow. Diabetes screening for expectant mums. *The Straits Times* 18/11/2015
11. Tan J. Gestational diabetes screening to be offered to pregnant patients at KKH, SGH. *Channel News Asia* 18/11/2015
12. HAPO Study Cooperative Research Group, Metzger BE, Lowe LP, Dyer AR, Trimble ER, Chaovarindr U, Coustan DR, Hadden DR, McCance DR, Hod M, McIntyre HD, Oats JJ, Persson B, Rogers MS, Sacks DA. Hyperglycemia and adverse pregnancy outcomes. *N Engl J Med.* 2008 May 8;358(19):1991-2002. HAPO study: Pregnancy outcomes related to a 75-g, 2-hour oral glucose tolerance test in a blinded, multinational, multiethnic cohort study of 25,000 gravidas. (One of the 15 centres in the world - KK Women's and Children's Hospital, Singapore City, Singapore: Y.H. Cao, J.J. Chee, A. Koh, E. Tan, V.S. Rajadurai, H.Y. Wee, G.S.H. Yeo)
13. Yew TW, Khoo CM, Thai AC1, Kale AS, Yong EL, Tai ES. The Prevalence of Gestational Diabetes Mellitus Among Asian Females is Lower Using the New 2013 World Health Organization Diagnostic Criteria. *Endocr Pract.* 2014 Oct;20(10):1064-9. doi: 10.4158/EP14028.OR.
14. World Health Organization. Diagnostic criteria and classification of hyperglycaemia first detected in pregnancy. Geneva: World Health Organization, 2013. Available at: <http://www.who.int/iris/handle/10665/85975>. Accessed March 31, 2014.
15. The Straits Times. Rising obesity among young set to worsen diabetes rate in Singapore. 22 February 2016