ORCHID: Optimisation of screening for and management of hyperglycaemia in pregnancy

Research Focus: Women's Health, Diabetes, Health Services

Project Overview: Maternal hyperglycaemia in pregnancy (HIP) is a significant intergenerational issue. HIP increases the risk for poor birth outcomes, resulting in prolonged hospitalisation and requirement for special neonatal care. It also increases risk of chronic metabolic disease for both mothers and offspring. Management of HIP can improve birth outcomes, and long-term lifestyle interventions after delivery can reduce progression to diabetes. For women without known diabetes or prediabetes, detecting HIP is complex and requires using a two-hour 75 g oral glucose tolerance test (OGTT) or sugar drink test. Screening for HIP happens on or near first antenatal presentation for those with risk-factors (early) and between 24–28 weeks' gestation (routine). We established the ORCHID study to improve screening for and management of HIP in regional, rural and remote communities in Western Australia. Through this study, we have identified several deficiencies and opportunities in current HIP screening protocols.

Improving early screening: A HbA1c in early pregnancy identifies Aboriginal women with high-risk for having large babies. Both Aboriginal and non-Aboriginal women were more likely to do an HbA1c test early in pregnancy compared to an early OGTT.

Issues with 24–28-week screening: Many rural and remote Australian women are not tested using the OGTT. Two-thirds of women with GDM who do the test are missed due to blood glucose sample instability. This glucose instability means that we miss identifying pregnancies at risk for large babies. ORCHID Co-lead Investigators are also members of a national Harmonisation Glucose Preanalytical Working Group to provide advice on how clinics and laboratories can improve OGTT protocols. Despite awareness and effort expended in providing universal screening, current screening guidelines are still not being achieved in regional, rural and remote areas. Reliance on the OGTT is part of the problem. Implementation into policy and practice is built into our research projects. So far, we:

- Are supporting Kimberley Aboriginal Community Controlled Health Organisations in implementing pathology tubes that stabilise glucose immediately and auditing the impact of this change.
- Are advocating for changes to laboratory practice across Australia to address the glucose stability issue through the National Harmonisation Glucose Preanalytical Working Group.
- Have produced a joint position statement that outlines approaches to simplify screening for HIP in Kimberley Aboriginal antenatal patients. We are supporting the 2024 revision of the Kimberley Clinical Protocol for Diabetes in Pregnancy.

ORCHID Team: The ORCHID Study is a collaborative research project between the Rural Clinical School of WA and WA Aboriginal Community Controlled Health Organisations, as well as WA Country Health Service. Our state-wide team consists of researchers, clinicians and community members. We acknowledge all study participants and health services who have assisted with the ORCHID Study.

Co-Lead Investigators:

- Julia Marley- Rural Clinical School of WA, Broome
- Erica Spry, Bardi Jawi Traditional Owner - Rural Clinical School of WA and Kimberley Aboriginal Medical Services, Broome
- Emma Jamieson - Rural Clinical School of WA, Bunbury

Phase 3 Collaborators:

- Kimberley Aboriginal Medical Services
- Broome Regional Aboriginal Medical Service
- Derby Aboriginal Health Service
- Ord Valley Aboriginal Health Service
- Yura Yungi Medical Service
- South West Aboriginal Medical Services
- West Australian Country Health Service
- Diabetes WA

Locations: Kimberley, Midwest, Southwest and Great Southern

Timeframe: 2018 – current

Funding and Support: We thank all partner health services for their significant in-kind contributions. We have also received $4 M in MRFF and FHRI grant funding to 2027

Plain Language Reports: ORCHID-Plain Language Reports

Publications:

Kirke A, Atkinson D, Moore S, Sterry K, Singleton S, Roxburgh C, Parrish K, Porter C, Marley JV. Diabetes screening in pregnancy failing women in rural WA: An audit of oral glucose tolerance test completion rates. *Aust J Rural Health* 2019; 27:64-69. DOI:10.1111/ajr.12465

Jamieson E, Spry E, Kirke A, Atkinson D, Marley JV. Real-world gestational diabetes screening: problems with the oral glucose tolerance test in rural and remote Australia. *Int J Environ Res Public Health* 2019; 16: 4488. DOI:10.3390/ijerph16224488

Jamieson E, Spry E, Kirke A, Atkinson D, Roxburgh C, Marley JV. Underestimation of risk for large babies in rural and remote Australia: Time to change plasma glucose collection protocols. *J Clinical Translational Endocrinology* 2021; 23:100247. DOI:10.1016/j.jcte.2020.100247

Jamieson EL, Spry EP, Kirke AB, Griffiths E, Porter C, Roxburgh C, Singleton S, Sterry K, Atkinson DN, Marley JV. Prediabetes and pregnancy: Early pregnancy HbA1c identifies Australian Aboriginal women with high-risk of gestational diabetes mellitus and adverse perinatal outcomes. *Diabetes Research Clinical Practice* 2021; 176:108868. DOI:10.1016/j.diabres.2021.108868

Jamieson E, Spry E, Kirke A, Atkinson D, Roxburgh C, Marley JV. Variations in the Prevalence of Gestational Diabetes Mellitus with Remote Testing and a Pragmatic Solution to Improve Accuracy. *Diabetes Care* 2021; 44:e4-e5. DOI:10.2337/dc20-2211

Jamieson E, Spry E, Kirke A, Griffiths E, Porter C, Roxburgh C, Singleton S, Sterry K, Atkinson DN, Marley JV. Real-world screening for diabetes in early pregnancy: improved screening coverage using universal glycated haemoglobin. *Primary Care Diabetes* 2021; 15:995-1001. DOI:10.1016/j.pcd.2021.09.011

Jamieson E. Developing algorithms to improve predicting the development of and screening for gestational diabetes mellitus in rural communities. Doctoral Thesis, *The University of Western Australia* 2022. DOI:10.26182/6fcx-aj38

Jamieson EL, Dimeski G, Flatman R, Hickman PE, Jones GRD, Marley JV, McIntyre HD, McNeil AR, Nolan CJ, Potter JM, Sweeting A, Ward P, Williams P, Horvath AR. Oral glucose tolerance test to diagnose gestational diabetes mellitus: impact of variations in specimen handling. *Clinical Biochemistry* 2023; 115:33-48. DOI:10.1016/j.clinbiochem.2022.10.002

Kirke AB, Spry E, Atkinson D, Sinclair C, Marley JV. Oral glucose tolerance test – The imperfect gold standard for gestational diabetes screening: A qualitative study involving clinicians in regional, rural and remote areas of Western Australia. *Health Promotion J Aust* 2024;899. DOI:10.1002/hpja.899

Get Involved: for further details, please contact the ORCHID Study team: orchid@rcswa.edu.au