

Cardiovascular Risk Assessment in Children Born to Diabetic Mothers

Dear Editor,

Hyperglycemia in pregnancy is a common metabolic disorder and is associated with serious maternal and neonatal complications¹. Recent estimates suggest that the global prevalence of this disorder is 17%.¹ More than 90% of cases are observed in low and middle-income countries¹ and two thirds of them are young women (<30 years).¹ With the global epidemic of type 2 diabetes, it is expected that the prevalence of diabetes among young women will increase with subsequent medical and financial implications for the health care system.²

With the emergence of the Developmental Origins of Health and Disease paradigm, exposure to an abnormal intrauterine environment such as maternal hyperglycemia may result in permanent reprogramming of physiologic pathways in the growing fetus that could increase susceptibility to the occurrence of cardiovascular disease risk.

Due to the long latency period, the link between in-utero cardiac reprogramming in children of diabetic mothers and future onset of cardiovascular disease has been difficult to establish.³ Though, evidence suggests an adverse risk factor profile such as increased prevalence of hypertension, obesity, dyslipidemia and metabolic syndrome in children of women with hyperglycemia during pregnancy by as early as 5 years of age,³ not all studies are supportive of this association.⁴ To establish this risk, it would be imperative to study cardiovascular risk profile in young children as early as in infancy.

Standard clinical management of maternal diabetes is directed at achieving good glycemic control and treating immediate maternal and neonatal complications. This has substantially improved the short-term outcomes but the long-term consequences in these children needs to be explored further.

Recently, carotid intima-media thickness, a measure of the thickness of the intima and media layers of the wall of the carotid artery, has been evaluated as marker for subclinical atherosclerosis. In the paediatric population, this marker is increased in children with known risk factors such as hypercholesterolemia, obesity, hypertension and metabolic syndrome.⁵ The remodeled arteries are likely to increase arterial stiffness in the systemic circulation which may contribute to elevated blood pressure.⁵ Carotid intima-media thickness is measured using ultrasound and therefore

involves no radiation, is noninvasive and is relatively inexpensive. Hence, it has the potential to be utilised as a surrogate marker to assess future risk in exposed children. Further, carotid intima-media thickness along with other characteristics such as age, body mass index, blood pressure and lipid profile of the child could be of value to derive a predictive cardiovascular risk score in such children.

The "Global action plan for the prevention and control of Non-Communicable Diseases 2013-2020" laid out by World Health Organization, aims to reduce the number of premature deaths by 25% by 2025. From a public health perspective, development of a predictive score could help in early identification and subsequent behavioral modification in these children to prevent potential chronic diseases later in life.

Conflict of Interest

The authors have no conflicts of interest relevant to this article.

References

1. Guariguata L, Linnenkamp U, Beagley J, Whiting DR, Cho NH. Global estimates of the prevalence of hyperglycaemia in pregnancy. *Diabetes Res Clin Pract* 2014;103:176-85.
2. Kolu P, Raitanen J, Rissanen P, Luoto R. Health care costs associated with gestational diabetes mellitus among high-risk women: results from a randomised trial. *BMC Pregnancy Childbirth* 2012;12:71.
3. Marco LJ, McCloskey K, Vuillermin PJ, Burgner D, Said J, Ponsonby AL. Cardiovascular disease risk in the offspring of diabetic women: the impact of the intrauterine environment. *Exp Diabetes Res* 2012;2012:565160.
4. Beyerlein A, Nehring I, Rosario AS, von Kries R. Gestational diabetes and cardiovascular risk factors in the offspring: Results from a cross-sectional study. *Diabet Med* 2012;29:378-84.
5. Lande MB, Carson NL, Roy J, Meagher CC. Effects of Childhood Primary Hypertension on Carotid Intima Media Thickness: A Matched Controlled Study. *Hypertension* 2006;48:40-4.

Z HOODBHAY¹

R NURUDDIN²

N MOHAMMED^{1*}

¹Department of Obstetrics and Gynaecology;

²Department of Community Health Sciences,
The Aga Khan University, Karachi, Pakistan

*Correspondence to: Dr N MOHAMMED