

Maternal obesity and risk of adverse obstetric outcomes in Malaysia

Dear Editor,

Obesity during pregnancy is associated with increased risk of adverse health outcomes such as gestational diabetes mellitus (GDM), hypertension and pre-eclampsia.¹ Unlike the well-known association between maternal hyperglycaemia and pregnancy outcomes, the effect of obesity in pregnancy has drawn some controversial conclusions.¹ Data are even scarcer in Southeast Asia countries. In this research, we examined prospectively the effect of obesity in pregnancy and gestational weight gain (GWG) on pregnancy outcomes.

A prospective study was conducted from October 2017 to March 2019 in 5 maternal and child health centres in Kuching, Malaysia, and was approved by the Medical Research & Ethics Committee (MREC), Ministry of Health Malaysia. This study was also registered under the National Medical Research Register (NMRR ID: NMRR-16-2725-31652). All participants who fulfilled the study criteria were recruited after informed consent. This study received research grant from the Universiti Malaysia Sarawak Special Grant Scheme F05/SpGS/1548/2017.

All participants in their first trimester who were more than 18 years of age underwent a 75g oral glucose tolerance test (OGTT). Participants were excluded if their fasting plasma glucose was ≥ 7.0 mmol/L and/or 2-hour plasma glucose was ≥ 11.1 mmol/L (undiagnosed diabetes mellitus [DM]); or fasting plasma glucose was ≥ 5.1 mmol/L and/or 2-hour plasma glucose was ≥ 8.5 mmol/L (GDM). All other participants underwent second OGTT between 24 and 28 weeks of gestation and were excluded if they were diagnosed with GDM. We also excluded participants with underlying DM, genetic disorders affecting growth or congenital anomalies, multiple pregnancy, conception using artificial insemination, or human immunodeficiency virus/Hepatitis B/Hepatitis C infection.

We divided the participants into subject or control groups based on first trimester body mass index (BMI) as weight gain during first trimester of pregnancy is negligible.² The World Health Organization has recommended a BMI cut-off of 23kg/m^2 as overweight for Asians, and $\geq 25\text{kg/m}^2$ as obese. Based on this, participants with a BMI of $\geq 23\text{kg/m}^2$ were recruited as subjects (obese group) and those with a BMI of $18.5\text{--}23\text{kg/m}^2$ were recruited as controls. Total GWG was calculated based on the difference between first and

third trimester weight. As multiparity (≥ 2 live births) is associated with higher risk of pregnancy-induced hypertension (PIH), we categorised parity of the mothers as 0–1 live birth and ≥ 2 live births.

Demographic data were recorded. At first trimester, the participants' weight and height were recorded for calculation of BMI. At every trimester visit, the following were recorded: (1) blood pressure (BP) using sphygmomanometer after 15 minutes of rest, (2) mid-stream urine for presence of proteinuria, and (3) weight. The participants were followed up until the point of delivery. Occurrence of adverse pregnancy outcomes was documented.

The outcomes measured in this study included the occurrence of PIH, pre-eclampsia, gestational age at delivery, need of induction of labour (IOL) and primary caesarean section for delivery. PIH is defined as new-onset hypertension ($>140/90$ mmHg) after 20 weeks gestation without significant proteinuria. Pre-eclampsia is defined as systolic BP >140 mmHg, diastolic BP >90 mmHg and proteinuria ($>1+$) on ≥ 2 occasions ≥ 6 hours apart after 20-week gestation. The need of IOL is the process of initiating labour using either pharmacological or non-pharmacological methods.

Statistical analysis was performed using SPSS version 19.0 (IBM Corp, Armonk, US). Univariate analyses were used to compare dichotomous outcomes, and Student's t-test was used to compare continuous outcomes. Multiple logistic regression models were used to evaluate outcomes, adjusting for maternal age, parity, smoking status and gestational age. Adjusted odds ratios and 95% confidence interval were calculated. A value of $P < 0.05$ was considered significant.

A total of 123 obese mothers and 102 controls consented to the study. There was no significant difference in baseline demographic data (Table 1).

Obese mothers gained $6.5\text{kg} \pm 4.0$ throughout the pregnancy over 267.8 gestational days ± 11.0 . Non-obese mothers gained $8.4\text{kg} \pm 3.8$ throughout the pregnancy over 268.7 gestational days ± 7.3 . There was no significant difference in gestational age between the groups ($P = 0.953$).

The maternal outcomes are summarised in Table 2. Significantly more obese mothers developed PIH and underwent primary caesarean section compared to the control group. All subjects with PIH were given