**LENGTH OF INTER-PREGNANCY INTERVAL AND SUBSEQUENT PRECONCEPTION ADIPOSITY: FINDINGS FROM A POPULATION-BASED COHORT IN THE SOUTH OF ENGLAND**

Conference theme: Determinants

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**Abstract**

*Introduction*: Maternal obesity is a key predictor of adverse short- and long-term health outcomes for both mother and child. The aim was to investigate the association between duration of the inter-pregnancy interval between successive pregnancies and change in maternal body mass index (BMI) during that period to assess the optimal interval associated with the least likelihood of starting the following pregnancy with a higher body weight.

*Methods*: A regional population-based cohort of prospectively collected routine healthcare data for antenatal care between January 2003 and September 2017 at University Hospital Southampton was utilised. Records of women with two or more consecutive singleton pregnancies (up to five) were analysed. Information on previous births was used to categorise pregnancies as first to second, second to third, third to fourth and fourth to fifth. Inter-pregnancy interval was defined as timing between a live birth and the next conception calculated by subtracting gestational age according to dating ultrasound scan of the latter birth from the interval between births. BMI was treated as a continuous and categorical variable which was defined as underweight (BMI <18·5 kg/m2), normal weight (18·5 to 24·9 kg/m2),overweight (25·0 to 29·9 kg/m2) and obese (>=30 kg/m2). Regression analyses was used to examine the association between change in maternal BMI measured at the first antenatal (booking) appointment and inter-pregnancy interval (adjusted for timing of booking appointments, age, ethnicity, highest educational qualification, employment status at booking appointment, baseline BMI, smoking status and whether undergone infertility treatment). Clustering of pregnancies within each woman was also adjusted for.

*Findings*: 20571 women of which 12636 had first two, 2654 had first three, 530 had first four and 120 had first five pregnancies were included. Two-thirds of women had gained weight when first presenting to antenatal care for their subsequent pregnancy with 21-24% moving into a higher compared to 4-6% moving into a lower BMI category.

A significant positive linear association was found between change in maternal BMI with each year of inter-pregnancy interval with the coefficient remaining similar across pregnancies (adjusted increase in maternal BMI per year of inter-pregnancy interval 0.25 kg/m2, 95% CI 0.22 to 0.28) and increasing for the fourth to fifth pregnancy (adjusted increase in maternal BMI per year of inter-pregnancy interval 0.36 kg/m2, 95% CI 0.25 to 0.47).

Compared to an interval of 24-35 months, there is a significantly increased risk of starting the next pregnancy with a higher weight than the previous one with an interval of 36 months or more for the second, third and fourth pregnancies (adjusted OR 1.43, 95% CI 1.29 to 1.59, P<0.001 for first to second, adjusted OR 1.51, 95% CI 1.28 to 1.78, P<0.001 for second to third, adjusted OR 1.59, 95% CI 1.20 to 2.11, P=0.001 for third to fourth pregnancy). In contrast, there was a significantly decreased risk of starting the next pregnancy with a higher BMI in those with an interval of 12-23 months for the second and third pregnancies (adjusted OR 0.77 95% CI 0.71 to 0.85, P<0.001; adjusted OR 0.82, 95% CI 0.70 to 0.97, p=0.02 respectively) but not higher order pregnancies.

*Conclusions*: Birth spacing of 12-23 months appears most protective against starting the next pregnancy with a higher body weight, even when adjusting for maternal age. In high-income country settings, getting pregnant within 1-2 years of the previous birth and advising those anticipating longer intervals to limit weight gain could be simple preconception preventive measures in tackling maternal obesity and hence achieving better subsequent maternal and offspring health outcomes.