Cord Blood Inflammation and Birth Size in the Bangladesh Projahnmo Pregnancy Cohort

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Objectives: To examine the association between cord blood inflammation and infant birth size in a pregnancy cohort from rural Bangladesh

Methods: In Sylhet district, Bangladesh, we consecutively enrolled 297 pregnancies and collected prenatal data and umbilical cord dried blood spots at birth (December 2015- 6). Cord blood was analyzed for interleukin (IL)-1α, IL-1β, IL-6, IL-8, and C-reactive protein (CRP). Z score values for weight, length, and head circumference at birth were calculated using the Intergrowth-21 standard. The association between inflammation (>75% vs < = 75%) and birth size was assessed using logistic regression. For birth size outcomes, we assessed small for gestational age (SGA) (<3% and 10% birth weight for GA/sex using Intergrowth-21) as well as birth weight, length, and head circumference z-scores (lowest quartile Z-scores vs others). In model 1, we calculated direct crude associations between exposure (inflammation) and outcome (birth size), and in model 2, adjusted for factors which may be associated both exposure and - independently of exposure - outcome (socioeconomic status, maternal age, maternal nutritional status, infant gestational age and sex).

Results: Study mothers were a mean (sd) age of 23.7 ± 4.7 years. 34.2% had a maternal upper arm circumference (MUAC) < 22 cm, and 19% exhibited stunting (height < 145 cm). Mean gestational age at birth was 38.9 ± 2.1; 11.5% infants were preterm, 27.3% low birthweight (<2500 g), and 41.3% SGA. Mean birth size z-scores were −1.0 ± 1.1 for weight, 0.1 ± 0.9 for length, and 0.2 ± 1.1 for head circumference. We found no significant associations between cord inflammation biomarkers and SGA status. In model 1, elevated IL-1α and IL-6 exhibited a negative trend with low birth length z scores in crude analysis (odds ratio (OR) = 1.9, 95% CI: 0.9, 3.9). In model 2, statistical trends were observed for IL-1α (OR = 2.2, 95% CI: 1.0, 5.1), IL-6 (OR = 2.1, 95% CI: 0.9, 4.7), and CRP (OR = 2.0, 95% CI: 0.9, 4.6). No associations were observed between cord blood inflammation and birth weight or head circumference z scores.

Conclusions: Among infants in rural Bangladesh, elevated cord blood inflammation was associated with trends of smaller birth length z-scores.