Fall CH, Sachdev HS, Osmond C, Restrepo-Mendez MC, Victora C, Martorell R, Stein AD, Sinha S, Tandon N, Adair L, Bas I, Norris S, Richter LM; COHORTS investigators. **Association between maternal age at childbirth and child and adult outcomes in the offspring: a prospective study in five low-income and middle-income countries (COHORTS collaboration)**. Lancet Glob Health. 2015 Jul;3(7):e366-77. Epub 2015 May 18.

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Introduction

Women at both the lower and upper extreme of reproductive age have an increased risk of adverse pregnancy outcomes and child health. Due to biological, social and behavioral factors, maternal age at childbearing <19 years increases the risk of preterm birth and intrauterine growth restriction, infant mortality and child undernutrition. Maternal age >35 years is also associated with increased risk, including stillbirths, preterm births, intrauterine growth restriction and chromosomal abnormalities (1).

This issue of NNA summarizes an article recently published in *Lancet Global Health* which reports on associations between maternal age and birth outcomes, nutritional status and cardiometabolic risk factors of the child. The results derive from a pooled analysis of five birth cohort studies from low- and middle-income countries in which women were recruited before or during pregnancy, and their children were followed up to adulthood (2).

Methods

The present study included five prospective birth cohort studies from Brazil, Guatemala, India, the Philippines, and South Africa, known as the COHORTS (Consortium for Health Orientated Research in Transitioning Societies). Each site enrolled women either before or during pregnancy, and maternal age at birth was calculated from data obtained during interviews or from birth notification forms. Gestational age of the child was calculated from the last menstrual period, through interviews with the mothers, or from medical records. Birthweight was either measured by the research groups or obtained from hospital records. In all study sites, children's weight and height were measured longitudinally at 2 and again at 4 – 8.5 years of age. Height-for-age z-scores (HAZ) and weight-for-age z-scores (WAZ) were calculated based on the World Health Organization

(WHO) growth standards. A body-mass index (BMI) of >25 and >30 kg/m^2 were used to define overweight and obesity, respectively. Fasting glucose was available from all sites, except Brazil. Impaired fasting glucose was defined as fasting glucose ≥6.1 mmol/L but <7.00 mmol/L and diabetes as fasting glucose ≥7.00 mmol/L. Analyses included the following 5 socio-economic indicators: maternal education, marital status, wealth index, urban/rural residence and ethnic origin. Maternal height, maternal parity and breastfeeding duration were considered potential mediators.

Results and Conclusions:

Records from a total of 22,188 women and their children were included in the pooled analysis (Brazil in=5913, Guatemala n=2392, India n=7530, Philippines n=3080, and South Africa n=3273). In 3 of the studies (Brazil, Philippines, South Africa), 99.9% of the women provided maternal age and any outcome of interest. In Guatemala, outcomes of interest were available for 81.2% and in India for 69.1% of women. The mean maternal age (± standard deviation (SD)) in each site ranged from 25.8 ± 6.1 years in Brazil to 27.2 ± 7.2 in Guatemala. The youngest women were 12 years of age and the oldest were 49 years of age. The 5 study sites differed by many of the measured indicators of socio-economic status. An analysis of associations between confounders and mediators show that older maternal age was associated with being married, and having less schooling, but greater wealth, longer breastfeeding duration, and higher parity.

Birthweight was greater with increasing maternal age, but lower among the oldest mothers. Inclusion of socio-economic factors, maternal height and breastfeeding duration in the model did not change this association. Adjustment for maternal parity attenuated the association; but young maternal age (<19 years) remained associated with lower birthweight, resulting in odds ratios for low birthweight of 1.18 (95% confidence interval (CI) 1.02 – 1.36) for young mothers <19 years of age. Gestational age at birth was associated with both young and older maternal age. Odds ratios for preterm birth were 1.26 (95% CI 1.03 – 1.53) for mothers <19 years of age and 1.33 (95% CI 1.05 – 1.67) for mothers ≥35 years. Stunting at 2 years of age was also associated with younger maternal age [odds ratio 1.46 (95% CI 1.25 – 1.70)]. In contrast, children of older women had less stunting at 2 years of age [odds ratio 0.64 (95% CI 0.54 – 0.77)]. The failure to complete secondary schooling was more common in children of younger mothers [odds ratio 1.38 (95% CI 1.18 – 1.62)], whereas the opposite was found for children of older mothers [odds ratio 0.59 (95% CI .48 – 0.71)]. Adult fasting glucose concentration was increased in offspring of both younger and older women.

Conclusions and policy Implications:

Findings from these 5 population-based cohorts in low- and middle-income countries confirm earlier findings that pregnancy during adolescence puts the newborn at a disadvantage. Although adjustment for socio-economic status reduced the association between young age and the measured risk factors, they remained significant. It is uncertain whether this elevated risk was due to biological or behavioral factors or a combination of both. In addition to strengthening efforts to prevent pregnancy during adolescence, young mothers should be targeted with intervention programs to help improve their children's nutrition and schooling.

The impact of pregnancy among women of ≥35 years is mixed. Newborns of older women are at elevated risk of preterm birth and increased plasma glucose concentration in adulthood, but they tend to have less stunting in early childhood and less failure of secondary schooling. Thus, targeting women of younger age seems to be of greatest priority.

NNA Editor's Comments *

Postponing pregnancy has advantages for both adolescent women and their offspring. In addition to the benefits for children described above, delaying pregnancy allows young women to complete their own growth and development while avoiding growth restriction imposed by adolescent pregnancy. Adolescence is normally a period of rapid growth, and efforts should also be devoted to ensure optimal nutrition of young women (3).

*These comments have been added by the editorial team and are not part of the cited publication.

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