The effect of maternal fasting during pregnancy

Muslim women who are pregnant during the holy month of Ramadan will typically continue the practice of fasting during daylight hours. *Douglas Almond* and *Bhashkar Mazumder* investigate the impact on their children – in terms of birthweight, the likelihood of being a boy or girl, and later life health outcomes.

People's early childhood environment, including that experienced before birth, can have permanent effects on their lives. Recent studies by economists have used external shocks, such as exposure to famine or infectious disease, to provide compelling evidence in support of the 'foetal origins' hypothesis. An unresolved question is whether more commonly encountered early life exposures also have significant long-term effects on health and human capital.

In this study, we consider a common early childhood exposure: disruptions to the timing of pre-natal nutrition from skipping meals during pregnancy. Specifically, we consider the effects of maternal fasting during daylight hours in the month of Ramadan. Three in four Muslim pregnancies overlap with Ramadan, and surveys indicate that the majority of pregnant Muslims observe the fast.

There is currently no consensus on whether pre-natal fasting harms newborn health. We provide new evidence on the effects of fasting on birth outcomes and the first evidence of effects later in life using large sample micro data on Muslims in the United States, Iraq and Uganda.

Our methodological approach addresses a key flaw in previous studies of Ramadan fasting and birth outcomes. These epidemiological studies have compared pregnant women who fasted to those who did not at a point in time, under the basic assumption that the decision to fast is exogenous. Instead, we compare births over many years where Ramadan overlaps with pregnancy to those where Ramadan does not, and estimate the effect of Ramadan's timing.

This approach yields distinct estimates for specific months of gestation; Muslim births where Ramadan falls in the early post-natal period serve as the control group. Because Ramadan follows a lunar calendar, its occurence moves forward by roughly 11 days each year. Thus, we can disentangle the effect of pre-natal overlap with Ramadan from season of birth, which is also related to health in adulthood.

Pre-natal exposure to Ramadan results in lower birthweight, a reduced probability of a male birth and an increased likelihood of learning disabilities in adulthood

Using natality data from Michigan, we find that pre-natal exposure to Ramadan lowers birthweight and reduces gestation length. Furthermore, the likelihood of a male birth is about 10% lower when Ramadan falls very early in pregnancy and occurs during the peak period of daylight fasting hours. Using census data for the United States, Iraq and Uganda, we find long-term effects on adult health and some economic outcomes.

We generally find the largest effects on adults when Ramadan falls early in pregnancy. Rates of adult disability are roughly 20% higher, with specific mental disabilities showing substantially larger effects. Our estimates are conservative to the extent that Ramadan is not universally observed. Importantly, we detect no corresponding outcome differences when the same design is applied to non-Muslims.

Our findings are plausible in the context of biomedical research, where studies have documented that even relatively short fasts lasting 12 hours result in dramatic changes in the metabolic biochemical profiles of pregnant mothers.

This article summarises 'Health Capital and the Prenatal Environment: The Effect of Maternal Fasting During Pregnancy' by Douglas Almond and Bhashkar Mazumder.

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