Medical Assisted Reproduction, Low Birth Weight and Children Cognitive Development

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Introduction & Research Aim

Medical assisted reproduction (MAR) conceptions increased sharply in the last decades, with more than five million children born due to these techniques (Goisis, Remes, Martikainen, Klemetti, & Myrskylä, 2019), but the possible consequences on children development are still uncertain. MAR children have been shown to experience poorer birth outcomes (i.e. low birth weight: smaller than 2.5kg - LBW) than their naturally conceived (NC) counterparts (Martin et al., 2017), and this raises concerns about their longer-term cognitive development. However, parents who undergo MAR to conceive are, on average, from advantaged socioeconomic backgrounds which could compensate for the negative effects of being born LBW, whether this is the case remains an open empirical question.

In this article, we compare MAR and naturally conceived children and investigate whether the consequences of being born LBW on cognitive development in childhood and adolescence differ between the two groups. We draw on the UK Millennium Cohort Study (waves 2-6), which contains a sample of MAR conceived children and detailed information on both their cognitive development (measured at ages 3,5,7,11 and 14) and family socio-demographic characteristics.

Data, variables & analytical strategy

We use data from the MCS, which contains a sample of children born in the 12 months following September 2000 in the United Kingdom. The MCS also contains a sample of MAR conceived children. We include children from waves 2 to 6 and maintain maximum sample

size at each wave. Analyses use weights to account for the complex sampling design of the MCS.

Our main outcome variable is children cognitive ability assessed with the British Ability Scales. At age 3 and 5 children are assessed with the naming vocabulary scale. At age 7 with a reading test; at age 11 with a verbal similarity test; and at age 14 with a word activity score. Cognitive ability is standardized and age-adjusted within each wave. Our main independent variables are whether the child was MAR conceived, and whether the child was born LBW.

We compute two sets of regression models at each wave. First, we compute baseline models including only controls for the gender of the child, and whether the child was born in a multiple births' delivery. Second, we include a set of covariates as: maternal education, birth order, maternal age, maternal marital status, timing of the first prenatal visit, ethnic origin, whether the mother smoked during pregnancy.

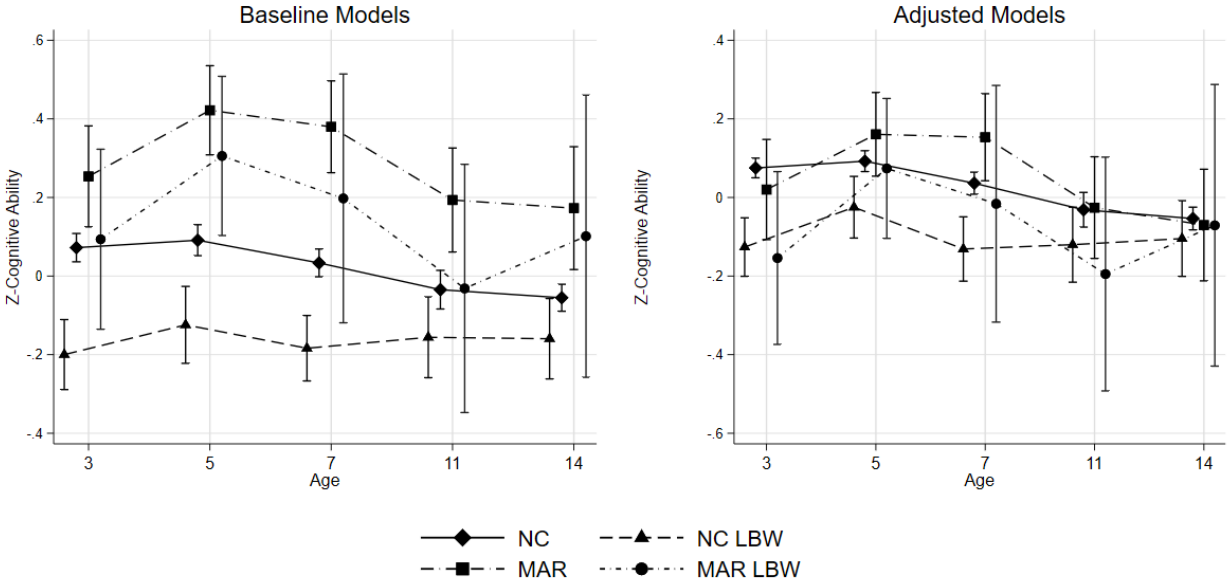
Preliminary Results

Figure 1 below shows the preliminary results. The left-panel reports the predicted cognitive scores at each age for the baseline models. The right-panel reports cognitive ability at each age for the adjusted models. Point estimates report predicted cognitive scores for MAR and NC children by their birth weight.

From baseline models, we can notice that MAR children performs better than any other group at each age. MAR children born LBW seems to perform better than NC LBW children, especially at age five. NC conceived children have better predicted cognitive scores than NC LBW children, who show to lowest scores. The MAR advantage disappear after age 7, when all the groups seem to converge. These differences are fully attenuated in the adjusted models, highlighting how family characteristics explain these differences.

Preliminary results seem to show that MAR children perform better than other groups, and this is most likely explained by the fact that they are a highly selected group, as suggested by adjusted models. MAR LBW children do not to show particularly negative cognitive ability at any age, when compared with NC LBW children. We might than conclude that despite their higher risk of being born LBW, there is no indication of a hampered cognitive development of MAR LBW children.

Figure 1. Difference in cognitive development between MAR and naturally conceived children by their weight at birth.



Baseline model includes controls for: sex, multiple birth

Adjusted models include: sex, multiple birth, maternal education, birth order, maternal age, maternal marital status, timing of the first prenatal visit, ethnic origin, whether the mother smoked during pregnancy

References

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