

## **Having a live birth following medically assisted reproduction: Does socio-economic status matter?**

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Prior work has highlighted marked social disparities in births after Medically Assisted Reproduction (MAR) as socio-economically advantaged couples are, on average, considerably more likely to use MAR treatments to conceive. Recent research suggests multiple mechanisms – such as the (un)affordability of the MAR treatments and geographic proximity to infertility clinics – are likely to be involved in explaining this association, yet the extent to which these differences are due to barriers in accessing MAR or lower demands for MAR treatments amongst less socio-economically advantaged couples is still not fully understood. An aspect which has so far been overlooked in this emerging area of work is the fact that social disparities in MAR births could emerge not only before but also after accessing MAR treatments. For example, the live birth rate after MAR could be higher for more advantaged individuals who might be able to afford a higher number of treatments and to continue the treatments if the subsidized ones do not result in a live birth. In this paper, using data from Finnish administrative registers covering all childless women in the Finnish population in 1995 who underwent MAR treatments between 1995-2015, we explore for the first time the association between undergoing MAR treatments and having a live birth by socio-economic status. Preliminary results show large inequalities in the probability of having a live birth throughout the MAR process between more and less advantaged women. The results suggest that a non-negligible portion of the social inequalities in MAR births could emerge throughout the MAR process.

## Introduction

Prior work has highlighted marked social disparities in births after Medically Assisted Reproduction (MAR) as MAR conceived children tend to have socio-economically advantaged parents (Goisis et al, 2020). Recent research suggests that these disparities could be explained by the (un)affordability of the MAR treatments and geographic proximity to infertility clinics (Lazzari et al, 2022) which might make it more difficult for less advantaged sub-population groups (with fewer financial resources and who live further away from urban centres where fertility clinics tend to be located) to access, afford and undergo MAR treatments. The extent to which these differences are due to barriers in accessing MAR or lower demands for MAR treatments amongst less socio-economically advantaged couples is still not fully understood (Passet-Wittig and Greil, 2021).

An aspect which has so far been overlooked in this emerging area of work is the fact that social disparities in MAR births could emerge not only before but also after accessing MAR treatments. Different mechanisms could support this argument. First, the live birth rate after MAR could be higher for more advantaged individuals who might be able to afford a higher number of treatments and to continue the treatments if the subsidized ones do not result in a live birth. Second, more advantaged women might have better coping mechanisms and be less likely to drop out of the treatments (i.e. discontinue after one or two treatments and when still eligible for additional treatments under the national health service). Third, more advantaged women might be more likely to follow the strict appointment and injection schedules (possibly because they are more likely to be employed in occupations which allow for more flexibility) resulting in higher live birth rates.

In this paper, using data from Finnish administrative registers covering all childless women in the Finnish population in 1995 who underwent MAR treatments between 1995-2015, we explore for the first time whether the association between undergoing MAR treatments and having a live birth varies by the level of socio-economic status proxied by the woman's level of education.

## Data & Methods

We relied on Finnish Register Data which includes all women born between 1960 and 1985 who underwent MAR treatments between the ages of 20 and 45 between 1995 and 2017 to conceive their first child. We excluded births that took place before 1996 (as information on the mode of conception is available from 1996), women who gave birth outside of Finland and women who started MAR treatments in 2017 to have at least one year follow up since the start of treatments. The analytical sample size is 43,240 (which corresponds to 4.7% of the population).

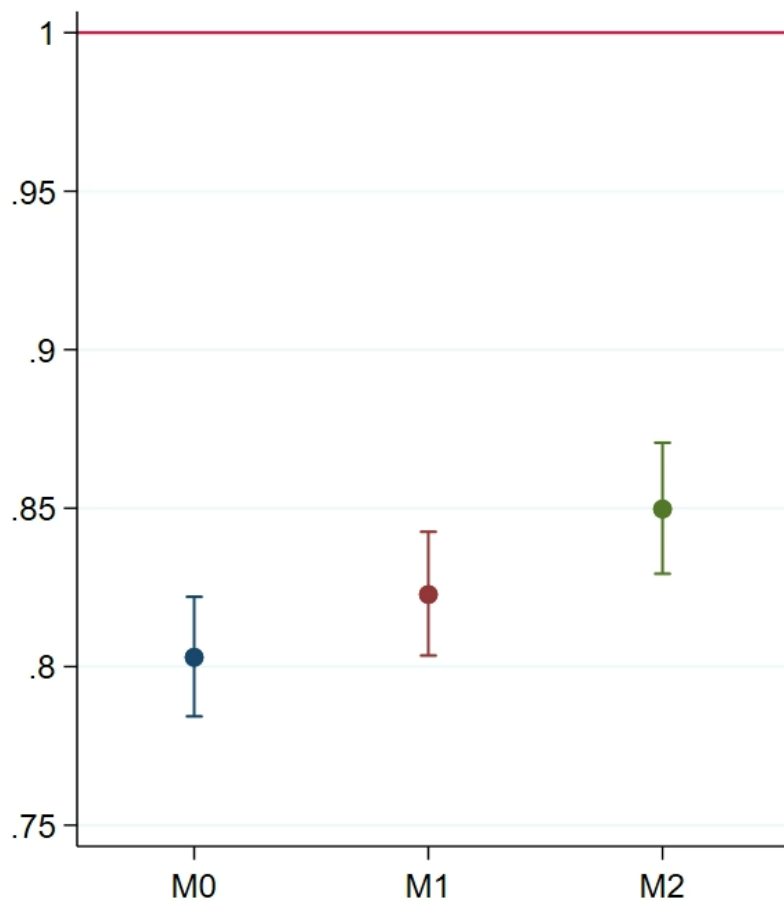
The main exposure variable is the woman's level of education which was coded as having a tertiary level of education or less. Additional control variables included: the woman's age at the start of MAR treatments, the partnership duration (in years) and type (married or cohabiting), the woman's birth cohort (in 5 years groups), the household income at the start of MAR treatments (in quintiles) and whether the woman was prescribed antidepressants 3 years before starting MAR treatments (as a marker of the woman's mental health).

We estimated piecewise constant exponential models. The clock starts with the start of MAR treatments and ends with either conception (if there is a live birth) or with the last MAR treatment cycle if the treatments are discontinued. We censored cases where the woman migrated outside of Finland, 10 years after the start of MAR treatments and in the case of the woman or her partner's death. We estimated three model specifications: an unadjusted model (M0 – which only included education and the woman's age at the start of treatments), a model which included all covariates except income (M1) and a model which included all covariates including income (M2).

## Results

Preliminary results show inequalities across educational groups. Figure 1 shows that the unadjusted model (M0) shows that the hazard of having a live birth for women undergoing MAR is lower for those with a lower than tertiary level of education compared to women with a tertiary level of education. The association is only partially attenuated when we adjust for women's socio-demographic characteristics (M1 and M2). Although the data does not enable us to fully test the potential mechanisms, additional descriptive analyses (Table 1) suggest that the disparities are unlikely to be explained by the fact that more advantaged women undergo more MAR treatments cycles. Instead, Table 2 shows evidence of higher rates of drop-outs for lower educated women.

**Figure 1 Hazard ratios for live birth after MAR, by level of education**



**Table 1 Mean number of cycles, by live birth outcome and education**

Level of Education	Live Birth		No live birth	
	Mean	SD	Mean	SD
Below tertiary	4.03	3.37	6.39	5.49
Tertiary	4.09	3.29	6.63	5.04

**Table 2 Proportion of drop-outs after the 1<sup>st</sup> and 2<sup>nd</sup> cycle, by live birth outcome and education**

Level of Education	Live Birth		No live birth	
	Mean	SD	Mean	SD
Below tertiary	4.03	3.37	6.39	5.49
Tertiary	4.09	3.29	6.63	5.04

## Conclusions

The results show that at least some of the social gradients in MAR births originates during the MAR process and after accessing the treatments. In the next months, we will work towards refining these analyses by exploring different ways to estimate the gradients (e.g. using income instead of education as the main exposure) and by exploring ways to test the mechanisms underlying the observed association.

## References

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