DEMOGRAPHIC RESEARCH
A peer-reviewed, open-access journal of population sciences

DEMOGRAPHIC RESEARCH

VOLUME 53, ARTICLE 20, PAGES 611–628
PUBLISHED 2 OCTOBER 2025
https://www.demographic-research.org/Volumes/Vol53/20
DOI: 10.4054/DemRes.2025.53.20

Descriptive Finding

Socioeconomic differences in ART treatment success: Evidence from Italy

Marco Cozzani

Maria Elisabetta Coccia

Emilia Giusti

Sara Landini

Francesca Piazzini

Valentina Tocchioni

Daniele Vignoli

Contents

Demographic Research: Volume 53, Article 20
Descriptive Finding

Socioeconomic differences in ART treatment success: Evidence from Italy

Marco Cozzani[1*]
Maria Elisabetta Coccia[2,3]
Emilia Giusti[4]
Sara Landini[4]
Francesca Piazzini[2]
Valentina Tocchioni[1]
Daniele Vignoli[1]

Abstract

BACKGROUND
Several studies have shown stark socioeconomic disparities in births resulting from assisted reproduction technology (ART), but only a few have investigated the underlying causes. An explanation may be possible inequalities in ART treatment success.

OBJECTIVE
This study investigates whether there are disparities in ART treatment success. We use observational data from women undergoing ART treatment at the ART center at Careggi Hospital in Florence. We analyze three outcomes: the probability of conception following ART, the probability of a miscarriage after conception, and the probability of a live birth. We further examine these disparities across population subgroups, including first-time or last-time patients, Italian-born individuals, and different age groups.

METHODS
We estimate baseline and adjusted logistic models and display predicted probabilities.

RESULTS
The results show no socioeconomic disparities between more and less advantaged patients in any of the outcomes considered. These findings are consistent across all the subgroups we investigated.

[1] Department of Statistics, Computer Science, Applications, University of Florence, Italy.
[2] Centre for Assisted Reproductive Technology, Division of Obstetrics and Gynecology, Careggi University Hospital, Florence, Italy.
[3] Department of Clinical and Experimental Biomedical Sciences, University of Florence, Italy.
[4] Department of Law, University of Florence, Italy
[*] Correspondence to: marco.cozzani@unifi.it.

CONTRIBUTION
We explore a possible mechanism underlying ART birth disparities and highlight that these disparities do not appear to arise from treatment success, at least when treatments are performed in a widely subsidized public context in Italy.

1. Introduction

Since the first child was born via assisted reproduction technology (ART) in the late 1970s, ART has become a globally used medical procedure (De Geyter et al. 2018). ART accounts for almost one-tenth of newborns in Spain and Denmark and roughly 3% to 4% of newborns in the United States, the United Kingdom, France, and Italy (Campo et al. 2023; Goisis et al. 2024; Scaravelli et al. 2024). ART accounted for 2.9% of Italy's total fertility rate in 2022 (Burgio et al. 2025). Several phenomena have created these circumstances. For example, the postponement of parenthood at later ages (Beaujouan and Sobotka 2022; Mills et al. 2011; Tocchioni et al. 2022) makes conception more difficult for potential parents as their fecundity decays with age (Cito et al. 2019). Moreover, the increased diffusion and social acceptance of same-sex and single parents have also contributed to a larger pool of individuals relying on ART for their fertility desires (Raja, Russell, and Moravek 2022).

Within this context, ART plays a pivotal role in realizing reproductive autonomy – not only in terms of the right not to have children but also in affirming the right to have children, particularly for individuals and couples facing infertility, subfertility, or structural barriers to biological parenthood. More broadly, ART contributes to the fulfillment of reproductive rights, supports fertility aspirations, and helps mitigate involuntary childlessness in high-income countries (Lazzari, Gray, and Chambers 2021).

Despite the growing number of individuals resorting to ART to fulfill their fertility desires, the share of ART births is not equally distributed across socioeconomic strata. Studies have consistently shown substantial socioeconomic gradients in the proportion of ART births across many high-income countries, such as the United States, the United Kingdom, Denmark, Finland, Spain, France, and Italy, with mothers from low socio-economic backgrounds systematically underrepresented (Campo et al. 2023; Goisis et al. 2024; Goisis et al. 2020; Klemetti et al. 2007).

However, our understanding of the mechanisms underlying socioeconomic disparities in ART success remains limited. These mechanisms can be broadly divided into micro-level and macro-level factors. At the micro level, women from lower socio-economic backgrounds tend to have, on average, poorer general health (Mackenbach et al. 2008) and are more likely to engage in unhealthy behaviors (Härkönen et al. 2018) –

both of which are linked to subfertility and reduced ART success (Rooney and Domar 2014; Van Heertum and Rossi 2017). These women may also face difficulties adhering to complex treatment regimens due to lower health literacy (Abel 2008; Chang and Lauderdale 2009) and greater time and financial constraints (Lazzari, Baffour, and Chambers 2022). At the macro level, broader social inequalities – such as poor living conditions, economic precarity, and environmental exposures like air pollution – also shape reproductive health. These disadvantages can accelerate biological aging and reproductive decline, a process described by the weathering hypothesis (Geronimus 1992, 1996). Indeed, evidence suggests that advanced maternal age is associated with worse birth outcomes among disadvantaged women (Goisis and Sigle-Rushton 2014), which may partially explain socioeconomic gradients in ART outcomes. Recent findings from Denmark further support this perspective, showing that even in universal health care systems, socioeconomic disparities persist in ART success rates (Groes et al. 2024).

In this article, we advance literature on socioeconomic gradients in ART births by studying whether there are socioeconomic differences in the probability of a successful ART treatment in terms of conception, miscarriage, and live birth. We further investigate these disparities across population subgroups, such as those at first or last treatment, those who are Italian born, and by age group. We draw on the universe of ART treatments performed at the ART center in Careggi Hospital between 2016 and 2021. Careggi is a public university hospital in Florence, the regional capital of Tuscany. Throughout the study period, the center offered ART treatments with heavy public subsidization. The Tuscan regional administration covered most of the costs up to age 43 for homologous treatments, up to age 43 for heterologous treatments involving sperm donation, and up to age 46 for heterologous treatments involving oocyte donation. The cost ranges from as little as 500 euros for a subsidized IVF cycle to a maximum of 1,800 euros when the patient bears the full cost. The costs are covered for up to four cycles. Access to services depends on the patient, who can freely choose the center with a referral from their general practitioner, as established by Italian Law No. 40/2004.

2. Materials and methods

2.1 Data

We use data on ART treatments conducted at Careggi Hospital between 2016 and 2021. The data were collected directly by medical personnel overseeing ART cycles and include sociodemographic, biometric, and treatment-related information pertaining to ART treatment and its potential success. There were 4,943 registered procedures conducted within the study period, both homologous (using patients' gametes – i.e., eggs and sperm) and heterologous (using donor gametes). From this number, we excluded only 3.97% of cases (N = 196) due certain information going unreported, such as the region or country of birth (N = 31), marital status (N = 145), and whether the treatment led to a conception (N = 20). The final analytical sample consisted of N = 4,747 cycles across N = 2,709 patients (on average 1.75 cycles per patient).

2.2 Outcome variables

We have three binary outcome variables. The first outcome measures whether the ART cycle led to a conception. This outcome is computed across the whole sample of initiated cycles. Conception is assessed by midwives and doctors following the patient at the ART center. All women undergoing embryo transfer receive beta HCG dosage measurement after 15 days. In case of values above 30 mUI/ml, the test is repeated after two days and an ultrasound scan is scheduled for six to seven gestational weeks. The second outcome measures whether there has been a miscarriage, which is assessed via echography. This outcome is computed on the subsample of treatments leading to a conception. The third outcome is whether the cycle led to a live birth. This outcome also is computed on the full sample of cycles. For pregnancies carried out in other centers after the ART treatment, personnel do trimestral phone calls to patients until delivery. Outcomes are recorded accordingly.

2.3 Main predictor and its validation

The main predictor is a socioeconomic status (SES) indicator of the patient, namely the self-reported occupational level, which we transformed in the International Standard Classification of Occupations (ISCO) 2008, in one digit (Ganzeboom and Treiman 1996). Medical personnel gather sociodemographic information on patients when they begin treatment. We further operationalize the predictor by distinguishing between high-status occupations (ISCO 1 and 2) and medium/low-status occupations (ISCO 3–9). In the following discussion, we refer to these two categories as high SES and med/low SES. We also include categories for women who were not employed at the time of the treatment and for those who could not be classified. We validate the SES measure in two ways. First, we test it on a newborn's birth weight (BW). BW is a well-known heath indicator, and it is widely acknowledged that it is socially stratified (Cozzani 2023). We find our measure to replicate this finding in this sample (see sensitivity analyses section). Second, since information on education is not available in this data, we investigated the joint distribution of education and occupational status using the 2016 ISTAT Family and

Social Subjects (FSS) survey, which provides the most recent and comprehensive data on family and demographic behaviors available for Italy. We limit analyses to women aged 25–49. We define SES on the FSS as in the ART data and find that the high-SES group is predominantly university educated; the other categories also display a clear educational gradient. Education and SES are even more strongly correlated when focusing on childless women, who represent about 75% of our sample (result not shown for space constraint but available on request).

2.4 Control variables

In adjusted models, we include a set of possible confounders, including maternal age; treatment order (whether the patient is undergoing their first, second, or third-plus cycle); whether the patient was attempting to transition to first parity; the treatment: intrauterine insemination (from partner or donor), intracytoplasmic sperm injection (ICSI), frozen embryo transfer (homologous or donor), or in vitro fertilization (IVF); whether the treatment required donor sperm or oocytes; region of birth (or a residual category for those born abroad); and year of treatment.

2.5 Methods

As main analyses, we estimate two sets of logistic regression models for ART conception, delivery, or miscarriage with and without adjustments, and we compute predicted probabilities to allow for comparison across nested models in logistic regression (Mood 2010). These analyses are computed on the whole sample of cycles. Baseline models predict the probability of conceiving or delivering a child, or having a miscarriage, after an ART treatment only as a function of SES. Adjusted models include the set of covariates specified in the previous paragraph. Since data are at the treatment level and the same patient may have appeared more than once in the records due to multiple treatments, we cluster standard errors at the patient level. We also perform heterogeneity analyses by age, for Italian patients, and at the first and last observed cycles. The analyses for the first and last cycles are conducted at the patient level rather than the cycle level.

3. Results

3.1 Descriptive results

Table 1 reports descriptive statistics. We observe very little difference in the probability of conception, miscarriage, and live birth across SES categories and those who are not employed. The share of conceptions varies in a two percentage point range, between 33.7% for high SES and 35.8% for med/low SES. We compare this distribution with the SES distribution of the FSS data and find that our sample contains slightly more high-SES and fewer low-SES individuals relative to the general female population aged 25–49. The probability of miscarriage is also comparable across the SES groups, with a 2.6 percentage point difference between high and med/low SES. Similarly, the probability of giving a live birth is also remarkably stable across SES groups: 25.2% for high SES and 27.5% for med/low SES. Moreover, we do not observe any other notable variance across SES groups for any other characteristics. The only slight difference is that those of high SES are more likely to be born out of region.

Table 1: Descriptive statistics of ART treatments

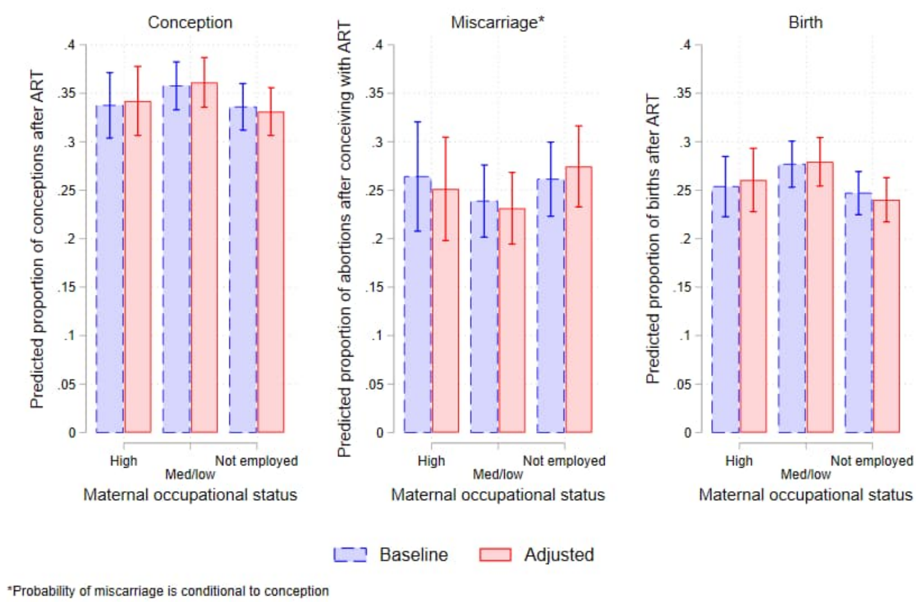
	Overall		High SES		Med/low SES		Not employed	
	% value /mean value	Std. dev.	% value /mean value	Std. dev.	% value/mean value	Std. dev.	% value/mean value	Std. dev.
Outcomes								
Conception	34.59		33.71		35.80		33.60	
Miscarriage[a]	24.61		26.41		23.88		26.13	
Birth	26.31		25.24		27.53	.	24.57	
First birth	75.27		74.50		74.50		77.30	
Patient's age	38.25	4.85	38.57	4.49	38.33	4.53	38.15	5.29
Patient's marital status								
Cohabitation	37.62		39.62		43.61		31.05	
Married	62.10		60.25		55.91		68.78	
Single	0.27		0.12		0.48		0.17	
Patient's region of birth								
Tuscany	37.35		38.81		43.67		30.31	
Another region	40.85		51.12		36.29		41.58	
Foreign	21.80		10.07		20.04		28.11	
Treatment number								
First	56.98		55.47		58.73		57.07	
Second	27.45		27.99		26.99		27.15	
Third+	15.57		16.54		14.28		15.77	
Number of embryos transferred	1,46	0.64	1.37	0.62	1.45	0.32	1.52	0.17
N	4,747		800		1,658		1,765	

Note: Descriptive statistics exclude ART treatments with unclassifiable SES (N = 524).
[a] Miscarriage percentage is computed on the subsample of those who conceived and have valid information on miscarriage (N = 1,597).

3.2 Regression results

Figure 1 presents the predicted probabilities, along with their respective 95% confidence intervals (CIs), depicting the probability of successful conception and childbirth, or miscarriage, following an ART treatment by maternal occupational status. Overall, we do not observe any difference in the likelihood of conceiving, miscarriage, and delivering a child after ART treatment, both before and after adjustment for relevant confounders. In baseline models, we do not find any difference in the probability of conceiving a child after ART treatment for high-SES, med/low-SES, and unemployed groups. Similarly, no difference is observed in the probability of experiencing a miscarriage or giving a live birth for these groups. We observe the same pattern of no differences in the adjusted models. The likelihood of conceiving, miscarriage, and live birth remains consistent across high-SES, med/low-SES, and unemployed groups following ART treatment.

Figure 1: Predicted probabilities of conception (on the left), miscarriage (on the center), and birth (on the right) after ART by maternal occupational status. Careggi Hospital, Florence, Italy, 2016–2021



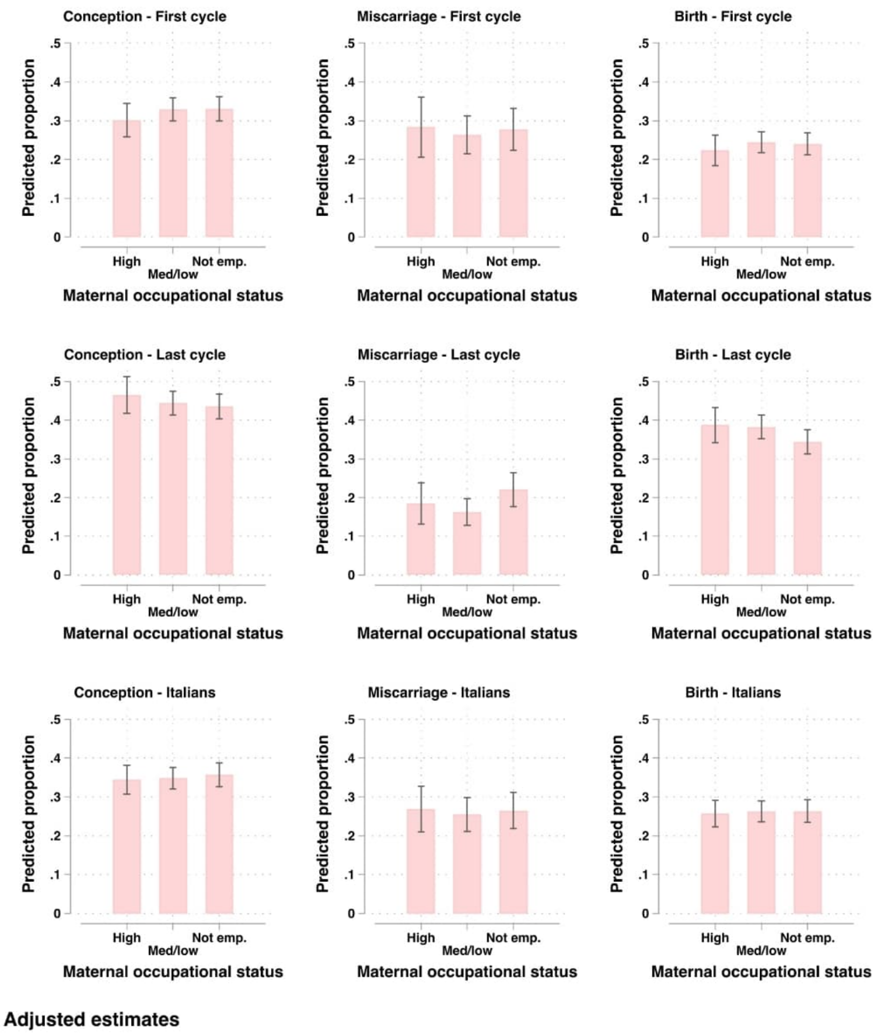
Notes: Predicted probabilities for baseline models are obtained from a logit model including only the socioeconomic indicator. Adjusted predicted probabilities are obtained from logit, including controls for maternal age (continuous); treatment order; whether the patient is attempting to conceive a first child; kind of treatment; whether treatment required third-party semen or oocytes; region of birth (or a residual category for those born abroad); and year of treatment.

3.3 Heterogeneity analyses

We further investigate whether the pattern of no SES differences remains if we focus instead on subpopulations, such as those at first or last treatment (the final cycle during which a specific patient is observed) or only Italian-born patients, and age categories. Analyses at first and last observed cycle are computed at the patient level. The results presented in Figure 2 point toward the absence of socioeconomic disparities. Among those at first treatment (upper panel) and last treatment (central panel) we do not observe any difference across SES groups regarding the chance of conception, miscarriage, or live birth. In terms of the probability of conception, miscarriage, and live birth across the high-SES, medium/low-SES, and unemployed groups, similar results are obtained when we restrict the sample to only Italian-born patients (see lower panel).

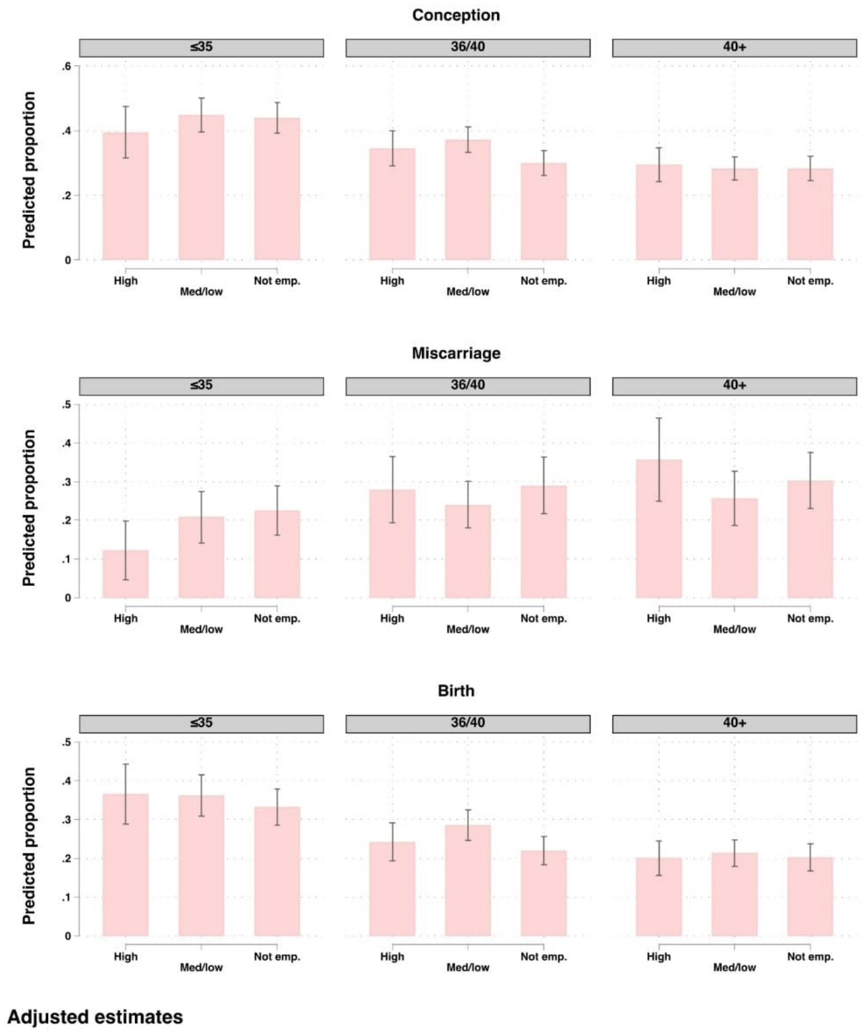
We also replicate analyses on three age groups: women 35 years old or less, women between 36 and 40, and women above 40. Figure 3 displays the results by age group and outcome. Overall, we do not observe any disparity in any of the outcomes we considered.

Figure 2: Predicted probabilities of conception, miscarriage, and birth after ART by maternal occupational status, treatment order, and maternal nationality



Note: Adjusted predicted probabilities are obtained from logit, including controls for maternal age (metric); number of treatments (excluded in the upper panel); whether the patient is attempting to conceive a first child; the kind of treatment; whether treatment required third-party semen/oocytes; region (or country in the case of non-Italian patients) of birth (excluded in the bottom panel); and year of treatment.

Figure 3: Predicted probabilities of conception, miscarriage, and birth after ART by maternal occupational status and maternal age

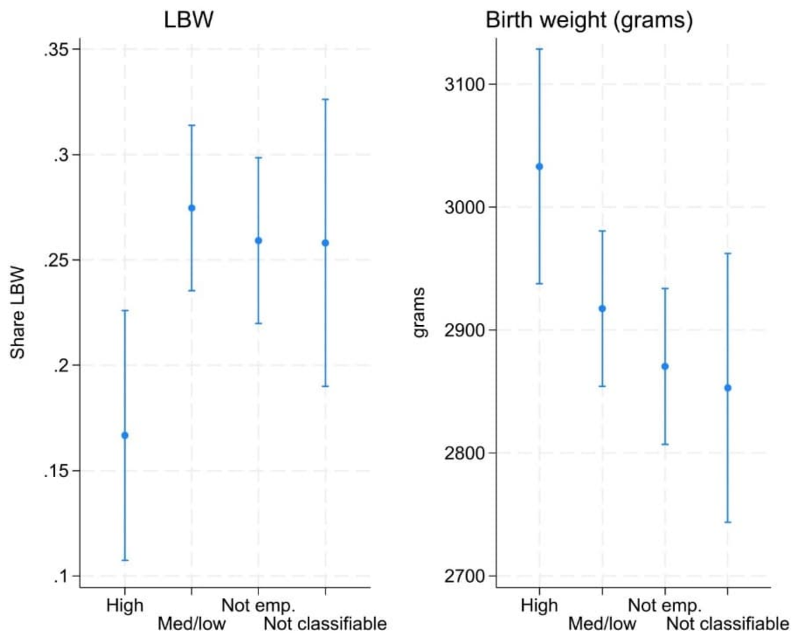


Note: Adjusted predicted probabilities are obtained from logit, including controls for number of treatments; whether the patient is attempting to conceive a first child; kind of treatment; whether treatment required third-party semen or oocytes; region (or country in the case of a non-Italian patient) of birth; and year of treatment.

3.4 Sensitivity analyses

We perform six sensitivity analyses. (Five analyses are not shown due to space constraints but are available upon request.) First, since not all patients could be classified into an ISCO category, they were placed in a separate category, and they did not show any differences. Second, we replicate our analyses using a more detailed version of SES, distinguishing between medium (ISCO categories 3–5) and low (ISCO categories 6–9) groups. The results are fully consistent. Third, we validate our SES measure on BW. We find that those with a high SES have both heavier children and fewer low birth weight deliveries (< 2.500 g). Results are shown in Figure 4. Fourth, we replicated analyses using age as categorical variable, and results are fully consistent. Fifth, we examined the potential role of dropout, defined as patients who do not continue treatment after a failed cycle. We analyzed dropout rates by SES at each cycle following a failure. We find that high-SES patients are only slightly less likely to drop out after a failed first cycle (34% vs. 38% among medium/low-SES and unemployed patients). Sixth, we repeated our analyses by estimating the probability of live birth at each cycle (first, second, third, fourth-plus), stratified by SES. The results show no SES differences at any cycle.

Figure 4: Validation of SES measurement on newborn's birth weight (right) and newborn's low birth weight (LBW; left)



Note: Predicted values and probabilities are obtained by estimating a linear regression (right panel) and a logistic regression (left panel) on birth weight using SES as a predictor.

4. Discussion and conclusions

Our study investigates whether there are socioeconomic disparities in ART treatment success in terms of the likelihood of conception and live birth using treatment data from the ART center in Careggi Hospital in Florence between 2016 and 2021. The results show the absence of socioeconomic differences in ART treatment success, even after adjusting for important confounders, both at the cycle and at the patient level.

These results must be interpreted within the specific context of this study. The findings are based on data from a single, universalistic, heavily subsidized public center, where the cost of treatment is relatively affordable. Given that disparities in ART success were reported in other high-income settings such as Denmark (Groes et al. 2024), it is important to consider why such disparities are absent in this study. One possibility is that a specific SES group is either overperforming or underperforming. Although direct comparisons are difficult due to differences in variable definitions, model specifications, and patient pools (we observe only heterosexual couples), there may be some indication that our medium- and low-SES groups have a slightly higher chance of conceiving compared to those in the study by Groes et al. (2024). This could be because the public center in our setting provides high-quality medical care at minimal cost, potentially increasing the likelihood of successful ART outcomes for individuals who might not otherwise have access to such services. However, this interpretation should be approached with caution.

This study is not free from limitations. First, we focus on a single center in Tuscany with high subsidization. Therefore results should not be generalized to the whole universe of centers, as private clinics may have different outcomes. Nonetheless, our sample of patients is diverse, including almost half of the patients from all across the country. Second, our socioeconomic indicator focused on capturing maternal occupational level, whereas most studies have focused on maternal education as main measure of SES. The extent to which this accounts for our specific result is difficult to assess. Nonetheless, occupation and education are usually highly correlated (Ganzeboom, De Graaf, and Treiman 1992) – and this is what emerges also with 2016 FSS data. Third, we could not explore SES differences in dropout (discontinuation), as those discontinuing the treatment are included among those not conceiving. Fourth, with our data, we do not know whether women have pursued ART cycles in other centers. Those with more resources might keep pursuing a pregnancy after their attempt in Careggi.

Despite these limitations, we were able to investigate all the treatments with precise clinical and socioeconomic information gathered by medical personnel over a time span of six years. We were also able to account for several potential confounders of the relationship between SES and ART treatment outcomes. Finally, our study is one of the few to specifically focus on the likelihood of ART treatment success in terms of conception, miscarriage, and live birth as a possible explanation for the disparities in ART births observed in high-income countries.

Our results partly diverge from findings in other countries, highlighting cross-national heterogeneity and suggesting potential within-country variation as well. These findings underscore the need for future comparative research on this topic. Further research and policy attention should also focus on factors influencing selection into clinics and fertility treatments, including barriers such as distance to clinics and cultural factors like attitudes and knowledge about treatment efficacy, success rates, and the associated risks for mothers and children. Moreover, we call for both quantitative and qualitative studies to explore how patients self-select into ART centers, how practitioners select patients, and the lived experiences of individuals undergoing ART procedures.

5. Acknowledgments

The authors thank the members of the Population and Society Unit of the University of Florence for their valuable comments. We are grateful to Beatrice Cacciamani for her excellent research assistance. We are also grateful to the participants of ECSR 2023, SISEC 2024, EPC 2024, and the MAR Symposium in Como for their feedback on earlier versions of this manuscript. This article was produced with co-funding from the Next Generation EU – National Recovery and Resilience Plan, Investment Partenariato Esteso PE8 “Conseguenze e sfide dell’invecchiamento,” Age-it (Ageing Well in an Ageing Society), grant/award number PE8-B83C22004800006.

References

Abel, T. (2008). Cultural capital and social inequality in health. *Journal of Epidemiology and Community Health* sc62(7): e13. doi:10.1136/jech.2007.066159.

Beaujouan, É. and Sobotka, T. (2022). Is 40 the new 30? Increasing reproductive intentions and fertility rates beyond age 40. In: Nikolaou, D. and Seifer, D. (eds.). *Optimizing the management of fertility in women over 40*. Cambridge: Cambridge University Press: 3–18. doi:10.1017/9781009025270.002.

Burgio, A., Castagnaro, C., Vignoli, D., and Vitali, A. (2025). The contribution of medically assisted reproduction to total, age-, and parity-specific fertility in Italy. *Human Reproduction* deaf137(early view version). doi:10.1093/humrep/deaf137.

Campo, G., Boldrini, R., Di Cesare, M., Basili, F., Moroni, R., Romanelli, M., and Trevisani, V. (2023). Certificato di assistenza al parto (CeDAP) 2022 – Analisi dell’evento nascita 2022. Roma: Ministero della salute.

Chang, V.W. and Lauderdale, D. S. (2009). Fundamental cause theory, technological innovation, and health disparities: The case of cholesterol in the era of statins. *Journal of Health and Social Behavior* 50(3): 245–260. doi:10.1177/002214650905000301.

Cito, G., Coccia, M.E., Picone, R., Cocci, A., Russo, G.I., Garaffa, G., Fucci, R., Bertocci, F., Borrani, E., Basile, V., Micelli, E., Criscuoli, L., Serni, S., Carini, M., and Natali, A. (2019). Impact of advanced paternal age on the intracytoplasmic sperm injection (ICSI) outcomes in donor egg cycles. *Translational Andrology and Urology* 8(Suppl 1): S22. doi:10.21037/tau.2018.12.13.

Cozzani, M. (2023). Inequalities at birth: Stable socioeconomic differences in birth outcomes in three British cohorts. *Genus 79*(1): 18. doi:10.1186/s41118-023-00191-z.

De Geyter, C., Calhaz-Jorge, C., Kupka, M. S., Wyns, C., Mocanu, E., Motrenko, T., Scaravelli, G., Smeenk, J., Vidakovic, S., Goossens, V., and The European IVF-monitoring Consortium (EIM) for the European Society of Human Reproduction and Embryology (ESHRE) (2018). ART in Europe, 2014: Results generated from European registries by ESHRE†: The European IVF-monitoring Consortium (EIM)‡ for the European Society of Human Reproduction and Embryology (ESHRE). *Human Reproduction* 33(9): 1586–1601. doi:10.1093/humrep/dey242.

Ganzeboom, H.B., De Graaf, P.M., and Treiman, D.J. (1992). A standard international socio-economic index of occupational status. *Social Science Research* 21(1): 1–56. doi:10.1016/0049-089X(92)90017-B.

Ganzeboom, H.B. and Treiman, D. J. (1996). Internationally comparable measures of occupational status for the 1988 International Standard Classification of Occupations. *Social Science Research* 25(3): 201–239. doi:10.1006/ssre.1996.0010.

Geronimus, A.T. (1992). The weathering hypothesis and the health of African-American women and infants: evidence and speculations. *Ethnicity and Disease* 2(3): 207–221.

Geronimus, A.T. (1996). Black/white differences in the relationship of maternal age to birthweight: A population-based test of the weathering hypothesis. *Social Science and Medicine* 42(4): 589–597. doi:10.1016/0277-9536(95)00159-X.

Goisis, A., Fallesen, P., Seiz, M., Salazar, L., Eremenko, T., and Cozzani, M. (2024). Educational gradients in the prevalence of medically assisted reproduction births in a comparative perspective. *Fertility and Sterility* 122(4): 648–657. doi:10.1016/j.fertnstert.2024.05.149.

Goisis, A., Håberg, S.E., Hanevik, H.I., Magnus, M.C., and Kravdal, Ø. (2020). The demographics of assisted reproductive technology births in a Nordic country. *Human Reproduction* 35(6): 1441–1450. doi:10.1093/humrep/deaa055.

Goisis, A. and Sigle-Rushton, W. (2014). Childbearing postponement and child well-being: a complex and varied relationship? *Demography* 51(5): 1821–1841. doi:10.1007/s13524-014-0335-4.

Groes, F., Houštecká, A., Iorio, D., and Santaeulalia-Llopis, R. (2024). The unequal battle against infertility: Theory and evidence from IVF success. (Working Paper 1421). Barcelona: Barcelona School of Economics.

Härkönen, J., Lindberg, M., Karlsson, L., Karlsson, H., and Scheinin, N.M. (2018). Education is the strongest socioeconomic predictor of smoking in pregnancy. *Addiction* 113(6): 1117–1126. doi:10.1111/add.14158.

Klemetti, R., Gissler, M., Sevón, T., and Hemminki, E. (2007). Resource allocation of in vitro fertilization: A nationwide register-based cohort study. *BMC Health Services Research* 7(1): 1–8. doi:10.1186/1472-6963-7-210.

Lazzari, E., Baffour, B., and Chambers, G.M. (2022). Residential proximity to a fertility clinic is independently associated with likelihood of women having ART and IUI treatment. *Human Reproduction* 37(11): 2662–2671. doi:10.1093/humrep/deac205.

Lazzari, E., Gray, E., and Chambers, G.M. (2021). The contribution of assisted reproductive technology to fertility rates and parity transition. *Demographic Research* 45(35): 1081–1096. doi:10.4054/DemRes.2021.45.35.

Mackenbach, J.P., Stirbu, I., Roskam, A.J.R., Schaap, M.M., Menvielle, G., Leinsalu, M., and Kunst, A.E. for the European Union Working Group on Socioeconomic Inequalities in Health (2008). Socioeconomic inequalities in health in 22 European countries. *New England Journal of Medicine* 358(23): 2468–2481. doi:10.1056/NEJMsa0707519.

Mills, M., Rindfuss, R.R., McDonald, P., and Te Velde, E. (2011). Why do people postpone parenthood? Reasons and social policy incentives. *Human Reproduction Update* 17(6): 848–860. doi:10.1093/humupd/dmr026.

Mood, C. (2010). Logistic regression: Why we cannot do what we think we can do, and what we can do about it. *European Sociological Review* 26(1): 67–82. doi:10.1093/esr/jcp006.

Raja, N.S., Russell, C.B., and Moravek, M.B. (2022). Assisted reproductive technology: Considerations for the nonheterosexual population and single parents. *Fertility and Sterility* 118(1): 47–53. doi:10.1016/j.fertnstert.2022.04.012.

Rooney, K.L. and Domar, A.D. (2014). The impact of lifestyle behaviors on infertility treatment outcome. *Current Opinion in Obstetrics and Gynecology* 26(3): 181–185. doi:10.1097/GCO.0000000000000069.

Scaravelli, G., de Luca, R., Spoletini, R., Speziale, L., Fedele, F., Bolli, S., Mazzola, M., Bertini, A., Di Monte, C., and Vigiliano, V. (2024). Medically assisted reproduction in Italy, 2020 data from the Italian MAR Register. *Minerva Obstetrics and Gynecology* 76(2): 118–126. doi:10.23736/S2724-606X.23.05375-7.

Tocchioni, V., Rybińska, A., Mynarska, M., Matysiak, A., and Vignoli, D. (2022). Life-course trajectories of childless women: Country-specific or universal? *European Journal of Population* 38(5): 1315–1332. doi:10.1007/s10680-022-09624-5.

Van Heertum, K. and Rossi, B. (2017). Alcohol and fertility: how much is too much? *Fertility Research and Practice* 3(1): 1–7. doi:10.1186/s40738-017-0037-x.