Use of Medically Assisted Reproduction to Have a Child and Its Social and Demographic Determinants in Germany

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Research Question

Continued postponement of births to higher ages in most European countries contributes to higher risk of experiencing infertility. Medical infertility is typically defined as the failure to achieve a pregnancy within a year of regular unprotected sexual intercourse (Zegers-Hochschild et al. 2017). Because having children is a central life goal for many people, infertility is often experienced as a problem needing a solution. Use of medically assisted reproduction (MAR) has increased over time. However, despite its increasing relevance, our knowledge about the conditions under which individuals and couples seek medical help to have a child is quite limited.

To advance understanding of the social determinants of people ever using MAR, this study aims to answer two related research questions: 1) In Germany, what percentage of people use which type of MAR? 2) How does MAR use vary by socio-economic and demographic characteristics, and does the answer depend upon the treatment stage?

Answers to these questions contribute to understanding MAR use in two ways. First, this study considers multiple stages of seeking medical help to get pregnant. MAR use is a process consisting of several stages from first doctor appointment to IVF treatment, but most studies use simple binary indicators of medical help-seeking. The issue with binary indicators is that they potentially combine very different types of treatment and do not allow for determinants to vary by treatment stages. Existing studies, which are predominantly from English-speaking countries show that the social and demographic determinants of MAR use differ across treatment stages. For instance, income may not be as important at lower treatment stages (e.g. seeking advice) as it is for receiving more expensive treatment such as ART (Greil et al 2010; Staniec & Webb 2007). It is important, therefore, to analyse stages separately to determine whether similar patterns of help-seeking exist in the European context.

Existing studies using data from Germany use binary indicators of medical help-seeking in their multivariate analyses of the determinants of help-seeking (Bruckert 1991; Helfferich 2001; Köppen et al. 2022). The most recent study by Köppen et al. (2021) uses data from the German family panel pairfam, which contains information about treatment stages, but the sample size is too small for an analysis by stage. For the current study, we use data from the first wave of the FReDA study, which contains more than 20,000 respondents. Thus, using FReDA data makes it possible to look at socio-economic and demographic determinants of a relatively rare event such as medical help-seeking across treatment stages.

A second contribution of this paper is that we do all analyses separately by gender. For a long time, demographic and epidemiological research on fertility in general, and on infertility and MAR use in particular, has focussed on women. In demographic fertility research, it has

become more and more common to study women and men or to consider the couple as the unit of analysis. However, research on the determinants of help-seeking still mostly focusses on women (Passet-Wittig & Greil, 2021). Gender is likely to shape personal help-seeking because most fertility treatments involve women. Therefore we expect higher treatment use among women. It is also likely that couples seek MAR together, but involvement of partners could depend upon treatment stage. For example, men may get involved only after women have first talked to doctor and maybe even after an initial check-up.

Data & Methods

This study uses data from the first wave of the newly established FReDA panel survey (Family Research and Demographic Analysis, release v2.0), a large-scale representative survey of German residents of reproductive age (18 to 49 years, N=20,220). The data are from all three sub-waves (W1R, W1A, and W1B), collected between April 2021 and January 2022 (Bujard et al. 2023). The analytic sample consists of 9,865 women and 8,380 men.

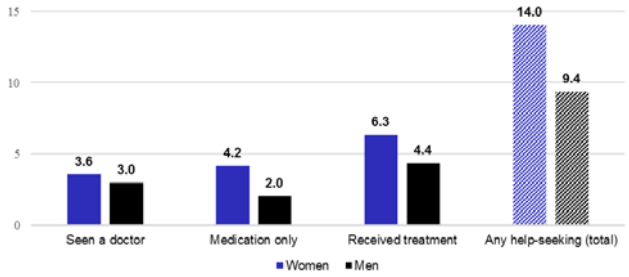
Information on infertility and MAR use was included in sub-wave W1A. For the lifetime indicator of MAR use (ever used MAR), participants were categorized into the highest category that they indicated: (0) no treatment, (1) seen a doctor, (2) received medication, (3) received treatment (insemination, operations, In-Vitro-Fertilisation, Intracytoplasmatic Sperm Injection). We would have liked to differentiate between inseminations on one hand and IVF and ICSI on the other hand, but due to small group size this was not feasible. Indicators of socio-demographic determinants included age (at interview), number of biological children (at interview), ever married, region of birth, level of education (at interview), household income (at interview), level of urbanization of community (at interview), and ever perceived infertility.

The dependent variable consists of ordered categories, but the Brant test showed that the parallel regression assumption, which is required for ordinal regression is not met. Therefore, we used a method that is less restrictive than ordinal regression, the partial proportional odds model which can be estimated with the gologit2-command in Stata. The partial proportional odds model distinguishes between variables for which the parallel regression assumption holds versus does not hold. The former are fixed (coefficient are the same at all stages), whereas for the latter, coefficients are allowed to vary across treatment stages. Based on the Brant test we allow coefficients for gender, age, parity, and ever infertile (medical definition) to vary across stages. We have also conducted sensitivity tests using an ordinal regression model and a binary logit model (of ever vs. never help-seeking).The overall results comparing the findings from these models indicates similar trends, particularly for the fixed variables, thus providing more confidence that the results are robust to various specifications.

Preliminary findings

Descriptive analyses show that the probability of any help-seeking is 4.5 percentage points higher for women compared to men. The differences between women and men were smaller for seeing a doctor than for receiving medication or treatment.

Fig. 1 Lifetime prevalence of seeking MAR at different treatment stages in Germany (in %)



*Data: FReDA waves W1R, W1A & W1B (*release v2.0).

Table 1 Partial proportional odds model of determinants of seeking MAR (Odds Ratios)

	Women			Men		
Determinants at time of interview	**-1- No help vs. talk to doctor, medication, treatment**	**-2- No help, talk to doctor vs. medication, treatment**	**-3- No help, talk to doctor, medication vs. treatment**	**-1- No help vs. any-help**	**-2- No help, talk to doctor vs. medication, treatment**	**-3- No help, talk to doctor, medication vs. treatment**
Age (ref. <=34 years)						
35-39 years	1.207	1.112	**1.664****	**1.522****	**1.681****	**1.903****
40-44 years	1.107	1.124	**2.032****	**1.436***	**1.604****	**2.294****
45+ years	0.947	0.977	**1.796****	1.27	**1.511***	**2.379****
Biol. children (ref. no biol. children)						
1 child	**1.299***	1.128	0.888	**2.025****	**1.565****	**1.604****
2+ children	0.826	**0.729****	**0.539****	1.113	0.907	1.057
Ever married (ref. never married)						
ever married	**2.579****			**2.200****		
Region of birth (ref. FRG)						
GDR	0.951			0.909		
abroad	0.999			1.101		
Level of education (ref. lower educ.)						
higher education	0.940			0.980		
currently enrolled/other degree	0.712			1.126		
Net household income (ref. <=2000€)						
>2000-3000€	1.237	1.111	**1.499***	1.122	0.859	0.815
>3000-5000€	**1.611****	**1.357***	**1.778****	**1.769****	1.280	1.418
>5000€	**1.914****	**1.558****	**1.966****	**2.371****	**1.886****	**1.893***
Level of urbanization (ref. City)						
suburban area	**0.841***			0.899		
rural area	0.9			1.094		
Ever infertile (ref. Never infertile)	**30.63****	**23.35****	**29.14****	**40.43****	**32.52****	**37.65****

Notes: * p < 0.05, ** p < 0.01. *Data: FReDA waves W1R, W1A & W1B (*release v2.0).

Table 1 shows the results of the partial proportional odds models. Only one set of coefficients is presented for variables that meet the proportional odds assumption, as the coefficients are the same across stages of treatment (shown in first column for women and men respectively). Having ever been married is associated with considerably higher MAR use for women and men. This association could reflect a strong cultural norm for having children when being married and/or the German statutory health insurance restriction on reimbursement of treatment costs to married couples. The high costs of these treatments could mean that mostly married respondents can afford to have received medical help. Somewhat surprisingly, the odds of help-seeking are lower in suburban areas but not in rural areas, as compared to cities.

We would have expected that access to fertility care is better in urban and suburban areas (Lazzari et al. 2022; Jones et al. 2023). Region of birth and level of education are not associated with medical help-seeking, adjusted for the other variables.

We now turn to the explanatory variables that vary by treatment stage. Among women, age at interview is relevant for seeking treatment but not for lower stages, and the association is someone non-linear. Treatment use is highest for those 40-44 compared to those less than or equal to 34 years old. Among men, higher age at interview is associated with higher odds of MAR use at all stages. Women who have up to 1 child at interview have higher odds to have ever sought help to conceive, whereas women with two or more children have lower odds of help-seeking across all stages when compared to those without children. In contrast, men with one child at interview have increased odds of help-seeking at all treatment stages. As regards household income analyses show that it matters at all treatment stages, but its relevance increases with treatment stage. This is not surprising as treatments are only partially reimbursed by statutory health insurance (50% for max. of three treatment cycles). Finally, having ever experienced infertility is a strong predictor of MAR use at all stages.

Discussion and next steps

This study shows the prevalence of several different MAR treatments and reveals that seeking MAR is a multifaceted process that is shaped by a variety of socio-economic and demographic factors. Importantly, the associations of some of the factors with help-seeking differ by gender and stage of help-seeking, showing that more detailed analyses are warranted. Moreover, we find that gender matters because women – overall – are more likely than men to have ever sought medical help to have a child. Given that the FReDA question asked about personal help-seeking rather than help-seeking of the couple these results make sense because treatments are more likely to focus on women's than on men's bodies. In a next step we will apply multiple imputation to reduce the number of missing values, particularly for the household income. We will also conduct more sensitivity analyses and will test the significance of the differences by gender.

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