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An investigation of social inequalities in help-seeking and use of health services for fertility problems in a population-based sample of UK women

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Summary

Although infertility is an important public health problem, treatment can be expensive and resources are increasingly scarce. This study investigates possible inequalities in the use of medical services for fertility problems. We analysed data from a population-based survey for associations between socio-economic characteristics and help-seeking or use of services, to establish whether inequalities existed. More women of higher social status and education reported fertility problems, but there was no clear trend in help-seeking, investigations or treatments for infertility by social status and education level. New work is planned to investigate these issues more fully, particularly the role of family income.

Introduction

Infertility is an important public health problem thought to affect up to 15% of women of reproductive age at any one time, (Boivin, Bunting et al. 2007) and apart from pregnancy itself it is the most common reason for women aged 20-45 to consult their GP. (Human Fertilisation and Embryology Authority 2007) Although a number of demographic and lifestyle factors have been identified as being consistently associated with infertility, evidence relating to the association between socioeconomic indicators and infertility-related outcomes is equivocal.

The NICE 2004 guidelines for medical practitioners (National Collaborating Centre for Women's and Children's Health 2004) provide a very clear suggested course of management, starting from initial investigations which can be carried out in primary care to the treatment a couple may receive in a specialist centre. We previously reported that 16% of women aged 40-55 in this UK population-based sample had sought advice from a doctor due to difficulties conceiving. (Oakley, Doyle et al. 2008) However, it has been estimated that 56% of couples experiencing problems conceiving seek advice and treatment. (Boivin, Bunting et al. 2007) Several UK studies have reported that higher socioeconomic groups and/or more highly educated women are disproportionately represented among those seeking and receiving infertility treatment (Bunting and Boivin 2007). This association has been confirmed in international studies carried out in settings with similar access to infertility treatment. (Terävä, Gissler et al. 2008)

The over-representation of women from higher socioeconomic classes among births resulting from assisted reproductive technology (ART) is likely to be partly attributable to costs, both in terms of initiation of care and ability to continue treatment until a birth is achieved. Current National Institute for Health and Clinical Excellence (NICE) guidance recommends that up to three cycles of IVF are provided on the NHS for eligible couples. However, the Human Fertilisation and Embryology Authority (HFEA) stated in its 2003-2004 report that 25% of IVF cycles are NHS-funded (Human Fertilisation and Embryology Authority 2007) and a survey of licensed IVF centres conducted in 2005 found that in the majority of cases only one NHS-funded cycle was provided. (Kennedy, Kingsland et al. 2006)

This article reports data from the National Women's Health Study, a UK population-based cross-sectional study of women's reproductive histories. The aim of our analysis was to investigate the association between the socioeconomic indicators of occupation and education, and not only self-reporting of infertility (here defined as trying to conceive for over 12 months) and treatment-seeking for infertility, but also access to investigations, any treatment and successful fertility treatment.

Methods

The NWHS, undertaken in 2001-2002, was originally designed to enable the construction of a retrospective population-based reproductive cohort and a case-control study of risk factors for miscarriage. The study began by sending a postal survey to women believed to be 55 years old or younger chosen randomly from the UK electoral register. Full details of the methods have been published elsewhere (Maconochie, Doyle et al. 2004)

The survey itself was conducted in two stages: Stage One comprised a screening questionnaire, asking for the woman's reproductive history, including periods of infertility and infertility treatment. 26,050 (46%) of these were returned by the addressee. To verify that the results would be generalisable and that the women responding were representative of the general population in terms of their reproductive histories, the data were examined against national statistics for relevant reproductive markers (maternal age at first birth, stillbirth and multiple delivery rates by maternal age). These analyses provided no evidence of statistical differences or biases between the survey data and expectation from national data with respect to patterns of reproduction. (Maconochie, Doyle et al. 2004)

Stage Two consisted of a more detailed questionnaire sent to 10,828 Stage 1 responders who had reported ever being pregnant or trying to conceive. 7702 women (71.1%) responded to the second stage questionnaire, of whom 194 (2.5%) had never achieved a pregnancy and two were currently pregnant for the first time. The Stage 2 questionnaire collected information about socio-demographic indicators alongside questions on fertility problems (e.g. help-seeking) and the details of pregnancies experienced (e.g. the outcome and whether it had resulted from assisted conception). Detailed questions were asked about behaviour, lifestyle and factors related to socio-economic status (e.g. occupation). The latter were asked in relation to the woman's last (most recent) pregnancy in order to try and minimise the potential for recall bias. This information was therefore not collected for the women who had never achieved a pregnancy.

Analysis strategy

Separate analyses were performed for the following five outcomes: (1) reporting problems getting pregnant; (2) ever consulting a doctor about these problems; (3) ever having (+/- partner ever having) fertility investigations; (4) ever having fertility treatment and (5) ever conceiving a pregnancy through fertility treatment. Each analysis was restricted to those women "at risk" of the outcome. For instance, only those who reported consulting a doctor were included in the analysis of whether the women had had fertility investigations.

Since the factors of interest (SES and educational level) are both proxy measures of health-related behaviour and are thus potentially highly correlated, they were not modelled together. Socio-economic status (SES) was coded using information on the reported occupation of the woman's partner during the last pregnancy and was therefore only available for women who had ever been pregnant. The partner's occupation was felt to be the best reflection of relative economic and social position as 42% of the women reported that they themselves were "at home" (n=2835, 38%), unemployed or a student. All women in Stage 2 were asked what their highest attained qualification was at the time of the survey. Several variables were potentially associated with both fertility-related outcomes and a woman's

educational level or SES (i.e. were potential confounding factors). These were: the year in which a woman sought help, her age at survey, gravidity and age when she first tried to get pregnant.

All data were analysed using STATA 11.0 software. Associations between the principle factors of interest (SES / education) and the various outcomes were examined using multiple logistic regression analysis, assessing statistical significance using likelihood ratio tests (LRT). Confounding was assessed through examination of changes in the estimates following inclusion of potential confounding factors. Age and gravidity were included in all analyses, however, for completeness and to enable comparison with the literature. In all analyses, $p=0.05$ was taken as the level for statistical significance.

The NWHS received ethical approval from both Trent Multi-centre Research Ethics Committee (MREC) and the research institution (London School of Hygiene & Tropical Medicine). The authors of the NWHS data approved its use in this analysis.

Results

Study population

Among the 7702 women responding to the Stage 2 survey, the average age was 40.3 years (SD 8.3), 52% (n=4001) being over the age of 40. The majority (78%; n=6035) reported two or more pregnancies. Five percent of the women (n=393) had never had a live birth and 2.5% (n=194) had never achieved a pregnancy. The majority of women reporting at least one live birth had had their first child in their twenties (67.2%; n=5178).

Over 50% of the study population had been educated to A level or higher (n=4122, 53.5%), while 9.3% had no qualifications at all (n=719). Information was missing on this variable for 139 (1.8%) women. Among women with at least one pregnancy, 44% (n=3402) were in the highest SES category (I and II). SES was not available for the 196 women (2.5%) who had never been pregnant or were currently pregnant for the first time (n=2).

Reporting of fertility problems

Almost a fifth (19.3%, n=1486) of the women in this sample reported problems getting pregnant in this survey. There was a clear trend of decreasing likelihood of reporting problems conceiving with decreasing levels of educational achievement, regardless of age and gravidity at time of trying (p for trend = 0.003). Women in the two lowest educational categories were around 20% less likely than those with a college degree to report that they had had problems conceiving, whereas those with A levels or equivalent showed little evidence of a difference from those with a degree (Table 1). Among women who had ever conceived (for whom SES information was available), there was also a clear trend of decreasing reporting of fertility problems with decreasing social class (p for trend = 0.001, Table 1), the lowest group being almost 30% less likely to report problems than the highest.

Seeking medical help, having investigations, and having treatment for infertility

In this sample, 16.3% (n=1256) women had consulted a doctor at some time about problems conceiving, representing 84.5% of those reporting problems overall (although 52 women who stated they sought help for fertility problems, also reported no problems conceiving). Of these 1256 women, 81.1% (n=1019; 13.2% overall) went on to have investigations into a possible cause of the couple's problems, and 616 (49.0%) of those consulting a doctor (8.0% overall) underwent fertility treatment of some kind.

The prevalence of these outcomes by educational status and SES is shown in Table 1. There is some suggestion that women with lower or no qualifications might be less likely to consult a doctor about problems conceiving, or to have investigations or ART treatment, but there was no statistical evidence of a trend (all $p \geq 0.05$). Among women who had ever conceived, there was no evidence of differences in the probability of seeking help, being investigated or being treated for infertility by socioeconomic status.

Conceiving a pregnancy following treatment

There were 327 women who reported conceiving a pregnancy after having fertility treatment (53.1% of those who had treatment, 4.4% of women reporting any pregnancies). Women without academic qualifications appeared less likely to conceive than women who had a degree (Table 1). Among women with formal qualifications there was no evidence of an effect of educational attainment on probability of conception (Table 1).

Among women who had ever been pregnant (and had ever undergone fertility treatment), there was no evidence of an effect of SES on likelihood of conception following treatment (Table 1).

Table 1: The association between different fertility-related outcomes and women's education level and socio-economic status

Discussion

In this UK population-based sample of women, higher educational level and socio-economic status were associated with increased likelihood of reporting fertility problems. However, the association between these socioeconomic indicators and seeking help for fertility problems, undergoing fertility investigations, receiving fertility treatment, or conceiving a pregnancy through treatment was not clearly demonstrated.

The higher rate of reporting fertility problems seen in higher SES women and those with more education is unlikely to be explained by delaying conception because we adjusted for the possible confounding effects of age. Further, existing literature lends little support to the hypothesis that there is a true difference in fertility by socioeconomic status. Higher education levels have been found to be associated with greater use of fertility services in the US (Bitler and Schmidt 2006, Eisenberg, Smith et al. 2010) and in Scandinavia (Wulff, Hogberg et al. 1997, Terävä, Gissler et al. 2008). However, the most plausible explanation for our findings is that it is the recognition and/or reporting of fertility problems, which is the first step toward seeking help (White, McQuillan et al. 2006), and not fertility problems per se, which differs by socioeconomic status. It is possible that women with higher levels of education are more aware of how long conception might typically take, and possibly have greater expectations of what medical help they can access, and so be quicker to report their delay in conceiving as a fertility problem. This hypothesis is consistent with the results of a recent UK survey which found that women who met the criteria for infertility but had not sought help were characterised by, amongst other things, a lower educational level compared to those who had sought help (Bunting and Boivin 2007).

We also aimed to investigate the effect of socioeconomic status on treatment seeking behaviour and pathways of care. In the UK, the cost of infertility treatment could affect use of care by couples from more financially disadvantaged backgrounds, and as such we expected the differences between SES groups would have an effect on progression through the fertility treatment 'system'. Indeed, lack of personal or NHS funding was cited by 23% and 36% of couples respectively as a reason for discontinuing IVF treatment in a survey carried out in Scotland (Rajkhowa, McConnell et al. 2006). Our results did not, however, reveal clear trends in the use of health services for infertility problems according to educational level or SES status as measured by partner's occupation. However we did note a consistent pattern in

the data that those women with no qualifications were less likely than those with a degree to consult a doctor, and to have investigations and treatment. Little can be made of this observation because numbers were small in this group and the role of chance cannot be ruled out, but it is worth mentioning as something to consider in future studies. We should also note that our study captured all forms of infertility treatment and not just treatment involving IVF.

Previous studies have reported that middle-class patients are more likely to pursue their goals with the medical profession, spending more time with them and asking more questions.(Goddard and Smith 2001) While this may have an effect, it is also possible that social status is not what affects couple's use of fertility services, but rather it is their family income, for which SES can be a poor proxy and about which we did not have data in this survey. Our finding that women who had treatment were less likely to conceive a pregnancy if they had no qualifications may be evidence of a persistence in the pursuit of goals for the women with qualifications, but perhaps because they have the income to fund repeated attempts.

Education and social class derived from occupation are the most commonly used indicators of socioeconomic status. It has been suggested that these two variables measure different phenomena, with one recent study finding only low to moderate correlation between these two indicators.(Geyer, Hemström et al. 2006) It is a strength of our study that we conducted analyses using both education and social class as explanatory factors, particularly given concern that occupation at the time of the last pregnancy may not accurately capture socioeconomic position at time of infertility.

There are limitations to this study: it is based on data that may reflect experiences some while ago, however, a more recent study from Scotland has found the prevalence of reported problems conceiving to be similar,(Bhattacharya, Porter et al. 2009) providing some evidence that our data are still applicable to the current situation in the UK. Although the economic climate and funding provision has changed significantly over that time, it is unlikely that the effect of SES on women's propensity to report difficulties or seek help has.

We also recognise that numbers "at risk" diminished with progression through the subsets of analysis, commencing with 1486 women who reported ever having fertility problems, and reducing to 1204 who sought medical help, 1019 who had investigations, and 615 who had treatment. The statistical power of the study to detect differences in the outcomes analysed across the different social and educational groups (should they truly exist) is reduced accordingly. Nevertheless, we are confident that there was

sufficient power (over 80%) to detect a 25% (or greater) decrease in true prevalence of outcome between the highest and lowest levels of education or SES level should it actually exist in the population.

We found that women of higher SES level and with higher levels of education are more likely to report infertility problems. There was no clear evidence that better educated and higher SES women subsequently made more use of fertility services, but, for those who had treatment, the less well-educated women were less likely to achieve a pregnancy. These findings could alert practitioners to the possibility that some of their patients might need more guidance on the recognition of fertility problems to enable prompt access to the help they might need, especially for older patients.

There is a need for further research in this area which will update estimates and take into account family income in order to explain who uses fertility services to the full, and why. We are currently conducting another cross-sectional survey to collect more recent data on fertility experiences alongside a range of potential confounders. This new survey should provide opportunities to investigate other potential differences such as inequalities in how long women wait before they seek help, as well as looking at the effect of family income.

Table 1: The association between different fertility-related outcomes and women's education level and socio-economic status

Total women in survey: N = 7702			
Reported ever having fertility problems: n = 1486			
	n (%)	Crude OR (95% CIs)	Adjusted OR ^a (95% CIs)
Highest qualification			
Degree / equivalent	551 (22.2)	1	1
A level / equivalent	323 (19.7)	0.86 (0.74 – 1.01)	0.91 (0.77 – 1.07)
CSE, GCSE / equivalent	479 (17.6)	0.76 (0.66 – 0.87)	0.80 (0.69 – 0.93)
No qualifications	111 (15.4)	0.67 (0.54 – 0.83)	0.78 (0.61 – 1.00)
Total	1464 (19.4)		<i>P</i> _{trend (1df)} = 0.003
Missing [% women reporting problems]	22 [1.5]		
SES (among gravid women^b)			
I/II (professional & managerial)	585 (18.4)	1	1
III (skilled non-manual)	119 (17.7)	0.98 (0.79 – 1.21)	0.99 (0.80 – 1.23)
III (skilled manual)	339 (16.1)	0.86 (0.74 – 0.99)	0.90 (0.77 – 1.05)
IV/V (partly unskilled & unskilled)	160 (14.6)	0.79 (0.65 – 0.94)	0.82 (0.68 – 1.00)
Unemployed / student	40 (13.7)	0.72 (0.51 – 1.00)	0.71 (0.50 – 1.01)
Total	1243 (16.9)		<i>P</i> _{trend (1df)} = 0.001 ^c
Missing [% women reporting problems]	47 [3.2]		
Not collected ^b [% women reporting problems]	196 [13.2]		
Sought medical help for fertility problems (among 1486 women with reported problems): n=1204			
	n (%)	Crude OR (95% CIs)	Adjusted OR ^a (95% CIs)
Highest qualification			
Degree / equivalent	440 (79.9)	1	1
A level / equivalent	267 (82.7)	1.21 (0.84-1.72)	1.17 (0.81-1.70)
CSE, GCSE / equivalent	390 (81.4)	1.11 (0.81-1.51)	1.10 (0.79-1.53)
No qualifications	87 (78.4)	0.91 (0.56-1.50)	0.89 (0.52-1.52)
Total	1184 (80.9)		<i>P</i> _{trend (1df)} = 0.930
Missing [% women seeking help]	20 [1.7]		
SES (gravid women only^b)			
I/II (professional & managerial)	461 (78.8)	1	1
III (skilled non-manual)	96 (80.7)	1.12 (0.68-1.84)	1.12 (0.68-1.84)

III (skilled manual)	261 (77.0)	0.90 (0.65-1.24)	0.85 (0.61-1.19)
IV/V (partly unskilled & unskilled)	125 (78.1)	0.96 (0.63-1.47)	0.92 (0.59-1.43)
Unemployed / student	32 (80.0)	1.08 (0.48-2.39)	1.15 (0.51-2.63)
Total	975 (78.4)		$P_{trend (1df)}=0.627^c$
Missing [% women seeking help]	39 [3.2]		
Not collected ^b [% women seeking help]	190 [16.8]		

Ever had fertility investigations (among 1204 women who sought help): n=1019

	n (%)	Crude OR (95% CIs)	Adjusted OR ^a (95% CIs)
Highest qualification			
Degree / equivalent	374 (82.2)	1	1
A level / equivalent	229 (82.4)	1.01 (0.68-1.50)	1.11 (0.74-1.66)
CSE, GCSE / equivalent	323 (79.8)	0.85 (0.61-1.20)	0.90 (0.63-1.30)
No qualifications	76 (79.2)	0.82 (0.48-1.42)	0.88 (0.49-1.57)
Total	1002 (81.2)		$P_{trend (1df)}=0.494$
Missing [% women who had investigations]	17 [1.7]		

SES (gravid women only^b)

I/II (professional & managerial)	397 (81.7)	1	1
III (skilled non-manual)	77 (79.4)	0.86 (0.50-1.49)	0.84 (0.49-1.46)
III (skilled manual)	211 (76.7)	0.74 (0.51-1.06)	0.73 (0.50-1.07)
IV/V (partly unskilled & unskilled)	108 (81.2)	0.97 (0.59-1.58)	0.94 (0.56-1.56)
Unemployed / student	24 (66.7)	0.45 (0.22-0.93)	0.41 (0.19-0.88)
Total	817 (79.6)		$P_{trend (1df)}=0.075^c$
Missing [% women who had investigations]	28 [2.8]		
Not collected ^b [% women who had investigations]	174 [17.1]		

Ever had fertility treatment (among 1204 women who sought help): n=615

	n (%)	Crude OR (95% CIs)	Adjusted OR ^d (95% CIs)
Highest qualification			
Degree / equivalent	222 (48.8)	1	1
A level / equivalent	145 (52.0)	1.14 (0.84-1.53)	1.29 (0.93-1.79)
CSE, GCSE / equivalent	199 (49.0)	1.01 (0.77-1.32)	1.00 (0.74-1.35)
No qualifications	39 (40.6)	0.72 (0.46-1.12)	0.84 (0.51-1.38)
Total	605 (49.0)		$P_{trend (1df)}=0.619$
Missing [% women who had treatment]	10 [1.6]		

SES (gravid women only^b)

I/II (professional & managerial)	240 (49.4)	1	1
III (skilled non-manual)	50 (51.6)	1.09 (0.71-1.69)	1.06 (0.67-1.68)
III (skilled manual)	116 (42.2)	0.75 (0.56-1.01)	0.79 (0.57-1.10)
IV/V (partly unskilled & unskilled)	67 (50.4)	1.04 (0.71-1.52)	1.13 (0.73-1.73)
Unemployed / student	8 (22.2)	0.29 (0.13-0.66)	0.33 (0.14-0.77)
Total	481 (46.8)		$P_{trend (1df)}=0.152^c$
Missing [% women who had treatment]	24 [3.9]		
Not collected ^b [% women who had treatment]	110 [17.9]		

Ever conceived a pregnancy through fertility treatment (among 615 women who had fertility treatment): n=324

	n (%)	Crude OR (95% CIs)	Adjusted OR ^a (95% CIs)
Highest qualification			
Degree	119 (65.0)	1	1
A level / equivalent	78 (63.9)	0.95 (0.59-1.54)	0.85 (0.51-1.40)
GCSE / equivalent	107 (66.5)	1.07 (0.68-1.67)	0.97 (0.60-1.57)
No qualifications	15 (44.1)	0.42 (0.20-0.89)	0.34 (0.16-0.76)
Total	319 (63.8)		$P_{trend (1df)}=0.124$
Missing [%women who conceived through treatment]	5 [1.5]		

SES (gravid women only^b)

I/II (professional & managerial)	162 (66.9)	1	1
III (skilled non-manual)	27 (54.0)	0.58 (0.31-1.07)	0.61 (0.32-1.15)
III (skilled manual)	76 (65.5)	0.94 (0.59-1.50)	0.92 (0.56-1.50)
IV/V (partly unskilled & unskilled)	41 (60.3)	0.75 (0.43-1.31)	0.79 (0.44-1.41)
Unemployed / student	3 (37.5)	0.30 (0.07-1.27)	0.31 (0.07-1.41)
TOTAL	309 (37.5)		$P_{trend (1df)}=0.244^c$
Missing [% women who conceived through treatment]	15 [4.6]		

^a Adjusted for woman's age at first trying and gravidity

^b SES was not available for the 196 women with gravidity=0 because questions about occupation (used to code SES) were only asked in relation to the last pregnancy.

^c Test for trend excludes the "Unemployed/student" category, which differs in a non-quantifiable way from the other SES groups

^d Adjusted for woman's age at first trying and gravidity and year in which she consulted first a doctor

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Declaration of interest: The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

Contribution to authorship

Melanie Morris designed this study, cleaned and coded some of the data, analysed and interpreted the data and wrote part of the paper.

Laura Oakley cleaned and coded some of the data, analysed and interpreted the data and wrote part of the paper.

Noreen Maconochie designed and conducted the original cross-sectional study, cleaned and coded much of the data, interpreted the data and edited drafts of the paper.

Pat Doyle designed and conducted the original cross-sectional study, interpreted the data and edited drafts of the paper.

Ethics Approval

The original NWHs was given ethical approval by the Trent Multi-centre Research Ethics Committee and London School of Hygiene & Tropical Medicine Ethics Committee. This study required no additional ethical approval as it was a secondary analysis of the data.

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