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Socioeconomic Disparities in the Utilization and Success of Fertility Treatments: Analysis of Data from a Prospective Cohort in the United States

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Abstract

Objective—To determine the effect of income, education, and race on the utilization and outcomes of infertility care.

Design—Prospective cohort

Setting—8 community and academic infertility practices

Patients—391 women presenting for an infertility evaluation

Interventions—Face-to-face and telephone interviews and questionnaires

Main Outcome Measures—Utilization of infertility services and odds of pregnancy. Linear and logistic regression used to assess relationship between racial and socioeconomic (SES) characteristics, utilization of fertility services, and fertility outcomes.

Results—After adjustment for age, demographic and fertility characteristics, college-educated couples (β $5,786, p=0.006) and households earning $100,000–$150,000 (β $6,465, p=0.01) and ≥ $150,000 (β $8,602, p < 0.001) spent significantly more on fertility care than their non-college-

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educated, lower income couples. Higher income and college-educated couples were much more likely to utilize more cycles of higher intensity fertility treatment. The increased cost of fertility care was primarily explained by these differences in number and type of fertility treatment. Even after adjustment for these factors and total amount spent on fertility care, having a college degree was associated with persistently higher odds of achieving a pregnancy (OR 1.9, p=0.02).

Conclusions—Education and household income were independently associated with the amount of money spent on fertility care. This relationship was primarily explained by types and intensity of fertility treatments used. Having at least a college degree was independently associated with improved odds of pregnancy.

Keywords

Socioeconomic status; race; infertility; cost; epidemiology; outcome; disparity

Introduction

The cost of in-vitro fertilization (IVF) treatment in the US was estimated to be $1.8 billion in 2007 (1). This high cost is driven by infertility prevalence (7–17%) and rising utilization of advanced reproductive technologies (2–6). With mean IVF per-cycle costs ranging from $8,000–$15,000 (7–10) and a median 2007 household income of $47,845 (11), many couples are unable to afford all aspects of infertility care. Although infertility care costs are driven largely by IVF, most couples begin fertility care with ovarian stimulation with or without intrauterine insemination (IUI).

Socioeconomic status (SES) and race play prominent roles in determining infertility care utilization, with minority racial groups having decreased access to infertility care relative to Caucasians (12, 13). Even in states with laws requiring insurance companies to provide infertility coverage, racial disparities in fertility care persist (13,14). Individuals seeking infertility care have higher incomes and are more likely to have completed a four-year college degree and have private health insurance (12, 15).

Although SES and race affect a range of diseases and health outcomes (16), controversy exists regarding the role of these factors in determining fertility outcome. Studies have found no connection between race and IVF outcomes (17), and reported both lower (18) and higher pregnancy rates for African-American women (19) with ART. No studies have evaluated the role of race as well as socioeconomic status on the utilization of infertility services and fertility outcomes couples seeking these services. In this analysis of a prospective fertility cohort, we characterized the relationship between annual household income, educational status, and race on outcomes of infertility care, hypothesizing that observed differences would be partially or completely explained by the number and type of fertility treatments used and total expenditures for fertility care.

Methods

Cohort Description

A detailed description of the cohort and methods has been previously published (20). Briefly, women were recruited into the study from 8 participating reproductive endocrinology clinics after the female partner presented for infertility treatment (20), and were followed for 18 months. Of 809 women who met inclusion criteria, 437 (54%) agreed to participate. Among this group, 391 (90%) had complete data for fertility service utilization and outcomes and were followed to the end of the 18 month study period or until

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achieving a pregnancy. The Institutional Review Board at the University of California, San Francisco approved the study protocol; all subjects provided written consent.

Variables

Primary Outcome—Fertility treatment outcomes were determined by follow-up interviews and medical record abstraction. For analysis, fertility outcome was defined as any pregnancy during the study period versus no pregnancy.

Intermediate Outcomes and Mediating Variables—Fertility treatment use was categorized based on the highest treatment intensity utilized: no treatment, ovulation induction medications only, intrauterine insemination (IUI) only, and in-vitro fertilization (IVF). Number of treatment cycles was represented by the number of cycles utilizing particular treatments. Couples transitioning from a lower intensity of treatment to a higher intensity were included in the highest intensity treatment group. Of couples using IUI, 90% had documented use of ovulation induction; for the remaining 10%, this data was missing.

Expenditures for infertility treatment were estimated based on use of health services and medications identified from medical record abstraction and subject interviews. Costs were standardized across clinics and over time by linking services to CPT (Current Procedural Terminology) codes and assigning common costs derived from 2005 national Medicare records to each CPT code. Prices assigned to medications were the average wholesale prices obtained from the 2005 Red Book (21). Costs were analyzed as both a continuous variable and categorical: <$2,500; $2,500–44,999; $45,000+. These cost categories were chosen because pregnancy rates were similar within each category, and different between categories.

Predictor Variables—Female highest level of education, annual household income, female age, female race/ethnicity, prior parity, duration of infertility, marital status, and insurance coverage for fertility services were determined through questionnaires. Education was dichotomized to less than college graduate or college graduate. Income was categorized to <$60,000/year, $60,000–$99,999, $100,000–$149,999, ≥$140,000/year, and refusal to declare income. Low numbers of subjects in the lowest 2 subgroups forced us to combine these groups for linear and logistic regression models. Race and ethnicity were determined by female partner self-report and categorized to white, black, Hispanic, Asian, and other, according to US Census guidelines (22). Because of low numbers in several racial and ethnic minority groups, race was dichotomized to white or non-white. The etiology of infertility was obtained through medical record abstraction and classified as no known etiology, male factor only, female factor only, and both male and female factors.

Conceptual Model—We sought to test the hypothesis that race, education, and income were independently associated with the outcome of infertility care, and that the number and intensity of fertility treatments used by infertile couples, and thus total expenditures for fertility care, mediated this relationship. Further, we sought to understand if these effects would persist independent of the age of the female partner, prior gravidity, marital status, insurance coverage for fertility care, duration of infertility, and infertility diagnosis. Logically, this model could be depicted as:

SES, Race → Number and Type of Fertility Treatment → Total Fertility Cost → Pregnancy

(A) → **(B)** → **(C)** → **(D)**

Data Analysis—Linear and logistic regression was used to explore bivariate relationships between predictor variables and outcomes.

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To explore the relationship between race, SES, treatment type, and number of treatment cycles (**A→B**), we developed two multinomial logistic regression models to examine the multilevel categorical outcomes: fertility treatment (i.e. no treatment, medications, IUI, IVF) and number of cycles (0, 1–2, 3–4, 5+). This technique allowed us to examine these categorical outcome variables without the loss of information required by dichotomizing the outcome as necessary for standard logistic regression. These analyses examined the probability of utilizing a particular fertility treatment or number of cycles compared to a reference group (23, 24), adjusting for female age, prior delivery, marital status, insurance coverage for fertility care, duration of infertility, and infertility diagnosis. For ease of interpretation, we chose the no treatment and 0 cycle group as the reference.

We used multivariable linear regression to model the relationship between SES, race/ethnicity and the cost of infertility care (**A→C**) after adjustment for female age, prior delivery, marital status, insurance coverage for fertility care, duration of infertility, and infertility diagnosis. A second model was developed to determine if number of treatment cycles and types of cycle-based fertility treatments used mediated the relationship between SES and cost of fertility care (**A→B→C**). For the linear regression models, constant variance was observed, and removal of outliers did not significantly affect regression coefficients or standard errors; however, residuals were not normally distributed.

Multivariable logistic regression was used to model the relationship between SES, race, and pregnancy (**A→D**), adjusting for the same covariates described above. The next analysis added the number of treatment cycles and type of treatment to the regression model to determine if SES had an independent effect on pregnancy outcome, beyond the effect of number and type of treatment (**A→B→D**). We have previously demonstrated that the number and type of fertility treatments are highly associated with outcomes in this cohort (25). Finally, we added the total cost of fertility care to our multivariable logistic regression model to determine if costs had an independent effect on pregnancy outcomes, after accounting for SES, race/ethnicity, and treatments (**A→B→C→D**).

We evaluated statistical interaction by modeling cross-product terms between educational level, race, and household income and the utilization of infertility care or pregnancy status. No cross-product terms were significantly associated with outcomes, so no interaction terms were included in the final models. All P values were based on two-tailed tests, with statistical significance indicated by $P < 0.05$ (95% confidence interval excluding one for logistic regression or excluding zero for linear regression models). STATA 11 (Statacorp, College Station, TX, USA) was used for all analyses.

Results

Subject characteristics are shown in Table 1. In bivariate analyses, college education, white race, and higher income were associated with higher fertility treatment expenditures. The likelihood of achieving a pregnancy was significantly higher for higher income and college educated couples. Fertility treatment intensity and number of treatments were associated with higher fertility treatment costs and improved pregnancy rates. Higher fertility expenditures were associated with improved pregnancy rates; however, a threshold was observed at $2,500 at which point pregnancy rates remained relatively constant until $45,000 at which point they began to decline.

After multivariable adjustment for female age, marital status, previous children, insurance coverage for fertility care, duration of infertility, and couple infertility diagnosis, compared to women not using fertility treatment, women with household incomes of more than $150,000 per year were more likely to use IUI (RR 2.4, 95% CI[1.0–5.9], Table 2B), and

IVF (RR 5.2, 95% CI [2.4–11.3], Table 2C) relative to household incomes <$100,000 (**A→B**). Couples earning $100,000–149,999 were more likely to use IVF (RR 2.5, 95% CI[1.2–5.1]). The highest income households were also more likely to use 1–2 cycles (RR 3.4, 95% CI [1.5–7.6], Table 2D), 3–4 cycles (RR 4.3, 95% CI [1.7–10.7], Table 2E), and 5 or more cycles (RR 3.5, 95% CI [1.4–8.5], Table 2F) compared to 0 cycles. Household incomes $100-000–$149,000 were more likely to use 3–4 cycles and 5+ cycles compared to lower income couples.

Furthermore, in these same models (**A→B**), compared to choosing no treatment, women with a college degree were more likely to use IUI (RR 2.0, 95% CI [1.0–4.2], Table 3B) and IVF (RR 2.3, 95% CI [1.3–4.3], Table 3C). College educated women were also more likely to use 3–4 cycles (RR 3.0, 95% CI [1.4–6.5], Table 3E), and five or more cycles (RR 2.6, 95% CI [1.2–5.3], Table 3F) compared to 0 cycles. There were no statistically significant differences in the use of medications only as a treatment choice between women with and without a college degree. A college degree did not increase the probability of using 1–2 cycles compared to no treatment.

Although white women were slightly more likely to choose higher levels of reproductive care and more treatment cycles, these differences did not achieve statistical significance after multivariable adjustment (Table 2).

After adjustment for female age, marital status, prior parity, duration of infertility, insurance coverage for fertility services, and infertility diagnosis; several significant income and education differences in infertility expenditure were found (**A→C**, Table 3A). Although white women relative to non-white women (β: $3,172, 95% CI [$-876– $7,220) spent slightly more, this difference was not statistically significant. Those women with a college degree (β: $5,786, 95% CI [$1,658–$9,914) and households earning $100,000–$149,999 per year (β: $6,465, 95% CI [$1,697–$11,232) and more than $150,000 per year (β: $8,602, 95% CI [$3,805–$13,399) incurred higher infertility costs than households earning less than $100,000 annually. The addition of treatment pathway (i.e. no treatment, ovulation induction medications only, IUI only, or IVF) and number of treatment cycles to the models resulted in loss of significant differences in fertility costs (Table 3B).

Although odds ratios for pregnancy were somewhat improved among white women and higher household income groups in bivariate analyses, multivariable logistic regression revealed statistically significant differences in the odds of achieving a pregnancy only among women with a college degree (OR 2.1, 95% CI [1.2 – 3.5]). This relationship persisted after adjustment for treatments used and number of cycles (OR 2.0, 95% CI[1.1–3.4], Table 3B) and total fertility cost (OR 1.9, 95% CI[1.1–3.3]), Table 3C; **A→D**).

Discussion

Household income and education, but not race, were important predictors of use of fertility treatments. Graduation from college was independently associated with successful pregnancy. Higher SES was associated with greater use of fertility treatments with a concomitant increase in the cost of fertility care. Interestingly, spending more on fertility care was not directly related to improved fertility outcomes. Instead, we observed a threshold of fertility expenditure after which significant and stable increases in pregnancy were observed. The mechanisms behind these socioeconomic differences in fertility expenditure are likely multi-factorial, but were primarily explained in these data by differences in fertility treatments and number of cycles utilized. Although tempting to conclude that improved fertility success was due to using more ART or spending more for fertility care, alternative explanations must be examined.

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In the present study, higher income and college-educated women were much more likely to choose more expensive treatment pathways. Although this finding is not surprising given the rising utilization of advanced reproductive technologies nationwide (26), it is disheartening to observe the disparity in utilization of infertility services and fertility outcomes even among those already seeking fertility care. We also found that college-educated women had persistently better fertility outcomes after multivariable adjustment.

Several explanations are possible for these differences in fertility spending and improved fertility outcome. Income, and educational characteristics may lead to increased access to health care through increased knowledge of health care options (27), cultural differences in the acceptance of specific fertility treatments, or a greater likelihood of belonging to social networks that help to identify optimal treatments(28). Insurance coverage for fertility care did not explain the SES differences observed in this study, and it is likely that households with higher incomes have the freedom to pay for such services out-of-pocket. In contrast, households with lower incomes may limit the number and/or type of infertility treatments employed. College-educated individuals have also been shown to have better overall health status independent of age or the other variables adjusted for in the present data (29). Taken together, these factors may explain why college-educated women had persistently higher pregnancy rates in our data.

White women spent significantly more on infertility care after adjusting for education, income, fertility characteristics and insurance coverage; however, these differences did not persist after additional adjustment for type and number of fertility treatments used. Furthermore, race was not significantly associated with improvements in pregnancy outcomes. It could be that education and income were more important mediators of utilization of fertility treatments. Alternatively, cultural or other differences among non-white sub-populations might explain the differences in these treatment choices; however, the size of our non-white population was not large enough to systematically explore these differences in other racial and ethnic subgroups.

Several limitations of this study are worth noting. These data likely reflect the experiences of couples seeking fertility care at infertility clinics, but may not be generalizable to the broader population of couples not yet seen in reproductive health centers. While we noticed suggestive trends for our fertility outcomes, we also observed wide confidence intervals that led to lack of statistical significance for several factors--a problem that might be corrected by a larger sample size. Although we found significant disparities in fertility treatment utilization by SES, we cannot rule out the possibility that physician decision-making played a role in these differences. However, for this to be the case, infertility physicians in the 8 clinical practices would have had to systematically recommend lower levels of fertility care to couples of lower SES. We do not have data on physician decision-making to support or refute this possibility. Further, we did not measure the overall health status of participants in the study. Differences in health between higher and lower SES groups or among educational groups may explain the persistent advantage in pregnancy rates enjoyed by the college-educated women. Although losses to follow-up may affect the validity of prospective cohort studies, the relatively low rate of loss in this study suggests this factor did not significantly affect the results.

This study may have significant public policy implications for couples seeking access to fertility services. While a majority of fertility patients are college-educated and high income earners, our findings underscore the disparities in utilization of infertility services and the differences in fertility outcomes when women are unable to use these services, and suggest that there may be many individuals among the broader population of infertile couples who are unable to afford the highest levels of infertility care. Further, our results reveal that more

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infertility care may not always result in better outcomes. Tailoring the right amount of treatment to the right patient is likely to be of even greater importance. Providing information to all couples about all of their available reproductive options may help improve patient decision making and improve reproductive outcomes. Laws that mandate health insurance coverage for fertility services would likely improve access to infertility services and fertility outcomes. In states where comprehensive fertility insurance coverage is mandated by law, IVF utilization was 3-fold higher than states that did not have this mandate (30) with concomitantly fewer multiple births (31), perhaps leading to overall lower fertility treatment costs. Access to high quality fertility insurance coverage may lead to more equitable access to infertility treatment across SES and racial strata, and thereby decrease disparities in the outcomes of infertile couples.

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Table 1

Demographic, Socioeconomic, and Fertility Characteristics of Cohort and the Cost and Outcome of Fertility Care (n=391)

				Infertility Utilization ($)*				Any Pregnancy**	
		N	%	Mean	SD	P-Value	Cumulative Pregnancy (%)	OR	P-Value
White Female									
	No	113	28.9	14,807	16,390	ref	45.1	1.00	ref
	Yes	278	71.1	19,182	18,688	0.03	53.6	1.40	0.13
College Degree									
	No	110	28.1	12,475	15,246	ref	39.1	1.00	ref
	Yes	281	71.9	20,048	18,755	<0.001	55.9	1.97	0.003
Household Income									
	< $60,000	25	6.4	8,822	13,012	ref	20.0	1.00	ref
	< $60,000 – $99,999	84	21.5	12,016	14,691	0.43	47.6	3.64	0.02
	$100,000–$149, 999	198	50.6	19,831	18,090	0.004	54.6	4.80	0.003
	≥ $150,000	66	16.9	23,172	19,514	0.001	57.6	5.43	0.002
	Unwilling to provide	18	4.6	17,781	23,794	0.10	50.0	4.00	0.04
Insurance coverage for infertility									
	No	242	62.5	17,970	17,941	ref	47.9	1.00	ref
	Yes	145	37.5	17,643	18,429	0.86	55.2	1.34	0.17
Female age									
	<35	156	39.9	17,398	16,556	ref	64.1	1.00	ref
	35–39	146	37.3	19,651	17,958	0.28	53.4	0.64	0.06
	40+	89	22.8	15,985	20,864	0.56	24.7	0.18	< 0.001
Duration of infertility									
	< 1 year	65	16.6	17,584	17,457	ref	47.7	1.00	ref
	1–2 years	156	39.9	18,774	20,352	0.66	59.6	1.62	0.11
	≥ 2 years	140	35.8	17,355	16,347	0.93	45.7	0.92	0.79
	Unknown	30	7.7	16,815	15,881	0.85	40.0	0.73	0.48
Infertility diagnosis									
	Male and female factors	120	30.7	19,725	18,284	ref	45.0	1.00	ref
	Female factor only	228	58.3	17,412	18,591	0.26	51.3	1.29	0.26

		N	%	Infertility Utilization ($)* Mean	SD	P-Value	Cumulative Pregnancy (%)	Any Pregnancy** OR	P-Value
	Male factor only	29	7.4	20,321	15,533	0.87	65.5	2.32	0.05
	No known infertility factors	14	3.6	5,679	7,101	0.01	71.4	3.06	0.07
Treatment intensity									
	No treatment	84	21.5	903	878	ref	31.0	1.00	ref
	Medications only	17	4.4	1,403	1,185	0.88	47.1	1.98	0.21
	IUI only	83	21.2	7,704	8,486	<0.001	61.5	3.56	<0.001
	IVF	207	52.9	30,274	16,064	<0.001	55.6	2.79	<0.001
Number of treatment cycles									
	0	84	21.5	903	878	ref	31.0	1.00	ref
	1–2	125	32.0	13,432	10,883	<0.001	64.0	3.97	<0.001
	3–4	89	22.8	25,249	16,107	<0.001	51.7	2.39	0.01
	5+	93	23.8	32,300	20,833	<0.001	51.6	2.38	0.01
Fertility Care Expenditure									
	<$2,500	119	30.4				32.8	1.00	ref
	$2,500 – $44,999	234	59.9				62.0	3.34	<0.001
	$45,000+	38	9.7				42.1	1.49	0.30
Any fertility treatment									
	No	84	21.5	903	878	ref	31.0	1.00	ref
	Yes	307	78.5	22,573	17,834	<0.001	56.7	2.92	< 0.001

* Bivariate linear regression for each characteristic

** Bivariate logistic regression analysis for each characteristic

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Table 2

Multinomial Logistic Regression Characterizing Relationship between Socioeconomic and Racial Characteristics, Intensity of Fertility Treatment, and Number of Treatment Cycles

	Relative Risk for Each Treatment Intensity Compared to No Treatment					Relative Risk for Number of Cycles Compared to 0 Cycles			
A. Medications only vs. No Treatment†	**RR**	**95% CI**		**P Value**	**D. 1–2 Cycles vs. 0 Cycles†**	**RR**	**95% CI**		**P Value**
White female	0.38	0.12	1.24	0.11	White female	0.85	0.44	1.64	0.63
College degree	1.13	0.34	3.73	0.84	College degree	1.53	0.80	2.91	0.20
Household income					Household income				
< $100,000	1.00	ref		ref	< $100,000	1.00	ref		ref
$100,000–$149,999	1.19	0.31	4.63	0.80	$100,000–$149,999	1.42	0.67	3.00	0.36
≥ $150,000	0.75	0.15	3.72	0.72	≥ $150,000	3.37	1.49	7.62	0.004
Unwilling to provide	N/A				Unwilling to provide	1.54	0.39	6.13	0.54
B. IUI vs. No Treatment†	**RR**	**95% CI**		**P Value**	**E. 3–4 Cycles vs. 0 Cycles†**	**RR**	**95% CI**		**P Value**
White female	1.09	0.53	2.27	0.81	White female	0.99	0.48	2.06	0.98
College degree	2.02	0.97	4.17	0.06	College degree	3.04	1.42	6.48	0.004
Household income					Household income				
< $100,000	1.00	ref		ref	< $100,000	1.00	ref		ref
$100,000–$149,999	1.20	0.52	2.77	0.67	$100,000–$149,999	2.55	1.10	5.93	0.03
≥ $150,000	2.42	1.00	5.88	0.05	≥ $150,000	4.28	1.71	10.71	0.002
Unwilling to provide	1.30	0.28	5.98	0.74	Unwilling to provide	2.61	0.55	12.44	0.23
C. IVF vs. No Treatment†	**RR**	**95% CI**		**P Value**	**F. 5+ Cycles vs. 0 Cycles†**	**RR**	**95% CI**		**P Value**
White female	1.19	0.63	2.24	0.59	White female	1.64	0.77	3.48	0.20
College degree	2.33	1.26	4.32	0.01	College degree	2.55	1.22	5.30	0.01
Household income					Household income				
< $100,000	1.00	ref		ref	< $100,000	1.00	ref		ref
$100,000–$149,999	2.51	1.24	5.09	0.01	$100,000–$149,999	2.09	0.91	4.77	0.08
≥ $150,000	5.15	2.35	11.32	0.001	≥ $150,000	3.47	1.42	8.52	0.01
Unwilling to provide	2.35	0.64	8.65	0.20	Unwilling to provide	1.35	0.26	6.97	0.72

†Adjusted for female age, marital status, previous children, insurance coverage for fertility care, duration of infertility, and couple infertility diagnosis

N/A: sample to small too evaluate

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Table 3

Multivariable Relationship between Socioeconomic and Racial Characteristics, Infertility Utilization, and Fertility Outcomes

	Infertility Utilization				Any Pregnancy			
A. Adjusted†	**β ($)**	**95% CI ($)**		**P Value**	**OR**	**95% CI**		**P value**
White female	3,172	−876	7,220	0.12	1.13	0.68	1.88	0.63
College degree	5,786	1,658	9,914	0.006	2.06	1.22	3.47	0.01
Household income								
< $100,000	0	ref		ref	1.00	ref		ref
$100,000–$149,999	6,465	1,697	11,232	0.01	1.35	0.74	2.46	0.32
≥ $150,000	8,602	3,805	13,399	<0.001	1.69	0.92	3.08	0.09
Unwilling to provide	5,111	−3,961	14,184	0.27	1.43	0.47	4.38	0.53
B. Adjusted for Treatment††	**β ($)**	**95% CI ($)**		**P Value**	**OR**	**95% CI**		**P value**
White female	849	−1,653	3,350	0.51	1.14	0.67	1.93	0.63
College degree	981	−1,591	3,554	0.45	1.98	1.14	3.43	0.02
Household income								
< $100,000	0	ref		ref	1.00	ref		ref
100,000–$149,999	1,106	−1,855	4,066	0.46	1.28	0.68	2.40	0.45
≥ $150,000	1,726	−1,298	4,749	0.26	1.41	0.74	2.67	0.29
Unwilling to provide	−300	−5,896	5,297	0.92	1.37	0.42	4.48	0.60
C. Adjusted for Treatment & Cost†††					**OR**	**95% CI**		**P value**
White female					1.11	0.65	1.88	0.70
College degree					1.87	1.08	3.24	0.03
Household income								
< $100,000					1.00	ref		ref
$100,000–$149,999					1.19	0.64	2.23	0.59
≥ $150,000					1.42	0.75	2.69	0.28
Unwilling to provide					1.17	0.36	3.84	0.79

† Adjusted for female age, marital status, previous children, insurance coverage for infertility, duration of infertility, and couple infertility diagnosis

[††] Adjusted for number of cycles (i.e. 0, 1–2, 3–4, 5+) and types of treatment (i.e. ovulation induction medications, IUI, or IVF), female age, marital status, previous children, insurance coverage for infertility, duration of infertility, and couple infertility diagnosis

[†††] Adjusted for total cost of fertility diagnosis and treatment, types of treatment (i.e. ovulation induction medications, IUI, or IVF), female age, marital status, previous children, insurance coverage for infertility, duration of infertility, and couple infertility diagnosis

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