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Risks Factors and Treatment Use Related to Infertility and Impaired Fecundity Among Reproductive-Aged Women

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Abstract

Introduction—Population-level data on infertility and impaired fecundity are sparse. We explored the use of self-reported information provided by reproductive-aged women participating in the Centers for Disease Control and Prevention’s Behavioral Risk Factor Surveillance System (BRFSS).

Materials and Methods—Three out of 12 questions on reproductive history, family planning, and infertility that seven states included in the 2013 BRFSS were used for this study. In addition to descriptive statistics, we used multinomial logistic regression to identify factors associated with ever experiencing infertility only, difficulty staying pregnant only, and neither infertility nor difficulty staying pregnant. We also explored the association between healthcare coverage and type of treatment received among women ever experiencing infertility only or difficulty staying pregnant only.

Results—Compared with women reporting having never experienced either infertility or difficulty staying pregnant, women who reported ever experiencing difficulty staying pregnant only were significantly more likely to report a history of depressive disorders and smoking (adjusted odds ratio [aOR] = 1.69, 95% confidence interval [CI] = 1.07–2.68 and aOR = 1.98, 95% CI = 1.22–3.20, respectively). Women who ever experienced infertility only were also more likely to report a history of depressive disorders (aOR = 2.02, 95% CI = 1.14–3.59), but less likely to report healthcare coverage (aOR = 0.26, 95% CI = 0.14–0.46). Only 18.9% (95% CI = 11.4–29.9) of women who ever experienced difficulty staying pregnant only reported seeking infertility treatment compared with 49.6% (95% CI = 34.9–64.4) of women who ever experienced infertility only.

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Author Disclosure Statement

No competing financial interests exist.

Conclusions—Ongoing public health surveillance systems of state-specific self-reported data, such as BRFSS, provide the opportunity to explore preventable risk factors and treatment use related to infertility and impaired fecundity.

Keywords

infertility; impaired fecundity; BRFSS; population-based survey; public health surveillance

Introduction

A SUBSTANTIAL PROPORTION of women of reproductive age in the United States experience infertility or impaired fecundity. Infertility is generally defined as a lack of pregnancy after 12 months of trying to get pregnant,¹ whereas impaired fecundity is defined as physical difficulty in either getting pregnant or carrying a pregnancy to live birth.² Despite recognition of infertility as a public health concern, considerable gaps and opportunities exist in research, program, and policy development in the prevention, detection, and management of infertility and impaired fecundity.^{3,4} A comprehensive public health approach is needed that includes surveillance and monitoring to explore and better understand preventable risk factors and disparities in access to care and treatment use.

Different factors including sociodemographic, behavioral, and physical and mental health conditions have been identified as possible contributors to fertility problems in women. Many of the behavioral factors and health conditions may be preventable, such as smoking, obesity, and diabetes. Disparities by race/ethnicity and socioeconomic status in prevalence, access to care, and use of infertility services/treatments have also been noted in the literature.^{5–7} Population level survey data include information that can be used to explore both infertility and impaired fecundity, in addition to sociodemographic factors that may be related to differential access to treatment and potentially unmet treatment needs. One population level survey is the National Survey of Family Growth (NSFG) conducted by the Centers for Disease Control and Prevention's (CDC) National Center for Health Statistics.⁸ Recent estimates from the 2011 to 2013 NSFG revealed that among currently married, women 15–44 years of age, 6.1% were infertile and 12.3% had impaired fecundity.⁹ However, state-based population level data are lacking. Ultimately, findings from analyses of such data may lead to designing and implementing effective strategies to help close gaps in access to care, prevention, and education.

State-specific estimates may be obtained from other surveillance systems such as the CDC's Behavioral Risk Factor Surveillance System (BRFSS), which gathers information on the prevalence and distribution of self-reported behaviors, health conditions, and services. The BRFSS was developed in 1984 and is the world's largest ongoing telephone health survey system. Although the core BRFSS does not regularly collect information on either infertility or impaired fecundity, the survey does allow for the addition of questions related to these issues.

In this article, we use the BRFSS to explore infertility and impaired fecundity. Specific questions were added to the survey with the following objectives: (1) to identify health and behavioral factors and correlates associated with infertility and difficulty staying pregnant

and (2) to explore access to care, treatment utilization, and outcomes associated with infertility and difficulty staying pregnant.

Materials and Methods

Data source

We used 2013 BRFSS data from seven states: Connecticut, Kentucky, Massachusetts, Mississippi, Ohio, Texas, and Utah. The BRFSS is a state-based health survey coordinated by the CDC and administrated annually by each state. The BRFSS uses a sample of both landline and cellular telephone numbers to elicit self-reported health behaviors and preventive health practices from adults.¹⁰ In addition to the core BRFSS questionnaire, these seven states added 12 questions for women 18–50 years old that cover reproductive health history, family planning, and infertility. The BRFSS used a two-stage weighting process (design weighting and “raking” weighting) to ensure the weighted data were representative of all women aged 18–50 years in each state. Variables used in the raking process included categories of age, race, and ethnicity groups, marital status, education levels, and telephone source. More detailed information on the implementation of this set of women’s reproductive health state-added questions within BRFSS has been published elsewhere.¹¹ For this article, we analyzed data from the three state-added questions related to infertility and impaired fecundity (specifically difficulty in staying pregnant). The other reproductive health questions related to gravidity, parity, and family planning were not of interest for this study. Of note, the overall average weighted cooperation rate (*i.e.*, the proportion of contacted eligible men and women who at least partially completed the survey) and the average weighted response rate (*i.e.*, the estimated proportion of eligible men and women, including both contacted and not contacted men and women, who at least partially completed the survey), for the entire BRFSS survey, both adjusted for sampling design, for these seven states were 65.7% and 44.2%, respectively.¹² Additional information is available at www.cdc.gov/brfss.

Primary outcomes of interest

The primary outcomes of interest were related to infertility, defined as the inability to become pregnant or stay pregnant after a year of trying. We explored (1) ever having experienced infertility only, or the inability to become pregnant, and (2) ever having experienced difficulty staying pregnant only (as a component of impaired fecundity). These outcomes were created from the following two state-added questions asked of women 18–50 years of age: “Have you or your spouse or partner ever experienced infertility, including difficulty staying pregnant” and “Was it infertility, difficulty staying pregnant, or both?” Figure 1A shows how the three analysis groups (infertility only, difficulty staying pregnant only, and no infertility and no difficulty staying pregnant) were created from these two survey questions. Those participants experiencing both infertility and difficulty staying pregnant were excluded to provide mutually exclusive groups for analysis.

Secondary outcome of interest

The secondary outcome of interest was the treatment(s) received by women ever experiencing infertility or difficulty staying pregnant. It was created using the BRFSS state-

added question: “Did you or your spouse or partner receive any of the following treatments?” Figure 1B shows how the three treatment groups (any treatment, consultation only, and no treatment) were created using this question.

Demographic, behavioral, and other health-related characteristics

We used data from the BRFSS core questionnaire to obtain demographic, behavioral, and health-related information. The demographic characteristics explored included age (18–24, 25–34, 35–44, 45–50 years); race/ethnicity (non-Hispanic white, non-Hispanic black, Hispanic, other); marital status (married or living with partner, unmarried and living with a partner or never married); education (some high school, high school graduate, college graduate); employment (employed, unemployed, not working, unable to work); and annual household salary (<\$25,000, \$25,000 to <\$50,000, \$50,000 to <\$75,000, \$75,000 or more). The behavioral and health-related characteristics explored included ever smoked at least 100 cigarettes (yes, no); average hours of sleep per night (<4 hours, 4 hours or more); possession of healthcare coverage (yes, no); timing of last checkup (<12 months, never, 12 months or more); general health status (good to excellent, poor to fair); ever told have diabetes (yes, pregnancy only, no, prediabetic or borderline); ever told have hypertension (yes, pregnancy only, no, prehypertensive or borderline); ever told have depressive disorder (yes, no); and body mass index (underweight, normal, overweight, obese).

Sample selection

There were 8691 women in the seven states who met the age criteria (18–50 years) and were asked the 2013 BRFSS reproductive health state-added questions (Fig. 1). We excluded a total of 1269 (14.6%) women, resulting in an overall sample size of 7422 women (386 ever experiencing infertility only, 337 ever experiencing difficulty staying pregnant only, and 6699 never experiencing infertility or difficulty staying pregnant). Women who had ever experienced infertility only or difficulty staying pregnant only were included in the analysis of the secondary outcome “treatment received among women with infertility or difficulty staying pregnant” ($n = 723$). After exclusions, the resulting sample size was 689 women, 349 receiving any treatment and consultation only (301 and 48, respectively), and 340 never seeking any treatment.

Analysis

We first calculated the proportion and 95% confidence interval (CI) of each demographic, behavioral, and health-related characteristic for women in each of the three categories: infertility only, difficulty staying pregnant only, and no infertility and no difficulty staying pregnant. The differences in the distribution of the characteristics for women were assessed using chi square tests and CIs for proportions. The association between independent variables and infertility only compared with no infertility and no difficulty staying pregnant, difficulty staying pregnant only compared with no infertility and no difficulty staying pregnant, and infertility only compared with difficulty staying pregnant only was assessed using multinomial logistic regression. The reference group was changed to allow for the comparison of all three groups. A backward selection procedure was used to build the final model, with statistical significance set at 0.10 for the univariate analysis and 0.05 for the multivariable analysis; however, age group and marital status were retained in the

multivariable model regardless of statistical significance as potential cofounders. The Wald F-test was used to select the best fit between models. To assess infertility treatment(s) received, we calculated the prevalence estimates and 95% CIs of receiving “any infertility treatment,” “consultation but no treatment,” and “no treatment” among women with infertility or difficulty staying pregnant.

A secondary analysis exploring the association between independent variables and infertility group was conducted among married women 35–50 years of age. The population was restricted by age to isolate those participants who were old enough to have ever experienced infertility or difficulty staying pregnant and by marital status to isolate those participants who were more likely to be aware of any fertility problems.

All analyses were conducted using SAS version 9.3 and SAS-callable SUDAAN version 11.0.0. Data were weighted to account for the complex survey design and adjusted for nonresponse.

Results

The overall percentage of women reporting infertility only was 4.8% (95% CI = 3.6–6.3), with state-specific values ranging from 3.1% (95% CI = 2.0–4.8) in Connecticut to 6.1% (95% CI = 4.7–7.8) in Utah. The overall percentage reporting difficulty staying pregnant only was 4.0% (95% CI = 3.1–5.2), with state-specific estimates ranging from 3.2% (95% CI = 1.8–5.8) in Texas to 5.2% (95% CI = 3.5–7.5) in Ohio.

The distribution of some characteristics of women differed among groups (infertility only, difficulty staying pregnant only, and neither infertility nor difficulty staying pregnant; Table 1). Compared with the percentage of women reporting neither infertility nor difficulty staying pregnant, the percentage of women reporting infertility only was higher for older (67.2% were 35 years of age or older vs. 49.1%), married (74.3% vs. 55.4%), college educated (35.5% vs. 25.3%), covered by healthcare (92.9% vs. 75.5%), and ever told they had a depressive disorder (38.2% vs. 25.0%). The percentage of women ever told they had a depressive disorder also was high among women reporting difficulty staying pregnant only (39.1%). Finally, the percentage ever smoking 100 cigarettes or more among women reporting difficulty staying pregnant only (52.0%) was higher than among women reporting infertility only (35.5%) and higher than women reporting neither (34.1%).

In multivariable analysis, compared with women who reported neither infertility nor difficulty staying pregnant, women ever told they had a depressive disorder were more likely to report either infertility only or difficulty staying pregnant only (adjusted odds ratio [aOR] = 2.02, 95% CI = 1.14–3.59 and aOR = 1.69, 95% CI = 1.07–2.68, respectively), whereas women who had ever smoked at least 100 cigarettes were more likely to report difficulty staying pregnant only (aOR = 1.98, 95% CI = 1.22–3.20) (Table 2). Compared with women with healthcare coverage, women without health-care coverage were less likely to report infertility only compared with those who reported difficulty staying pregnant only (aOR = 0.37, 95% CI = 0.17–0.84) and those who experienced neither (aOR = 0.26, 95% CI = 0.14–0.46).

When the multivariable analysis was restricted to married women 35–50 years of age, the results did not change substantially, but smoking was no longer significantly associated with the infertility group (Table 3). Compared with women who reported neither infertility nor difficulty staying pregnant, women who were ever told they had a depressive disorder were more likely to report either infertility only or difficulty staying pregnant only (aOR = 2.89, 95% CI = 1.22–6.85 and aOR = 2.08, 95% CI = 1.14–3.80, respectively), whereas women without healthcare coverage were less likely to report infertility only or difficulty staying pregnant only (aOR = 0.13, 95% CI = 0.06–0.29 and aOR = 0.24, 95% CI = 0.10–0.55, respectively).

Among all women 18–50 years of age reporting infertility only or difficulty staying pregnant only, the weighted number of women seeking treatment was 334,147 (35.8%), whereas the weighted number of women seeking treatment or consultation was 459,790 (49.3%) (Table 4). Among women who reported difficulty staying pregnant only, the majority did not seek treatment (73.1%); however, 8.0% sought a consultation only, whereas 18.9% sought infertility treatment including infertility drugs, intrauterine insemination, assisted reproductive technology, or surgical intervention. In contrast, almost half (49.6%) of women who reported infertility only sought out infertility treatment, whereas 18.0% sought a consultation only and 32.4% did not seek treatment. Of note, the prevalence of healthcare coverage was lower among those women not seeking treatment (84.5%) compared with those seeking treatment (96.3%) or consultation only (99.0%) (Table 5).

Discussion

Within our study sample, 4.8% of women reported infertility only and 4.0% reported difficulty staying pregnant only, for a combined 8.8% of women ever experiencing impaired fecundity, defined here as ever having experienced infertility *or* ever having experienced difficulty staying pregnant (but not both). When including the women experiencing both, the percentages ever experiencing infertility and impaired fecundity are 6.3% and 11.0%, respectively. Population-based estimates of infertility and impaired fecundity are sparse and lack common definitions, limiting the ability to compare estimates across sources. The 2011–2013 NSFG data showed 6.1% of married 15–44-year-old women experiencing infertility and 12.3% of all 15–44-year-old women experiencing impaired fecundity.⁹ However, there are many differences between the NSFG estimates and the BRFSS estimates that limit their comparability, such as different definitions of infertility and impaired fecundity as well as the BRFSS being limited to seven states rather than providing a national estimate.¹³ In addition, the BRFSS analysis explored ever experiencing infertility or impaired fecundity (*i.e.*, lifetime infertility and impaired fecundity), restricted analysis to women having ever tried to get pregnant, and excluded women experiencing both infertility and difficulty staying pregnant. Finally, the age range of included women also differed (18–50 years of age in our study compared with 15–44 years of age in NSFG). The lower age limit in BRFSS is higher; however, as women attempt to conceive at increasing ages, we increased the upper limit for reproductive age to 50 years.

In our study, factors found to be associated with either infertility only or difficulty staying pregnant only included history of depressive disorder, history of smoking, and healthcare

coverage. For instance, women with a history of depressive disorder were more likely to report difficulty staying pregnant only and infertility only, women who had ever smoked at least 100 cigarettes were more likely to report difficulty staying pregnant only, and women without healthcare coverage were less likely to report infertility only. Despite controlling for age and marital status in the multivariable model, a secondary analysis of married women 35–50 years of age was conducted to isolate a group more likely to have experienced and identified an infertility problem in their lifetime. The increased risk of impaired fecundity among those with a history of depressive disorder and the decreased risk among those without healthcare coverage persisted; however, the association with smoking did not. Smoking may be related to age and marital status, such that restricting the sample reduced the effects of smoking; however, the reduced statistical power resulting from the smaller sample size may have also played a role.

Because of the cross-sectional nature of this study, we cannot determine the directionality of the observed associations. Although impaired fecundity may lead to depression in women trying to achieve pregnancy, it is also possible that a history of depression may affect fertility. Women without healthcare coverage may be less likely to have discussed issues surrounding impaired fecundity with a healthcare provider, and therefore, be less likely to classify themselves as infertile. Other studies support the findings of an association between infertility and history of depressive disorder as well as associations between smoking and infertility and difficulty staying pregnant.^{14–20} Additional female risk factors for infertility and difficulty staying pregnant reported in other studies that were not explored or not found to be associated with infertility with the BRFSS data include abnormal menstrual cycle patterns and menstrual cycle length,^{21,22} obesity,^{18,23–29} intense physical activity,^{28,29} lower folate intake,³⁰ alcohol consumption,^{17–19,28,31} diabetes,²³ cancer,^{32–34} karyotypic disorders,¹⁷ immunological rejection,²³ thrombophilias,^{17,23} endocrinological issues,^{17,35,36} infections,^{18,23} environmental pollutants,¹⁸ and delivery history.¹⁹

In our study, the majority of women ever experiencing difficulty staying pregnant only did not seek infertility treatment. In contrast, approximately half of women ever experiencing infertility only did seek infertility treatment, with an additional 18.0% undergoing a treatment consultation only. In addition to the different demographic characteristics of these two groups of women, a reason for this difference also may be that more treatments are designed for infertility and not for difficulty maintaining a pregnancy. The 2011–2013 NSFG showed that 11.3%, or 6.9 million women aged 15–44 years, have ever received any infertility services,⁹ and that the percentage of women aged 25–44 years with current fertility problems seeking treatment to help get pregnant or prevent miscarriage has been slightly >40%.³⁷ Infertility services assessed in the NSFG include advice, infertility testing, ovulation drugs, surgery, artificial insemination, or other services such as assisted reproductive technology. Although the BRFSS statistics are not directly comparable because of differences in the populations and questions, it is important to note that our study yielded similar results with 35.8% of the study sample ever experiencing infertility or difficulty getting pregnant having sought treatment and 49.3% having sought treatment or consultation.

There are several limitations affecting this analysis. First, the BRFSS collects self-reported data from a population 18 years of age and older. The reliability of self-reported data is dependent on the ability of the respondent to accurately recall and relay the questioned information. In addition, the age of the population meant that we were not able to use the classic definition of reproductive age (15–44 years old), which, in combination with the way infertility was defined, made it difficult to compare our results with other studies. Second, the reproductive health questions were included in 2013 BRFSS as state-added questions by seven states that were not randomly selected. It was a convenience sample of states willing to include these questions. As a result, our findings are not generalizable to all states and no inferences related to the U.S. population could be made. Third, although one objective of the study was to explore infertility treatment use among women with infertility or impaired fecundity, the small sample size prevented us from looking in depth at the types of treatment sought and from assessing the relationship between sociodemographic factors and treatment use/types of treatment sought. Fourth, we excluded women reporting both infertility and difficulty staying pregnant. Fifth, the questions only assess infertility as experienced by the female respondent and exclude infertility experienced by the male respondent only. Sixth, the question assessing treatment use was asked of female respondents only, but specified treatment among either the respondent or the partner/spouse. Finally, the response rate for the BRFSS is low.

The study also has several strengths. The BRFSS is a well-known state-based survey that has been widely used by public health professionals and leaders to assess and monitor behaviors and health-related issues at the population level. We were able to use BRFSS data collected in seven states that added reproductive health questions on reproductive history, family planning, and infertility to assess infertility-related issues in this analysis. The findings of this study will be used to review and adjust, as necessary, the reproductive health questions that may be added in the future to BRFSS and by more states, and also to other surveys. The use and expansion of state-based findings can impact state policies, such as insurance coverage and mandates, and can demonstrate variation in infertility itself.

Conclusion

Existing and ongoing surveillance systems such as BRFSS provide an opportunity to obtain population-based measures to estimate the state-specific burden of reproductive health-related issues, including infertility. In addition, they allow us to examine associations between sociodemographic, behavioral and health factors, and infertility and to explore healthcare access and utilization. Gathering state-specific data and expanding the use of such systems enable tracking of trends and allow for comparability of measures across states, and could be adapted for local use. Understanding the burden of infertility and how treatment and services are being accessed could allow states to address unmet need. In addition, understanding how modifiable behaviors or treatable health conditions are related to infertility could help states implement prevention strategies that may reduce the burden of infertility.

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Disclaimer

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the CDC.

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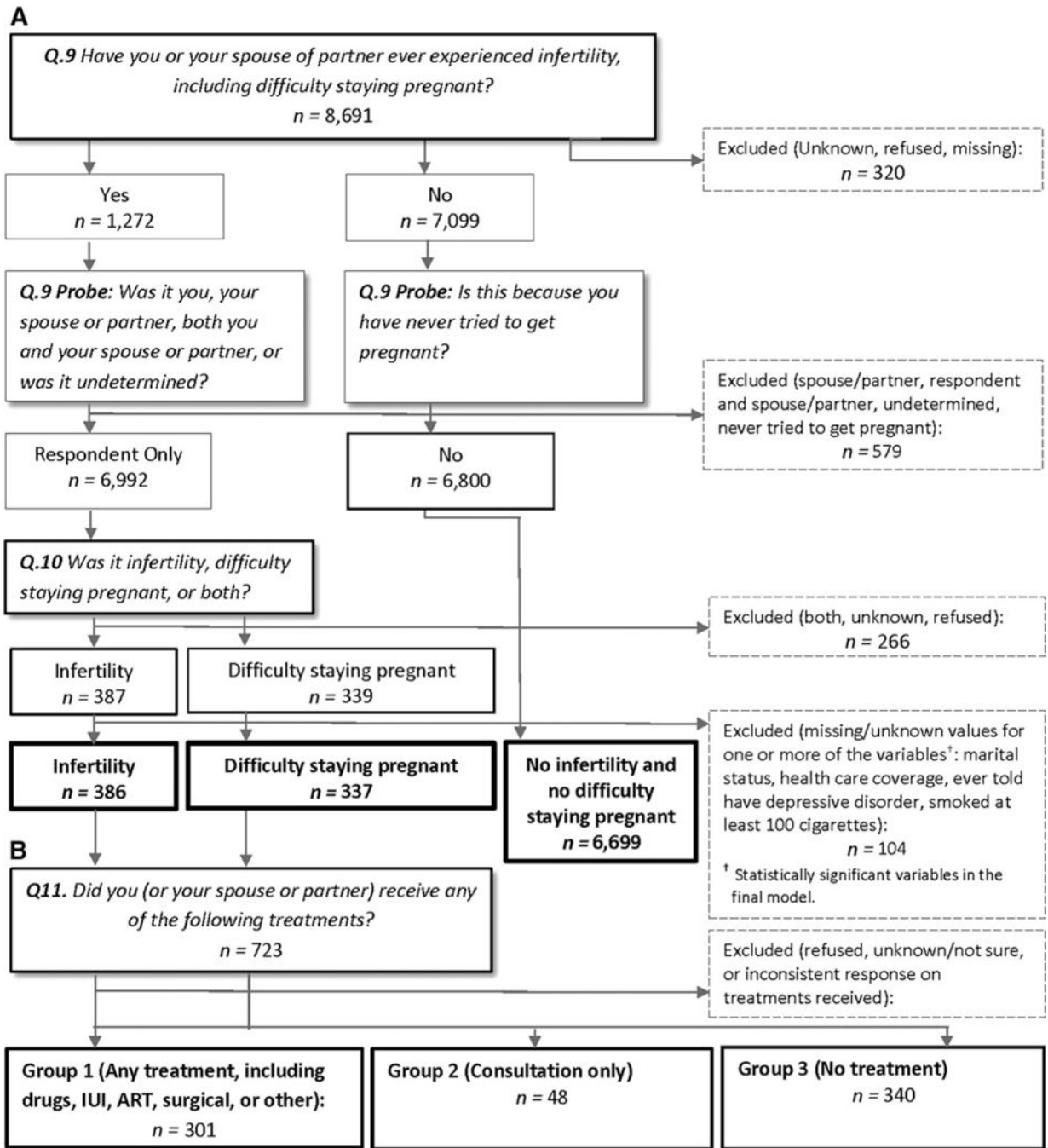


FIG. 1. Sample selection—BRFSS Reproductive Health State-Added Survey for seven states, 2013. (A) Sample selection for primary outcome; (B) Sample selection for secondary outcome. BRFSS, Behavioral Risk Factor Surveillance System.

Table 1

Demographic and Risk Characteristics for Women of Reproductive Age, by Female Infertility Problems—Behavioral Risk Factor Surveillance System Reproductive Health State-Added Survey for Seven States, 2013

Demographic and risk characteristics	n	N	No infertility and no Difficulty staying pregnant (n = 6699), N = 10,075,896		Difficulty staying pregnant only (n = 337), N = 444,865		Infertility only (n = 386), N = 526,268		p ^b	p ^c
			Percentage ^d	95% CI	Percentage ^d	95% CI	Percentage ^d	95% CI		
Age										
18–24	837	2,130,737	20.0	17.5–22.7	20.2	8.8–39.9	5.5	1.8–15.3	0.02	0.14
25–34	1860	3,409,694	30.9	28.1–33.7	35.3	24.6–47.6	27.3	16.7–41.2		
35–44	2655	3,392,806	30.3	27.9–32.9	28.4	20.4–38.1	39.9	27.0–54.3		
45–50	2070	2,113,792	18.8	16.9–20.9	16.2	11.1–23.0	27.3	17.0–40.9		
Race/ethnicity									0.24	0.40
Non-Hispanic white	5480	6,454,870	57.8	54.9–60.7	62.1	47.4–74.9	66.7	51.3–79.2		
Non-Hispanic black	904	1,432,776	13.3	11.2–15.6	10.6	5.5–19.4	9.1	4.0–19.6		
Hispanic	713	2,561,239	23.8	21.2–26.7	22.8	11.0–41.5	11.1	4.6–24.4		
Other	325	598,143	5.1	4.0–6.3	4.5	1.9–10.5	13.1	5.3–29.1		
Marital status ^d									0.01	0.19
Married or cohabitating ^e	4407	6,253,229	55.4	52.5–58.2	63.9	52.1–74.1	74.3	62.3–83.5		
Unmarried and not cohabitating or never married	3015	4,793,800	44.6	41.8–47.5	36.1	25.9–47.9	25.7	16.5–37.7		
Education ^d									0.04	0.33
Some high school	493	1,516,530	14.1	11.8–16.8	15.0	5.1–36.8	5.8	2.8–11.9		
High school graduate	3992	6,658,927	60.6	57.7–63.4	59.9	46.4–72.1	58.7	44.6–71.6		
College graduate	2925	2,838,433	25.3	23.3–27.4	25.1	18.1–33.6	35.5	23.6–49.4		
Employment ^d									0.07	0.24
Employed	4826	6,496,522	59.4	56.4–62.3	52.0	39.1–64.6	57.6	43.3–70.7		
Unemployed	581	766,491	6.9	5.9–8.1	11.5	6.1–20.7	4.2	2.4–7.2		
Not working by choice	1451	3,158,555	28.7	25.8–31.8	25.8	13.5–43.5	30.3	18.0–46.2		
Unable to work	548	590,603	5.0	4.1–6.0	10.7	6.1–18.2	7.9	4.3–14.1		
Annual household salary ^f									0.33	0.22
<\$25,000	1896	3,416,352	36.3	33.4–39.3	41.8	28.5–56.4	28.6	17.0–44.0		

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Demographic and risk characteristics	n	N	No infertility and no Difficulty staying pregnant (n = 6699), N = 10,075,896		Difficulty staying pregnant only (n = 337), N = 444,865		Infertility only (n = 386) N = 526,268		p ^c
			Percentage ^d	95% CI	Percentage ^d	95% CI	Percentage ^d	95% CI	
\$25,000 to <\$50,000	1439	1,911,922	20.4	18.0–22.9	20.6	12.2–32.5	17.2	8.3–32.1	
\$50,000 to <\$75,000	987	1,198,449	13.1	11.3–15.1	10.5	5.3–19.8	7.4	4.5–12.1	
\$75,000 or more	2192	2,931,104	30.3	27.5–33.3	27.1	19.2–36.8	46.8	32.3–61.8	
Healthcare coverage ^d									<0.001
Yes	6194	8,467,975	75.5	72.9–78.0	82.5	72.2–89.5	92.9	88.1–95.8	
No	1228	2,579,054	24.5	22.0–27.1	17.5	10.5–27.8	7.1	4.2–11.9	0.38
Timing of last checkup ^f									0.19
<12 months	5001	7,257,744	66.8	64.0–69.4	61.6	47.2–74.2	73.6	62.3–82.5	
Never or 12 months or more	2308	3,592,782	33.2	30.6–36.0	38.4	25.8–52.8	26.4	17.5–37.7	
General health status ^d									0.49
Good to excellent	6343	9,245,685	85.4	83.3–87.3	80.1	69.9–87.4	85.9	77.1–91.7	
Poor to fair	1059	1,604,730	14.6	12.7–16.7	19.9	12.6–30.1	14.1	8.3–22.9	
Ever told have diabetes ^d									0.57
Yes	382	467,246	4.0	3.1–5.1	4.8	2.3–10.0	8.9	3.4–21.4	
Yes, pregnancy only	214	335,252	3.1	2.2–4.3	2.8	1.0–7.9	2.0	1.1–3.7	
No or prediabetic or borderline	6816	10,227,307	92.9	91.4–94.2	92.3	86.1–95.9	89.1	77.4–95.1	
Ever told have hypertension ^d									0.36
Yes	1321	1,577,421	13.8	12.1–15.7	12.4	7.7–19.2	25.0	14.0–40.5	
Yes, pregnancy only	193	291,235	2.5	1.7–3.6	4.6	2.0–10.2	4.4	0.9–18.5	
No or prehypertensive or borderline	5899	9,158,047	83.7	81.6–85.6	83.0	75.0–88.8	70.7	55.0–82.6	
Ever told have depressive disorder ^d									0.01
Yes	1963	2,898,288	25.0	22.7–27.5	39.1	28.3–51.1	38.2	24.9–53.5	
No	5459	8,148,741	75.0	72.5–77.3	60.9	48.9–71.7	61.8	46.5–75.1	
Body mass index ^f									0.39
Underweight	161	317,114	3.0	2.2–4.1	5.7	1.3–21.9	5.3	1.0–24.3	
Normal	2764	3,828,967	39.5	36.6–42.6	33.9	25.0–44.0	26.8	17.8–38.3	
Overweight	1873	2,738,742	27.5	24.8–30.4	23.8	16.1–33.8	33.9	20.0–51.2	
Obese	2005	2,999,859	29.9	27.2–32.8	36.5	26.5–47.9	33.9	21.3–49.4	

Demographic and risk characteristics	n	N	No infertility and no Difficulty staying pregnant (n = 6699), N = 10,075,896		Difficulty staying pregnant only (n = 337), N = 444,865		Infertility only (n = 386) N = 526,268		p ^b	p ^c
			Percentage ^d	95% CI	Percentage ^d	95% CI	Percentage ^d	95% CI		
Ever smoked at least 100 cigarettes ^d										
Yes	2703	3,852,646	34.1	31.5–36.8	52.0	39.4–64.4	35.5	22.7–50.8	0.02	0.09
No	4719	7,194,383	65.9	63.2–68.5	48.0	35.6–60.6	64.5	49.2–77.3		
Average hours of sleep per night ^d										
<4 hours	103	147,679	0.9	0.6–1.4	2.2	0.7–6.5	8.4	1.4–38.0	0.37	0.43
Four hours or more	7256	10,723,744	99.1	98.6–99.4	97.8	93.5–99.3	91.6	62.0–98.6		

^aWeighted proportion (as a percentage).

^bAssessing any difference between the three groups: no infertility and no difficulty staying pregnant, difficulty staying pregnant, infertility.

^cAssessing any difference between the difficulty staying pregnant and infertility groups.

^dMissing <1%.

^eCohabiting indicates living with a partner.

^fAnnual household salary missing for 12.2%, timing of last checkup missing for 1.5%, and body mass index for 8.3% of observations.

CI, confidence interval.

Table 2

Multinomial Regression of Characteristics Associated with Infertility Group Among Women of Reproductive Age—Behavioral Risk Factor Surveillance System Reproductive Health State-Added Survey for Seven States, 2013

Demographic and risk characteristics ^b	Unadjusted			Adjusted odds ratio ^{a,b}						p			
	OR	95% CI	Inferfertility only vs. no infertility and no difficulty staying pregnant	OR	95% CI	Inferfertility only vs. difficulty staying pregnant	aOR	95% CI	Inferfertility only vs. no infertility and no difficulty staying pregnant		aOR	95% CI	Inferfertility only vs. difficulty staying pregnant only
Healthcare coverage													<0.01
Yes	1.00	—	1.00	1.00	—	1.00	1.00	—	1.00	—	1.00	—	
No	0.66	0.36–1.21	0.24	0.13–0.42	0.36	0.16–0.82	0.68	0.38–1.24	0.26	0.14–0.46	0.37	0.17–0.84	
Ever told have depressive disorder													0.01
Yes	1.92	1.16–3.17	1.85	0.98–3.47	0.96	0.44–2.12	1.69	1.07–2.68	2.02	1.14–3.59	1.20	0.58–2.45	
No	1.00	—	1.00	—	1.00	—	1.00	—	1.00	—	1.00	—	
Ever smoked at least 100 cigarettes													0.02
Yes	2.10	1.24–3.56	1.07	0.56–2.02	0.51	0.22–1.15	1.98	1.22–3.20	0.88	0.49–1.57	0.44	0.21–0.93	
No	1.00	—	1.00	—	1.00	—	1.00	—	1.00	—	1.00	—	

Bold values represent alpha = 0.05.

^aListwise deletion of observations with missing demographic or risk characteristics resulted in the following unweighted sample sizes and weighted percentages of women: no infertility and no difficulty staying pregnant ($n = 6699$, 91.2%), difficulty staying pregnant ($n = 337$, 4.0%), and infertility ($n = 386$, 4.8%).

^bOnly statistically significant demographic and risk characteristics in the adjusted model are presented in Table 2; the adjusted model included age, marital status, healthcare coverage, history of depressive disorder, and smoking.

aOR is the adjusted odds ratio.

Table 4

Prevalence of Treatment Among Women of Reproductive Age with Infertility Only or Difficulty Staying Pregnant Only—Behavioral Risk Factor Surveillance System Reproductive Health State-Added Survey for Seven States, 2013

<i>Type of infertility treatment</i>	<i>n</i>	<i>N</i>	<i>Difficulty staying pregnant only</i>		<i>Infertility only</i>		<i>p</i>
			<i>Percentage</i>	<i>95% CI</i>	<i>Percentage</i>	<i>95% CI</i>	
Treatment ^a	301	334,147	18.9	11.4–29.9	49.6	34.9–64.4	<0.001
Consultation only	48	125,643	8.0	3.3–18.1	18.0	7.0–38.9	
No treatment	340	472,723	73.1	60.9–82.5	32.4	20.9–46.6	

^aTreatment includes drugs, IUI, ART, surgical intervention, or other treatment (and excludes consultation only). ART, assisted reproductive technology; IUI, intrauterine insemination.

Table 5

Prevalence of Healthcare Coverage Among Women of Reproductive Age with Infertility, by Infertility Treatment—Behavioral Risk Factor Surveillance System Reproductive Health State-Added Survey for Seven States, 2013

	n	N	Percentage	95% CI
Type of treatment infertility				
Treatment ^a	236	254,760	96.3 ^b	92.6–98.2
Consultation only	30	92,272	99.0 ^c	94.2–99.8
No treatment	104	166,397	84.5	70.0–92.7

Healthcare coverage includes health insurance, prepaid plans such as HMOs, government plans such as Medicare, or Indian Health Service.

^aTreatment includes drugs, IUI, ART, surgical intervention, or other treatment (and excludes consultation only).

^bSignificant difference in prevalence of healthcare coverage between treatment and no treatment using *t*-test (difference = 11.8, 95% CI = 0.4–23.2, *p* value = 0.0426).

^cSignificant difference in prevalence of healthcare coverage between consultation only and no treatment using *t*-test (difference = 14.5, 95% CI = 3.2–25.7, *p* value = 0.0119).

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