A Comparative Analysis of Health-Seeking Behaviors for Women at Risk of Primary or Secondary Infertility

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ABSTRACT

Health-seeking behaviors (HSB) are influenced by multiple social and personal factors and in the case of infertility, seeking treatment is likely to occur after the inability to get pregnant or carry a pregnancy to term persists for longer than one year. This is after prolonged exposure to the risk of pregnancy fails to provide a successful pregnancy, and, the desire for children remains. Most research on health-seeking behaviors for infertility focus on the nulliparous woman who is at risk of primary infertility. This research furthers this examination by comparing the rates of health-seeking behaviors for nulliparous women at risk of primary infertility to parous women at risk of secondary infertility. Applying socially constructed pathways of HSB, preliminary findings suggest that the rates of health-seeking behaviors do indeed vary by fertility status with observed differences in HSB dependent on fertility status.

INTRODUCTION

This research is a comparative analysis of unique social pathways, including education, employment status, and relationship status and duration, that influence the risk of health-seeking behaviors (HSB) for nulliparous women and parous women experiencing infertility. Specifically, this research examines how in the presence of these selected social factors the rates of HSB for infertility vary by parity status, or rather, there will be observable differences in the effects of these pathways on the rates of HSB for women at risk of primary infertility compared to women at risk of secondary infertility. Infertility, briefly defined, is the inability to get pregnant or carry a pregnancy to term. A respondent at risk of primary infertility is identified as nulliparous in that she has never been pregnant, or, has never had a pregnancy end in a live birth. A respondent at risk of secondary infertility, identified as parous, is a woman who has already had one pregnancy end in live childbirth but has been unable to subsequently get pregnant or carry a pregnancy to term.

It is important to compare the rates of HSB by parity status for many reasons. First, is the assumed higher rates of both reported and unreported, secondary infertility in the United States (Simmons, 2000). In addition, not all women who experience any lifetime infertility will seek treatment, so not only is it important to identify what factors influence the decisions to engage in HSB, but to further this understanding and determine why women at risk of primary infertility behave differently compared to women at risk of secondary infertility. This distinction is essential in providing quality health and professional services for all women experiencing infertility.

Furthermore, it is important to examine the differences in HSB by parity status due in part to competing realities of changing social trends and norms that influence the timing and

circumstances of childbearing, with the consistent fertility expectations that women will have two, or at least one, children during their reproductive life course (McQuillan, Greil, Shreffler, & Tichenor, 2008). Therefore, examining the effects of these competing realities on HSB by parity status is necessary to better understand the fertility outcomes and the infertility experience of women in the U.S.

The second reason is that the infertility experience for the nulliparous and parous woman is very different, and this difference has yet to be fully explored in the reproductive health research. Women experiencing secondary infertility, or parous respondents, present a unique infertility experience. On one hand, they are not necessarily infertile, because they have had at least one biological child; however, they are not necessarily fertile, because they are unable to have another biological child. The dual status of fertile/yet infertile distinguishes the parous woman from the nulliparous woman not only in how they identify and measure their infertility status, but in how, and why they engage in HSB for infertility. This research would be the first study to examine how in the presence of select social factors, biological mechanisms, and contextual effects the rates of HSB for infertility will be higher or lower dependent on parity status.

INFERTILITY DEFINED

For the purpose of this research, a combined definition of infertility is applied using both a biomedical and demographic approach to define infertility. Primary infertility is defined as the inability to get pregnant or carry a pregnancy to term when a woman has never had a live birth. Women at risk of primary infertility are also identified as nulliparous. Secondary infertility is defined as the inability to get pregnant or carry a pregnancy to term, after a woman has had at least one pregnancy end in a live birth. Women at risk of secondary infertility can also be

referenced as parous. It is important to mention that within group differences may exist among parous respondents at risk of secondary infertility, such that the HSB within this group may differ if the respondent has 1, 2, 3, or more children. However, the specific focus of this research is to identify whether rates of HSB differ for primary versus secondary infertility and focusing on within group differences for respondents at risk of secondary infertility goes beyond the scope of this research.

Furthermore, Collins *et al* (1986) argues that secondary infertility is not solely defined by the presence or absence of infertility complications in the first or any subsequent pregnancies. For example, a parous woman who had her first pregnancy without using any infertility services, but engages in HSB for infertility for a subsequent pregnancy is identified as experiencing secondary infertility. Likewise, a parous woman did have her first pregnancy occur through infertility assistance, and is engaging in HSB for infertility for her next pregnancy is also identified as experiencing secondary infertility. Therefore, in this research, the risk of secondary infertility is not defined by the presence, or absence, of previous HSB for infertility for prior pregnancies, rather, HSB for secondary infertility are observed among women who are parous – regardless of how the previous pregnancies occurred.

SOCIAL FACTORS AND HEALTH-SEEKING BEHAVIORS

Evolving social environments since the 1960s, advancements in reproductive technologies and overall public awareness of the so-called "biological clock" influence fertility trends and fertility-related health-seeking behaviors (Abma & Martinez, 2006). Changing familial and social expectations have led to an increasing number of women pursuing education and employment opportunities, delaying the transition to marriage, and subsequently delaying childbearing (Abma & Martinez, 2006; Thornton & Young-DeMarco, 2001). However, the

social-normative trend in the United States promoting parenthood and imposing social expectations for women to become mothers is counterintuitive to these changing social trends that have contributed to delaying childbearing (Thornton & Young-DeMarco, 2001). This in turn, results in women feeling social pressure to become mothers at all costs possible (Mathews & Hamilton, 2009). Furthermore, popular and mass media attention to the so-called "biological clock" has persisted for women, further promoting the social norm/expectation of having children (Thornton & Young-DeMarco, 2001).

I hypothesize that educational attainment, employment status, relationship type, and relationship duration are some of the social factors that not only influence when, or if, a woman has children, but they influence the rates of HSB for infertility. More specifically, I hypothesize that the risk of HSB in the presence of these social factors will be significantly different for women at risk of primary infertility versus women at risk of secondary infertility.

DATA AND METHODOLOGY

To test the effects of social factors on HSB for infertility I use retrospective data from the female respondent and pregnancy history files of the NSFG 2006-2010 continuous data file. The method of analysis is discrete-time event history models. The dependent variable is the rates of HSB for help to get pregnant or carry a pregnancy to term. Because not all respondents are at risk for HSB for infertility, and the dependent outcome may be right censored, event history methodology is the most appropriate technique (Allison, 1982). The dependent variable is constructed from the female respondent file and includes all respondents who have ever had sexual intercourse with a male partner, or are at least 18-years-old.

In these analyses, the risk of HSB for infertility is determined based on parity status. For women at risk of HSB for primary infertility, the hazard begins at age 15, which is the earliest

age reported of having sex with a man by a respondent in this sample. Even though the likelihood of HSB at an age younger than 18 is very low, I start the hazard at age 15 based on the logic that once the risk of pregnancy begins, so begins the risk of infertility, and subsequently, the risk of engaging in HSB for infertility. For women at risk of HSB for secondary infertility, the hazard begins at the century month of their first live birth. I start the hazard when the first birth has occurred because a woman cannot be at risk for secondary infertility if she has not already had at least one successful pregnancy.

The dependent outcome in these analyses is the rates of HSB for infertility. The dependent variable is 0 for every person month that the female has no HSB for infertility. When the female respondent reports any HSB for infertility, the outcome is coded 1 and the female is removed from the analysis. At the end of the observation period, which is the end date for the interview survey, any female respondents with no HSB for infertility are censored. Female respondents younger than age 18 and those who have never had sex with a man are removed from the analysis because they were not asked any of the health-seeking behavior questions for infertility based on the survey design and skip patterns of the NSFG. In total, there were 902 cases removed through list wise deletion because respondents were not asked questions about HSB for infertility. The final sample size for these analyses is 11,210 cases.

The main effects for these analyses are the various social factors including education, employment, and relationship status. These main effects are interacted with parity status and the variable construction for these main effects will be discussed later in this section. A female respondent is observed in one of two parity conditions: parous or nulliparous. A female identified as parous will have at least one pregnancy history that ended with a live birth. A parous woman in these analyses is identified as being at risk for secondary infertility. A female is

identified as nulliparous if she has never been pregnant, has never been able to carry a pregnancy to term, or, if she has been pregnant, but the pregnancy did not end in a live birth. A nulliparous woman is identified as being at risk for primary infertility. Parity status is a dichotomous variable where parous females are coded 1 and nulliparous females are coded 0.

Although it is possible that there are within-group differences of HSB, for example, that the HSB for women at risk of secondary infertility varies dependent on the number of children she has had, the purpose of this research is to identify the difference between groups of women at risk of primary versus secondary infertility. Therefore, the dichotomized coding of the parity status variable suggests that having at least one live birth, or being parous, is a permanent effect that will influence the outcome of HSB for infertility differently when compared to a nulliparous woman and when other independent variables are present. This permanent effect is assumed constant even in the presence of more than one pregnancy.

Controls for these analyses include race/ethnicity, age and a series of variables from the respondent's childhood used as a proxy for current socioeconomic status. I control for age and parameterize the baseline hazard through a series of six dummy variables for 5-year birth cohorts that include ages 15-19, 20-24, 25-29, 30-34, 35-39, and 40-45. The last cohort is a 6-year cohort because a small sample of female respondents (N=4) were age 44 at the time of interview screener but had their 45^{th} birthday prior to the actual interview.

To test the effect of social factors on HSB for infertility I include four independent variables that include highest level of education, employment status, relationship type, and relationship duration. The highest level of education is a time-varying dichotomous variable where a 1 indicates that the female respondent has the educational level and a zero 0 indicates they have not. There are four distinct educational levels included: 1) no high school or GED

degree, 2) high school or GED degree, 3) a bachelor's degree and 4) a graduate degree including a Master's and PhD. Educational attainment is important to include because of the dual role education has on predicting HSB for infertility. In one case education attainment may delay childbearing and increase the risk of infertility, and subsequently HSB for infertility. Alternatively, having more education can also increase the number of resources available to someone who faces infertility making the decision to seek treatment more feasible.

Employment status is an important measure to include when testing the effect of social factors on the risk of HSB for infertility because employment is associated with greater access to financial and social support resources that influences the decision to utilize health services as well as the ease of accessing these services. There are two measures of employment included in the analyses. In the first, employment is a time-varying dichotomous variable coded 1 if the respondent was working in full- or part-time employment in the month prior to the risk of HSB and coded 0 otherwise. The second measure is a time-varying interval-level variable that measures the cumulative number of years the female respondent was working in full- or part-time employment at the time of the risk for HSB for infertility. Using two measures of employment is important because I can test the effect being employed in either full or part time employment on the risks of HSB for infertility based on the presence of predisposing factors that come with employment. However, I can also measure the effect of the cumulative number of years of employment on the risk of HSB as it may vary by parity status. The reference for the employment variables are women who were not employed at the time of risk for HSB for infertility.

To test the effects of relationship type on the rates of HSB for women at risk of primary or secondary infertility, I include three time-varying dichotomous variables coded 1 if the

respondent was in that relationship type or 0 if she was not. These categories are 1) not in a relationship because she was single, divorced, or separated, 2) cohabiting or 3) married. It is possible that a respondent can move between these types of relationships during the period of observation, but because the purpose of this research is to look at the effect of parity status on HSB, I am interested in looking at the effect of relationship status at the time of risk for HSB and not the effect of relationship transitions on HSB. Therefore, the number of times a respondents has moved between a single, cohabiting, or married relationship is not included in these analyses, but rather the type of relationship she was in the month prior to the risk of HSB. To capture any effect of parity status on the risks of HSB, I look at the effect of relationship type, controlling for relationship duration among women at risk of primary infertility, and again among women at risk of secondary infertility. By approaching the analyses of relationship type in this manner, I am able to observe any effects of relationship type among nulliparous women and among parous women.

The second aspect of relationship status included in these analyses is the duration of the relationship at the time of risk for HSB for infertility. In these analyses, I control for relationship type and use a series of time-varying dichotomous variables for relationship duration that include: 1) in a relationship for less than one year 2) in a relationship for 1 to 3 years 3) in a relationship for 3 to 5 years, and 4) in a relationship for 5 or more years. The fifth category is also the reference group and refers to individuals who are single, or not in a relationship. I include these particular categories based on the idea that the transition from beginning a relationship into parenthood varies by the age of the couple, their socioeconomic status, and race/ethnicity (Furstenberg, 2010). The analyses testing the effects of relationship duration control for relationship type, leaving single as the reference group, and consist of a series of models where I

look at differences in the effects of relationship duration on the rates of HSB for infertility. This is done within groups of women at risk of primary infertility and repeated within groups of women at risk of secondary infertility. The comparative focus in these analyses is between relationship duration. If there are significant differences in the effects of relationship duration among the parity types, this is identified with an 'X' indicating significant differences by duration at the .05 level. Table 1-1 provides the descriptive statistics for the final sample.

RESULTS

In these analyses I start the hazard for the risk of primary infertility at age 15 and the hazard for the risk of secondary infertility at the age of the female respondent at her first, live birth. I have two different hazards because women can only become at risk for secondary infertility after she has had at least one successful pregnancy. Therefore, it is necessary to begin measuring the risk once after this first live birth and after she can be identified as parous.

For primary infertility, the hazard begins at age 15 for two reasons. First, at least 60% of the sample reports having their first sexual intercourse with a man before age 18 and the youngest age being age 15. There were no reported first sexual intercourses younger than age 15 in this sample. Second, even though the risks for primary infertility are relatively low for women younger than age 18, starting the hazard at age 15 is a natural point in time to begin the period of risk for HSB for infertility, because with the onset of exposure to pregnancy, so begins the risk for infertility. The time-varying covariates included in this model pertain to time periods after the hazard begins for both primary and secondary infertility and controls are based on fixed, childhood characteristics.

Because this research is looking at the effect of parity status on HSB for infertility, pairs of models were conducted separately for women at risk of primary infertility and women at risk

of secondary infertility. Fully interactive models were conducted that interacted infertility risk with each predictor and control. A third column next to each pair of models indicates with an 'X' if the differences in the risks of HSB are significant for women at risk of primary infertility compared to women at risk of secondary infertility at the .05 level.

As I present the findings from the hazard models estimating the effects of social factors on the risks of HSB for infertility, results for the controls can be seen in models 1 and 2 of Table 1-2. In models 3 and 4 of Table 1-2 I examine the effect of educational attainment on the risks of HSB for infertility by parity status. My overarching hypothesis is that with more education the higher the rates of HSB for infertility. More specifically, I hypothesize that with more education, women at risk of primary infertility will have higher rates of HSB compared to women at risk of secondary infertility with similar levels of education. Pairs of models were run that stratify by parity status. Model 3 are the results of the effects of education on the rates of HSB for women at risk of primary infertility and Model 4 are the effects of education on HSB for infertility for women at risk of secondary infertility.

The results from Model 3 show that the rates of HSB for respondents at risk of primary infertility increase with each additional degree of education completed, when compared to the reference group (no high school/GED degree). For example, the rates of HSB for nulliparous respondents with a high school degree are 55% (1.55 – 1.00 = 55%) greater than the rates for women with no high school/GED degree. HSB rates for respondents with a bachelor's degree are 85% greater than the reference groups, and women at risk of primary infertility with a graduate degree are more than 190% more likely to be at risk of HSB for infertility compared to women with less than a high school degree. As expected, with more education, the rates of HSB increase, significantly for respondents with a bachelors ($p<.01$) or graduate degree ($p<.05$). This

relationship may be explained by the fact that educational attainment is an enabling factor that can both delay the transition to childbearing for women, but is also provides access to certain resources or social networks that makes pursuing HSB for infertility more likely.

In Model 4 I look at the effects of education on HSB for respondents at risk of secondary infertility. In comparison to women with less than a high school degree/GED equivalent, the rates of HSB increase with each educational degree higher. For example, women at risk of secondary infertility who have at least a high school diploma are 69% more likely to engage in HSB for infertility compared to women with less than a high school diploma. For women with a bachelor's degree the rates of HSB are 197% greater than the reference group and for women with a graduate degree the rates are 234% greater than women with less than a high school degree. The effects of educational attainment on the rates of HSB for women at risk of secondary infertility are all significant at the $p<.001$. Contrary to my hypotheses that the effects of education on the rates of HSB for infertility would be stronger for women at risk of primary infertility compared to women at risk for secondary infertility, there was no significant difference observed in the rates of HSB by parity status.

In Table 1-3 I present the results for two types of employment-status effects on the risk of HSB for infertility, based on parity status. The first employment effect is being employed in either full- or part-time employment in the month prior to the risk of HSB for infertility. The second employment effect is cumulative years of full- or part-time employment in the month prior to the risk of HSB for infertility. My hypothesis regarding employment status is that being employed in either full- or part-time employment as well as the cumulative number of years of employment will increase the rates of HSB for infertility for both nulliparous and parous woman. More specifically, I hypothesize that the effects of employment on the rates of HSB will be

stronger for women at risk of primary infertility compared to women at risk of secondary infertility.

In Model 1 of Table 1-3 I present the results of employment status on the rates of HSB for women at risk of primary infertility. The rates of HSB for infertility for women who were employed in paid labor for either full- or part-time work in the month prior to the risk of HSB are 180% greater than the rates of HSB for unemployed women, or women working in unpaid labor. Put another way, the risks of HSB for primary infertility are 180% greater than employed women (full or part time employment) compared to the rates of HSB for women who are unemployed or working in unpaid labor. This is significant at the .001 level. However, the effect of cumulative years of employment did not have a significant effect on the rates of HSB for women at risk of primary infertility. The higher rates of HSB for employed women compared to unemployed women is likely due the enabling aspects of employment that provide financial resources and benefits to a woman, influencing her HSB for infertility.

Model 2 in Table 1-3 presents the results of employment for women who are at risk of HSB for secondary infertility. The first significant finding of employment status in the rates of HSB for women at risk of secondary infertility is being employed in either full or part time employment. The rates of HSB women who are employed in full- or part-time employment are 168% greater than the rates for unemployed women. In addition, the rates of HSB for women at risk of secondary employment increase by 11% for each year of employment. Put another way, for each year that a woman was employed in full- or part-time employment, her risks of HSB for secondary infertility increase by 11%.

The interactive models (not shown here, but identified with an ‘X’ in the model for any significant differences; $p<.05$) comparing the effects of employment on the rates of HSB for

primary versus secondary infertility suggest that there is a significant difference in the rates of HSB for infertility for women at risk of primary infertility compared to women at risk for secondary infertility. For example, cumulative years of employment results in significant differences in the rates of HSB for women who are at risk of primary infertility compared to women who are at risk of secondary infertility; this is significant at $p<.05$. It is possible that the significant difference in the rates of HSB by parity status reflects the experience of the parous woman's exit and re-entry to the workforce from their first childbirth, and their willingness to postpone career aspirations to meet their fertility expectations, or, they have access to resources, financially or emotional, in the workplace environment that would promote HSB for infertility.

In Table 1-4 I control for relationship type and test the effects of relationship duration on the rates of HSB in two distinct models. In one model, I look at the effects of relationship duration for women who are at risk of primary infertility, and only for women who are married or in a cohabiting relationship – with single women as the reference group. In the second model, I look at the effects of relationship duration for women at risk of HSB for secondary infertility, and only for women who are married or in a cohabiting relationship – again, single women are the reference group. Unique to the models testing the effects of relationship duration and type, I do not compare the rates of HSB by parity status, but rather, I look at the different effects of relationship type among women at risk of either type of infertility. I do not compare rates by parity status for these models because doing so would reduce the number of observations in each category and any significant effects would be biased towards those low numbers. By approaching the analyses in this manner (looking at effects among groups of women by infertility risk) I am still able to distinguish the effects, if any, relationship duration has on the rates of HSB, specific to parity type.

In Model 1 of Table 1-4, I present the findings of the effects of relationship duration, for women who are married and are at risk of primary infertility. The coefficients presented in Model 1 of Table 1-4 come from the analyses that controls for relationship type and uses single women as the reference group. In a series of analyses (not shown here) I compare the effects of relationship duration by leaving out one of the four duration categories. For example, I use married for 0 – 1 year as a reference for one set of analyses, followed by married for 1 to 3 years as a reference, then married for 3 to 5 years as a reference, and finally, married for 5 or more years as a reference. Any significant effects between the different relationship durations are identified in Model 1 of Table 1-4 with a line between relationship durations and an asterisk indicating a significant difference at the .05 level. This series of analyses (i.e. leaving out one duration period for each model) is repeated for women who are cohabiting and are at risk of primary infertility, as well as the models for women who are married or cohabiting and are at risk of secondary infertility.

The results from Table 1-4, Model 1 indicate that among married women at risk of primary infertility, the highest rates of HSB for infertility are observed among women married for 3 to 5 years which is 147%% greater than single women. The next highest rate of HSB is among women who have been married for 1 to 3 years which is 123% greater than single women. Women at risk of primary infertility who have been married for 5 or more years have rates of HSB that are 103% greater than single women, and women married for less than 1 year have rates of HSB that are 74% greater than single women. These findings suggest that the effect of relationship duration increase the rates of HSB during the earlier years of a marital union, and that after 5 or more years of marriage, there is a slight lower rate of HSB compared to women married between 1 to 5 years, but this is still higher than the rates of HSB for single women.

The significant differences in relationship duration are observed among women at risk of primary infertility who have been married for less than 1 year compared to women married for 1 to 3 years. In this comparison, the higher rates of HSB among women married for 1 to 3 years is significantly greater than the rates of HSB for women married for less than 1 year. Likewise, the rates of HSB for women married for 3 to 5 years who are at risk of primary infertility are significantly greater than the rates of HSB for women married for less than 1 year. These significant comparisons by relationship duration suggest that there is an effect of relationship duration during the initial, or earlier years of the marital union.

Also in Model 1 of Table 1-4 I present the findings from the analyses testing the effects of duration for women in cohabiting unions which that the duration of a cohabiting relationship on the rates of HSB are significantly different from the rates of single women, but there are no significant differences between the different duration periods among this group of cohabiting women at risk of primary infertility.

In Table 1-5 I present the results from the analyses that control for relationship type and test the effects of relationship duration on the rates of HSB for women at risk of secondary infertility, controlling for relationship type and using single women as the reference group. In Model 1 of Table 1-5 I look at the effects of marriage duration on the rates of HSB for women at risk of secondary infertility. Women at risk of secondary infertility, who have been married for less than 1 year have HSB rates that are 164% greater than single women. The rates of HSB for women who have been married for 1 to 3 years is 196% greater than single women, and is 119% greater for women married for 3 to 5 years. The lowest rates of HSB compared to single women is observed among women at risk of secondary infertility who have been married for more than 5 years – their rates of HSB are 84% greater than single women. The effects of relationship

duration for women who are married and at risk of secondary infertility are significant in predicting HSB for infertility, however, the only significant differences observed between relationship durations is between women married for 1 to 3 years and women married for 3 to 5 years. The effect of duration for women married for 1 to 3 years is significantly greater than the effect of duration for women married for 3 to 5 years. There were no significant effects of the duration on the rates of HSB for cohabiting women who are at risk of secondary infertility, nor were there any significant differences between the different lengths of relationship duration for women in cohabiting relationships.

In Table 1-6 I rearrange the coefficients from the analyses in Tables 5-4 and 5-5 to examine if, controlling for relationship duration, there are any significant effects on the rates of HSB by relationship type, among women at risk of primary infertility, or, among women at risk of secondary infertility. In Table 1-6 I do not include any control measures and only present the results for relationship type effects on HSB for infertility. The three relationship types I include are married, cohabiting, or single. The reference group for these analyses is single women. A woman can only be observed in one of these relationship types at the time of risk for HSB. I hypothesized that married women, more than cohabiting or single women, would have the highest rates of HSB for infertility.

In Model 1 of Table 1-6 I present the coefficients for the effects of relationship type for women at risk of primary infertility on the rates of HSB. It appears that being married and cohabiting increase the rates of HSB, compared to single women, but the only significant difference by relationship status is observed between women who have been married or cohabiting for 3 to 5 years. In this circumstance, the rates of HSB for women at risk of primary infertility are significantly higher for married women than cohabiting women. Model 2 of Table

1-6 is the coefficients testing the effects of relationship duration rearranged to test the effects of relationship type for women at risk of secondary infertility. The results from these analyses suggest that for women at risk of secondary infertility, being married, versus being single, significantly increases the rates of HSB for infertility. There were no significant effects of being in a cohabiting union on the rates of HSB, nor were there are any significant difference between relationship type for women who are married or cohabiting and are at risk of secondary infertility.

A final set of models presented in Table 1-7 tests the effects of all the social factors on the rates of HSB for infertility. In Model 1 I test the effects of education, employment, and relationship status on the rates of HSB for women at risk of primary infertility. In Model 2 I test the effects of education, employment, and relationship status on the rates of HSB for women at risk of secondary infertility. This full model, testing the effects of all the social factors on the rates of HSB, was estimated to determine if the outcomes for each of the theoretical concepts would persist in the presence of the other social factors. The results from Model 1 indicate that the rates of HSB for women at risk of primary infertility increase with each higher degree of education, the rates of HSB are higher if she is employed in full or part time paid employment, and the rates of HSB increase the longer she has been in a relationship, and if she is married versus being single or cohabiting. These outcomes are similar the outcomes observed when I tested the individual effects of the social factors on rates of HSB for women at risk of primary infertility.

In Model 2 I estimate the effects of the combined social factors for women at risk of secondary infertility. The outcomes from this full model suggest that the rates of HSB are higher among women at risk of secondary infertility with more education, those who are employed, the longer she has been in a relationship, and if she is married. These outcomes are similar to the

outcomes when I tested each individual social factor effect on the rates of HSB for women at risk of secondary infertility.

Additionally, the rates of HSB by parity status in the presence of the combined social factors reflect the outcomes from each individual model. For example, women at risk of primary infertility are 7% less likely to engage in HSB for infertility with each cumulative year of employment, whereas women at risk of secondary infertility are 5% more likely to engage in HSB for infertility. The outcomes from the models in Table 1-7 demonstrate that in the presence of all the social factor effects, the rates of HSB for infertility vary among women at risk of primary or secondary infertility. Finally, in a separate series of models, not shown here, I test the individual effect of parity status in a combined, full model to determine which group of women, those at risk of primary infertility or those at risk of secondary infertility, have overall higher risks of HSB for infertility. The results from these analyses suggest that for women at risk of primary infertility, the overall risk of HSB are 38% higher than women at risk of secondary infertility. These findings support my overall hypothesis that the rates of HSB for infertility significantly vary by parity status.

CONCLUSION

The results from these analyses have two implications for the existing research on fertility and health-seeking behaviors. The first is the identification of social factors that influence HSB within groups of women at risk of primary infertility and women at risk of secondary infertility. The second is a comparison of the rates of HSB by these two types of infertility risk. Beginning with educational attainment, the lack of significant findings between groups of women at risk of primary infertility compared to women at risk of secondary infertility is not indicative that education is not an important factor in predicting HSB. As the results

indicate, among women at risk of primary infertility, more education increased the rates of HSB, and similarly, among women at risk of secondary infertility, education increased the rates of HSB. One possible explanation why there is a lack of significance in the rates of HSB between women at risk of primary versus secondary infertility is that traditional educational attainment occurs at younger, or earlier years of the reproductive life cycle for women (Davis, Hall, & Kaufmann, 2007; Martin, 2000). For example, the traditional age for a high school graduate is 18 years old, and for a graduate with a bachelor's degree is 23 years old (U.S National Center for Education Statistics, retrieved May 2012). These ages represent the beginning of the reproductive life cycle for women and, taking into consideration that HSB for infertility typically occur after 2 to 3 years of infertility, any difference in HSB by parity status would not be expected at the beginning of the reproductive life cycle. Therefore, any differences in HSB by parity status, in the presence of educational attainment, are also less likely to be observed.

To explain the findings from the cumulative years of employment on the rates of HSB for infertility I draw upon the concept of the motherhood-wage-penalty that suggests during the prime childbearing years, women with children suffer from lower wages, fewer professional advancement opportunities, and job instability (Anderson, Binder, & Krause, 2002; Budig & England, 2001). Combined with the theory that the benefits and resources available to employed women acts as predisposing factors, increasing the likelihood of engaging in HSB, the concept of the motherhood-wage-penalty can explain why, with more cumulative years of employment, women at risk of secondary infertility have significantly higher rates of HSB compared to women at risk of primary infertility. I proposed that women at risk of secondary infertility, otherwise identified as parous women, would have already experienced an exit and re-entry into the workforce that occurred during the birth of their first child. According to the mother-hood-

wage penalty, this exit and re-entry into the workforce would have impacted a woman's professional trajectory. In light of this penalty, a woman at risk of secondary infertility would be more likely to engage in HSB for infertility because she has already experienced the wage-penalty. In addition, the effect of the wage-penalty combined with the effect of the predisposing factors of cumulative years of employment, are possible reasons why parous women, at risk of secondary infertility, had significantly higher rates of HSB compared to nulliparous women at risk of primary infertility.

As predicted, the rates of HSB for married or cohabiting women at risk of primary infertility or secondary infertility were significantly higher than the rates of HSB for single women. Being in a relationship, compared to being single, provides access to enabling resources such as emotional support, pooled financial resources, social support, and perceptions of long-term relationship stability or commitment, which is linked to increasing the likelihood of engaging in HSB for infertility. The findings regarding relationship type are important contributions to the existing literature on infertility and HSB, as well useful tools for public and medical health professionals working with patients seeking infertility assistance. The main contribution is a better understanding regarding the health behaviors of parous women even in the presence of enabling resources from being in a relationship. For parous women experiencing secondary infertility, the enabling resources that come from being in a relationship are assumed to be partially committed towards parenting and childrearing. For this reason, the ability and opportunity to engage in HSB for infertility may be less available when compared to a nulliparous woman. However, and without testing or controlling for fertility intentions, the results from these analyses indicate that even though parous women have lower rates of HSB

compared to nulliparous women, the parous woman at risk of infertility is still more likely to engage in HSB than the single woman.

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Table 1-1: Means and Standard Deviations for the Outcome Meaures, Independent Variables and Controls for the Social Factors Hypotheses

	Mean	Std. Dev.	Minimum	Maximum	N
Ever use HSB for infertility (at time of interview)	0.11	0.31	0	1	11210
HSB for Primary Infertility	0.33	0.25	0	1	411
HSB for Secondary Infertility	0.67	0.34	0	1	832
Parity Status (at time of interview)					
Nulliparous	0.42	0.49	0	1	11210
Parous	0.58	0.49	0	1	11210
Educational Attainment					
No High School Degree/GED	0.35	0.48	0	1	11210
High School Degree	0.51	0.50	0	1	11210
Bachelor's Degree	0.12	0.33	0	1	11210
Graduate Degree (MA or PhD)	0.02	0.13	0	1	11210
Employment Status					
Full- or Part-Time Employment	0.63	0.48	0	1	11210
Unemployed/Working Unpaid Labor	0.37	0.29	0	1	11210
Cumulative Years of Employment					
Full- or Part-Time Years of Employment	13.4	2.71	1	20	11210
Relationship Type					
Married	0.35	0.17	0	1	11210
Cohabiting	0.18	0.25	0	1	11210
Single	0.47	0.23	0	1	11210
Relationship Duration					
0 to 1 years	0.11	0.12	0	1	654
1 to 3 years	0.39	0.15	0	1	2317
3 to 5 years	0.28	0.11	0	1	1664
5 or more years	0.22	0.12	0	1	1307

Source: National Survey of Family Growth, 2006-2010 Continuous Data File

Table 1-1 *(continued):* Means and Standard Deviations for the Outcome Meaures, Independent Variables and Controls for the Social Factors Hypotheses

	Mean	Std. Dev.	Minimum	Maximum	N
Age Cohorts					
Age 15-19	0.33	0.47	0	1	11210
Age 20-24	0.27	0.44	0	1	11210
Age 25-29	0.19	0.39	0	1	11210
Age 30-34	0.12	0.33	0	1	11210
Age 35-39	0.07	0.25	0	1	11210
Age 40-45	0.02	0.15	0	1	11210
Race/Ethnicity					
Non-Hispanic White	0.52	0.50	0	1	11210
Non-Hispanic Black	0.21	0.41	0	1	11210
Hispanic	0.22	0.41	0	1	11210
Non-Hispanic Other	0.05	0.23	0	1	11210
Childhood Sociodemographics					
Biological parents married at birth	0.78	0.42	0	1	11210
Mother's Education					
No High School Diploma/GED	0.25	0.44	0	1	11210
High School Diploma/GED	0.32	0.47	0	1	11210
Two Years of College	0.24	0.42	0	1	11210
Bachelor's Degree	0.19	0.39	0	1	11210
Mother worked full or part time	0.72	0.45	0	1	11210
Mother's age at first baby					
Age 19 or younger	0.37	0.48	0	1	11210
Age 20 to 24	0.37	0.48	0	1	11210
Age 25 to 30	0.18	0.38	0	1	11210
Age 30 or older	0.08	0.27	0	1	11210

Source: National Survey of Family Growth, 2006-2010 Continuous Data File

Table 1-2: Effects of Educational Attainment on the Rates of Health-Seeking Behaviors for Infertility

Model	1	2		3	4	
Type of Infertility Risk	Primary	Secondary		Primary	Secondary	
Educational Attainment[1] (time-varying)						
High School Degree (GED Equivalent)				1.55*	1.69***	
Bachelors Degree				1.85*	2.97***	
Graduate Degree (Masters or PhD)				2.90***	3.34***	
Time-Invariant Controls						
Age Cohorts[2]						
20-24	2.71***	1.81***	X	2.36***	1.79***	
25-29	3.02***	1.98***	X	3.14***	1.96***	X
30-34	3.99***	1.81***	X	3.97***	1.82***	X
35-39	2.27***	1.36***	X	2.37***	1.37***	X
40-45	1.88***	1.96***	X	1.38***	1.02***	X
Race/Ethnicity[3]						
Non-Hispanic Black	0.49	0.50		0.63*	0.49*	
Hispanic	0.54	0.54		0.91	0.58	
Non-Hispanic Other	0.77	0.80		0.63	0.71	
Childhood Sociodemographics						
Biological parents married at birth[4]	1.08	1.15		0.74	1.01	
Mother's Education[5]						
High School/GED	1.01	1.02		1.00	1.04	
Two Years College	1.14	1.13		1.12	1.01	
Bachelor's Degree	1.49	1.48		0.97	1.22	
Mother worked full or part time[6]	1.05	1.01		0.88	1.05	
Mother's age at first baby[7]						
Age 20 to 24	0.97	0.99		0.77	0.90	
Age 25 to 29	0.94	0.97		0.71	0.84	
Age 30 or older	0.67	0.69		0.36	0.62	
Person Months	1096796	868559		1096796	868559	

Coefficients are odds ratios
*p<.05, **p<.01, ***p<.001
'X' indicates significant (p<.05) difference by infertility risk type

[1] Reference group is less than a high school degree; [2] Reference group is age 15 to 19; [3] Reference group is non-Hispanic white;
[4] Reference group is parents not married at birth; [5] Reference group is less than high school degree;
[6] Reference group is not working; [7] Reference group is age 19 or younger

Table 1-3: Effects of Employment Status on the Rates of Health-Seeking Behaviors for Infertility

Model	1	2	
Type of Infertility Risk	Primary	Secondary	
Employment Status[1] (time-varying)			
Full or part time employmenet	2.80***	2.68***	
Cumulative years of full/part time employment	0.97	1.11***	X
Time-Invariant Controls			
Age Cohorts[2]			
20-24	2.04***	1.74*	
25-29	2.58***	1.88*	X
30-34	2.39***	1.70*	X
35-39	1.87***	1.31*	X
40-45	1.08***	1.85*	X
Race/Ethnicity[3]			
Non-Hispanic Black	0.67**	0.55**	
Hispanic	0.92	0.66**	
Non-Hispanic Other	0.78	0.80	
Childhood Sociodemographics			
Biological parents married at birth[4]	0.82	1.05	
Mother's Education[5]			
High School/GED	1.15	0.82	
Two Years College	1.10	0.91	
Bachelor's Degree	1.16	1.14	
Mother worked full or part time[6]	0.85	0.99	
Mother's age at first baby[7]			
Age 20 to 24	0.80	0.92	
Age 25 to 29	0.77	0.85	
Age 30 or older	0.40	0.63	
Person Months	1096316	868176	

Coefficients are odds ratios
*p<.05, **p<.01, ***p<.001
'X' indicates significant (p<.05) difference by infertility risk type

[1] Reference group is unemployed/working in unpaid labor; [2] Reference group is age 15 to 19;
[3] Reference group is non-Hispanic white; [4] Reference group is parents not married at birth;
[5] Reference group is less than high school degree; [6] Reference group is not working;
[7] Reference group is age 19 or younger

Table 1-4: Effects of Relationship Duration on the Rates of Health-Seeking Behaviors for Women at Risk of Primary Infertility

	Model 1
Within Marital Relationships[1]	
0 to 1 years	1.74***
1 to 3 years	2.23***
3 to 5 years	2.47***
5 or more years	2.03***
Within Cohabiting Relationships[1]	
0 to 1 years	1.22***
1 to 3 years	1.36***
3 to 5 years	1.93***
5 or more years	1.07***
Person Months	965,720

Coefficients are odds ratios
*p<.05, **p<.01, ***p<.001

[1]Reference is single/not in a relationship; [2]Reference is ages 15 to 19;
[3]Reference is non-Hispanic white; [4]Reference is not married at birth
[5]Reference is no high school degree; [6]Reference is unemployed
[7]Reference is age 19 or younger

Table 1-5: Effects of Relationship Duration on the Rates of Health-Seeking Behaviors for Women at Risk of Secondary Infertility

	Model 1	
Within Marital Relationships[1]		
0 to 1 years	2.64***	
1 to 3 years	2.96***	*
3 to 5 years	2.19***	
5 or more years	1.84***	
Within Cohabiting Relationships[1]		
0 to 1 years	1.54	
1 to 3 years	1.94	
3 to 5 years	1.26	
5 or more years	0.93	
Person Months	418,753	

Coefficients are odds ratios
*p<.05, **p<.01, ***p<.001

[1]Reference is single/not in a relationship; [2]Reference is ages 15 to 19;
[3]Reference is non-Hispanic white; [4]Reference is not married at birth
[5]Reference is no high school degree; [6]Reference is unemployed
[7]Reference is age 19 or younger

T**able 1-5** ***(continued)*** *:* Effects of Relationship Duration on the Rates of Health-Seeking Behaviors for Women at Risk of Secondary Infertility

	Model 1
Time-Invariant Controls	
Age Cohorts[2]	
20-24	2.17**
25-29	3.25**
30-34	3.51**
35-39	3.15**
40-45	1.910
Race/Ethnicity[3]	
Non-Hispanic Black	0.62**
Hispanic	0.56**
Non-Hispanic Other	0.74
Childhood Sociodemographics	
Biological parents married at birth[4]	0.99
Mother's Education & Employment Status[5]	
High School/GED	0.92
Two Years College	1.14
Bachelor's Degree	1.48
Mother worked full or part time[6]	1.07
Mother's Age at First Baby[7]	
Age 20 to 24	0.94
Age 25 to 29	0.91
Age 30 or older	0.66
Person Months	418,753

Coefficients are odds ratios
*p<.05, **p<.01, ***p<.001

[1]Reference is single/not in a relationship; [2]Reference is ages 15 to 19;
[3]Reference is non-Hispanic white; [4]Reference is not married at birth
[5]Reference is no high school degree; [6]Reference is unemployed
[7]Reference is age 19 or younger

Table 1-6: Effects of Relationship Type on the Rates of Health-Seeking Behaviors for Infertility, Controlling for Duration

Model 1: Risk of HSB for Primary Infertility

Relationship Type	Married	Cohabiting	
Duration[1]			
0 to 1 years	1.74***	1.22***	
1 to 3 years	2.23***	1.36***	
3 to 5 years	2.47***	1.93***	X
5 or more years	2.03***	1.07***	

Model 2: Risk of HSB for Secondary Infertility

Relationship Type	Married	Cohabiting
Duration[1]		
0 to 1 years	2.64***	1.54
1 to 3years	2.96***	1.94
3 to 5 years	2.19***	1.26
5 or more years	1.84***	0.93

Coefficients are odds ratios
*p<.05, **p<.01, ***p<.001
'X' indicates significant (p<.05) difference by Relationship Type

[1]Reference is single/not in a relationship

Table 1-7: Effects of all Social Factors on the Rates of Health-Seeking Behaviors for Infertility

Model	1	2	
Type of Infertility Risk	Primary	Secondary	
Educational Attainment[1] (time-varying)			
High School Degree (GED Equivalent)	1.57*	1.18**	
Bachelors Degree	1.99*	2.49**	
Graduate Degree (Masters or PhD)	3.92**	2.54**	
Employment Status[2] (time-varying)			
Full or part time employmenet	2.86***	2.46***	
Cumulative years of full/part time employment	0.93	1.05**	X
Within Marital Relationships[3]			
0 to 1 years	1.84**	2.53**	
1 to 3 years	2.41**	2.74**	
3 to 5 years	2.50**	2.01**	
5 or more years	1.75**	1.90**	
Within Cohabiting Relationships[3]			
0 to 1 years	1.06**	1.44	
1 to 3 years	1.26**	1.86	
3 to 5 years	1.36**	1.34	
5 or more years	1.02**	1.05	
Person Months	1096316	868176	

Coefficients are odds ratios
*p<.05, **p<.01, ***p<.001
'X' indicates significant (p<.05) difference by infertility risk type

[1] Reference group is less than a high school degree;
[2] Reference group is unemployed/working in unpaid labor;
[3] Reference is single/not in a relationship; [4] Reference is age 15 to 19;
[5] Reference is non-hispanic white;
[6] Reference group is parents not married at birth;
[7] Reference group is less than high school degree;
[8] Reference group is not working; [9] Reference group is age 19 or younger