Impaired Fecundity Status and Access to Infertility Treatment by Race/Ethnicity

by

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Abstract

This study examines the association between race/ethnicity and the fecundity status among all women who are not surgically sterile and documents the racial differential in the utilization of infertility services among the fecundity-impaired population, based on data from the 1995 National Survey of Family Growth. With controlling age and motivational factors, minority populations, except other Hispanics, are at greater risk of having fecundity problems which fully take into account by their poor socioeconomic conditions. Further, the models of infertility services utilization reveal that the socioeconomic status plays an important role in race/ethnic differences in infertility services utilization. Therefore, with the growing number of the infertile population and enormous technological advancements in infertility diagnoses and treatments, these race/ethnic cleavages in the prevalence of impaired fecundity and access to infertility care should deserve more attention and be grounds for future research directions and pubic health policies.

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Introduction

As controlling fertility and reducing births have been a primary concern in the United States (Menken 1985; King and Meyer 1997; Olsen and Rachootin 2003), and infertility is not considered as a medical problem (Katz, Nachtigall, and Showstack 2002), impaired fecundity[1] has gotten much less attention or rather been neglected from academia and public policies, compared to other reproductive health agendas. However, the sizable proportion of the current population experiences impaired fecundity in the United States (Mosher 1985 & 1988; Smith, Pfeifer, and Collins 2003; Stephen 1996), and a wide range of strong and negative psychological and social effects resulted from infertility and involuntary childlessness have been identified (Andrews, Abbey, and Halman 1991 & 1992; Matthews and Matthews 1986; Sabatelli, Meth, and Gavazzi 1988).

Because there is a common belief that infertility is a problem for the white and well educated populations due to their delayed childbearing, there has been little research on racial differentials in infertility status and utilization patterns of infertility services. However, it has been found that the prevalence of infertility and access to medical care for infertility among the infertile population are stratified arcos racial groups. That is, while minority women are more likely to experience infertility problems, they are disproportionately to utilize infertility services (Aral and Cates 1983; Chandra and Stephen 1998; Hirsch and Mosher 1987; Kalmuss 1987). Although those tendencies have been identified across many aspects of health outcomes, racial cleavages seem to be more pronounced in infertility problems and infertility services. Reasons for this can be that the large poverty and income disparities across racial groups persist, and there are no no/or inappropriate insurance policies for infertility services in the United

[1] There are two terms to define the physical ability to have children: impaired fecundity and infertility. For convenience in this paper, I use two terms interchangeably although I utilized the definition of impaired fecundity. Further elaboration will be in the section of methodology.

States (Higgins 1990; Katz et al. 2002; King and Meyer 1987; Kurth et al. 2001; Phipps 1996). King and Meyer (1997) argued that minority women have more potential barriers to access to infertility treatments because they tend to be uninsured and they are hard to afford medical costs of diagnosis and treatments for infertility out of their pockets, given their higher rate of infertility.

More intriguing findings are that infertility results in a wide range of negative psychological and social effects on families who desire a child. Further, women with a minority status have reported a greater degree of social impacts of infertility than their white counterparts, which might be due to the differently defined meaning of childlessness and non-parenthood across race/ethnic groups (Balen and Inhorn 2002; Cooper-Hilbert 1998; Mattews and Matthews 1986). Also, it might be because the highly unmet needs for infertility services might be responsible for the fact that minority infertile women acerbate the psychological, physical and monetary conditions than their counterparts, as the cost of diagnoses and treatments is one of the main contributors of fertility related stress (Epstein et al. 2002; Katz, Millstein, and Pasch 2002 [abstract]).

Little research, however, has examined the association between race/ethnicity and impaired fecundity status, and further utilization patterns of infertility medical care. It seems that the social and economic factors lead to the higher infertility rate among minorities also lead to lower access to appropriate diagnoses and treatment for resolution of infertility. Due to lack of research, we do not have any information as to why minorities are at greater risk of having fecundity impaired problems and why they are much less likely to obtain infertility services given the higher infertility rate. Understanding the mechanisms between race/ethnicity and fertility status and further linkage to medical care for infertility can be a first and crucial step to establish the effective public policies for minority reproductive health in general, and infertility in particular. Based on the recognition that having a child is one of the fundamental human rights, regardless of social and minority status, that declining human fecundity is a public health

problem, socially disadvantaged and minority populations deserve more attention and investment.

Background

Although fertility is taken for granted by most peoples, a sizable proportion of women experiences some form of fecundity impairment in the United States. Indeed, one out of ten childbearing aged women report impaired-fecundity problems in 1995 (Chandra and Stephen 1998). Furthermore, the proportion of fecundity-impaired women increased by 20% from 8.4% in 1988 to 10.2% in 1995, and the absolute number of infertile women grew from 4.9 million to 6.1 million during the same period of time (Abma et al. 1997; Chandra and Stephen 1998; Stephen 1996). The rate of fecundity-impaired women is projected to increase in incoming years (Menning 1980; Stephen and Chandra 1998).

Although impaired fecundity is largely attributable to advanced reproductive age (Menken 1985; Practice Committee of the American Society for Reproductive Medicine 2002) previous research has found that the likelihood of having impaired fecundity appears to be higher among minority women than their white counterparts (Aral and Cates 1983; Chandra and Stephen 1998; Laurent et al. 1992). However, it is not sure why women with minority status have greater risk of having problems with infertility, compared to white women, because there have been no research that specifically looked at the relationship between race/ethnicity and fecundity status. Just previous research implies that it might be due to differentials in medical health status (Porter et al. 1984; Wilcox and Mosher 1994), sexual and health behaviors (Aral and Cates 1983; Bloumar et al. 1996; Laurent et al. 1992; Mosher and Bachrach 1996; Olsen 1991), exposure to hazard materials through working environment (Aral and Cates 1983; Higgins 1990; Olsen and Rachootin 2003), as well as momentary condition (Kunz, Brinkerhoff and Hundley 1973; Soules 2003; Phipps 1996).

Accompanying the increasing number and proportion of infertile women, there have been enormous technological advances in infertility diagnoses and treatments which have led

the greater success rate of being pregnant and keeping a baby to term among the infertile population (Aral and Cates 1983; Phipps 1996; Wright et al. 2003). According to the American Board of Obstetrics and Gynecology, actively certified obstetrician-gynecologists have increased by about 18% from 23,000 in 1989 to 27,000 in 1995. Also, the number of assisted reproductive technology clinics have risen markedly (Schieve, Jeng, and Wilcox 2002). Although the success rate of infertility treatments differs by time of diagnoses and types of treatments, it is estimated that more than 85% of fecundity impaired women can be treated if they have timely access to infertility medical care (ASRM Practice Committee 2000).

Despite those growing availability and proven efficacy of interventions, the rate of infertility utilization remains fairly constant between 1988 and 1995 (Abma et al. 1997; Chandra and Stephen 1998). Only 44 percent of infertile women reported that they had some form of infertility services to achieve pregnancy or to prevent miscarriage (Chandra and Stephen 1998; Wilcox and Mosher 1993). Furthermore, infertile women who seek medical help are highly selective groups and are not representative of all women with infertility problems. It is generally found that white, well-educated, and affluent women are disproportionately to utilize infertility services, given their lower risk of having fecundity impairment, compared to their counterparts (Chandra and Stephen 1998; Esptein et al. 2002; Hirsh and Mosher 1987; Kalmuss 1987; Mosher and Bachrach 1996; Phipps 1996).

Katz et al. (2002) attribute the unmet need for infertility treatment to the current health insurance policies in the United States. Kurth et al. (2001) pointed out that infertility is the least covered reproductive health problem from health insurance, compared to other conditions (see also Orr and Forrest 1985 and King and Meyer 1997). Those research asserted that no coverage or/ inappropriate coverage for infertility services is a primary reason for fewer than half of infertile women to seek medical treatments, and in turn, those who seek medical help for infertility problems are generally white, highly educated, married women and with middle-to high income (Katz et al. 2002; King and Meyer 1997; Phipps 1996). As individuals need to pay

for such services out-of-pocket when insurance benefits are not available, the least fortunate people forgo medical help entirely, or use less expensive, but less effective methods (Higgins 1990; Katz et al. 2002; King and Meyer 1997). Consequently, this exclusion of infertility services from health coverage gives rise to tremendous inequalities in access to and quality of infertility diagnoses and treatments for the disadvantaged and minority population.

Further, King and Meyer (1997) discussed the implicit, but important role of states in shaping the unequal distribution of benefits depending on social and economic strata through health insurance policies. Up to the mid 1990s, 10 states have a law mandating insurance coverage for infertility treatments (i.e., Arkansas, California, Connecticut, Hawaii, Illinois, Maryland, Massachusetts, New York, Rhode island, and Texas) (Beck et al. 1994; King and Meyer 1997; www.resolve.org). In 2003, they increase up to 14 states (Frankfurter 2003; Reynolds et al. 2003; www.resolve.org). The King and Meyer (1997) main argument is that, even within states where mandate health insurance coverage for infertility care, such care is much less accessible to the disadvantaged and minority population. A major reason for this is that health insurance is very of the employment-based, and Medicaid available to the disadvantaged and minority groups does not include medical benefits for infertility. Therefore, the mandate applies only to insured, working women or married women whose partners are insured through jobs. They argued that it can be the more difficult for the minority women to gain access to infertility treatments, due to lower incomes, higher rates of being uninsured, and lower marital statues, given the higher rates of infertility (also see Adnrulis 1998; Higgins 1990; Katz et al. 2002; Kurth et al. 2001; Orr and Forrest 1985; Phipps 1996).

Even though the infertility problem is not a life-threatening problem, and therefore it is not considered as a medical condition, many research documented that infertility has stronger negative impacts on overall life satisfactions and also on sense of sexual identify and self-efficacy, than any other problem (Andrews and Halman 1992; Andrews et al. 1992; Menning 1980; Sabatelli et al. 1988). More intriguing findings are that minority infertile women are more

likely to experience severe psychological and physical conditions, compared to their white counterparts, and it might be due to the different meaning of childlessness and non-parenthood across race/ethnic groups (Balen and Inhorn 2002; Cooper-Hilbert 1998; Mattews and Matthews 1986).

Taken all together, with the growing number of the infertile population and enormous technological advancements in infertility diagnoses and treatments, infertility and access to medical care for infertility should deserve more attention as a public health problem. Furthermore, marked racial cleavages in fecundity status and access to infertility care need to be studied within the perspective of social and economic inequalities. Particularly, I focus on the role of states' insurance policies for infertility in access to infertility treatments, as emphasized by King and Meyer (1997). That is, first, fecundity status can be stratified by race/ethnic groups via demographic and motivational factors, health endowments, sexual and health behaviors, and economic factors. Second, as socioeconomic differentials across race/ethnic groups stratify the means to obtain medical care, minority and have a significant effect on access to infertility services among the infertile population.

Accordingly, the general questions to be undertaken are; (1) to determine the association between race/ethnicity and impaired fecundity status, (2) to examine the extent to which race/ethnic variations in impaired fecundity status are taken into account by demographic and motivational factors, general health status, sexual and health behaviors, and economic factors, (3), among infertile women, to investigate race/ethnic differences in utilization of infertility treatments, and (4) to explore the extent to which race/ethnic differentials in utilization of such services are explained by the demographic and motivational factors, and monetary and insurance status with the consideration of states' mandate status for infertility.

METHODOLOGY

Data

Data were drawn from the Cycles 5 of the National Survey of Family Growth (NSFG) which was conducted by the National Center for Health Statistics in 1995. The NSFG is a nationally representative of 10,847 women aged 15-44, and Black and Hispanic women were oversampled in this Cycles 5.

The descriptive results were weighted counts and percentages using a post-stratified weight adjusted for a sample design, but the multivariate results were not weighted to estimate two main outcomes. Data were limited to non-Hispanic white, non-Hispanic black, Mexican Americans, and other Hispanic populations. Further, for the analysis of an impaired fecundity problem, the data were restricted to sexually experienced women who are not surgically sterile at the time of interview. And, only impaired fecundity women were included to analyze the likelihood of women who ever received infertility services. These restrictions leave over 6603 cases and 1029 cases for the analyses of risks of impaired fecundity and utilization of such services, respectively.

Two distinct measures of fertility problems are available from the NSFG: Infertility and Impaired fecundity. The measure of infertility is a medical concept to define the physical ability to have children. Infertility is defined as inability to conceive more than 12 months of unprotected intercourse among married or cohabiting people who are not surgically sterile.

Meanwhile, impaired fecundity status is a respondent's self-reported fertility condition at the time of the interview. Among sexually experienced women who are not surgically sterile, the measure of impaired fecundity includes three physical problems: Nonsurgically sterility, subfecundity, and long interval without a conception. The nonsurgically sterile is defined that, if it is impossible for her to conceive or deliver a baby, or for her husband or cohabiting partner to father a baby. If she identifies herself or her husband or partner to have physical difficulty to conceive or deliver a baby (again) or to father a baby, or if a doctor told her never to become pregnant because it would pose a danger to her, to her fetus or to both, they are classified as subfecundity. The long interval without a conception refers that, without protected intercourse in

each consecutive month, she has not conceived in the 3 years before the interview. In short, impaired fecundity is the physical inability or difficulty with conceiving or keeping a baby or no conception after three years of unprotected intercourse. However, it should note that, for married or cohabiting women, they are considered to have impaired fecundity, if they or their husband and partner have problems with fecundity. The fecundity status for unmarried and noncohabiting women is just based on their own fertility condition.

In this study, I used two terms interchangeably, for convenience. But, I entirely focused on the measure of impaired fecundity as an outcome of interest, because it includes more complete ranges of fertility problems related to the potential demand for infertility medical services. Therefore, medical help, another outcome variable of interest, includes the utilization of both services for preventing miscarriage, as well as achieving pregnancy.

Measurement

One of the interested outcomes is the fecundity condition. As explained above, women classified as nonsurgically sterility, subfecundity, and long interval without a conception are defined as impaired fecundity. Otherwise, she is considered “fecund”.

Among infertile women, the measure of utilization of infertility services is whether or not the infertile women have ever sought medical help for either achieving pregnancy or preventing miscarriage. Therefore, infertility services-seeking behaviors included medical services for both conditions, such as medical advice, test, drugs, surgery, or other treatments. If women or their husbands or partners have ever received any medical help for either problem, they are classified as those who ever sought medical help for infertility.

Race/ethnicity is coded into Non-Hispanic Whites, Non-Hispanic Blacks, U.S born Mexican American, Foreign born Mexican American, and other Hispanic groups.

As a control variable, reproductive age is divided into 3 categories: less than 24 years old as a reference category, women aged 25-34, and women aged 35 to 44 years old.

Family and fertility factors indicate marital status, parity, and intention to have a (or another) child. Marital status is dichotomized into the married and the unmarried as a reference group. Parity is measured by whether women have a prior live birth or not up to the time of interview. The intention measure refers whether women want to have a (or another) baby in the future.

Also, affecting impaired fecundity risk is related to women's medical history of PID and health endowments (such as hypertension, anemia, diabetes, and ovarian cyst). The measure of ever having had PID is whether women have ever been treated for infection in your fallopian tubes, womb, or ovaries or not. The presence of one or more of those medical risks is considered as a high-risk group.

It has been established that sexual and health behaviors heighten the risk of impaired fecundity conditions. The first intercourse prior to 18 years of age and no contraceptive use at the first intercourse are included as risk factors, as measures of sexual behaviors. Of health behaviors are current smoking status and starting to smoke regularly before 18 years of age.

Education as a root cause of fecundity status and access to infertility services is used as one of the indicators of socioeconomic variables. In this sample, education is ranged from no education to 19 years of education (7 or more years of education after high school) and it is treated as continuous in the analyses. As another measure of socioeconomic status, I construct the combined measure of insurance status and residence in states mandating health coverage for infertility. Up to 1990, 10 states had mandated insurance coverage for infertility care -- Arkansas, California, Connecticut, Hawaii, Illinois, Maryland, Massachusetts, New York, Ohio, Rhode Island, and Texas, and there are no states which additionally mandate health coverage for infertility medical care until 1995 when the NSFG survey was actually conducted. The categories for this variable are: as a reference category, women having a private insurance and living a mandating state for infertility services, women having a private insurance, but not living mandating state for infertility treatments, women having no private insurance, but living a

mandating state for infertility services, and women not having private insurance and not living mandating state for infertility treatments.

RESULTS

Descriptive Results: Impaired Fecundity

Table 1 shows the unweighted and weighted percentage of the currently having impaired fecundity among women who have sexually experienced and were no surgically sterile. The results between the unweighted and weighted are similar, except U.S. born Mexican Americans whose the unweighted proportion of impaired fecundity is much higher than the weighted (16.7% v.s. 14.5%, respectively). Based on the weighted results, overall, 15.7% of women at risk tend to have some form of fecundity problems, and there are no pronounced differences across race/ethnic groups in impaired fecundity, although variation is rather noticeable between foreign born Mexicans and other groups. That is, 22.2 % of foreign-born Mexican Americans experience impaired fecundity, while rates for other race/ethnic groups are 15.5% for non-Hispanic whites, 16.0% for non-Hispanic blacks, 14.5% for U.S. born Mexican Americans, and 14.4% for other Hispanics.

-- Table 1 about here --

The weighted distribution of risk factors by race/ethnic groups appears in Table 2. Risk distributions are quite heterogeneous by race/ethnicity. The reproductive age between 25-34 years old is a modal category for every race/ethnic group, except U.S. born Mexicans. More than half of U.S. born Mexicans is in the young age group of 14-24 years, while whites and foreign born Mexicans are most likely to be in the old age group. Blacks have the lowest percentage of being married (22.0%), with percentages ranging from 43.0% for other Hispanics to 64.2% foreign born Mexicans. Seemingly reflecting age and marital status distributions, the proportion of having a prior live birth among foreign born Mexicans exceeds 85.0%, while nearly or more than half of other race/ethnic groups gave birth before. Despite the high proportion of having a prior live birth among foreign born Mexicans, more than 50% of them

want to have a (or another) child in coming years. About 60% of U.S. born Mexicans and other Hispanics has an intention to have a (or another) baby, while around 50% of whites and blacks do. Around 8 to 9% of black, foreign born Mexican, and other Hispanic populations have been diagnosed PID, in contrast to about 6% for whites and U.S. born Mexicans. Whites and blacks are more apt to have one of medical risks (31.9 and 33.5 percent, respectively), and foreign born Mexicans (19.3%) are the least, followed by other Hispanics (27.4%) and U.S. born Mexicans (27.9%). Foreign born Mexicans are the least likely to initiate the sexual intercourse before 18 years of old (around 50%), while more than 80% of blacks have a sexual intercourse prior to 18 years of old, around 70% for whites and U.S. born Mexicans, 65% for other Hispanics.

Contraceptive use at the first intercourse is more common among whites (66.4%), followed by blacks (55%). At the other extreme, only 15% of foreign born Mexicans reported contraceptive use at the first intercourse, with 43% for U.S. born Mexicans and 48% for other Hispanics. As consistent to previous research, foreign born and U.S. born Mexicans are much less likely to be current smokers (7% and 14%, respectively), while current smokers are much common among whites (29%), blacks (21%) and other Hispanics (21%). In addition, whites are less likely to be never smokers and they are more apt to smoke prior to 18 years of age. The same is true for blacks, U.S. born Mexicans and other Hispanics, despite much less degree. Only, foreign born Mexicans are not likely to be in the category of smoking regularly, and if did, they are more apt to start later than 18 years old.

Educational attainment also varies. White women report the highest mean years of schooling (about 14 years), and blacks and other Hispanics have average 12 to 13 years of schooling. At the other extreme, the mean years of schooling for foreign born Mexicans is 9 and those for U.S. born Mexicans are 11. In terms of the distribution of the combined measure of insurance and mandating states, whites are by far the most likely to possess the private insurance, while foreign born Mexicans are far less. However, all Hispanic groups are slightly more common to reside in the states which mandate insurance coverage for infertility, while whites

are slightly less likely to reside in those states. Overall, there are rather substantial variations between foreign born Mexicans and other subgroups, despite no consistent patterns in risk factors found across race/ethnic groups.

-- Table 1 about here --

Multivariate Results: Impaired Fecundity

Table 3 displays results for set of logistic regression models which explain the relationship between race/ethnicity and fecundity status. The model 1 shows odds ratio of race/ethnicity on impaired fecundity, with a control of reproductive age. Only, foreign born Mexican Americans are a greater risk of experiencing fecundity problems than NHW (ORs = 1.51). Although U.S. born Mexicans have 29% greater odds of experiencing impaired fecundity, it is not statistically significant. Also, there are no statistical differences between other race/ethnic groups and whites. Consonant with previous research, advanced reproductive age are significantly related to greater likelihood of experiencing impaired fecundity. Women aged 25-34 and 35-44 years old have respectively about 2.1 and 4.2 times higher odds of experiencing fecundity problems, compared to those less than 24 years old.

Adding family and fertility factors in model 2 make substantial differences in odds for race/ethnicity. Odds for every race/ethnic group increases in this model, and now, they significantly differ from those of whites, except other Hispanic groups. Blacks have 36% higher odds of having impaired fecundity problems, 40% for U.S born Mexican Americans, and 62% for foreign born Mexicans, compared to NHW. The larger magnitudes of race/ethnicity effects seem to reflect distributional variations in the marital status and parity measures, as minorities tend to have a prior live birth and be disproportionately the unmarried that are less subjected to report impaired fecundity problems. Therefore, once controlling family and fertility related factors, especially marital status and parity, the odds for minorities increase their own risks of having impaired fecundity, compared to their counterpart. Also, being married and no prior live

birth are significantly associated to greater risks of impaired fecundity as found in the previous research.

-- Table 3 about here --

Model 3 includes women's health variables. The medical history of having had PID and poor health status are strongly related to risks of impaired fecundity, as ORs are 2.69 and 2.11, respectively, relative to their counterparts. Unexpectedly, controls for those health variables result in no substantial changes in odds for race/ethnic groups. However, it is worthwhile to mention that odds for foreign born Mexican women increase their odds by 16% in the current model, compared to the previous model, while blacks decrease by 10%. It might be due that foreign born Mexicans are more favorable in general health conditions, while blacks are more detrimental in the distribution of the PID measure, compared to the white population. No changes among U.S. born Mexicans and other Hispanics might be due to offsetting effects between a history of PID and general health status on impaired fecundity – i.e., risks decrease with controlling a history of PID and increases again with a general health measure, in general.

Also, adjustment for sexual and health behaviors in model 4 does not alter race/ethnic impaired fecundity risks. The favorable smoking behaviors among minority groups seem to help compensate the risky non-contraceptive use at the first intercourse among them. Every sexual and health behavior factor is significantly associated to the likelihood of impaired fecundity.

As expected, adding socioeconomic variables (Model 5) has a sizable impact, with risks of impaired fecundity for every minority group becoming essentially identical to the corresponding white risk. And, once one year of education increase, odds of impaired fecundity reduce by 9%. In terms of a combined measure of insurance and state's mandating insurance status, women not covered by the private insurance have about 34% and 22% higher odds of having impaired fecundity depending on the residential state, compared to women with a private insurance and living in mandating states for infertility treatments. This result indicates that women's residential states do not have an effect on impaired fecundity, as expected, while

private health insurance statues have a sizable impact. In general, the results support the view that socioeconomic conditions are influential determinants of race/ethnic inequality in impaired fecundity, especially for U.S. and foreign born Mexican Americans.

Descriptive Results: Utilization of Infertility Services among the Infertile Women

I turn to results of the receipt of infertility services among fecundity-impaired women. Table 4 demonstrates the unweighted and weighted percentage of women who had ever sought infertility services. Again, the unweighted result is quite similar to the weighted, although the unweighted is slightly higher across for every race/ethnic group, with the rather substantial difference among U.S. born Mexican Americans. Based on the weighted result, overall, 46% of women obtain some form of infertility services, while there are marked differences between white and other race/ethnic groups. Compared to nearly half of whites, about 32% of blacks have ever gotten medical care for infertility, 34% for U.S. born Mexicans, 39% for foreign born Mexicans, and 35% for other Hispanics.

-- Table 4 about here –

The weighted distribution of risk factors[2] of the receipting of infertility care by race/ethnic groups appears in Table 5. As expected, the characteristics of women with fecundity problems are more likely to be old, and to get married, while they are less educated, compared to those of women who are not surgically sterile (Table 2). Unexpectedly, fecundity-impaired women tend to have less intention to have a (or another) child, compared to all women who are not surgically sterile. Among fecundity-impaired women, there are substantial variations and no consistent patterns in risk factors by race/ethnic groups. In general, black, U.S. born Mexicans and other Hispanic infertile women are more likely to be young and less likely to get married, than whites and foreign born Mexicans. Higher parity women occur more frequently among U.S. and foreign born Mexicans (71% and 87%, respectively). While infertile white women are less

[2] The measures of medical histories, and sexual and health behaviors did not include the analysis of services-seeking behaviors for infertility, as the preliminary outcomes of multivariate models demonstrated that those variables were not significantly related to the outcome variable and did not improve the model fit (available upon request). Also, it is due to concerns for the small number of sample cases, especially for Hispanic populations.

likely to have a prior live birth (44%), they are the least likely to have an intention to have a (or another) baby. Education gap across race/ethnic groups is pronounced, as expected. Whites are the most educated (13.3 mean years), while foreign born Mexicans are the least (7.8 years), with 12.5 years for blacks, 11.8 for U.S. born Mexicans, and 12.9 for Other Hispanics. And, while whites are the most likely to possess a private insurance (78%), they are the least likely to live in the states where mandate insurance coverage for infertility (33%). At the other extreme, only 40% and 42 % of foreign and U.S. born Mexicans have a private insurance, while they are slightly more likely to reside in the mandating states (40% and 45 %, respectively). Overall, risk profiles quite differ across race/ethnic groups, but there are relative similarities between whites and other Hispanics and, between U.S. and foreign born Mexicans.

-- Table 5 about here --

Multivariate Results: Utilization of Infertility Services among the Infertile Women

Table 6 shows the estimate of no seeking behaviors for infertility treatments among infertile women. Model 1 demonstrates the odds ratio of race/ethnicity on the likelihood of not receiving of infertility care, with adjustment for reproductive age. Although risks of no services-seeking behaviors for every race/ethnic group are much higher than white risk, only blacks and other Hispanic groups show statistically significant differences from white risk. Although U.S. and foreign born Mexicans have 27% and 53% higher odds of having impaired fecundity that white women, they do not reach the significance level due to the small number of cases for those populations. Consonant to prior research, services-seeking behaviors are much more common among old women, compared to women aged 14-24.

Adding family and fertility related factors of marital status, parity, and intention to have a (or another) child has a rather substantial impact, especially for blacks and foreign born Mexicans. Foreign born Mexicans exhibit 25 percent higher odds increases in impaired fecundity, compared to the previous model 1. Now, they turn out to be significantly related to a greater likelihood of experiencing impaired fecundity, compared to whites. In contrast, risk of

blacks reduces by 35% due to their lower marriage and higher parity rate, compared to whites. Married women and women with an intention to have a (or another) child are twice more likely to have ever sought medical care for fecundity problems, compared to their each counterpart (ORs=0.452 and 0.548, respectively).

- Table 6 about here --

Model 3 which controls for education and the combined measure of the insurance statues and the residential state substantially alters race/ethnic utilization patterns of infertility treatments, except the other Hispanic population. For instance, controlling for those factors reduces gap to a 5% difference between whites and U.S. and foreign born Mexican Americans. Also, the statistically significant difference between blacks and whites disappears as blacks narrow their odds by 12% with controls of socioeconomic factors. While race/ethnic difference drops substantially with controls for socioeconomic variables, education in itself exerts a significant influence on infertility services-seeking risk. When one year of education is heightened, odds of not receiving infertility care exhibit 6% increases. As predicted, infertile women with no private insurance and not residing states where mandate law for infertility treatments are at 73% greater odds of not seeking infertility services, compared to women having a private insurance and living such a mandating states. Also, women who do not have a private insurance, but reside in the mandating state have 65% higher odds of not pursuing medical care. Thus, a major contributor to race/ethnic variations in infertility services-seeking patterns is socioeconomic status. The fact that blacks and Mexicans acquire less education and a private insurance than whites contributes to utilization difference in infertility care.

Conclusions

This study examines the impaired fecundity status and utilization patterns of infertility services across race/ethnic groups. Further, it offers detailed mechanisms between race/ethnicity and outcome variables. In general, this study underscores the importance of socioeconomic and

family and fertility factors on race/ethnic differences both in fecundity status and access to infertility care.

In case of fecundity status, the inclusion of motivational factors notably increase the racial gap in comparison to the baseline model (Model 1 in Table 3) since, compared to the white women, minority populations are less likely to get married and more likely to have a previous live birth, in turn reduce the risk of having infertility problems. Although the medical histories and sexual and health behavioral factors do not help account race/ethnic gap in this outcome measure. However, it does not mean that those factors are noting to do with risks of impaired fecundity, but there are count-balancing effects among them on race/ethnic fecundity risk. For instance, minorities' favorable smoking behaviors help compensate the risky non-contraceptive use at the first intercourse among them.

Also, there is marked variation by race/ethnic groups in the likelihood that women had ever sought infertility services among fecundity-impaired women, mainly due to the socioeconomic differences. As expected, the differential in education and insurance status is more responsible for the racial gap in access to care.

Although the result reveals that there is no significant impact of a state policy which mandate infertility treatment on the utilization of infertility services, however, the implicit, but significant role of states with the interplay of an individual's insurance status in access to infertility treatments should not be disregarded. I used a broad definition of an impaired fecundity condition, therefore, infertility services in this study encompass a wide range from simple diagnoses to complicated and high-cost treatments. However, it is highly plausible that the state's insurance policy for infertility can play a more critical role in differentiating access to certain types of infertility care. For example, medical benefits for preventing miscarriage might be more equally distributed across racial groups than other infertility services, as most states guarantee prenatal care to poor, minority pregnant women through Medicaid. In contrast, assisted reproductive technologies (ART) can be highly stratified, as the extremely high cost

(i.e., $ 9,226 per IVF cycle [Jain and Horsten 2003]) and lack of insurance coverage are more likely to put this treatment out of reach for a substantial portion of the minority population (Jain and Hornstein 2003; Katz et al. 2003).

Although access to medical care can not be a primary determinant of, and might not make much improvement in the baseline fecundity status, without the equal access to medical care, it is kind of evident that race/ethnic differentials not only in infertility status, but also in general health status seems to be acerbated by the unequal access to infertility intervention. That is, timely access to diagnoses and treatment for infertility not only leads to the higher success rate of being pregnant, but also can reduce other serious health risks as infertility in itself is a risk factor for breast cancer and other disease (Olsen and Rachootin 2003). Also, as infertility has a strong, negative impact on overall life satisfactions and on sense of sexual identify and self-efficacy, the minority infertile women are more likely to experience severe psychological and physical conditions, partially due to the high cost of diagnosis and treatments.

I believe that fecundity problems should not be ignored as one of the aspects of health conditions. Also, as having a child and being a parent are the most fundamental aspect of family life, regardless of socioeconomic and minority status, all women should have the right and the means to achieve a birth when they desire. Based on this recognition, the current racial differences in frequency, suffering, and access to infertility care should be grounds for future research directions and pubic health policies.

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Table 1. Unweighted and Weighted Rates of Imparied Fecundity Rate by Race/Ethnicity

	Total [6403]	NHW [3948]	NHB [1480]	MX-US [329]	MX-IM [246]	Oth. Hisp. [400]
Unweighted						
Imparied Fecundity	16.07	15.96	15.61	16.72	22.36	14.50
Weighted						
Imparied Fecundity	15.65	15.49	15.98	14.46	22.19	14.39

SOURCE: National Survey of Family Growth. 1995.
Notes: Data restricted to women who have sexually experienced and were not surgically sterile.

Table 2. Weighted Distributions on Risk Factors of Impaired Fecundity by Race/Ethnicity

	NHW	NHB	MX-US	MX-IM	Oth. Hisp.
Maternal Age					
≤ 24	30.87	39.08	50.25	26.09	35.09
25-34	41.34	37.90	33.65	50.24	42.25
35-44	27.79	23.03	16.10	23.67	22.66
Marital Status					
Married	51.49	21.98	43.30	64.16	42.98
Unwed	48.51	78.02	56.70	35.84	57.02
Parity					
None	50.28	43.11	43.65	14.69	39.82
1+	49.72	56.89	56.35	85.31	60.18
Want a Baby					
Yes	52.53	52.57	63.19	51.26	60.39
No	47.47	47.43	36.81	48.74	39.61
Ever Had PID					
Yes	6.49	9.44	5.56	7.58	9.15
No	93.51	90.56	94.44	92.42	90.85
Health Risks					
No	68.07	66.48	72.14	80.70	72.58
Yes	31.93	33.52	27.86	19.30	27.42
Age at the First Intercourse					
≤ 18	70.30	81.99	73.00	50.84	65.40
19+	29.70	18.01	27.00	49.16	34.60
Contraceptive Use at the first Intercourse					
Yes	66.37	54.88	42.65	15.37	46.75
No	33.63	46.12	57.35	84.63	53.25
Current Smokers					
Yes	28.90	21.48	14.11	6.57	20.74
No	71.10	78.52	85.89	93.43	79.26
Age at Smoking Regularly					
Never Smoking	53.49	72.23	71.98	86.36	66.83
≤ 18	37.73	18.81	19.95	7.30	25.48
19+	8.78	8.96	8.07	6.34	7.69
Education [Cont.]					
Mean Years of Schooling	13.56	12.58	11.91	9.02	12.29
Insurance and State Mandate					
Private and Mandate	30.75	22.28	19.02	13.29	26.82
Private and No Mandate	49.49	34.42	34.17	20.61	31.82
No Private and Mandate	6.45	16.45	21.44	26.66	16.59
No Private and No Mandate	13.32	26.85	25.37	39.43	24.78
Total	100.00	100.00	100.00	100.00	100.00

SOURCE: See table 1.
Notes: Data restricted to women who have sexually experienced and were not surgically sterile.

Table 3. Odds Ratios for Effects of Risk Factors on Impaired Fecundity

	Impaired Fecundity [Yes]				
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**
Race/Ethnicity [NHW]					
NHB	1.044	1.362***	1.264**	1.236**	1.137
MX-US	1.294	1.401**	1.439**	1.434**	1.215
MX-IM	1.512***	1.621***	1.782***	1.757***	1.048
Oth. Hisp.	0.949	1.048	1.059	1.070	0.955
Maternal Age [≤ 24]					
25-34	2.129***	1.857***	1.780***	1.744***	2.036***
35-44	4.224***	3.970***	3.640***	3.615***	4.426***
Marital Status [Unwed]					
Married		2.102***	2.139***	2.400***	2.526***
Parity [1+]					
None		1.445***	1.444***	1.573***	1.743***
Want a Baby [No]					
Yes		1.105	1.138	1.177*	1.217**
Ever Had PID [No]					
Yes			2.686***	2.355***	2.400***
Health Risks [No]					
Yes			2.113***	2.093***	2.148***
Age at the First Intercourse [19+]					
≤ 18				1.234**	1.136
Contraceptive Use at the first Intercourse [Yes]					
No				1.479***	1.373***
Current Smokers [No]					
No				1.372***	1.216*
Age at Smoking Regularly [Never]					
≤ 18				1.110	1.079
19+				1.302**	1.336**
Education [Cont.]					0.912***
Insurance and State Mandate [Private and Mandate]					
Private and No Mandate					1.069
No Private and Mandate					1.337**
No Private and No Mandate					1.219*
Intercept	-2.502***	-3.085***	3.441***	4.001***	-2.936***
-2LL	5400.0***	5301.9***	5101.6***	5027.5***	4978.8***

SOURCE: See Table 1.
Notes: Data restricted to women who have sexually experienced and were not surgically sterile.
Note: Brackets [ ] indicates reference group.
*** $p \leq 0.01$. ** $p \leq 0.05$. * $p \leq 0.10$.

Table 4. Unweighted and Weighted Rates of Utilization of Infertility Services by Race/Ethnicity

	Total [1029]	NHW [630]	NHB [231]	MX-US [55]	MX-IM [55]	Oth. Hisp. [58]
Unweighted						
Who Ever Sought Medical Help	45.09	50.32	35.06	41.82	40.00	36.21
Weighted						
Who Ever Sought Medical Help	45.64	49.97	32.07	33.81	38.82	35.30

SOURCE: See Table 1.

Notes: Data restricted to women who reported impaired fecundity problems.

Table 5. Weighted Distributions on Risk Factors of Utilization of Infertility Services by Race/ethnicity

	NHW	NHB	MX-US	MX-IM	Oth. Hisp.
Maternal Age					
≤ 24	14.33	20.09	26.77	10.67	20.69
25-34	39.35	37.85	38.98	53.57	39.63
35-44	46.32	42.06	34.25	35.76	39.68
Marital Status					
Married	71.72	36.08	53.34	78.71	50.99
Unwed	28.28	63.92	46.66	21.29	49.01
Parity					
None	44.10	50.59	28.88	12.51	42.70
1+	55.90	49.41	71.12	87.49	57.30
Want a Baby					
Yes	39.47	52.24	51.92	49.98	59.37
No	60.53	47.76	48.08	50.02	40.63
Education					
Mean Years of Schooling	13.26	12.50	11.84	7.78	12.93
Insurance and State Mandate					
Private and Mandate	26.94	30.52	21.72	18.68	31.02
Private and No Mandate	51.52	31.85	20.88	18.33	39.52
No Private and Mandate	6.89	15.78	24.80	22.25	15.74
No Private and No Mandate	14.66	21.86	32.60	40.74	13.72
Total	100.00	100.00	100.00	100.00	100.00

SOURCE: See Table 1.

Notes: Data restricted to women who reported impaired fecundity problems.

Table 6. Odds Ratios for Effects of Risk Factors on Infertility Services Utilization

	Infertility Services Utilization [No]		
	Model 1	**Model 2**	**Model 3**
Race/Ethnicity [NHW]			
NHB	1.804***	1.454**	1.331
MX-US	1.270	1.229	1.045
MX-IM	1.529	1.776**	1.044
Oth. Hisp.	1.714*	1.672*	1.666*
Maternal Age [≤ 24]			
25-34	0.412***	0.509***	0.592**
35-44	0.327***	0.347***	0.428***
Marital Status [Unwed]			
Married		0.452***	0.513***
Parity [1+]			
None		1.199	1.272*
Want a Baby [No]			
Yes		0.548***	0.569***
Education [Cont.]			0.936**
Insurance and State Mandate [Private and Mandate]			
Private and No Mandate			1.006
No Private and Mandate			1.653**
No Private and No Mandate			1.731**
Intercept	0.873***	1.505***	1.972***
-2LL	1366.0***	1319.5***	1296.6***

SOURCE: See Table 1.
Notes: Data restricted to women who reported impaired fecundity problems.
Note: Brackets [ ] indicates reference group.
*** $p \leq 0.01$. ** $p \leq 0.05$. * $p \leq 0.10$.