Awareness of and attitudes towards infertility and its treatment: a cross-sectional survey of men in a United States primary care population

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INTRODUCTION

In the United States, the prevalence of infertility is estimated between 7% and 10% with 7.3 million couples seeking care for this condition. Despite significant advances in assisted reproduction, the high cost of treatment, lack of access to service, and lack of awareness of treatment options make infertility an area especially prone to treatment disparities.

Factors such as race or ethnicity, measures of socioeconomic status (SES) and gender have all been studied as barriers to care for infertility. A recent systematic review of the Society for Assisted Reproductive Technology data suggested that in vitro fertilization outcomes do vary by race, but a significant limitation of these data was incomplete race reporting in 35% of cases, and SES factors were not included in the analysis. In their study Smith et al. found that household income and education, but not race, were important predictors of seeking treatment. Finally, studies from states in the United States with legally-mandated insurance coverage of infertility show that racial disparities persist, suggesting that factors besides cost contribute to the disparities described. Drivers of disparities are certainly many, but patient factors, such as beliefs and awareness of infertility and its treatment remain poorly understood.

Up to 50% of infertility cases will involve a male factor, and a male factor is the only identifiable one in approximately 20% of couples. Despite this, men are less likely to seek services for infertility than women, and many men from infertile couples do not undergo a male evaluation, despite recommendations from the American Society for Reproductive Medicine in 2012, which advocates evaluation of both partners.

Much of the available information on attitudes and treatment-seeking behaviors pertaining to infertility is based on data collected from women. Data about men's beliefs and awareness of infertility and its treatment are scant and understudied.

To examine the awareness and attitudes of men on infertility and its treatments, we conducted a cross-sectional survey of a diverse group of men presenting to their primary care doctors. The study was administered with the following objectives: (1) to describe awareness of, attitudes towards and treatment desire for infertility and its treatment, (2) to examine racial and socioeconomic differences in awareness and beliefs as possible explanatory factors for previously-described disparities, and (3) to examine demographic, awareness or attitudes as predictors of desire for treatment.

PATIENTS AND METHODS

Study design

We conducted a cross-sectional survey among men at two primary care clinics in Atlanta, Georgia, USA. The infertility questions were part of a larger survey that examined men's health topics, including erectile
A majority of participants agreed that infertility should be treated (67%), and that infertility was a treatable condition (68%), and relatively few (11%) believed treatments for infertility were dangerous (Table 2). Over half of the men agreed with the statement “infertility is a serious medical condition,” 43% agreed that “being capable of having children is important to my overall health,” 43% agreed that “infertility decreases a man’s quality-of-life,” and 40% agreed to the statement “I am concerned about infertility.”

Racial and socioeconomic variation in awareness and attitudes
Racial and socioeconomic associations with all infertility awareness and attitude items were examined (Table 3). Significant variation by SES was observed in two awareness items. High SES men (vs rest of cohort) were more likely to have heard of infertility (95% vs 75%, OR: 4.03, 95% CI: 1.38–14.85, P = 0.009), to be very or somewhat familiar with the condition (65% vs 45%, OR: 2.34, 95% CI: 1.19–4.74, P = 0.013). Caucasian men were more likely to have heard of infertility, however when adjusted for age and SES this association was no longer statistically significant. Three of the eight attitude measures varied by race, but no attitudes items varied by SES. Caucasian men (vs non-Caucasian men)
were less likely to agree with the following statements: “infertility is a serious medical condition” (36% vs 57%, OR: 0.38, 95% CI: 0.18–0.78, \( P = 0.01 \)), “I am concerned about infertility” (16% vs 52%, OR: 0.27, 95% CI: 0.11–0.59, \( P = 0.001 \)), and “infertility decreased a man’s quality-of-life” (28% vs 50%, OR: 0.42, 95% CI: 0.19–0.88, \( P = 0.021 \)).

**Predictors of treatment desire**

We examined demographic, awareness and attitude items as predictors of treatment desire among men under the age of 60 years (\( n = 161 \)), since it was assumed that men over 60 will likely not desire more children. Of these men, when asked if they would desire treatment for infertility if the doctor said they had infertility, 34% responded “yes, definitely;” 22% “yes, probably;” 14% “not sure;” 17% “no, probably not;” 13% “no, definitely not.” Those who responded “yes, definitely” and “yes, probably” were considered to desire treatment.

Two demographic items were significant predictors of treatment desire on both unadjusted and adjusted analyses (Table 4). The strongest demographic predictor of desire for treatment included currently desiring more children, compared with men who did not want children (OR: 3.62, 95% CI: 1.65–8.66, \( P = 0.001 \)). Men who were not married (vs married) were also more likely to desire treatment (OR: 2.65, 95% CI: 1.41–5.08, \( P = 0.0025 \)). Age (20–39 vs 40–59), race, and SES were not significant predictors on the adjusted analyses, however non-Caucasian men were more likely to desire treatment on unadjusted analyses.

A majority of awareness and attitude items were statistically significant predictors of treatment desire on both unadjusted and adjusted analyses. In multivariate analysis, the following awareness items were predictors of desire for treatment: being very or somewhat familiar with infertility (OR: 2.23, 95% CI: 1.15–4.51), having heard of the condition (OR: 2.38, 95% CI: 1.04–5.60) and having knowledge of medication being a treatment for male infertility (OR: 2.77, 95% CI: 1.33–6.03). Agreeing with the following attitude statements (vs disagree/neutral) were also significant predictors of treatment desire: “I am concerned about infertility” (OR: 2.24, 95% CI: 1.06–4.81), “I am concerned about infertility” (OR: 2.23, 95% CI: 1.15–4.51), “I care about being able to have children” (OR: 2.65, 95% CI: 1.41–5.08), “I care about being able to have children” (OR: 2.65, 95% CI: 1.41–5.08), and “infertility should be treated” (OR: 2.42, 95% CI: 1.19–4.99).

**DISCUSSION**

Attitudes of and awareness toward medical conditions and their treatment are significant contributors to health-seeking behavior.
<table>
<thead>
<tr>
<th>Awareness items</th>
<th>Caucasian versus non-Caucasian</th>
<th>High SES (college graduate and/or income &gt;$100 k per year)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
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<tr>
<td></td>
<td>Univariate OR (95% CI)</td>
<td>P</td>
</tr>
<tr>
<td>Respondent had heard of the following...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infertility</td>
<td>93</td>
<td>77</td>
</tr>
<tr>
<td>Medications for infertile men</td>
<td>39</td>
<td>34</td>
</tr>
<tr>
<td>Surgeries for infertile men</td>
<td>18</td>
<td>23</td>
</tr>
<tr>
<td>Medications for infertile women</td>
<td>58</td>
<td>41</td>
</tr>
<tr>
<td>Surgeries for infertile women</td>
<td>42</td>
<td>34</td>
</tr>
<tr>
<td>Respondent very/somewhat familiar with...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infertility</td>
<td>55</td>
<td>50</td>
</tr>
<tr>
<td>Treatments for infertility</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>Respondent strongly agreed/agreed with statement...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infertility should be treated</td>
<td>58</td>
<td>71</td>
</tr>
<tr>
<td>Infertility is a serious medical condition</td>
<td>36</td>
<td>57</td>
</tr>
<tr>
<td>Infertility is a treatable condition</td>
<td>69</td>
<td>68</td>
</tr>
<tr>
<td>I care about being able to have children</td>
<td>34</td>
<td>57</td>
</tr>
<tr>
<td>Being capable of having children is important to my overall health</td>
<td>28</td>
<td>50</td>
</tr>
<tr>
<td>I am concerned about infertility</td>
<td>16</td>
<td>52</td>
</tr>
<tr>
<td>Infertility decreases a man’s quality-of-life or sense of well being</td>
<td>28</td>
<td>50</td>
</tr>
<tr>
<td>Treatments for infertility are dangerous</td>
<td>6</td>
<td>13</td>
</tr>
</tbody>
</table>

Multivariate model included the following covariates: age, race, and SES. SES: socioeconomic status; CI: confidence interval; OR: odds ratio
and possible determinants of health disparities. We sought to examine these factors as related specifically to infertility in a diverse group of men in the primary care setting. Overall, awareness of male infertility and its treatment was found to be poor with a substantial number of responders indicating that they were not familiar with the condition or had not heard of treatment options for its management. However, when queried about concern about infertility, most participants agreed that it is a serious, but treatable, medical condition. Only a few men believed treatments for infertility were dangerous. Familiarity with the condition and its treatments were significant predictors of treatment desire. Several attitude items were also associated with desire for treatment including the belief that infertility decreases a man’s quality-of-life and that the condition should be treated. Race and SES, however, were not significant predictors of desire for treatment. Overall, men had greater awareness of treatments for female infertility, with 35% indicating they had heard of surgery as treatment for female infertility and 85% indicating they had heard of medication as treatment for female infertility.

High SES, but not race, was significantly associated with greater awareness of infertility. On multivariate analysis, the odds of having heard of infertility was over 4 times higher, and the odds of being somewhat/very familiar with infertility was nearly 3 times higher in men of high SES (vs the rest of the cohort). Lack of awareness among men of lower SES in our study is consistent with previously-described disparities in infertility treatment. In their study Smith et al.\textsuperscript{15} found that household income and education were important predictors of those using fertility treatments and proposed several explanations for their findings, including knowledge of health care options and cultural differences in the acceptance of specific fertility treatments. A telephone survey of nearly 2000 unmarried men and women aged 18–29 found that 13% of men and 19% of women believed that they were “very likely” to be infertile.\textsuperscript{16} About 20% of African American and Hispanic men and <10% of Caucasian men in the sample believed they were infertile. Although it is possible that some of the respondents in were indeed infertile, the important contribution of this study is that it highlights the general lack of knowledge about infertility and potential racial variation in the level of awareness.

Our study has shown that several attitude items were significantly associated with race even after adjusting for SES. Non-Caucasian race (vs Caucasian) was associated with being concerned about the condition and that infertility decreases a man’s quality-of-life. A recent paper examining data from the 2002 National Survey of Family Growth found that African American men were significantly more likely to indicate that they were infertile than their Caucasian counterparts. This observation appears to indicate that infertility may be particularly burdensome for non-Caucasian. Thus, it
is particularly troublesome that disadvantaged racial minorities are less likely to receive treatment for infertility. For example, Jain et al. found that even in states in the United States with mandated insurance coverage of infertility treatment, African American women tended to wait longer before seeking infertility treatment than Caucasian. There are certainly several contributing factors to this observation; however, our data suggest that differences in awareness and attitudes are unlikely to explain racial disparities in infertility treatment. For this reason, other factors including cost, access to care, and provider's cultural competence should be examined.

The interpretation of our results warrants caution because of the modest study size, which limits statistical power. In the addition, the clinic-based, rather than population-based, recruitment of participants may affect the generalization of our findings. On the other hand, the main strengths of our study include the racial and socioeconomic diversity of the population and the use of men in a general medical practice, as opposed to specialized fertility-clinic setting. Of course, interest in this topic would be significantly higher in an infertility clinic.

CONCLUSIONS

Patient factors such as attitudes and awareness are one of many possible determinants of health disparities. Our findings suggest that racial disparities in the treatment of infertility may be not explained by negative attitudes or a lack of awareness. However, in socioeconomic disparities, lack of awareness but not attitudes may be a contributing factor. Future research should be aimed at understanding further the determinants of disparities with particular focus on modifiable factors. As recently proposed elsewhere, other contributors to disparities include health care system factors (cost, access to care, organizational characteristics, and complexity of clinic operations), provider factors (bias and stereotyping, competing demands), the clinical encounter (provider communication, cultural competence) and additional patient factors such as preferences and knowledge. As infertility and its treatment involve both men and women, additional research should focus on awareness of and attitudes towards this condition in couples rather than individuals.

AUTHOR CONTRIBUTIONS
RS Gerhard conceived of this study, collected data, and performed data analysis, and prepared the manuscript. CWMR conceived of this study. MG performed data analysis and prepared the manuscript. DV collected data. WH conceived of this study and performed data analysis, and prepared the manuscript. All authors read and approved the final manuscript.

COMPETING INTERESTS

The authors declare that they have no competing interests.

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