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Race and Ethnicity Do Not Contribute to Differences in Pre-operative Urinary Incontinence Severity or Symptom Bother In Women Undergoing Stress Incontinence Surgery

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Abstract

Aims— To determine whether race/ethnicity affects urinary incontinence (UI) severity and bother, in women undergoing surgery for stress incontinence.

Methods— We used baseline data from participants in the Stress Incontinence Surgical Treatment Efficacy trial. UI severity was measured by the number of leakage episodes during a 3-day urinary diary and by urodynamic evaluation. UI bother was measured using the Urogenital Distress Inventory (UDI). Race/ethnicity classification was based on self report.

Results— Of the 654 women, 72(11%) were Hispanic, 480(73%) non-Hispanic White, 44 (6.7%) non-Hispanic Black and 58 (8.9%) ‘Other’. No differences were seen in any UI severity measures. Non-Hispanic Whites had lowest UDI scores on bivariate analysis, explained by socioeconomic status, BMI and age on multivariate analysis.

Conclusion— Factors other than racial/ethnic differences underlie variations in UI symptoms and bother in this group of women seeking surgery for stress incontinence.

Keywords

Urinary Incontinence; Ethnicity; Race; Quality of life

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Condensation Statement:

Race and ethnicity did not directly impact the clinical severity or symptomatic bother of urinary incontinence after controlling for socioeconomic and clinical factors.

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INTRODUCTION

The prevalence of urinary incontinence (UI) in women has been estimated from several large population-based samples¹²³⁴. While the overall rates of stress UI (SUI) and urge UI (UUI) are similar in several of these reports, other studies report different rates across race and ethnic groups²³⁴⁵⁶⁷⁸⁹¹⁰. One clinical study from a gynecologic setting reported that White women had higher prevalence of SUI compared to both Hispanic and Black women⁸. In contrast, another study reported a higher rate of SUI in Hispanic compared to White women⁹ while other studies have found that Black women have consistently lower rates of SUI than do White women³⁴⁶¹⁰. Therefore, while there appears to be agreement that there are differences in prevalence of UI and SUI across race/ethnic groups, there is no agreement about the magnitude and the nature of those differences.

Even less is known about the variation in the severity of UI and its impact on quality of life across different racial and ethnic groups. Our group has previously published cross-sectional data on 655 women enrolled in a trial comparing two surgical treatments for SUI which showed that there are differences in the impact of UI on quality of life (QoL) as measured by the Incontinence Impact Questionnaire¹¹. Specifically, Hispanic women reported greater impact of UI on quality of life than did non-Hispanic White or Black women. Further, greater negative impact on QoL was associated with UI severity and symptom bother as has been reported by others¹²¹³¹⁴¹⁵. However, differences across race-ethnic groups in UI severity and symptom bother were not investigated.

The purpose of this analysis is to extend our prior work by investigating if there are differences in UI severity and associated bother across racial/ethnic groups and to determine patient characteristics that predict UI severity and bother.

METHODS

Design

Data for this study come from baseline assessments of 655 women enrolled in an ongoing randomized clinical trial (SISTER: **S**tress **I**ncontinence **S**urgical **T**reatment **E**fficacy **T**rial) that compares the efficacy of two commonly performed surgeries to treat stress urinary incontinence (SUI), the Burch colposuspension and the autologous fascial sling procedures. To be eligible for this trial, women were diagnosed with predominant SUI based on several self-report and clinical measures as described elsewhere¹⁶. The study is being conducted by the Urinary Incontinence Treatment Network (UITN). The UITN, which consists of nine clinical centers and a biostatistical coordinating center, is funded by the National Institute of Diabetes, Digestive and Kidney Disorders (NIDDK) and the National Institute of Child Health and Human Development. All study participants provided written informed consent for the study. The Institutional Review Board at each participating center reviewed and approved the study protocol.

Measures

Outcome measures include UI severity and symptom bother. *Severity of incontinence* was measured by self-report. The self-report measures were the number of incontinence episodes recorded in a 3-day bladder diary averaged over the three days¹⁷ and the frequency of symptoms of stress and urge UI as measured by responses to the questionnaire for the Medical, Epidemiologic, and Social Aspects of Aging Project (MESA)²². Questions referring to loss of urine at times of exertion such as laughing, sneezing, lifting, or bending over define symptoms of stress urinary incontinence. Questions referring to urine loss preceded by an urge to void, or uncontrollable voiding with little or no warning define symptoms of urge

incontinence. The questionnaire is summarized in two sub-scales, one for each type of symptoms, with a potential range of scores of 0–27 for stress UI symptoms and 0–18 for urge UI symptoms. Agreement between the MESA questions and a clinician's assessment has been reported as 87% for women²². A higher score denotes greater severity..

Symptom bother was measured by the Urogenital Distress Inventory (UDI)²¹ to assess the degree to which UI symptoms are troubling to women. For each symptom experienced, bother is rated on a scale from 0 = “not at all bothersome” to 3 = “Greatly bothersome”. Bother was computed as the average of the bother of the symptoms experienced and ranged from 0 to 3.

Determination of *race and ethnicity* was based on self-report, using categories established by the US Census Bureau. Of the 655 women, 654 responded to the questions on race and ethnicity and were classified into four race/ethnic groups: 72 (11.0%) identified themselves as Hispanic, 480 (73.4%) as non-Hispanic White, 44 (6.7%) as non-Hispanic Black, and 58 (8.9%) as “other”. The “other” group included all other Non-Hispanics, including women of Asian, Native Hawaiian or Pacific Islander, American Indian or Alaskan Native. Women of mixed heritage were considered in this group, unless they stated their ethnicity to be Hispanic or Latino.

In addition to race/ethnicity, factors considered *a priori* likely to be associated with UI severity and symptom bother included the following. *Urodynamic measures* included those obtained during non-instrumented uroflow studies (values for maximum flow rate[Qmax], average flow [Qaverage], time to maximum flow rate, voided volume, and post void residual) and during filling cystometry (values for volume at first desire to void, maximum cystometric capacity [MCC], whether or not detrusor over activity was present, and intravesical valsalva leak point pressure [VLPP]). The urodynamics (UDS) protocol used in this study complied with terminology from the Standardization Committee of the ICS¹⁸ and technical recommendations from the Good Urodynamic Practice guidelines.¹⁹ Details of the urodynamic protocol and interpretation guidelines have been reported elsewhere.²⁰ *Sociodemographic factors* included age (years) and socioeconomic status (SES) based on occupational class using the Nam-Powers-Boyd Occupational Status Scores²³. The Nam-Powers score ranks occupations based on educational requirements and expected salary on a scale from 0 to 100, where a higher score indicates greater status, and was used as a proxy measure for socioeconomic status. Measures of *health status and history* included body mass index (BMI), past treatment or surgery for UI (yes/no), number of vaginal deliveries, stage of pelvic organ prolapse as assessed by the Pelvic Organ Prolapse Quantification Exam (POP-Q)²⁴, and pelvic muscle strength as assessed using the Brinks score²⁵.

Data Analysis

One-way analysis of variance and cross-tabulation with Chi-Square testing were used to evaluate bivariate associations with racial/ethnic group for continuous variables and categorical variables, respectively. We utilized a significance level of $p < .01$ due to multiple comparisons²⁶. Least squares regression analysis was used to identify factors associated with symptom bother. Because there were no significant differences in measures of UI severity across race/ethnic groups, the multivariate modeling was restricted to symptom bother.

The final regression model was computed on the 560 women with complete data. To assess the relationship of race/ethnicity with symptom bother, we first found the most parsimonious model without race/ethnicity in explaining symptom bother. We then added race/ethnicity to that model to assess the additional variability in symptom bother accounted for by race/ethnicity. The first model included all explanatory factors as described above. We then removed variables not statistically significant in that model to obtain the base model and added race/

ethnicity to this base model to obtain the final model. All analyses were computed using SAS statistical software (SAS Institute, Inc. Cary, NC).

RESULTS

Sample

The majority of women in this study were non-Hispanic White (73%). Eleven percent of the sample was Hispanic, seven percent was non-Hispanic Black, and the remaining nine percent of the women were defined as “other”. The women were middle-age (average 52 years) and socioeconomically diverse (Table 1). They reported an average 3.2 incontinent episodes per day. By design, all patients had stress UI, but the vast majority (93%) also reported some degree of urge UI symptoms. Over half reported prior treatment for UI, and the majority demonstrated some degree of pelvic organ prolapse. The mean and median BMI was 30, indicating that the sample was generally overweight.

Differences across Race/Ethnic Groups

The differences in sociodemographic characteristics by race/ethnicity (Table 1) of the women in this study are those commonly observed in other population-based and clinical studies.

In terms of health status and history, racial/ethnic differences were apparent for BMI, pelvic floor strength, and pelvic organ prolapse. Black women had significantly higher BMI ($p<0.0001$) and greater strength and duration of pelvic floor muscle contraction ($p=0.04$) than did White or Hispanic women. White women were more likely than Black or Hispanic women to have more advanced (Stage III and IV) pelvic organ prolapse ($p=0.008$). There were no differences across racial/ethnic groups in number of vaginal deliveries or prior UI surgery or other treatment for UI.

There were no differences in severity of UI as measured by the type and extent of UI symptoms reported or the average number of incontinent episodes per day by race/ethnicity. However, Black women and those women whose race was categorized as “other” reported higher level of bother from UI symptoms than did White and Hispanic women ($p=0.006$). Non Hispanic White women reported the lowest level of symptom bother. With regards to urodynamic parameters, non-Hispanic White women had the highest maximum cystometric capacity (MCC) ($p=0.001$), but no other parameters differed across the race/ethnic groups.

Correlates of Symptom Bother

In multivariate analyses (Table 2), the results of the base model indicate that symptom bother was associated with younger age, higher BMI, lower SES, the number of stress and urge symptoms, and lower Qmax on the non-instrumented uroflow (NIF) test. The MCC and the volume at first desire to void showed confounding, and both measures were retained in the second model. Results of the final model show that controlling for age, SES, BMI, stress and urge symptoms, and the NIF Qmax, race/ethnicity was not related to symptom bother.

Because age, SES and BMI were significantly associated with race/ethnicity, another model was computed with these three factors removed. In this model (not shown), race/ethnicity was significantly related to symptom bother when controlling for the remaining clinical factors. The results of these two models with and without race/ethnicity indicate that, in determining factors related to UI symptom bother, race/ethnicity is confounded with age, SES, and BMI in this sample of women.

DISCUSSION

Differences across racial/ethnic groups in prevalence, severity, and impact of health conditions are of interest to both clinicians and social scientists. We investigated the relationship between race/ethnicity and measures of UI severity and the bothersomeness of the UI symptoms in this cohort of women with stress UI. At the bivariate level, we found no relationship between race/ethnicity and a range of measures of UI severity. There were no significant differences across racial/ethnic groups in the average number of incontinent episodes per day or in urodynamic measures with the exception of maximum cystometric capacity being higher for non-Hispanic White women. With regards to quantitative physical measures, Howard and Delancey²⁷ found that Blacks had 29% higher urethral pressures during maximum pelvic muscle contraction and also had a tendency for higher urethral closure pressures at rest. Unfortunately, urethral pressure was not measured in this study to allow comparison of results.

We found a bivariate association between race/ethnicity and UI symptom bother, indicating that non-Hispanic Black women and women in other race/ethnic groups (primarily mixed race/ethnicity) experienced more bother from their UI symptoms than did Hispanic and non-Hispanic White women. However, results of the multivariate analysis show that, when controlling for sociodemographic characteristics, BMI, and UI symptoms and severity, race/ethnicity is no longer related to UI symptom bother. The degree of UI symptom bother was associated with younger age, lower socioeconomic status, higher BMI, and a greater number of UI symptoms, both stress and urge. These findings underscore the importance of multivariate analyses and controlling for potentially confounding factors. Such factors must be included when examining the prevalence of UI as well as when looking at outcomes after treatment.

The study sample consists of women with stress incontinence that had elected to undergo surgery. Limitations of the sample include the fact that compared to most women undergoing incontinence surgery, the women in the SISTER trial may represent a more clinically complex population since they were recruited from tertiary referral practices in academic medical centers. Furthermore, the eligibility criteria for the trial constrain the range of UI symptoms that were observed in that study participants were required to have predominantly stress UI symptoms. Therefore, the extent of urge UI symptoms, which other studies have reported are more bothersome²⁸ was limited by design. This design allows us to evaluate the association of explanatory factors with symptom bother, holding the presence and type of incontinence constant.

The entrance criteria for the study may have introduced some selection bias. All women had to have SUI that was bothersome enough for them to want surgery. If there are social or cultural differences in the level of bother that motivate a woman to seek treatment, we might observe an apparent association of bother with race/ethnicity that is due to selection bias. On the other hand, the possibility that various race/ethnic groups might underreport UI in population-based studies has been a longstanding concern. For example, it has often been thought that older Hispanic women were not likely to report UI or to seek treatment because of cultural inhibitions about discussing what is considered a personal and private problem. These data from a care-seeking population indicate that it is not race/ethnicity but rather other socioeconomic characteristics that drive symptom bother to the point of seeking care. In this sample, it is women who are younger and of lower socioeconomic status, regardless of race/ethnicity, who report more symptom bother. It is not known if this would be observed in a population-based sample.

There are several strengths of this analysis underscore the importance and implications of our findings. First, the SISTER population is large and both ethnically and socioeconomically diverse. Women were enrolled from multiple sites throughout the US to achieve this diversity.

Second, we examined a range of clinical and demographic factors, beyond those included in prior studies, to understand any relationship between race/ethnicity and UI severity and UI symptom bother. These factors included both patient self-report measures and results of clinical assessments. Finally, we used a validated and UI-specific instrument to measure symptom bother.

CONCLUSION

Differences across race/ethnic groups in severity of UI symptoms, both objective and self-report measures, were not observed in these women who had elected surgical treatment for SUI. Similarly, differences across race/ethnic groups in UI symptom bother were not observed when controlling for sociodemographic and clinical factors. These findings underscore the importance of looking beyond race/ethnicity when trying to understand the reactions of women who seek treatment to UI symptoms and the reasons for seeking treatment. This finding has important implications for clinical care and assessing treatment outcomes. If differences exist in the way women of different age or SES experience the symptoms of UI despite similarities in the objective measures of UI severity, it is likely that such differences would also impact on how they perceive improvement in UI symptoms after treatment.

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Table 1
Sociodemographic and Clinical Characteristics for All Women and For Women by Race/Ethnicity

	All N=655	Hispanic n = 72	White n = 480	Black n = 44	Other n = 58	p-value
Sociodemographic						
Age (yrs)	51.9 ± 10.3	49.8 ± 9.1	52.5 ± 10.4	49.0 ± 10.2	51.3 ± 10.6	0.04
Education, = HS/GED	225 (34)	37 (51)	149 (31)	17 (39)	21 (36)	0.002
SES: Occupational Score	56.9 ± 24.6	49.3 ± 24.6	59.7 ± 23.7	48.4 ± 24.8	49.8 ± 27.3	<0.0001
Health Status and History						
BMI kg/m ² mean ±SD	30.0 ± 6.1	30.8 ± 5.6	29.6 ± 5.9	34.4 ± 7.5	28.7 ± 5.9	<0.0001
POP-Q Stage: 0–I	162 (24.7)	25 (35)	108 (23)	14 (32)	15 (26)	0.008
II	387 (59.1)	43 (60)	279 (58)	28 (64)	36 (62)	
III–IV	106 (16.2)	4 (5)	93 (19)	2 (4)	7 (12)	
Pelvic floor strength	9.0 ± 2.1	8.8 ± 1.8	9.0 ± 2.1	9.6 ± 2.0	8.4 ± 2.3	0.04
Number of vaginal deliveries	2.6 ± 1.5	2.4 ± 1.6	2.6 ± 1.5	2.7 ± 1.9	2.8 ± 1.7	0.43
Prior UI surgery/treatment	338 (52)	42 (58)	244 (51)	18 (41)	34 (59)	0.21
Severity of UI						
Stress UI symptoms	19.3 ± 4.6	19.9 ± 4.5	19.4 ± 4.7	18.5 ± 4.3	19.2 ± 4.4	0.42
Urge UI symptoms	6.5 ± 3.9	7.1 ± 3.8	6.3 ± 3.9	6.7 ± 4.5	6.8 ± 3.7	0.33
Accidents per day	3.2 ± 3.0	3.6 ± 3.1	3.2 ± 3.0	3.3 ± 3.1	3.0 ± 2.5	0.68
Urodynamic Measures:						
NIF Qmax	25.5 ± 11.2	26.5 ± 10.0	25.6 ± 11.4	24.2 ± 12.6	24.2 ± 10.0	0.61
NIF Time to max flow	11.6 ± 11.2	9.8 ± 7.9	12.0 ± 12.3	11.2 ± 7.0	10.3 ± 7.5	0.35
NIF Voided volume	308.8 ± 133.6	297.6 ± 107.9	313.2 ± 140.7	289.6 ± 114.0	301.4 ± 119.5	0.58
NIF PVR	24.8 ± 37.5	19.7 ± 30.0	26.3 ± 39.7	22.8 ± 30.7	20.7 ± 33.0	0.44
CMG Volume at first desire	142.1 ± 96.0	127.1 ± 68.4	146.8 ± 102.5	145.5 ± 86.9	118.4 ± 69.7	0.09
CMG MCC	391.6 ± 137.8	358.5 ± 104.8	404.5 ± 143.2	354.2 ± 115.6	352.7 ± 126.9	0.001
CMG Detrusor overactivity	60 (9)	11 (15)	39 (8)	2 (5)	8 (14)	0.10
CMG VLPP	116.6 ± 37.5	109.0 ± 30.9	116.8 ± 38.2	122.6 ± 36.8	119.2 ± 39.5	0.38
Symptom Bother						
UDI	151 ± 48.6	156.9 ± 52.8	147.2 ± 47.2	161.0 ± 49.4	167.3 ± 50.8	0.006

All values reported as n (%) or mean ± standard deviation

Table 2

Factors Related to UI Symptom Bother in Women With Stress Urinary Incontinence: Multiple Regression Analysis of UDI (n=560)

Predictors	Base Model Without Race/Ethnicity		Final Model With Race/Ethnicity	
	slope	P-value	slope	P-value
<u>Sociodemographic</u>				
Age (yrs)	-0.49	0.005	-0.47	0.008
SES (occupational class)	-0.34	<0.0001	-0.32	<0.0001
<u>Health Status</u>				
BMI (kg/m ²)	0.87	0.003	0.89	0.003
<u>Severity of UI</u>				
Stress UI Symptoms	1.71	0.0001	1.76	<0.0001
Urge UI Symptoms	4.05	<0.0001	3.99	<0.0001
<u>Urodynamic Measures</u>				
NIF Qmax	-0.39	0.01	-0.37	0.02
MCC	-0.02	0.25	-0.02	0.29
CMG Volume first desire to void	-0.02	0.24	-0.02	0.26
<u>Ethnicity</u>	----	----		0.17
Hispanic			-0.87	
Non-Hispanic White			*	
Non-Hispanic Black			3.57	
Non-Hispanic Other			13.44	

* Reference group