Reported Symptoms Before and One Year After Hysterectomy in African American and White Women

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Abstract

Purpose: Although African American women are more likely than white women to undergo hysterectomy, there are few data describing their symptoms before and after surgery. This report compares reported symptoms in white and African American women before and 1-year after having a hysterectomy with at least one ovary retained.

Methods: Using data from a prospective cohort study, we compared self-reported symptoms at baseline and 1-year follow-up among 382 women undergoing hysterectomy without bilateral oophorectomy (197 African American and 185 white) and 448 controls (199 African American and 249 white). Symptoms were assessed using an 11-item scale with questions on somatic, psychologic, and urogenital symptoms.

Results: Women undergoing hysterectomy had more severe symptom scores before surgery than controls, but no significant racial differences were found. At follow-up, total scores for women with hysterectomies were comparable to those of control women, but some differences were observed within individual domains. Urogenital scores were worse for women with hysterectomies for both African American and white women. African American women with hysterectomies had better scores in the psychologic domain than either controls or white women with hysterectomies.

Conclusions: African American women, despite having such characteristics as larger uterine weight and lower hemoglobin that might suggest they would have more severe symptoms, had scores that were no worse than white women both before and after hysterectomy.

Introduction

H YSTERECTOMY IS THE MOST COMMON nonobstetrical surgical procedure among premenopausal women. The most frequent indications for hysterectomy are uterine fibroids, dysfunctional uterine bleeding, endometriosis, and pelvic organ prolapse.^{1,2} Most women undergo the surgery because such symptoms as bleeding, pelvic pain and pressure, and urinary incontinence are having a severe impact on their quality of life and in many cases have not been resolved by more conservative treatments. Several studies have reported that the vast majority of women having hysterectomies report considerable improvement in the symptoms that led to the surgery and a high level of satisfaction with the procedure.^{3–6}

Studies of hysterectomy outcomes generally have been conducted in predominantly white populations and have not described results separately by racial/ethnic group.^{4–6} Although African American women are at higher risk for having hysterectomy,^{7,8} there is much less information available on

changes in symptoms after hysterectomy in this population. Several lines of evidence suggest that there may be important racial differences in symptoms because of both physical and psychologic considerations. African American women tend to present for hysterectomy with more severe symptomology, especially related to fibroids. They tend to have larger and more numerous fibroids, higher uterine weight, and more severe pelvic pain.^{8,9} These differences in uterine anatomy are associated with higher rates of perioperative complications in African American women, which could potentially affect satisfaction with outcome.^{10–12} There is also evidence that psychologic aspects related to hysterectomy vary by race and ethnicity, with African American women more likely to express concerns about the effect of surgery on relationships and mistrust of their healthcare provider's motivation for recommending surgery.^{13–15} Other studies evaluating symptoms in women during midlife, but not in relation to hysterectomy, also report differences between racial and ethnic groups.^{16–19}

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In this report, we describe symptoms reported by premenopausal African American and white women undergoing hysterectomy without bilateral oophorectomy for benign conditions and a control group of age-matched women with intact uteri and ovaries. The aim of the analysis was to evaluate symptoms before hysterectomy and 1 year after surgery to compare the frequency, severity, and change in symptoms in these women compared to the symptoms experienced by control women over the same time period.

Materials and Methods

The study subjects were participants in the Prospective Research On Ovarian Function (PROOF) Study, a prospective cohort study designed to evaluate risk for ovarian failure among women undergoing premenopausal hysterectomy for benign conditions compared to a control group of women of similar age with intact uteri and ovaries. Women scheduled to undergo hysterectomy from 2004 to 2007 were identified from operating room schedules of the two hospitals in Durham, NC, both of which are part of the Duke University Health System. Potentially eligible women received a letter from their physicians describing the study and informing them that an interviewer would be contacting them about participating in the study. The interviewer verified that the women met the eligibility criteria of age 30–47 years, premenopausal as evidenced by at least one menstrual period in the previous 3 months, no personal history of cancer (except nonmelanoma skin cancer), and at least one ovary expected to be left intact after the hysterectomy. Eligible women who agreed to participate were scheduled for an interview visit in which they signed an informed consent form, a questionnaire was administered, a blood specimen was drawn, and body measurements (height, weight, and waist and hip circumference) were obtained. All baseline visits occurred before the women's hysterectomies, and most were done in conjunction with their preoperative workup.

Control women were recruited using study brochures and ads in publications placed in offices and clinics of gynecology and family medicine practices within the Duke University Health System. The eligibility criteria were age 30–47 years, premenopausal, no personal history of cancer, and not currently pregnant. Recruitment was targeted such that the age distribution was similar to that of the cases and the race distribution was similar to that of Durham County. Interview visit procedures for the control women were the same as for the women undergoing hysterectomy. Both women undergoing hysterectomy and the control women were recontacted annually for follow-up visits to obtain updated questionnaire information and blood samples. The study protocol was approved by the Duke University Medical Center Institutional Review Board.

Information obtained using the questionnaire included demographic characteristics, menstrual cycle characteristics, pregnancy and infertility history, history of contraceptive and hormone use, current use of medications, and lifestyle characteristics, such as smoking history and alcohol consumption. Information on symptoms was obtained using the Menopause Rating Scale (MRS),²⁰ a validated instrument that queries women about 11 symptoms (Table 3) and the severity of any reported symptom (mild, moderate, severe, or extremely severe). Although the scale was developed to evalu-

ate symptoms commonly experienced during the menopausal transition, most of the symptoms (e.g., bladder problems, depression, exhaustion) are relevant to women undergoing hysterectomy as well. Although other validated instruments to assess symptoms are available, the MRS was chosen because it captures information on symptoms that are relevant both to the short-term outcomes of hysterectomy and to the menopause transition that become more important with longer follow-up of the cohort. Possible values for each symptom are 0 (symptom not reported), 1 (mild), 2 (moderate), 3 (severe), and 4 (extremely severe), with the possible values of the scale ranging from 0 to 44. The scale is further divided into somatic, psychologic, and urogenital domains. The somatic domain includes questions on hot flashes, heart discomfort, sleeping problems, and muscle and joint problems; the psychologic domain includes questions on depressive mood, irritability, anxiety, and physical and mental exhaustion; and the urogenital domain includes questions on sexual problems, bladder problems, and vaginal dryness. Clinical information for patients, including type of surgery, preoperative diagnoses, and uterine weight, was abstracted from medical records.

Statistical methods

Comparisons between African American and white women or between women undergoing hysterectomy and control women were made using *t* tests for continuous variables and chi-square or Fisher's exact test for categorical variables. Changes in symptom scores between baseline and 1-year follow-up were evaluated using analysis of covariance (ANCOVA), controlling for the baseline symptom score. Multivariable linear regression models were used to evaluate predictors of total symptom scores, controlling for age as a continuous variable, race (African American or white), number of pregnancies, duration of oral contraceptive use, history of tubal ligation, smoking status, current alcohol consumption, body mass index (BMI), educational level, and marital status, using the categorizations described in Table 1. Models of predictors of symptom scores at 1-year follow-up also controlled for baseline scores. Models restricted to women with hysterectomies also included terms for the clinical characteristics of uterine weight (continuous), type of surgery, removal of one ovary, and hematocrit determination. All analyses were performed using SAS statistical software, version 9.1.3 (Cary, NC).

Results

The analyses are based on 382 women with hysterectomy (197 African American and 185 white) and 448 controls (199 African American and 249 white). Women whose reported race was neither African American nor white (2% of the cohort) were excluded from the analyses. Descriptive characteristics of the women undergoing hysterectomy and the control women, stratified by race, are presented in Table 1. Mean age at hysterectomy was 40.9 years for African American women and 40.6 years for white women. The age distribution of the controls was similar to that of the women undergoing hysterectomy. In regard to reproductive characteristics, the women with hysterectomy had more pregnancies and were more likely to have had a tubal ligation. Lower education level and being married or living with a partner

TABLE 1. DESCRIPTIVE CHARACTERISTICS OF WOMEN UNDERGOING HYSTERECTOMY AND CONTROL WOMEN, BY RACE

	African American women					White women				
	Hysterectomy (n=197)		No hysterectomy (n=199)		p value	Hysterectomy (n=185)		No hysterectomy (n=249)		p value
	n	(%)	n	(%)		n	(%)	n	(%)	
Age at baseline (years)										
30–34	11	5.6	17	8.5	0.1	17	9.2	26	10.4	0.9
35–39	52	26.4	70	35.2		55	29.7	68	27.3	
40–44	98	49.8	77	38.7		72	38.9	97	39.0	
45–47	36	18.3	35	17.6		41	22.2	58	23.3	
Number of pregnancies										
0	33	16.8	53	26.6	0.05	31	16.8	91	36.6	<0.0001
1–2	115	58.4	98	49.3		104	56.2	126	50.6	
3 +	49	24.9	48	24.1		50	27.0	32	12.8	
Duration of oral contraceptive use										
Never	14	7.1	13	6.7	0.5	15	8.2	23	9.5	0.7
< 1 year	17	8.6	25	12.8		24	13.2	23	9.5	
1– <5 years	50	25.4	48	24.6		39	21.4	59	24.5	
5– <10 years	40	20.3	47	24.1		42	23.1	58	24.1	
> 10 years	76	38.6	62	31.8		62	34.1	78	32.4	
Missing			4			3		8		
History of tubal ligation										
Yes	101	51.3	73	36.7	0.004	74	40.0	46	18.5	<0.0001
No	96	48.7	126	63.3		111	60.0	203	81.5	
Smoking status										
Never smoker	128	65.0	136	68.3	0.4	103	55.7	165	66.3	0.07
Former smoker	26	13.2	30	15.1		50	27.0	54	21.7	
Current smoker	43	21.8	33	16.6		32	17.3	30	12.0	
Current alcohol consumption										
<1 drink/month	137	69.5	113	56.9	0.04	88	47.6	101	40.6	0.2
1–8 drinks/month	43	21.8	67	33.7		64	34.6	85	34.1	
>8–20 drinks/ month	11	5.6	10	5.0		20	10.8	31	12.4	
>20 drinks/month	6	3.1	9	4.5		13	7.0	32	12.9	
BMI (kg/m ²)at baseline										
<25	21	10.7	32	16.1	0.1	64	35.4	120	48.4	0.01
25–<30	46	23.5	54	27.1		47	26.0	63	25.4	
>30	129	65.8	113	56.8		70	38.7	65	26.2	
Missing	1					4		1		
Educational level										
Up to high school graduate	131	66.5	104	52.3	0.004	108	58.4	88	35.3	<0.0001
Greater than high school	66	33.5	95	47.7		76	41.6	161	64.7	
Marital status										
Married/living together	95	48.2	78	39.2	0.08	146	78.9	161	64.7	0.001
Single, never married	48	24.4	67	33.7		12	6.5	44	17.7	
Divorced/separated/widowed	54	27.4	54	27.1		27	14.6	44	17.7	

BMI, body mass index.

also were associated with hysterectomy. Among white women only, those with hysterectomies had a higher average BMI than control women.

Clinical characteristics of African American and white women undergoing hysterectomy are shown in Table 2. African American women were much more likely to have a preoperative diagnosis of leiomyomas (fibroids), whereas white women more frequently had diagnoses of endometriosis and pelvic organ prolapse. The mean uterine weight was markedly higher among African American women than white women (455 g and 194 g respectively). Mean preoperative hematocrit and hemoglobin levels were significantly lower among African Americans. African American women were more likely to have an abdominal hysterectomy, presumably because of larger uterine size related to fibroids.

The prevalence of each symptom and the mean severity score among women reporting symptoms are presented descriptively in Table 3. It is noteworthy that the symptoms on the scale were reported very commonly by both the women undergoing surgery and the control women, with the reported individual symptom prevalence at baseline ranging from 15% for vaginal dryness to 66% for irritability.

Table 4 shows that the baseline total scores and the scores for the somatic and urogenital domains were significantly higher (indicating more severe symptoms) among African American and white women undergoing hysterectomy compared to controls. There were no statistically significant differences between African American and white women in the total score or scores for individual domains for either the women undergoing hysterectomy or the control women.

TABLE 2. CHARACTERISTICS OF AFRICAN AMERICAN AND WHITE WOMEN UNDERGOING HYSTERECTOMY

	African American women (n=196)		White women (n=185)		p value
	Mean	(SD)	Mean	(SD)	
Age at interview (years)	40.9	(3.8)	40.6	(4.4)	0.4
Uterine weight (g)	455.9	(409.3)	193.8	(228.8)	<0.0001
Hemoglobin (g/dL)	11.8	(1.6)	13.0	(1.4)	<0.0001
Hematocrit (L/L)	0.37	(0.04)	0.40	(0.04)	<0.0001
	n	(%)	n	(%)	
Type of hysterectomy					
Abdominal	137	(69.9)	80	(43.2)	<0.0001
Laparoscopic	8	(4.1)	16	(8.7)	
Vaginal	51	(26.0)	89	(48.1)	
Organs removed					
Uterus only	174	(88.8)	155	(83.8)	0.2
Uterus and one ovary	22	(11.2)	30	(16.2)	
Preoperative diagnosis ^a					
Leiomyomas	171	(87.2)	83	(44.9)	<0.0001
Dysmenorrhea	35	(17.9)	36	(19.5)	0.7
Menorrhagia	131	(66.8)	121	(65.4)	0.8
Pelvic pain	24	(12.2)	31	(16.8)	0.2
Endometriosis	7	(3.6)	18	(9.7)	0.02
Prolapse	2	(1.0)	21	(11.4)	<0.0001 ^b
Stress urinary incontinence	0	(0.0)	2	(1.1)	0.2 ^b
Cervical dysplasia	3	(1.5)	6	(3.2)	0.3 ^b
Adenomyosis	4	(2.0)	3	(1.6)	1.0 ^b
Other	32	(16.3)	52	(28.1)	0.006

^aMore than one diagnosis may have been reported.

^bFisher's exact test used to calculate *p* values.

SD, standard deviation.

At the 1-year follow-up, total scores improved from baseline among both women with hysterectomies and controls, with greater improvements among the women who had had hysterectomies. Total scores for the women with hysterectomy were not significantly different from those for the control women and did not differ significantly by race. Within the subscales, African American women with hysterectomy had significantly lower scores for the psychologic domain than either African American controls or white women. Although both African American and white women with hysterectomies had larger reductions in their urogenital scores than the control women, their scores remained significantly higher than those of the control women.

Multivariable analyses were used to assess predictors of total scores at baseline and 1-year follow-up. Factors considered in the multivariable model included hysterectomy status, age as a continuous variable, and all other variables listed in Table 1. At baseline, statistically significant predictors of higher total scores (more severe symptoms) were hysterectomy status, current smoking, and being overweight or obese. Other variables, including older age, race, number of pregnancies, duration of oral contraceptive use, history of tubal ligation, current alcohol use, education level, and marital status, were not significantly associated with total scores. At follow-up, hysterectomy status was no longer a significant predictor of total score. Smoking status and overweight or obesity remained as significant predictors, and white race also emerged as a predictor of higher score.

In analyses restricted to women undergoing hysterectomy, we ran additional multivariable models that included variables for clinical characteristics (uterine weight, type of sur-

gery performed, removal of one ovary, and hematocrit level) in addition to the epidemiologic variables. None of the clinical characteristics was significantly associated with total scores at baseline or follow-up. Once again, current smoking and obesity were the only significant predictors of symptom scores.

Discussion

The analyses presented here are consistent with previous reports showing that women undergoing hysterectomy report overall improvement in symptoms.⁴⁻⁶ Whereas most other studies of symptoms related to hysterectomy have focused on changes before and after surgery, our study population also had a comparison group of women of similar age who were not undergoing surgery. These comparisons show that although the total symptom score after hysterectomy was very comparable to that of women who had not had surgery, there are differences within the individual domains. Urogenital scores were significantly improved for women who had hysterectomy yet remained significantly higher than scores for the control women at the 1-year follow-up. In contrast, the scores for the psychologic domain, which were not significantly different between women undergoing hysterectomy and controls at baseline, were significantly lower among African American women with hysterectomies at the 1-year follow-up.

The comparisons between African American and white women showed very similar total symptom scores at baseline across races despite the fact that African American women have a clinical and risk factor profile that would suggest they

TABLE 3. PREVALENCE AND SEVERITY OF SYMPTOMS AT BASELINE AND 1-YEAR FOLLOW-UP BY RACE AND HYSTERECTOMY STATUS

Subscale and symptoms ^a	African American women				White women			
	Hysterectomy (n = 197)		No hysterectomy (n = 199)		Hysterectomy (n = 185)		No hysterectomy (n = 249)	
	%	Severity ^b	%	Severity ^b	%	Severity ^b	%	Severity ^b
Baseline								
Somatic								
Hot flushes, sweating	51.8	1.8	38.2	1.7	46.5	1.7	33.3	1.6
Heart discomfort	23.9	1.5	24.1	1.3	22.2	1.3	23.3	1.3
Sleeping problems	51.3	2.0	43.2	1.9	57.6	2.0	51.4	1.8
Muscle and joint problems	39.1	2.0	36.7	1.8	31.9	2.0	32.9	1.7
Psychologic								
Depressive mood	36.6	1.7	43.2	1.7	46.0	1.7	48.6	1.7
Irritability	60.9	1.9	58.8	1.7	61.1	1.9	66.3	1.7
Anxiety	33.5	1.8	31.7	1.8	42.7	1.6	41.0	1.6
Physical and mental exhaustion	46.2	2.0	48.2	1.7	56.8	1.9	41.4	1.7
Urogenital								
Sexual problems	31.5	2.3	25.4	2.0	27.7	2.5	16.9	2.0
Bladder problems	38.1	2.2	20.6	1.9	44.0	2.0	15.7	1.7
Dryness of the vagina	15.2	2.2	14.6	1.7	14.8	2.1	17.7	1.3
One-year follow-up								
Somatic								
Hot flushes, sweating	39.1	2.0	37.7	1.6	40.1	1.9	33.1	1.6
Heart discomfort	16.7	1.5	19.6	1.4	17.8	1.4	23.0	1.3
Sleeping problems	47.7	2.0	44.2	1.9	49.7	2.0	49.4	1.9
Muscle and joint problems	32.7	2.0	30.0	2.0	28.1	2.0	34.1	1.8
Psychologic								
Depressive mood	31.0	1.5	33.7	1.8	36.4	1.7	38.6	1.8
Irritability	38.6	1.6	50.3	1.8	48.9	1.7	59.4	1.8
Anxiety	22.3	1.7	31.7	1.8	33.2	1.7	35.7	1.8
Physical and mental exhaustion	35.5	1.9	46.7	1.8	48.4	1.8	40.6	1.8
Urogenital								
Sexual problems	16.2	2.2	14.6	2.2	17.8	2.0	17.3	2.0
Bladder problems	20.3	1.8	15.1	1.6	30.8	1.9	19.3	1.5
Dryness of the vagina	16.2	2.1	9.1	1.4	15.7	1.5	12.9	1.4

^aHigher scores indicate more severe symptoms.^bMean severity score among those reporting the symptom.

might experience more frequent or severe symptoms. Based on previous studies of the characteristics of African American women undergoing hysterectomy and, more generally, African American women of middle to late reproductive age, we would have expected higher symptom scores at baseline. As we observed within our study population, African American women are more likely to undergo hysterectomies for fibroids and tend to have larger or more numerous fibroids.^{8,9} We found that the average uterine weight among African American women was more than twice that of white women, which could impact urinary symptoms, and the average preoperative hemoglobin and hematocrit values were significantly lower, which could affect physical and mental exhaustion. The high prevalence of obesity among African American women also might be expected to contribute to higher symptom scores in various domains, including hot flushes, muscle and joint problems, physical exhaustion, depressive mood, and bladder problems.^{21,22} In addition, previous reports on the attitudes and perceptions of African American women regarding the possible negative effects of hysterectomy on relationships and sexuality^{13,14} would suggest that psychologic symptoms, such as anxiety or depression, might

be more prevalent among African American women about to undergo hysterectomy. Our data did not support any of these expectations, as there were no significant differences between African American and white women for the total symptom score or for individual domains.

At 1-year follow-up, total symptom scores were not significantly different between African American and white women who had a hysterectomy. Within the individual domains, the only difference between African American and white women was in the psychologic domain, where African American women had lower scores and a greater improvement in scores between baseline and 1-year follow-up.

Among the major studies that have assessed symptom outcomes in women undergoing hysterectomy, a universal finding has been that hysterectomy results in improvements in reported symptoms or quality of life for the vast majority of women, whether the instrument used focused on specific symptoms, such as urinary problems or sexuality,^{23–25} or more globally on overall symptoms or quality of life.^{4–6,26,27} There has been relatively little information reported on racial/ethnic differences in hysterectomy outcomes, despite the well-documented differences in the rates of hysterectomy and

TABLE 4. MENOPAUSE RATING SCALE SCORES, TOTAL AND INDIVIDUAL DOMAINS, BY RACE AND HYSTERECTOMY STATUS

	African American women		White women	
	Hysterectomy Mean (SD)	No hysterectomy Mean (SD)	Hysterectomy Mean (SD)	No hysterectomy Mean (SD)
Baseline				
Total	8.3 (7.1)*	6.7 (6.2)*	8.4 (6.1)*	6.4 (5.3)*
Somatic	3.1 (2.8)*	2.5 (2.5)*	2.8 (2.4)*	2.3 (2.3)*
Psychologic	3.3 (3.4)	3.1 (3.2)	3.7 (3.2)	3.3 (3.1)
Urogenital	1.9 (2.4)*	1.1 (1.7)*	1.9 (2.3)*	0.8 (1.4)*
One-year follow-up				
Total	5.8 (5.6)	5.9 (6.2)	6.6 (5.5)	6.3 (5.8)
Somatic	2.6 (2.7)	2.3 (2.7)	2.6 (2.5)	2.4 (2.4)
Psychologic	2.2 (2.8)*, **	2.9 (3.3)*	2.9 (3.0)**	3.1 (3.2)
Urogenital	1.2 (1.8)*	0.7 (1.4)*	1.2 (1.6)*	0.8 (1.4)*
Change—Baseline to 1-year follow-up ^a				
Total	−2.46 (5.8)*	−0.77 (4.8)*	−1.78 (5.2)*	−0.15 (4.3)*
Somatic	−0.49 (2.7)	−0.11 (2.3)	−0.29 (2.5)	0.06 (2.0)
Psychologic	−1.15 (3.1)*, **	−0.22 (2.9)*	−0.80 (2.7)**	−0.20 (2.6)
Urogenital	−0.82 (2.1)	−0.44 (1.6)	−0.66 (2.2)	−0.00 (1.6)

Higher scores indicate more severe symptoms.

*Difference between women with and without hysterectomy within races significant at $p < 0.05$.

**Difference between African Americans and whites significant at $p < 0.05$.

^a p values for the differences between baseline and 1-year follow-up adjusted for baseline values.

indicators of severity of the condition leading to hysterectomy (i.e., size or number of fibroids). The Maryland Women's Health Study, a study population of approximately 1250 women (32% African Americans), has not reported results stratified by race but has reported that race was not a significant predictor of symptom relief after hysterectomy.⁵ In a smaller study ($n = 100$) comparing hysterectomy outcomes in underinsured women having surgery in a teaching hospital (60% African American) to insured patients at a private hospital (12% African American), race was not found to be a predictor of satisfaction and quality of life scores.²⁷ The results of these studies taken in conjunction with the findings from our study present a consistent picture that although individual symptoms may vary slightly between white women and African American women, overall measures of symptoms before and after hysterectomy do not differ significantly by race.

A possible limitation of our study is that women scheduled for hysterectomy who chose not to participate may have been different from the participants. Among the women identified on the operating room schedules, we were unable to contact 5% of them before their surgery to determine their eligibility and willingness to participate. Among those contacted, 27% of women declined to be in the study. If those who declined to be in the study were experiencing more severe symptoms, we may have underestimated the difference in symptoms at baseline between the women undergoing hysterectomy and the control women. In regard to the comparisons between African American and white women, response rates among African American women were only 3% lower than rates among white women, suggesting that differential response rates would not have been likely to influence comparison between racial groups.

Bias could have been introduced if women who enrolled in the study but did not complete the first follow-up differed in the prevalence and severity of their symptoms compared to

those who completed questionnaires at both times. Overall follow-up rates were 88% for women with hysterectomy and 92% for control women, and there were no significant differences by race. Comparisons of baseline symptom scores showed no significant differences between those women who completed both baseline and 1-year follow-up questionnaires and those who were excluded from the analysis because they did not complete the follow-up survey.

Another limitation is that the MRS, although a validated instrument, was not designed specifically for the assessment of symptoms related to hysterectomy. Although the scale does not address every symptom commonly experienced by women undergoing hysterectomy (e.g., relief of pelvic pain), the majority of symptoms queried about are relevant to hysterectomy. In addition, the questions asked about the presence or absence of the symptoms generally, not specifically in relation to menopause, so participants should have reported their experience of these symptoms without associating them with menopausal changes. The observed effects of hysterectomy on the symptoms assessed with this scale are similar to those seen with other scales, both general quality of life scales and disease-specific instruments.

The women in the control group did differ in several respects from the women undergoing hysterectomy, including number of pregnancies, history of tubal ligation, BMI, and educational level. This was not unexpected, as these factors have been reported to be associated with hysterectomy in previous studies; however, some of these characteristics might also have been associated with symptoms. Multivariable analyses that controlled for these variables did not alter the major conclusions that there were significant differences in symptoms between women undergoing hysterectomy and control women at baseline but not at the 1-year follow-up. Furthermore, given that higher BMI and lower educational level have been reported to be associated with higher symptom levels,^{28,29} the fact that the women with

hysterectomies did not have higher symptom scores than the control women despite having a higher BMI and lower educational level further strengthens the conclusions that after surgery, women with hysterectomies have a symptom profile that is no worse than that of women in the general population.

The generalizability of our findings should be considered, as our study was conducted in one city in the southern United States, a region where hysterectomy rates have been higher than in other areas of the country.³⁰ One might speculate that the higher rates may be due in part to the higher proportion of African American women living in southern states, who are more likely to undergo hysterectomies because of their higher prevalence of uterine fibroids. Our study did not find significant racial differences in symptoms; therefore, from this standpoint, we would expect our findings to be generalizable to women residing in other regions of the country.

Conclusions

Our findings show that although African American women had clinical and risk factor characteristics that might lead one to expect they would have higher symptom scores before hysterectomy, we found no statistically significant differences as compared to white women. One year after hysterectomy, improvements in symptom scores were observed among both races, resulting in a symptom profile that was very comparable to the symptom profile of women of similar age who had not had surgery.

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Disclosure Statement

No competing financial interests exist.

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