Black Women Are More Likely Than White Women to Schedule a Uterine-Sparing Treatment for Leiomyomas

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Abstract

Background: To evaluate differences in the proportion of uterine fibroid (UF) treatments that are uterine-sparing between Black women and White women and identify factors that could explain disparities.
Methods: Women at age 18–54 years who were enrolled from 10 clinical sites in the United States into the Comparing Options for Management: Patient-Centered Results for UFs (COMPARE-UF) treatment registry completed questionnaires before their UF procedure. UF symptoms and quality of life were assessed by questionnaires. Details on UF imaging and treatment (hysterectomy, myomectomy, or uterine artery embolization [UAE]) were collected from each patient's medical record. Random-effects logistic regression was used to assess the association between race and the odds of having a uterine-sparing procedure versus hysterectomy. Subgroup analyses compared each uterine-sparing procedure with hysterectomy.
Results: In this cohort of 1141 White women and 1196 Black women, Black women tended to be younger (median 41.0 vs. 42.0 years) and report worse symptoms, pain, and function on every scale compared with White women. Black women were more likely to have had a prior UF treatment compared with White women (22.8% vs. 14.6%). White women had more hysterectomies (43.6% vs. 32.2%) and myomectomies (50.9% vs. 50.2%) versus Black women. Black women had more UAEs (15.1% vs. 4.7%) than White women. After adjusting for clinical site and other variables, Black women had greater odds than White women of having a myomectomy (odds ratio [OR] = 2.41, 95% confidence interval [CI] = 1.63–3.56) or a UAE versus hysterectomy (OR = 4.24, 95% CI = 2.41–7.46).
Conclusion: In these participants, Black women were more likely to schedule a uterine-sparing UF treatment and a nonsurgical UF treatment than their White counterparts; this may not be true for all women. Longer

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comparative effectiveness studies are needed to inform women about the durability of UF treatments. Greater understanding of factors influencing treatment selection is needed as are studies that include women without access to tertiary care centers. Clinical Trial Registration: Clinicaltrials.gov, NCT02260752 (enrollment start: November 2015).

Keywords: uterine fibroids, racial differences, hysterectomy, myomectomy, uterine artery embolization

Introduction

By menopause, most women will have developed uterine leiomyomas (fibroids).[1] Symptomatic uterine fibroids (UFs) can cause heavy menstrual bleeding, pelvic pain and pressure, dyspareunia, and a bulky abdominal appearance.[2] UF can also adversely affect fertility and birth outcomes, although these data are limited.[3] Despite the large public health burden of UF in the United States, little is known about UF natural history or pathogenesis owing to a lack of longitudinal studies with imaging to confirm UF status. However, it is well accepted that the strongest risk factor for having UF is being of Black race.[4] Other suspected risk factors include increasing age up to time of menopause and greater time since last giving birth.[4] Three-quarters of the UF treatments in the United States are hysterectomies; however, uterine-sparing procedures are becoming more common as their clinical availability has increased.[4] Common uterine-sparing procedures include myomectomy (fibroid removal), uterine artery embolization (UAE), and endometrial ablation (EA). Those who have these uterine-sparing treatments, however, may require additional UF treatment over time for persistent symptoms or recurrent or new UF.

Black women are more likely than White women to develop UF, with more than 80% of Black women and nearly 70% of White women having ultrasound-based evidence of UF by menopause.[1] Black women also tend to have a greater number and larger size UF at the time of diagnosis, typically diagnosed at younger ages relative to White women.[5] The etiology of these racial disparities is unknown. Reasons for this may include greater provider vigilance for identification and treatment in Black women because of the higher prevalence. As a result, Black women may find themselves seeking a UF treatment at younger ages than their White counterparts. Stewart et al. have previously reported that among women with symptomatic UF, Black women are more likely than White women to report a preference for uterine-sparing fibroid treatments.[6]

Using the national UF treatment registry, Comparing Options for Management: Patient-Centered Results for UFs (COMPARE-UF), we evaluated the extent to which the proportion of UF treatments that were uterine-sparing differed between Black women and White women.[7,8] We also investigated potential reasons for differences between Black and White women's choices of procedural intervention.

Methods

The COMPARE-UF registry is under the direction of the Duke Clinical Research Institute, which served as the data-coordinating center for enrollment and follow-up. Clinical sites for this multisite registry across the United States are: Brigham and Women's Hospital, Henry Ford Health System, INOVA Health System, the Mayo Clinic Network, the University of California Fibroid Network, the University of Michigan, the University of Mississippi Medical Center, and the University of North Carolina at Chapel Hill. Additional participants who planned to have a UAE were recruited from two specialty clinics at the Atlanta Fibroid Center and Georgetown University. IRB approval was obtained. All participants provided informed consent.[7]

In brief, women scheduled for an UF treatment at any of these sites were invited to complete a baseline survey on their health and quality of life, including the disease-specific validated Uterine Fibroid Symptom and Quality of Life (UFS-QOL) instrument,[9–11] the EuroQOL 5-dimension with visual analog scale for overall wellness,[12] a financial toxicity questionnaire,[13] and the Patient Health Questionnaire-2[14] to screen for depression. Women self-reported their race. Women also answered questions about their reproductive health history, demographic characteristics including their insurance type, and any prior UF treatments. Medical chart review, performed by a centralized team of credentialed Registered Health Information Technicians at Henry Ford Health System, was conducted for each participant's baseline treatment. UF characteristics (estimated total UF volume, estimated uterine volume, and number of UF) based on pretreatment imaging were taken from the medical chart as were details of the treatment that was performed. Women who were 18–54 years of age at the time of UF treatment were recruited into the study. Although the study participants were of varying races and ethnicities, there were sufficient numbers of Black and White women to assess racial differences between these groups. Women were not excluded based on reported desire for future fertility. Black and White women who had either an UAE, a hysterectomy, or a myomectomy by any approach were included in these analyses. UAE and myomectomy were classified as uterine-sparing procedures.

Participants whose planned treatment was an EA or MRI-guided focused ultrasound (MRgFUS) were excluded from the main analyses as these procedures were only available at a minority of the recruitment sites. There were 193 EAs performed (56% for Black women) and 166 (86.0%) were performed at Henry Ford Health System, 8 were performed at the University of Mississippi, 3 sites performed none and no other site performed more than 5. There were 19 MRgFUS performed—18 at the Mayo Clinic and one at Henry Ford Health System and 79% were performed for White women. We have included a Appendix Table A1 in which these two procedures were added to the final models for purposes of sensitivity analyses. Women who were using medical management for their UF were not included in these analyses. Choosing between either initiating/continuing medical

management or having a procedural intervention like the women in these analyses is a different decision-making process compared with selecting a specific procedure.

Variables considered as potential confounders were those we have previously used in our analyses.[15,16] These variables include age, insurance type (public, private, or military), financial toxicity (rather than income and education), time since being diagnosed with UF, body mass index (BMI) (continuous kg/m^2), current use of birth control (any birth control pill, patch, ring, implant, intrauterine device, or injectable), whether the participant had any prior procedures for UF treatment, discomfort during intercourse, whether the participant's menstrual periods were ''regular'' or ''predictable,'' frequent urination, previous number of pregnancies, current marijuana use, calculated total fibroid volume, calculated uterine volume, and number of fibroids identified. Indicator variables were also created for self-report of each of the following health conditions (comorbidities): high blood pressure, diabetes, asthma, thyroid problems, and blood clots in the legs or lungs. Self-report (yes/no) of the following were also included in the analyses: having menstrual periods that lasted 7 or more days, heavy bleeding during periods, and bleeding between periods.

Counts and percentages, as well as medians with interquartile ranges, were used to describe the data. To compare factors between race groups, we used Pearson chi-square tests for categorical variables and chi-square rank-based group means score test statistics for continuous variables. We then used random-effects logistic regression to sequentially adjust for patient-level demographic and health variables, and socioeconomic status (SES) represented by the financial toxicity score, as well as clinical site. We then tested the significance of the adjusted odds ratio (OR) in the random-effects model. The significance test for the variance component of the site random effects helps assess whether clinical site is an important driving factor for differences in procedure rates. ORs and 95% confidence intervals (CIs) were generated to assess the association between race and the odds of having a uterine-sparing procedure versus a hysterectomy. Subgroup analyses were then performed to specifically consider UAE versus hysterectomy, and myomectomy versus hysterectomy.

Results

The cohort for this analysis comprised 1141 White women and 1196 Black women. Baseline patient characteristics are presented by race group in Appendix Table A2. In brief, the groups significantly differed statistically for every characteristic examined, including age, BMI, symptoms, and UFS-QOL, except the visual analog score for wellness, which was 75.0 for both groups. Black women tended to be younger (median age 41.0 vs. 42.0 years overall) and to report worse symptoms, pain, and function on every scale compared with White women. Black women were also more likely to have had a previous procedure for UF treatment compared with White women (22.8% vs. 14.6%).

Tables 1 and 2 provide the proportions of uterine-sparing procedures planned by site and by treatment separately for White women and Black women. Except at the University of Mississippi Medical Center, White women had lower percentages of uterine-sparing treatments compared with Black women. Overall, White women had more hysterectomies (43.6% vs. 32.2%) and myomectomies (50.9% vs. 50.2%) than Black women, and Black women had more UAEs (17.6% vs. 5.5%) (Table 2).

Table 1. Proportions of Uterine-Sparing Procedures Planned by Site and by Treatment

Site	*White*	*Black*
Brigham and Women's Hospital	72/92 (78.3)	47/51 (92.2)
INOVA Health System	27/90 (30.0)	53/95 (55.8)
Henry Ford Health System	47/88 (53.4)	193/246 (78.5)
Mayo Clinic Network	100/257 (38.9)	21/26 (80.8)
University of Michigan	37/70 (52.9)	25/42 (59.5)
University of California Fibroid Network	201/246 (81.7)	74/86 (86.1)
University of Mississippi Medical Center	18/33 (54.6)	86/203 (42.4)
University of North Carolina at Chapel Hill	73/149 (48.9)	211/319 (66.1)
Atlanta Fibroid Center[a]	4/4 (100)	31/31 (100)
Georgetown University[a]	4/4 (100)	12/12 (100)

Data shown are number of women with uterine-sparing UF treatment/all women who had a UF treatment (%).
[a]Only UAE patients were recruited from these sites.
UAE, uterine artery embolization; UF, uterine fibroid.

Baseline characteristics are compared between the White women and Black women by planned procedure in Table 3 (hysterectomy), Table 4 (myomectomy), and Table 5 (UAE). Regardless of the planned procedure, Black women tended to be younger and have larger BMIs. For women who planned to have a hysterectomy, Black women tended to have more UF and greater UF volume, but this was not true for women who planned to have an UAE. Black women who planned a myomectomy tended to have more UF but not greater UF volume. Among those who planned a hysterectomy or myomectomy, Black women were also more likely to have had a prior UF treatment; however, this was not true for women who planned UAE.

Black women were more likely to report having menses for at least 7 days compared with White women regardless of the planned treatment. Among women who planned a hysterectomy or myomectomy, Black women were also more likely to have reported pelvic pain requiring medication. Black women planning a myomectomy were more likely than White women planning a myomectomy to have reported heavy menses.

Table 2. Procedure by Race Group

Procedure	*White* (N = *1033*)	*Black* (N = *1112*)
Hysterectomy	450 (43.6)	358 (32.2)
Uterine-sparing procedure	583 (56.4)	753 (67.8)
Myomectomy	526 (50.9)	557 (50.2)
UAE	57 (5.5)	196 (17.6)

Data are given as *n* (%).
Chi-square test comparing the rate of the procedure versus hysterectomy between races, $p < 0.05$.

Table 3. Baseline Characteristics of Women With a Planned Hysterectomy

Characteristic	*White (N = 450)*	*Black (N = 358)*	p[a]
Age (years)	46.0 (42.0, 49.0)	44.0 (41.0, 47.0)	<0.05
Insurance			<0.05
Private	404 (89.8)	253 (70.7)	
Active military	2 (0.4)	2 (0.6)	
Other	44 (9.8)	103 (28.8)	
BMI (kg/m^2)	27.7 (24.2, 33.0)	33.4 (28.7, 39.1)	<0.05
Financial toxicity (lower score = worse status)	30.0 (23.0, 36.0)	24.0 (15.0, 31.0)	<0.05
Duration of symptoms (years)	3.0 (1.0, 8.0)	5.0 (2.0, 12.0)	<0.05
Any bleeding symptoms	375 (83.9)	306 (85.7)	0.48
Menses ≥7 days	254 (56.8)	229 (64.1)	0.04
Heavy menses	344 (77.0)	284 (79.6)	0.38
Bleeding between periods	232 (51.9)	191 (53.5)	0.65
Frequent urination	263 (58.8)	218 (61.1)	0.52
Discomfort during intercourse	193 (43.2)	174 (48.7)	0.12
Pelvic pain requiring meds	209 (46.8)	201 (56.3)	<0.05
Pelvic pain not during periods			<0.05
Pelvic pain during periods	66 (14.8)	48 (13.4)	
No pelvic pain	241 (53.9)	160 (44.8)	
Current contraception	313 (69.6)	224 (62.6)	<0.05
Previous medical condition (high blood pressure, diabetes, asthma, thyroid problems, blood clots in legs)	224 (50.6)	217 (61.6)	<0.05
Marijuana	27 (6.1)	27 (7.7)	0.11
Any prior UF treatment	82 (18.4)	83 (23.5)	0.08
Regular, predictable menses	263 (59.2)	168 (48.1)	<0.05
Number of previous pregnancies			<0.05
0	120 (27.0)	53 (15.1)	
1	62 (13.9)	44 (12.5)	
2	98 (22.0)	60 (17.0)	
3	81 (18.2)	63 (17.9)	
4	38 (8.5)	63 (17.9)	
5	23 (5.2)	30 (8.5)	
6	11 (2.5)	16 (4.5)	
>6	12 (2.7)	23 (6.5)	
Total UF volume (cm^3)	123.2 (28.7, 281.9)	139.7 (43.1, 328.9)	0.05
Uterine volume (cm^3)	325.6 (177.1, 601.0)	550.7 (272.6, 1037.5)	<0.05
Number of UFs measured	2.0 (1.0, 3.0)	3.0 (1.0, 4.0)	<0.05
Concern[b]	40.0 (20.0, 60.0)	25.0 (10.0, 45.0)	<0.05
Activities[b]	46.4 (28.6, 71.4)	35.7 (17.9, 60.7)	<0.05
Energy/mood[b]	46.4 (28.6, 64.3)	35.7 (16.2, 57.3)	<0.05
Control[b]	50.0 (34.4, 69.4)	40.0 (20.0, 65.0)	<0.05
Self-conscious[b]	41.7 (16.7, 66.7)	33.3 (8.3, 58.3)	<0.05
Sexual function[b]	50.0 (25.0, 75.0)	37.5 (12.5, 62.5)	<0.05
Total—sum of 6 subscale scores above[b]	44.8 (30.0, 62.9)	36.2 (18.1, 54.3)	<0.05
Symptom severity (lower score indicates more positive health status)	59.4 (43.8, 75.0)	68.8 (50.0, 84.4)	<0.05
Mobility			<0.05
I have no problems in walking about	360 (80.4)	232 (65.7)	
I have some problems in walking about	56 (12.5)	64 (18.1)	
I have moderate problems in walking about	26 (5.8)	42 (11.9)	
I have severe problems in walking about	6 (1.3)	14 (4.0)	
I am confined to bed	0 (0.0)	1 (0.3)	
Self-care			0.06
I have no problems washing or dressing myself	423 (94.6)	321 (90.4)	
I have slight problems washing or dressing myself	17 (3.8)	19 (5.4)	
I have moderate problems washing or dressing myself	6 (1.3)	11 (3.1)	
I have severe problems washing or dressing myself	0 (0.0)	3 (0.8)	
I am unable to wash or dress myself	1 (0.2)	1 (0.3)	
Usual activities			0.15
I have no problems doing my usual activities	282 (62.8)	204 (57.6)	
I have slight problems doing my usual activities	94 (20.9)	76 (21.5)	
I have moderate problems doing my usual activities	56 (12.5)	47 (13.3)	
I have severe problems doing my usual activities	14 (3.1)	20 (5.6)	
I am unable to perform my usual activities	3 (0.7)	7 (2.0)	

(*continued*)

TABLE 3. (CONTINUED)

Characteristic	*White (N = 450)*	*Black (N = 358)*	p[a]
Pain/discomfort			<0.05
I have no pain or discomfort	79 (17.6)	48 (13.5)	
I have slight pain or discomfort	151 (33.7)	71 (20.0)	
I have moderate pain or discomfort	155 (34.6)	131 (36.9)	
I have severe pain or discomfort	51 (11.4)	74 (20.8)	
I have extreme pain or discomfort	12 (2.7)	31 (8.7)	
Anxiety/depression			<0.05
I am not anxious or depressed	158 (35.4)	146 (41.0)	
I am slightly anxious or depressed	170 (38.1)	98 (27.5)	
I am moderately anxious or depressed	91 (20.4)	65 (18.3)	
I am severely anxious or depressed	23 (5.2)	29 (8.1)	
I am extremely anxious or depressed	4 (0.9)	18 (5.1)	
Visual Analogue Scale (0–100)	74.0 (54.0, 85.0)	75.0 (57.0, 84.0)	0.33

Data are median (interquartile range) or *n* (%).
[a]*p*-Values are based on Pearson chi-square tests for all categorical row variables. *p*-Values are based on chi-square rank based group means score statistics for all continuous/ordinal row variables. All tests treat the column variable as nominal.
[b]Higher score indicates more positive health status.
BMI, body mass index.

In the adjusted analyses, the site-level variances were statistically significantly different from 0 in all models (Table 6), indicating that site was associated with the treatment received. After adjusting for UF characteristics, clinical site, demographics, health, and other variables, Black women had greater odds than White women of having a myomectomy versus hysterectomy (OR = 2.41, 95% CI = 1.63–3.56) or a UAE versus hysterectomy (OR = 4.24, 95% CI = 2.41–7.46) (Table 6). The sensitivity analyses including EA and MRgFUS among the uterine-sparing procedures yielded similar results to the primary analysis. The CIs of both analyses largely overlap and the point estimates have similar direction and magnitude (Appendix Table A2).

Discussion

In this analysis from a large multisite U.S. registry of women who planned treatment for their UF, Black women were more likely than their White counterparts to have either a myomectomy or UAE compared with hysterectomy after adjustments for UF characteristics, symptoms, previous UF treatment, and financial toxicity associated with the treatment. Furthermore, these data show that Black women were more likely to schedule a nonsurgical treatment (UAE) compared with White women. These results align with the work of Stewart et al. showing that Black women with symptomatic UF reported a preference for uterine-sparing UF treatments.[6] These findings point to the importance of two high-priority research questions in the field of UF.

First, the reasons why women, and especially Black women, may seek uterine sparing treatment options is unknown and likely multifactorial. It may reflect distrust as a result of historic racial inequities in forced sterilization and hysterectomy.[6,17,18] Choice of nonsurgical alternatives is also likely influenced by more rapid recovery than with a hysterectomy[16] and by the patient's inability to take extended time off from work or need to manage child or elder care responsibilities. A woman's decision to keep her uterus may reflect her desire to maintain the possibility of childbearing, regardless of her actual fertility. This may be particularly true for the Black women who tended to be younger than the White women having an UF procedure. Among patients who underwent hysterectomy with or without oophorectomy, Farquhar et al. found that even 3 years after surgery, women regretted the loss of their fertility.[19] Similarly, Leppert et al. reported that women who desired more children before hysterectomy tended to report higher levels of depression, anger, anxiety, and pelvic pain compared with women without this desire at 12–24 months after surgery.[20] Finally, for some women, the uterus is essential for ''feminine'' identity. Based on focus groups and personal interviews with African American women, 70% of whom had a hysterectomy, Augustus reported a general belief that women were no longer ''whole'' women after hysterectomy.[21] This belief was also echoed in two recent focus group studies of both Black and White women who had undergone hysterectomy in Michigan and Alabama; these studies found that because of this belief, some women undergoing hysterectomy were afraid to share information about their surgery with others.[22,23]

The second research question introduced by this preference for uterine-sparing treatments, and often multiple sequential uterine-sparing treatments, is that Black women are at increased risk of future retreatment for recurrent and new fibroid symptoms. Stimulated by ovarian hormones, the risk of developing UF continues to menopause and prior research has shown that Black women do not have diminished growth as they reach this threshold as do White women.[24,25] Understanding the individual clinical characteristics such as age, race/ethnicity, and baseline UF characteristics, which are predictors of success are critical to provide precision medicine approaches to treatment of UF. Because Black women are disproportionally affected by UF,[8] the lack of understanding of predictors of subsequent treatment becomes a further

Table 4. Baseline Characteristics of Women with a Planned Myomectomy

Characteristic	*White (N = 526)*	*Black (N = 557)*	p[a]
Age (years)	38.0 (33.0, 43.0)	37.0 (33.0, 42.0)	0.07
Insurance			<0.05
Private	464 (88.7)	440 (79.4)	
Active military	2 (0.4)	10 (1.8)	
Other	57 (10.9)	104 (18.8)	
BMI (kg/m^2)	25.1 (22.2, 30.5)	29.9 (25.7, 36.0)	<0.05
Financial toxicity (lower score = worse status)	29.0 (22.0, 35.0)	26.0 (18.4, 33.0)	<0.05
Duration of symptoms (years)	2.0 (1.0, 5.0)	4.0 (1.0, 10.0)	<0.05
Any bleeding symptoms	409 (77.8)	462 (83.1)	<0.05
Menses ≥7 days	267 (50.8)	317 (57.0)	<0.05
Heavy menses	378 (71.9)	435 (78.2)	<0.05
Bleeding between periods	224 (42.6)	255 (45.9)	0.28
Frequent urination	289 (54.9)	314 (56.5)	0.61
Discomfort during intercourse	199 (37.8)	242 (43.5)	0.06
Pelvic pain requiring meds	174 (33.1)	248 (44.6)	<0.05
Pelvic pain not during periods			<0.05
Pelvic pain during periods	48 (9.1)	86 (15.5)	
No pelvic pain	357 (67.9)	311 (55.9)	
Current contraception	390 (74.1)	383 (68.8)	0.05
Previous medical condition (high blood pressure, diabetes, asthma, thyroid problems, blood clots in legs)	203 (39.1)	242 (43.9)	0.11
Marijuana	51 (9.8)	42 (7.7)	0.23
Any prior UF treatment	73 (14.0)	143 (26.0)	<0.05
Regular, predictable menses	368 (71.0)	381 (69.7)	0.62
Number of previous pregnancies			<0.05
0	268 (51.5)	211 (38.5)	
1	100 (19.2)	117 (21.4)	
2	75 (14.4)	91 (16.6)	
3	30 (5.8)	51 (9.3)	
4	21 (4.0)	37 (6.8)	
5	17 (3.3)	19 (3.5)	
6	3 (0.6)	10 (1.8)	
>6	6 (1.2)	12 (2.2)	
Total UF volume (cm^3)	158.6 (24.9, 418.2)	152.1 (39.2, 368.4)	0.96
Uterine volume (cm^3)	305.6 (137.0, 654.6)	462.2 (225.0, 885.5)	<0.05
Number of UFs measured	2.0 (1.0, 3.0)	2.0 (1.0, 4.0)	<0.05
Concern[b]	45.8 (20.0, 76.6)	35.0 (15.0, 65.0)	<0.05
Activities[b]	53.6 (35.7, 78.6)	50.0 (28.6, 71.4)	<0.05
Energy/mood[b]	50.0 (32.1, 75.0)	46.4 (25.0, 67.9)	<0.05
Control[b]	50.0 (30.0, 70.0)	50.0 (25.0, 70.0)	0.58
Self-conscious[b]	50.0 (25.0, 75.0)	41.7 (16.7, 66.7)	<0.05
Sexual Function[b]	50.0 (25.0, 75.0)	50.0 (25.0, 87.5)	0.37
Total—sum of 6 subscale scores above[b]	50.0 (33.6, 73.3)	45.7 (28.4, 65.5)	<0.05
Symptom severity (lower score indicates more positive health status)	50.0 (34.4, 67.2)	53.1 (34.4, 75.0)	<0.05
Mobility			0.20
I have no problems in walking about	448 (85.2)	441 (79.9)	
I have some problems in walking about	47 (8.9)	63 (11.4)	
I have moderate problems in walking about	23 (4.4)	32 (5.8)	
I have severe problems in walking about	7 (1.3)	13 (2.4)	
I am confined to bed	1 (0.2)	3 (0.5)	
Self-care			0.32
I have no problems washing or dressing myself	503 (95.6)	524 (94.8)	
I have slight problems washing or dressing myself	17 (3.2)	18 (3.3)	
I have moderate problems washing or dressing myself	6 (1.1)	7 (1.3)	
I have severe problems washing or dressing myself	0 (0.0)	4 (0.7)	
I am unable to wash or dress myself	0 (0.0)	0 (0.0)	
Usual activities			0.19
I have no problems doing my usual activities	348 (66.3)	382 (69.2)	
I have slight problems doing my usual activities	103 (19.6)	94 (17.0)	
I have moderate problems doing my usual activities	61 (11.6)	51 (9.2)	
I have severe problems doing my usual activities	11 (2.1)	20 (3.6)	
I am unable to perform my usual activities	2 (0.4)	5 (0.9)	

(*continued*)

Table 4. (Continued)

Characteristic	*White (N = 526)*	*Black (N = 557)*	p[a]
Pain/discomfort			<0.05
I have no pain or discomfort	124 (23.6)	150 (27.1)	
I have slight pain or discomfort	210 (39.9)	159 (28.8)	
I have moderate pain or discomfort	140 (26.6)	139 (25.1)	
I have severe pain or discomfort	41 (7.8)	70 (12.7)	
I have extreme pain or discomfort	11 (2.1)	35 (6.3)	
Anxiety/depression			<0.05
I am not anxious or depressed	173 (33.0)	254 (46.1)	
I am slightly anxious or depressed	194 (37.0)	138 (25.0)	
I am moderately anxious or depressed	121 (23.1)	104 (18.9)	
I am severely anxious or depressed	27 (5.2)	41 (7.4)	
I am extremely anxious or depressed	9 (1.7)	14 (2.5)	
Visual Analogue Scale (0–100)	76.0 (63.0, 87.0)	79.0 (63.0, 87.0)	0.65

Data are median (interquartile range) or *n* (%).

[a]*p*-Values are based on Pearson chi-square tests for all categorical row variables. *p*-Values are based on chi-square rank based group means score statistics for all continuous/ordinal row variables. All tests treat the column variable as nominal.

[b]Higher score indicates more positive health status.

health disparity for this disease. These evidence gaps make long-term follow-up of cohorts such as COMPARE-UF critical.

Evidence reports from the Agency for Healthcare Research and Quality have found almost no long-term (>2 years) evidence on comparative effectiveness of UF treatment options and have highlighted the massive knowledge gaps about UF treatments.[26,27] The 2017 report included only 12 comparative studies of UF procedures, but 6 of them used hysterectomy as the reference group.[28] Only three studies compared widely available uterine-sparing procedures with each other, and none included women in the United States, so results are not generalizable to our clinical population, where Black women incur the highest burden of UF. None of these studies had a follow-up time exceeding 2 years to assess clinical outcomes including treatment failure.

Nonetheless, most women who have either a hysterectomy or myomectomy to treat their UF will have improved short-term quality of life. In previous publications from the COMPARE-UF registry,[7] we reported that at 6–12 weeks after treatment, although there were some differences in specific quality of life subscales, and some influence of procedure type and route of surgery (open vs. endoscopic), women who had surgical therapies had decreased symptoms and improved quality of life.[9–11,15] More recently, we reported that overall, both women who had hysterectomy and those undergoing myomectomy had clinically meaningful (>10 points) improvement in the UFS-QOL scores 1 year after the procedure.[28]

Stronger evidence is available for the long-term effectiveness of UAE.[26,27] Based on seven randomized clinical trials studying nearly 8000 participants for up to 10 years following the procedure, there is strong quality of evidence that UAE results in decreased menstrual bleeding, volume reduction of UF, and moderate evidence of improved quality of life.[26,27] Similar long-term studies for all uterine-sparing UF treatments and especially comparative effectiveness studies are critical to fully determine the effectiveness of all uterine-sparing procedures.

Limitations of this study include that COMPARE-UF was designed to assess the comparative effectiveness of the most common UF treatments rather than to understand the treatment decision-making process. We did not assess information on treatment preference, doctor counseling, or access. The data also focused on the procedure that was planned, which for only a small number of women changed during the actual procedure (Appendix Table A3). The participants are not representative of all women in the United States, as these participants had access to large health care institutions, many of which are considered centers of excellence for UF care, and COMPARE-UF had limited inclusion of women residing in rural locations. More than three-quarters of the women in these analyses also had private insurance. Therefore, by no means are we suggesting that the experience of the Black women and White women in this study are representative of the experiences of all Black women and White women; however, these data do describe the experience of some Black women and some White women and should serve as an impetus to improving our understanding of the interface between patients, clinical care, and health systems and providers. Strengths of the study include a large racially diverse study population from multiple clinical sites around the country, and the inclusion of a wide range of UF characteristics abstracted from imaging reports in medical record data.

Without prevention strategies, UF treatments will be needed on the present scale over the long term. Better understanding of the sources of racial differences in treatment choice, which do not appear to be owing to UF characteristics or other clinical characteristics, could both impact physician counseling of their patients as well as inform the development of future UF treatments. Given the extraordinarily high cumulative incidence of UF, these changes could lead to improved quality of life and health for most women in the United States.

Table 5. Baseline Characteristics of Women With a Planned Uterine Artery Embolization

Characteristic	*White (N = 57)*	*Black (N = 196)*	p[a]
Age (years)	47.0 (42.0, 49.0)	45.0 (41.0, 47.0)	0.05
Insurance			0.48
Private	45 (80.4)	165 (84.2)	
Active military	0 (0.0)	3 (1.5)	
Other	11 (19.6)	28 (14.3)	
BMI (kg/m^2)	27.3 (24.3, 29.9)	31.3 (25.9, 36.9)	<0.05
Financial toxicity (lower score = worse status)	27.0 (22.0, 34.0)	27.0 (19.0, 34.0)	0.15
Duration of symptoms (years)	3.0 (1.0, 7.0)	6.0 (2.0, 13.0)	<0.05
Any bleeding symptoms	48 (84.2)	179 (91.3)	0.12
Menses ≥7 days	27 (47.4)	126 (64.3)	<0.05
Heavy menses	46 (80.7)	164 (83.7)	0.60
Bleeding between periods	21 (36.8)	99 (50.5)	0.07
Frequent urination	40 (70.2)	154 (78.6)	0.19
Discomfort during intercourse	20 (35.1)	87 (44.4)	0.21
Pelvic pain requiring meds	25 (43.9)	99 (50.5)	0.38
Pelvic pain not during periods			0.16
Pelvic pain during periods	3 (5.3)	29 (14.8)	
No pelvic pain	32 (56.1)	97 (49.5)	
Current contraception	33 (57.9)	129 (65.8)	0.27
Previous medical condition (high blood pressure, diabetes, asthma, thyroid problems, blood clots in legs)	26 (45.6)	118 (61.1)	0.04
Marijuana	4 (7.1)	8 (4.1)	0.37
Any prior UF treatment	8 (14.0)	38 (19.7)	0.33
Regular, predictable menses	45 (78.9)	99 (51.6)	<0.05
Number of previous pregnancies			0.05
0	19 (33.3)	38 (19.7)	
1	6 (10.5)	31 (16.1)	
2	14 (24.6)	40 (20.7)	
3	12 (21.1)	34 (17.6)	
4	3 (5.3)	24 (12.4)	
5	0 (0.0)	17 (8.8)	
6	1 (1.8)	5 (2.6)	
> 6	2 (3.5)	4 (2.1)	
Total UF volume (cm^3)	131.6 (69.4, 346.7)	133.8 (45.0, 307.3)	0.30
Uterine volume (cm^3)	507.2 (320.1, 915.6)	542.9 (311.5, 867.8)	0.91
Number of UFs measured	3.0 (1.0, 4.0)	2.0 (1.0, 4.0)	0.90
Concern[b]	36.6 (13.8, 65.0)	20.0 (5.0, 50.0)	<0.05
Activities[b]	46.4 (28.6, 75.0)	39.3 (17.9, 57.1)	<0.05
Energy/mood[b]	46.4 (32.1, 64.3)	35.7 (17.9, 53.6)	<0.05
Control[b]	45.0 (30.0, 65.0)	40.0 (20.0, 65.0)	0.57
Self-conscious[b]	33.3 (16.7, 58.3)	25.0 (8.3, 50.0)	0.47
Sexual function[b]	50.0 (25.0, 75.0)	37.5 (12.5, 75.0)	0.11
Total (sum of 6 subscale scores above)[b]	44.0 (31.9, 63.8)	35.8 (19.0, 54.3)	<0.05
Symptom severity (lower score indicates more positive health status)	62.5 (46.9, 71.9)	68.8 (50.0, 81.3)	0.06
Mobility			0.33
I have no problems in walking about	44 (77.2)	146 (74.5)	
I have some problems in walking about	11 (19.3)	25 (12.8)	
I have moderate problems in walking about	2 (3.5)	17 (8.7)	
I have severe problems in walking about	0 (0.0)	6 (3.1)	
I am confined to bed	0 (0.0)	2 (1.0)	
Self-care			0.45
I have no problems washing or dressing myself	52 (91.2)	184 (93.9)	
I have slight problems washing or dressing myself	5 (8.8)	8 (4.1)	
I have moderate problems washing or dressing myself	0 (0.0)	3 (1.5)	
I have severe problems washing or dressing myself	0 (0.0)	1 (0.5)	
I am unable to wash or dress myself	0 (0.0)	0 (0.0)	
Usual activities			0.57
I have no problems doing my usual activities	35 (61.4)	122 (62.6)	
I have slight problems doing my usual activities	18 (31.6)	45 (23.1)	
I have moderate problems doing my usual activities	3 (5.3)	21 (10.8)	
I have severe problems doing my usual activities	1 (1.8)	5 (2.6)	
I am unable to perform my usual activities	0 (0.0)	2 (1.0)	

(*continued*)

Table 5. (Continued)

Characteristic	*White (N = 57)*	*Black (N = 196)*	p[a]
Pain/discomfort			<0.05
I have no pain or discomfort	10 (17.5)	31 (15.8)	
I have slight pain or discomfort	26 (45.6)	58 (29.6)	
I have moderate pain or discomfort	20 (35.1)	54 (27.6)	
I have severe pain or discomfort	1 (1.8)	35 (17.9)	
I have extreme pain or discomfort	0 (0.0)	18 (9.2)	
Anxiety/depression			0.17
I am not anxious or depressed	22 (38.6)	75 (38.5)	
I am slightly anxious or depressed	24 (42.1)	64 (32.8)	
I am moderately anxious or depressed	10 (17.5)	36 (18.5)	
I am severely anxious or depressed	0 (0.0)	15 (7.7)	
I am extremely anxious or depressed	1 (1.8)	5 (2.6)	
Visual Analogue Scale (0–100)	79.0 (67.5, 87.0)	76.0 (59.0, 88.0)	0.86

Data are given as median (interquartile range) or *n* (%).
[a]*p*-Values are based on Pearson chi-square tests for all categorical row variables. *p*-values are based on chi-square rank-based group means score statistics for all continuous/ordinal row variables. All tests treat the column variable as nominal.
[b]Higher score indicates more positive health status.

Table 6. Odds of Black Women Versus White Women Having Uterine-Sparing Treatment Versus Hysterectomy

	OR (95% CI)	p	*Site-level variance (95% CI)*	p
Uterine-sparing treatment is myomectomy or UAE				
Race only	1.62 (1.36–1.94)	<0.05		
Race plus adjustment for site, demographics, health, SES,[a] and symptoms	2.72 (1.94–3.81)	<0.05	2.54 (0.99–15.32)	<0.05
Uterine-sparing treatment is myomectomy				
Race only	1.33 (1.11–1.60)	<0.05		
Race plus adjustment for site, demographics, health, SES, and symptoms	2.41 (1.63–3.56)	<0.05	0.82 (0.36–3.33)	<0.05
Uterine-sparing treatment is UAE				
Race only	4.32 (3.12–5.99)	<0.05		
Race plus adjustment for site, demographics, health, SES, and symptoms	4.24 (2.41–7.46)	<0.05	5.84 (2.36–31.06)	<0.05

Probability modeled is ''event = uterine-sparing surgery''; reported ORs are for Black versus White.
[a]SES variables are insurance type and financial security.
CI, confidence interval; ORs, odds ratios; SES, socioeconomic status.

Data Sharing Agreement

Data will be made publicly available by the DCRI in accordance with PCORI guidelines: https://www.pcori.org/about-us/governance/policy-data-management-and-data-sharing.

Disclaimer

The content of this article is solely the responsibility of the authors, and readers should not interpret any statement in this product as an official position or the views of AHRQ, the U.S. Department of Health and Human Services, or PCORI.

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Appendix

Appendix Table A1. Odds of Black Women Versus White Women Having Uterine-Sparing Treatment Versus Hysterectomy

	OR (95% CI)	p	*Site-level variance (95% CI)*	p
Uterine-sparing treatment is myomectomy or UAE or EA or MRgFUS				
Race only	1.50 (1.26–1.78)	<0.05		
Race plus adjustment for site, demographics, health, SES,[a] and symptoms	2.26 (1.65–3.09)	<0.05	2.43 (0.95–14.51)	<0.05

Probability modeled is ''event = uterine-sparing surgery''; reported ORs are for Black versus White.
[a]SES variables are insurance type and financial toxicity.
CI, confidence interval; EA, endometrial ablation; MRgFUS, MRI-guided focused ultrasound; ORs, odds ratios; SES, socioeconomic status; UAE, uterine artery embolization.

Appendix Table A2. Baseline Patient Characteristics by Race

Characteristic	*White (*N = *1033)*	*Black (*N = *1111)*	p[a]
Age (years)	42.0 (36.0, 47.0)[a]	41.0 (36.0, 46.0)[a]	<0.05
Insurance			<0.05
Private	913 (88.7)	858 (77.4)	
Active military	4 (0.4)	15 (1.4)	
Other	112 (10.9)	235 (21.2)	
BMI (kg/m^2)	26.6 (23.0, 31.8)	31.4 (26.7, 37.2)	<0.05
Financial toxicity (lower score = worse status)	29.0 (22.0, 36.0)	26.0 (17.0, 32.0)	<0.05
Duration of symptoms (years)	3.0 (1.0, 6.0)	5.0 (2.0, 11.0)	<0.05
Any bleeding symptoms	832 (80.8)	947 (85.4)	<0.05
Menses ≥7 days	548 (53.2)	672 (60.6)	<0.05
Heavy menses	768 (74.6)	883 (79.6)	<0.05
Bleeding between periods	477 (46.3)	545 (49.1)	0.19
Frequent urination	592 (57.5)	686 (61.9)	<0.05
Discomfort during intercourse	412 (40.0)	503 (45.4)	<0.05
Pelvic pain requiring meds	408 (39.6)	548 (49.4)	<0.05
Pelvic pain not during periods			<0.05
Pelvic pain during periods	117 (11.4)	163 (14.7)	
No pelvic pain	630 (61.2)	568 (51.2)	
Current contraception	736 (71.2)	736 (66.2)	<0.05
Previous medical condition (high blood pressure, diabetes, asthma, thyroid problems, blood clots in legs)	453 (44.5)	577 (52.6)	<0.05
Marijuana	82 (8.1)	77 (7.0)	<0.05
Any prior treatment	163 (15.9)	264 (24.1)	<0.05
Regular, predictable menses	676 (66.3)	648 (59.6)	<0.05
Number of pregnancies			<0.05
0	407 (39.8)	302 (27.6)	
1	168 (16.4)	192 (17.6)	
2	187 (18.3)	191 (17.5)	
3	123 (12.0)	148 (13.5)	
4	62 (6.1)	124 (11.3)	

(*Appendix Table A2 continues* →)

Appendix Table A2. (Continued)

Characteristic	*White (*N = *1033)*	*Black (*N = *1111)*	p[a]
5	40 (3.9)	66 (6.0)	
6	15 (1.5)	31 (2.8)	
>6	20 (2.0)	39 (3.6)	
Total UF volume (cm^3)	140.5 (28.6, 364.8)	147.3 (40.6, 336.7)	0.27
Uterine volume (cm^3)	324.2 (159.1, 640.0)	492.5 (255.8, 920.7)	<0.05
Number of UFs measured	2.0 (1.0, 3.0)	2.0 (1.0, 4.0)	<0.05
Concern[b]	40.0 (20.0, 71.6)	30.0 (10.0, 55.0)	<0.05
Activities[b]	50.0 (28.6, 75.0)	42.9 (21.4, 67.9)	<0.05
Energy/mood[b]	50.0 (28.9, 71.4)	42.9 (21.4, 60.7)	<0.05
Control[b]	50.0 (30.0, 70.0)	45.0 (25.0, 70.0)	<0.05
Self-conscious[b]	41.7 (16.7, 66.7)	33.3 (8.3, 66.7)	<0.05
Sexual function[b]	50.0 (25.0, 75.0)	50.0 (12.5, 75.0)	0.27
Total (sum of six subscale scores above)[b]	47.4 (31.0, 68.1)	40.5 (22.4, 60.3)	<0.05
Symptom severity (lower score indicates more positive health status)	56.3 (37.5, 71.9)	62.5 (40.6, 78.1)	<0.05
Mobility			<0.05
I have no problems in walking about	852 (82.6)	819 (74.4)	
I have some problems in walking about	114 (11.1)	152 (13.8)	
I have moderate problems in walking about	51 (4.9)	91 (8.3)	
I have severe problems in walking about	13 (1.3)	33 (3.0)	
I am confined to bed	1 (0.1)	6 (0.5)	
Self-care			0.02
I have no problems washing or dressing myself	978 (95.0)	1029 (93.2)	
I have slight problems washing or dressing myself	39 (3.8)	45 (4.1)	
I have moderate problems washing or dressing myself	12 (1.2)	21 (1.9)	
I have severe problems washing or dressing myself	0 (0.0)	8 (0.7)	
I am unable to wash or dress myself	1 (0.1)	1 (0.1)	
Usual activities			0.08
I have no problems doing my usual activities	665 (64.5)	708 (64.3)	
I have slight problems doing my usual activities	215 (20.9)	215 (19.5)	
I have moderate problems doing my usual activities	120 (11.6)	119 (10.8)	
I have severe problems doing my usual activities	26 (2.5)	45 (4.1)	
I am unable to perform my usual activities	5 (0.5)	14 (1.3)	
Pain/discomfort			<0.05
I have no pain or discomfort	213 (20.7)	229 (20.7)	
I have slight pain or discomfort	387 (37.5)	288 (26.1)	
I have moderate pain or discomfort	315 (30.6)	324 (29.3)	
I have severe pain or discomfort	93 (9.0)	179 (16.2)	
I have extreme pain or discomfort	23 (2.2)	84 (7.6)	
Anxiety/depression			<0.05
I am not anxious or depressed	353 (34.4)	475 (43.1)	
I am slightly anxious or depressed	388 (37.8)	300 (27.2)	
I am moderately anxious or depressed	222 (21.6)	205 (18.6)	
I am severely anxious or depressed	50 (4.9)	85 (7.7)	
I am extremely anxious or depressed	14 (1.4)	37 (3.4)	
Visual analog scale (0–100)	75.0 (60.0, 85.0)	75.0 (60.0, 86.0)	0.17

Data are given s median (interquartile range) or *n* (%).
[a]*p*-Values are based on Pearson chi-square tests for all categorical row variables. *p*-Values are based on chi-square rank-based group means score statistics for all continuous/ordinal row variables. This is equivalent to Wilcoxon tests. All tests treat the column variable as nominal.
[b]Higher score indicates more positive health status.
BMI, body mass index; UF, uterine fibroid.

Appendix Table A3. Planned Treatment Versus Completed Treatment

	Actual treatment performed						
	Unknown	*Myo*	*Hyst*	*UAE*	*EA*	*RFA*	*IUD*
Planned treatment							
Myo	19	**1042**	18	0	4	0	0
Hyst	8	5	**795**	0	0	0	0
UAE	34	0	0	**219**	0	0	0

Values in bold are concordant planned and completed treatments.
Planned treatment is based on participant report, and completed treatment is from medical chart review.
Hyst, hysterectomy; IUD, intrauterine device; Myo, myomectomy; RFA, radiofrequency ablation.