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## Comparison of Characteristics of Fibroids in African American and White Women Undergoing Pre-Menopausal Hysterectomy

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### Abstract

**Objective**—To compare pathologic characteristics and epidemiologic risk factors for uterine fibroids in African American and white women undergoing hysterectomy.

**Design**—Cross-sectional analysis of women undergoing pre-menopausal hysterectomy.

**Setting**—Two university-associated hospitals in North Carolina.

**Patients**—African American (n=225) and white women (n=135) with fibroid diagnosis.

**Interventions**—None

**Main Outcome Measures**—Data were obtained from an in-person interview and abstracted from operative and pathologic reports. Analysis of variance and multiple linear regression models were used to identify characteristics associated with higher uterine weight, greater number of fibroids and size of largest fibroid.

**Results**—African American women had substantially more fibroids (9.9 versus 4.5) with a concomitant higher mean uterine weight (477 versus 267 grams). Although African American women had a higher prevalence of established risk factors for fibroids such as high body mass index and hypertension, these factors were not associated with larger uteri or more numerous fibroids. In multiple linear regression models, the only factors statistically significantly associated with higher uterine weight, larger fibroids and more numerous fibroids were race and nulligravidity.

**Conclusions**—The presentation of fibroids as measured by uterine size or number of fibroids is more severe in African American women as compared to white women. The differences in presentation cannot be explained by racial differences in the prevalence of known risk factors; additional research is needed on environmental and genetic factors that may increase risk for fibroids.

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## Introduction

Hysterectomy is one of the most common surgical procedures in women with approximately 600,000 operations performed annually in the United States.(1) A diagnosis of uterine fibroids (or leiomyomata) is the most common indication for the surgery, reported in approximately 40% of hysterectomies across all ages.(1) Because symptomatic fibroids are more common in premenopausal women, they account for an even larger proportion of hysterectomies in this group.(2) Other common operative diagnoses such as dysfunctional uterine bleeding or pelvic pain are frequently associated with the presence of fibroids.

Prior studies have reported a higher prevalence of fibroids among African American women as compared to white women, whether based on ultrasound measurements or surgical diagnoses.(3–9) Although a number of studies have documented the higher prevalence of fibroids among African American women, many of them did not provide detailed descriptions of the number or size of fibroids. (3–6, 9, 10) Only three studies have examined the gross pathologic characteristics of fibroids comparing African American and white women who have undergone hysterectomy for this condition, (7, 11, 12) and of these, two had fewer than 35 women in one of racial groups being compared.(11, 12) Higher uterine weight among African American women with fibroids is a consistently reported finding, but there is less consistency in relation to findings on racial differences in the number of fibroids, location or size of the largest fibroid. In addition, while it is well-recognized that there is considerable variability in the presentation of fibroids at the time of surgery – e.g., some women have numerous small fibroids whereas others have a single or small number of large fibroids – there are few data on how the presentation varies by race and what factors, other than race, are associated with larger or more numerous fibroids.

In this report, we use data from a study of women undergoing pre-menopausal hysterectomy to compare African American and white women with fibroids in terms of the gross pathologic characteristics and predictors of more severe manifestations of fibroids. The purpose of these analyses is to compare uterine weight, fibroid size and number of fibroids between African American women and white women. We expand on prior research by conducting more detailed analyses of the gross pathologic characteristics of the fibroids and by performing analyses to determine whether the established fibroid risk factors are associated with larger or more numerous fibroids.

## Methods

Data for these analyses came from women participating in a study of ovarian function after premenopausal hysterectomy, known as the PROOF study (Prospective Research on Ovarian Function). The methods have been described in detail previously.(13) Briefly, women undergoing pre-menopausal hysterectomy between 2004 and 2007 at the two hospitals in Durham, NC, both part of the Duke University Health System, were identified from operating room schedules and invited to participate after receiving physician consent. Eligible women were aged 30 to 47 years and pre-menopausal as evidenced by at least one menstrual period in the previous three months, had no personal history of cancer (except non-melanoma skin cancer), were capable of completing an interview in English and were expected to have at least one ovary intact after the hysterectomy. Women who agreed to participate signed informed consent forms, completed an interviewer-administered questionnaire, had a blood sample drawn, and had body measurements taken. All interview visits occurred before their surgery. A control group of women with intact uteri and ovaries also was recruited, and study participants completed up to five annual follow-up visits, but this report is based only on the baseline characteristics of the women with hysterectomy.

The study protocol was approved by the Duke University Medical Center Institutional Review Board.

A total of 504 women undergoing hysterectomy (72.1% of the 699 women who were contacted and eligible) completed the baseline study visit. Fifty-one of these women were subsequently determined to be ineligible because review of medical records showed they had had a bilateral oophorectomy or cancer diagnosis (n=45) or had baseline follicle-stimulating hormone (FSH) levels  $\geq 40$  IU (n=6). An FSH level  $\geq 40$  IU was an exclusion criterion because the parent study was intended to enroll only pre-menopausal women and the primary outcome of ovarian failure was defined by FSH  $\geq 40$  IU.<sup>(13)</sup> The analyses in this paper are based on 360 women (225 African American and 135 white) with a pre- or post-operative diagnosis of uterine fibroids/leiomyomas.

Data obtained by interview included demographic characteristics; reproductive, gynecologic and medical history; family history of gynecologic conditions in mother and sisters; and certain lifestyle characteristics such as smoking and alcohol consumption. Age at diagnosis was based on a question in the survey on whether the woman had ever been diagnosed with fibroids and, if so, her age at diagnosis. If no previous diagnosis of fibroids was reported, age at surgery was considered the age at diagnosis. Medical records related to the hysterectomy were reviewed and abstracted. Details on pre- and post-operative diagnoses, uterine weight, uterine size in weeks, number of fibroids, size of fibroids and location of fibroids were abstracted from operative and pathology reports. In approximately 20% of cases, the number of fibroids was described semi-quantitatively, without reporting an exact number. We assigned a value of 5 if the pathologist described the uterus as having “several” fibroids and a value of 10 if the uterus was described as having “multiple or numerous” fibroids. The decision to assign these values was made in consultation with two gynecologists. We compared mean uterine weights of women with “several” fibroids and those with 5 to 9 fibroids (431 g and 374 g, respectively) and did not find a statistically significant difference (p=0.60). Similarly, the mean uterine weight of women with “multiple or numerous” (447 g) fibroids was not significantly different than that of women with 10 to 19 fibroids (512 g, p=0.43).

We analyzed characteristics of African American and white women with fibroids using student's t-test for comparisons of means (age, body mass index (BMI), age at menarche, number of pregnancies, uterine size in weeks, uterine weight, number of fibroids, age at diagnosis and surgery, time between diagnosis and surgery, and hemoglobin) and chi-square or Fisher's exact tests for comparison of distributions of categorical variables (age, BMI and pregnancy categories, time since last pregnancy, oral contraceptive duration, history of medical conditions, smoking status, alcohol use, operative diagnoses and pathologic characteristics). Analysis of variance and multiple linear regression models were used to assess predictors of uterine weight, size of largest fibroid or number of fibroids. All analyses were performed using SAS version 9.2.

## Results

Descriptive characteristics comparing African American and white women with fibroids are presented in Table 1. The mean age was similar across races, approximately 41 years, and approximately two-thirds of the women were in their forties at the time of surgery. The majority of women were overweight or obese, with the African-American women having a significantly higher mean BMI than the white women. African American women were less likely to be nulligravid and, among ever-pregnant women, had more pregnancies. Several statistically significant differences in gynecologic and medical history were observed. African American women were more likely to report a history of tubal ligation, infertility,

fibroids, myomectomy, hypertension and a family history of fibroids, whereas endometriosis and ovarian cysts were more frequently reported by white women.

Comparisons of diagnostic and pathologic characteristics showed marked differences in the presentation of fibroids between African American and white women (Table 2). All measures of severity of fibroids (uterine weight, uterine size in weeks, number of fibroids and size of largest fibroid) were significantly higher in African American women. The racial differences were most pronounced at the more extreme ends of the spectrum: the percentages of African American and white women, respectively, were 17.6% and 4.8% for uterine weight  $\geq 750$  g; 30.8% and 11.1% for uterine size  $\geq 16$  weeks; 13.0% and 0.8% for  $\geq 20$  fibroids; and 22.4% and 12.4% for size of largest fibroid  $\geq 8$  cm. In analyses examining both number and size of fibroids, 34% of African American women versus 7.6% of white women had  $\geq 10$  fibroids and at least one large fibroid ( $\geq 5$  cm).

In the vast majority of women (90%), at least one fibroid was described as intramural. African American women were more likely to have fibroids in multiple locations. In particular, they were about two and one-half times as likely as white women to have fibroids in submucosal, intramural and subserosal locations (31% versus 12%).

We performed analyses to identify characteristics that were associated with uterine weight (Table 3), size of fibroids (Table 4) and number of fibroids (Supplemental Table 1), and to determine if these factors differed by race. In bivariate analyses, the only factors that were statistically significantly associated with higher uterine weight were nulligravidity and no history of oral contraceptive use for both African Americans and whites, and greater time since first diagnosis of fibroids in whites. We conducted a multiple linear regression analysis for uterine weight that included terms for age, race, BMI, time since fibroid diagnosis, family history of fibroids, total pregnancies, duration of oral contraceptive use, smoking status and history of high blood pressure. The statistically significant predictors of uterine weight were race (with a 47.7%, 95% CI 29.2% – 61.42%, decreased uterine weight among white women compared to African Americans) and number of pregnancies (39.3%, 95% CI 22.2 – 52.7%, decreased uterine weight for 1–2 pregnancies and 59.6%, 95% CI 46.9% – 69.3%, for 3 or more pregnancies as compared to nulligravid women). Oral contraceptive users had lower uterine weight than non-users, with statistically significantly decreased uterine weight among women with  $\geq 10$  years of use (37.0%, 95% CI 10.3% – 55.8%), but there was not a consistent trend of decreased uterine weight with increased duration of use.

Similar to the analyses of uterine weight, few factors were significantly associated with size of largest fibroid (Table 4). In bivariate analyses, the size of the largest fibroid was significantly greater among nulligravid women as compared to women with one or more pregnancies among both African American and white women. There was a suggestion that fibroid size was smaller among white women who had used oral contraceptives, but no consistent trend with duration of use. Multiple linear regression analyses were consistent with the bivariate analyses. Statistically significant predictors of fibroid size were race (36.5%, 95% CI 22.7% – 47.8%, decreased size of largest fibroid in white women) and number of pregnancies (38.8%, 95% CI 26.5% – 49.1%, decrease for 1–2 pregnancies and 48.4%, 95% CI 38.2% – 57.0%, for 3 or more pregnancies as compared to nulligravid women).

Similar analyses conducted for number of fibroids are presented in Supplemental Table 1. The number of fibroids was significantly higher in nulligravid women and among white women only, in women with a longer reported time since diagnosis.

It is notable for each of these analyses that commonly reported risk factors for fibroids such as high BMI, history of hypertension and family history of fibroids were not associated with severity of fibroids (uterine weight, size of largest fibroid or number of fibroids).

## Discussion

Our analyses confirm findings of previous studies of fibroids which reported that African American women have higher uterine weight, larger fibroids and more numerous fibroids.(3, 7, 11, 12, 14–16) This observation has been consistent across studies of women undergoing hysterectomy(7, 11) as well as those involving women undergoing myomectomy,(11, 14) uterine artery embolization(15, 16) or ultrasound/MRI evaluation.(3, 12) Racial differences were most pronounced when comparing the proportion of women in the extremes of the categories, i.e., greater than 20 fibroids or uterine weight greater than 750 g. Somewhat surprisingly, characteristics that have been identified as risk factors for fibroids, including BMI,(4, 17, 18) hypertension,(4, 19) smoking(4, 18) or a family history of fibroids(4, 17, 20) were not significantly associated with larger uteri, larger fibroids or more numerous fibroids.

Our data demonstrate clear differences in the size and number of fibroids between African American and white women, but the reasons for such differences are not clear. One could posit that the more severe presentation of fibroids in African American women is due to their higher prevalence of factors such as obesity or hypertension that have been reported to be associated with risk for fibroids. Although we found African American women were nearly two times as likely as white women to be obese and more than two times as likely to have a history of high blood pressure, these factors were not associated with greater uterine size, size of largest fibroid or number of fibroids in either racial group.

Another hypothesis is that African American women have larger or more numerous fibroids because they delay surgical treatment for fibroids because of insurance or access to care issues or because of negative perceptions or emotional concerns about having a hysterectomy.(21) Once again, our data provided little evidence to support this. Among African American women, none of the measures of fibroid severity were significantly different between women reporting that their fibroids were recently diagnosed and those who had been diagnosed 5 or more years earlier. The lack of a clear association between time since diagnosis and size of uterus or largest fibroid is consistent with findings from a longitudinal study of fibroid growth patterns, which demonstrated that fibroids do not grow in a linear manner over time.(12, 23) Instead, fibroids show a variety of growth patterns, with some growing rapidly, others showing little change, and still others regressing in size over time.

The most consistent association we observed was that women with a history of more pregnancies had significantly smaller uteri, fewer fibroids and smaller fibroids; however it is impossible to determine the direction of causality for this association. The more severe presentation of fibroids among women with fewer pregnancies may simply reflect that women with larger fibroids have more difficulty becoming pregnant and maintaining a pregnancy.(24) Alternatively, studies of fibroids in pregnant women have shown that fibroids may shrink or even become undetectable during the involution of the uterus after delivery.(22)

The reasons for the higher prevalence and more severe presentation of fibroids in African American women remain elusive, and our data suggest that it is not explainable simply by the higher prevalence of established risk factors such as high BMI, hypertension or a family history of fibroids. It has been noted that despite the high prevalence of fibroids and

considerable health care costs associated with their treatment,(25) the epidemiologic data on risk factors for this condition are limited.(26, 27) Insight into the higher prevalence and more severe presentation of fibroids in African American women may come from more in-depth exploration of factors related to reproductive tract infections or injury, environmental exposures, the apocrine and paracrine effects of endogenous hormones or factors responsible for extracellular matrix secretion and degradation. Further follow-up and validation of promising findings from candidate gene and genome-wide association studies and microRNA expression analyses also may shed light on the observed racial differences.(28–33)

The limitations of this study should be taken into consideration when interpreting the findings. The study population was limited to women with fibroids who were undergoing hysterectomy and therefore are not representative of the full spectrum of women with fibroids. Women with fibroids who opted for treatments other than hysterectomy, including myomectomy and uterine artery embolization were not included in the study. If white women with more severe presentations of fibroids preferentially opted for other fibroid treatments, our findings could have overstated the racial differences in severity; however we think that this is unlikely. Papers describing characteristics of women receiving alternative treatments for fibroids, such as myomectomy or uterine artery embolization, also report that African American women have a significantly higher number of fibroids.(14–16) Furthermore, in a large registry study of uterine artery embolization,(15) the proportion of women with >5 fibroids was considerably less than what was observed in our study population and another large study comparing characteristics of fibroids in women undergoing hysterectomy,(7) suggesting that uterine artery embolization is not preferentially chosen by women with more numerous fibroids. Despite our study being limited to women undergoing hysterectomy, who presumably are those with larger or more symptomatic fibroids, we still found striking and significant differences between African American and white women.

An additional potential limitation is that the clinical and pathologic characteristics were abstracted from pathology reports and operative notes in the women's medical records. Although there was not standardized pathologic review of the hysterectomy specimens, the surgeries were performed at hospitals that are part of the same health care system and standards for pathologic review should not have differed widely between pathologists.

The strengths of our analysis include the size of the study population and the availability of data from pathology reports that allowed us to compare several measures of severity of fibroids. By conducting analyses that used more categories of uterine weight, fibroid size or fibroid number, we were able to demonstrate that racial differences are more pronounced when examining the more extreme categories of uterine or fibroid measurements. We also conducted more detailed analyses of the association between fibroid risk factors and gross pathologic characteristics, providing evidence that most of the established risk factors are not associated with larger uterine size or more numerous fibroids.

## Conclusion

Our analyses of characteristics of fibroids in African American and white women undergoing hysterectomy show marked differences in measures of severity of fibroids, with the most striking racial differences observed when comparing women at the extremes of uterine size or number of fibroids. The racial differences in fibroid severity are not explained by the higher prevalence of known risk factors for fibroids in African American women. The reasons for African American women having larger and more numerous fibroids remain elusive, and further exploration of genetic and environmental risk factors is needed.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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**Table 1**  
 Descriptive characteristics of African American and White women with diagnosis of fibroids at hysterectomy.

	African-American (N=225)		White (N=135)		
	Mean	(SD)	Mean	(SD)	p-value <sup>d</sup>
Age	41.51	(3.9)	41.81	(4.2)	0.5
BMI	33.57	(7.7)	28.56	(6.5)	<0.0001
Age at menarche	12.32	(1.7)	12.51	(1.6)	0.3
Number of pregnancies among ever-pregnant women	2.85	(1.8)	2.39	(1.7)	0.02
	<u>N</u>	<u>(%)</u>	<u>N</u>	<u>(%)</u>	<u>p-value</u>
Age categories					0.6
30 – 34	14	(6.2)	10	(7.4)	
35 – 39	59	(26.2)	30	(22.2)	
40 – 44	105	(46.7)	60	(44.4)	
45 – 47	47	(20.9)	35	(25.9)	
BMI categories					<0.0001
<25	23	(10.3)	48	(36.1)	
25 – <30	55	(24.7)	37	(27.8)	
30 – <35	59	(26.5)	27	(20.3)	
35	86	(38.6)	21	(15.8)	
Missing	2		2		
Total pregnancies					0.07
None	23	(10.2)	19	(14.1)	
1 – 2	77	(34.2)	58	(43.0)	
3	125	(55.6)	58	(43.0)	
Total full-term pregnancies (among ever-pregnant women)					0.5
None	13	(6.4)	10	(8.6)	
1 – 2	130	(64.4)	78	(67.2)	
3	59	(29.2)	28	(24.1)	
Time since last full-term pregnancy (among women with full-term pregnancies)					0.08

	African-American (N=225)		White (N=135)		p-value <sup>c</sup>
	Mean	(SD)	Mean	(SD)	
0-3 years	10	(5.3)	11	(10.4)	
4-9 years	39	(20.7)	29	(27.4)	
10+ years	139	(73.9)	66	(62.3)	
Missing	1		0		
Oral contraceptive duration					0.04
Never	17	(7.6)	18	(13.6)	
<1 year	19	(8.5)	22	(16.7)	
1 - <5 years	63	(28.3)	30	(22.7)	
5 - <10 years	42	(18.8)	23	(17.4)	
10 years	82	(36.8)	39	(29.6)	
Missing	3		2		
Self-reported history of:					
Tubal ligation	114	(50.7)	54	(40.0)	0.05
Infertility	55	(24.4)	19	(14.1)	0.02
Fibroids	215	(95.6)	107	(79.3)	<0.0001
Endometriosis	21	(9.4)	24	(17.8)	0.02
Myomectomy	31	(13.8)	7	(5.2)	0.01
Polycystic ovary syndrome	2	(0.9)	4	(3.0)	0.2
Ovarian cysts	52	(23.1)	69	(48.9)	<0.0001
History of fibroids in mother or sister					<0.0001
Yes	137	(65.9)	44	(36.4)	
No	71	(34.1)	77	(63.6)	
Missing	17		14		
Smoking status					0.03
Never	139	(61.8)	76	(56.3)	
Former	34	(15.1)	35	(25.9)	
Current	52	(23.1)	24	(17.8)	
History of high blood pressure					<0.0001
Yes	94	(42.0)	24	(17.8)	
No	130	(58.0)	111	(82.2)	

	African-American (N=225)		White (N=135)		p-value <sup>d</sup>
	Mean	(SD)	Mean	(SD)	
Missing	1				
Current alcohol consumption					
Yes	128	(56.9)	101	(74.8)	0.001
No	97	(43.1)	34	(25.2)	

<sup>d</sup>Continuous variables were compared with student's t-test; categorical variables were compared with chi-square or Fisher's exact test.

Table 2

Diagnostic and pathologic characteristics of African American and White women with diagnosis of fibroids at hysterectomy.

	African American (N=225)		White (N=135)		p-value <sup>d</sup>
	Mean	(SD)	Mean	(SD)	
Uterus size in weeks	13.1	(5.1)	8.9	(5.5)	<0.0001
Uterus size in grams	477.0	(437.4)	266.9	(300.2)	<0.0001
Number of fibroids	9.9	(8.1)	4.5	(4.0)	<0.0001
Number of fibroids (excluding women with imputed values) <sup>b</sup>	9.8	(9.3)	3.3	(3.6)	<0.0001
Age at diagnosis of fibroids	35.5	(6.66)	38.6	(5.95)	<0.0001
Age at surgery	41.5	(3.90)	41.9	(4.16)	0.4
Time (years) between diagnosis and surgery	6.0	(6.33)	3.4	(4.62)	<0.0001
Hemoglobin (g/dL)	11.8	(1.7)	12.8	(1.5)	<0.0001
	N	(%)	N	(%)	p-value
Pre-operative diagnosis <sup>c</sup>					
Fibroids/leiomyomas	201	(89.3)	96	(71.1)	<0.0001
Dysmenorrhea	36	(16.0)	26	(19.3)	0.4
Menorrhagia/DUB	158	(70.2)	91	(67.4)	0.6
Pelvic pain	28	(12.4)	19	(14.1)	0.7
Endometriosis	1	(0.4)	8	(5.9)	0.002
Pelvic organ prolapse	3	(1.3)	10	(7.4)	0.01
Cervical dysplasia/CIS	3	(1.3)	1	(0.7)	1.0
Adenomyosis	1	(0.4)	1	(0.7)	1.0
Post-operative diagnosis <sup>c</sup>					
Fibroids/leiomyomas	206	(91.7)	100	(74.1)	<0.0001
Dysmenorrhea	33	(14.7)	26	(19.3)	0.3
Menorrhagia/DUB	151	(67.1)	88	(65.2)	0.7
Pelvic pain	27	(12.0)	18	(13.3)	0.7
Endometriosis	7	(3.1)	20	(14.8)	<0.0001
Pelvic organ prolapse	3	(1.3)	10	(7.4)	0.003
Cervical dysplasia/CIS	3	(1.3)	1	(0.7)	1.0

	African American (N=225)		White (N=135)		p-value <sup>d</sup>
	Mean	(SD)	Mean	(SD)	
Adenomyosis	5	(2.2)	2	(1.5)	0.7
Uterine weight (g)					<0.0001
<100 g	4	(1.9)	18	(14.2)	
100 – <250g	80	(37.9)	75	(59.1)	
250 – <500g	56	(26.5)	18	(14.2)	
500 – <750g	34	(16.1)	10	(7.9)	
750 – <1000g	16	(7.6)	1	(0.8)	
1000g – <1500g	12	(5.7)	3	(2.4)	
>1500 g	9	(4.3)	2	(1.6)	
Missing	14		8		
Uterine size (weeks)					<0.0001
<6	9	(5.0)	24	(24.2)	
6 – 10	23	(12.6)	22	(22.2)	
11 – 15	94	(51.7)	42	(42.4)	
16 – 20	36	(19.8)	8	(8.1)	
>20	20	(11.0)	3	(3.0)	
Missing	43		36		
Number of fibroids					<0.0001
1 – 4	52	(25.0)	74	(61.2)	
5 – 9	42	(20.2)	23	(19.0)	
10 – 19	87	(41.8)	23	(19.0)	
20	27	(13.0)	1	(0.8)	
Missing	17		14		
Size of largest fibroid (cm)					<0.0001
2	34	(16.5)	49	(40.5)	
2 – <5	65	(31.6)	38	(31.4)	
5 – <8	61	(29.6)	19	(15.7)	
8 – <10	24	(11.7)	8	(6.6)	
10	22	(10.7)	7	(5.8)	
Missing	19		14		

	African American (N=225)		White (N=135)		p-value <sup>d</sup>
	Mean	(SD)	Mean	(SD)	
Number of fibroids AND size of largest fibroid					<0.0001
<3 AND <2 cm	13	(6.4)	26	(21.9)	
<3 AND 2 to 4.9 cm	8	(3.9)	16	(13.5)	
<3 AND 5 cm	13	(6.4)	12	(10.1)	
3 to 9 AND <2 cm	12	(5.9)	13	(10.9)	
3 to 9 AND 2-4.9 cm	21	(10.3)	17	(14.3)	
3 to 9 AND 5 cm	24	(11.8)	12	(10.1)	
10 AND <2 cm	4	(2.0)	4	(3.4)	
10 AND 2 to 4.9 cm	39	(19.2)	10	(8.4)	
10 AND 5 cm	69	(34.0)	9	(7.6)	
Missing	22		16		
Location of fibroid <sup>c</sup>					
Any submucosal	92	(46.5)	29	(24.8)	0.0001
Any intramural	180	(90.9)	104	(88.9)	0.6
Any subserosal	126	(63.6)	51	(43.6)	0.0005
Pedunculated in cavity	3	(1.5)	2	(1.7)	0.9
Pedunculated serosal	20	(10.1)	9	(7.7)	0.5
Missing	27		18		
Location of fibroid					
Submucosal (SM)only	5	(2.5)	3	(2.6)	1.0
Intramural (IM) only	49	(24.8)	54	(46.1)	<0.0001
Subserosal (SS) only	6	(3.0)	7	(6.0)	0.2
Submucosal and intramural	18	(9.1)	9	(7.7)	0.7
Submucosal and subserosal	7	(3.5)	3	(2.6)	0.7
Intramural and subserosal	51	(25.8)	27	(23.1)	0.6
Submucosal, intramural and subserosal	62	(31.3)	14	(12.0)	0.0001
Missing	27		18		

<sup>d</sup>Continuous variables were compared with student's t-test, categorical variables were compared with chi-square or Fisher's exact test.

<sup>b</sup>Based on 147 African American and 94 white women.

<sup>c</sup>More than one response may have been reported for each woman.

**Table 3**

Uterine weight (in grams) by race and selected variables.

	African-American			White		
	N	Mean (SD)	p-value	N	Mean (SD)	p-value <sup>a</sup>
Age categories						
30 – 34	13	301 (210)		9	371 (581)	
35 – 39	55	418 (408)	0.4	28	237 (180)	0.2
40 – 44	100	524 (466)	0.2	57	274 (324)	0.3
45 – 47	43	496 (444)	0.2	33	253 (237)	0.3
BMI categories						
<25	21	374 (294)		48	236 (286)	
25 – <30	49	472 (464)	0.4	37	282 (345)	0.5
30 – <35	56	467 (376)	0.4	27	289 (246)	0.5
35	83	510 (494)	0.3	21	239 (237)	1.0
Time since fibroid diagnosis						
<1 year	55	458 (515)		49	193 (136)	
1-<5 years	58	485 (383)	0.7	47	309 (324)	0.07
>=5 years	96	480 (423)	0.8	30	328 (422)	0.05
History of fibroids in mother or sister						
Yes	129	447 (397)		41	287 (396)	
No	66	478 (439)	0.6	72	250 (237)	0.5
Total pregnancies						
None	22	777 (572)		19	505 (601)	
1 – 2	72	573 (540)	0.03	53	222 (178)	0.0002
3	117	361 (269)	<0.0001	55	228 (190)	0.0002
Time since last full-term pregnancy (among women with full-term pregnancies)						
0–3 years	9	542 (580)		10	183 (132)	
4–9 years	38	278 (243)	0.03	27	178 (108)	0.9
10+ years	128	459 (373)	0.5	62	237 (204)	0.4
Duration of OC use						



	African-American			White		
	N	Mean (SD)	p-value	N	Mean (SD)	p-value <sup>a</sup>
Never	16	685 (831)		16	420 (510)	
<1 year	19	379 (296)	0.06	20	355 (263)	0.5
1-< 5 years	60	470 (436)	0.06	28	201 (114)	0.02
5-<10 years	39	443 (323)	0.05	22	234 (175)	0.06
>= 10 years	75	478 (397)	0.06	38	204 (307)	0.01
Smoking status						
Never	134	469 (393)		71	271 (337)	
Former	31	434 (278)	0.7	34	283 (298)	0.9
Current	46	529 (617)	0.4	22	229 (139)	0.6
History of high blood pressure						
Yes	89	490 (528)		22	233 (233)	
No	121	470 (359)	0.8	105	274 (313)	0.6

\* P-values from student's t-test or analysis of variance.

**Table 4**

Size of largest fibroid (in cm) by race and selected variables.

	African-American		White	
	N	Mean (SD)	N	Mean (SD)
Age categories				
30 – 34	12	4.8 (2.4)	8	5.0 (4.5)
35 – 39	53	5.0 (4.1)	24	3.6 (2.8)
40 – 44	98	6.0 (3.4)	57	3.5 (3.6)
45 – 47	43	4.9 (2.7)	32	3.9 (2.9)
BMI categories				
<25	22	5.3 (3.7)	43	3.6 (3.0)
25 – <30	50	5.3 (3.8)	33	3.7 (3.6)
30 – <35	55	5.1 (3.1)	24	3.8 (3.5)
35	77	5.7 (3.2)	19	3.3 (2.8)
Time since fibroid diagnosis				
<1 year	54	5.3 (4.0)	44	2.7 (2.2)
1-<5years	60	5.7 (3.4)	46	4.5 (3.7)
>=5 years	90	5.4 (3.1)	30	3.9 (3.8)
History of fibroids in mother or sister				
Yes	130	5.2 (2.9)	40	3.9 (3.8)
No	59	5.6 (3.9)	67	3.5 (3.0)
Total pregnancies				
None	23	8.7 (3.6)	18	6.7 (4.2)
1 – 2	71	5.7 (3.5)	52	3.6 (2.9)
3	112	4.6 (2.9)	51	2.9 (3.0)
Time since last full-term pregnancy (among women with full-term pregnancies)				
0–3 years	8	5.3 (5.6)	10	1.7 (2.1)
4–9 years	35	4.3 (3.3)	24	2.4 (2.5)
10+ years	126	5.1 (2.8)	59	3.5 (2.7)
Duration of OC use				

	African-American			White		
	N	Mean (SD)	p-value	N	Mean (SD)	p-value <sup>a</sup>
Never	15	6.1 (3.5)		13	5.2 (4.7)	
<1 year	18	5.3 (3.5)	0.5	20	4.6 (3.7)	0.6
1-< 5 years	59	5.6 (3.7)	0.6	29	3.0 (2.1)	0.04
5-<10 years	37	5.4 (2.8)	0.5	21	3.4 (2.8)	0.1
>= 10 years	75	5.3 (3.5)	0.4	35	3.3 (3.5)	0.06
Smoking status						
Never	127	5.5 (3.3)		68	3.8 (3.3)	
Former	30	5.0 (3.1)	0.5	30	4.2 (3.9)	0.5
Current	49	5.6 (4.0)	0.8	23	2.9 (2.3)	0.3
History of High blood pressure						
Yes	86	5.3 (3.3)		23	3.4 (3.0)	
No	119	5.5 (3.5)	0.7	98	3.8 (3.4)	0.6

\* p-values from student's t-test or analysis of variance.