

Patient race and the likelihood of undergoing bariatric surgery among patients seeking surgery

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Abstract

Background Ethnic minority adults have disproportionately higher rates of obesity than Caucasians but are less likely to undergo bariatric surgery. Recent data suggest that minorities might be less likely to seek surgery. Whether minorities who seek surgery are also less likely to proceed with surgery is unclear.

Methods We interviewed 651 patients who sought bariatric surgery at two academic medical centers to examine whether ethnic minorities are less likely to proceed with surgery than Caucasians and whether minorities who do proceed with surgery have higher illness burden than their counterparts. We collected patient demographics and abstracted clinical data from the medical records. We then conducted multivariable analyses to examine the

association between race and the likelihood of proceeding with bariatric surgery within 1 year of initial interview and to compare the illness burden by race and ethnicity among those who underwent surgery.

Results Of our study sample, 66 % were Caucasian, 18 % were African-American, and 12 % were Hispanics. After adjustment for socioeconomic factors, there were no racial differences in who proceeded with bariatric surgery. Among those who proceeded with surgery, illness burden was comparable between minorities and Caucasian patients with the exception that African-Americans were underrepresented among those with reflux disease (0.4, 95 % CI 0.2–0.7) and depression (0.4, 0.2–0.7), and overrepresented among those with anemia (4.8, 2.4–9.6) than Caucasian patients.

Conclusions Race and ethnicity were not independently associated with likelihood of proceeding with bariatric surgery. Minorities who proceeded with surgery did not clearly have higher illness burden than Caucasian patients.

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The prevalence of obesity remains high with ~36 % of US adult men and women with this diagnosis and ~22 % with moderate to severe obesity [1]. Ethnic minority populations have disproportionately higher rates of obesity; in African-American women approximately 60 % are obese and 49 % have a body mass index (BMI) ≥ 35 [1, 2]. Bariatric surgery effectively treats patients with moderate and severe obesity while markedly improving obesity-related comorbidities, particularly Type 2 diabetes mellitus [3]. Unfortunately racial minorities, men, those who are

socioeconomically disadvantaged, and those with a higher illness burden have lower utilization of bariatric surgery [4].

Few studies have sought to discern why ethnic minorities are less likely to proceed with bariatric surgery. While some have postulated that socioeconomic status, as determined by factors such as health insurance coverage, accounts for the differential utilization in bariatric surgery in ethnic minority patients, these studies have been inferential [1, 5, 6]. One study on beliefs about weight loss surgery among African-American women with obesity found that common barriers included fears and concerns about treatment effects, and perceptions that surgery was too extreme or a method of last resort [7].

More recently, Wee et al. found that men and African-American primary care patients with moderate to severe obesity were less likely to have considered bariatric surgery than Caucasian patients but racial differences were largely explained by higher quality of life reported by African-American patients with obesity [8]. That study also found that physicians were less likely to recommend weight loss surgery to African-American and male patients even though African-American patients were more likely to consider weight loss surgery than Caucasians if recommended by their physician [9]. Taken together, these data suggest that African-Americans are less likely to consider and be referred for bariatric surgery. However, once referred for bariatric surgery, it is unclear whether minority patients who seek evaluation for surgery are then less likely to proceed with it or not.

In this context, we interviewed patients being evaluated for bariatric surgery and examined factors associated with whether they proceeded with surgery. We hypothesize that African-American patients are less likely to proceed with bariatric surgery, and among those who proceeded with surgery, they are more likely to have a higher BMI and higher illness burden.

Materials and methods

Study sample, recruitment, and data collection

Our study sample consisted of participants in the Assessment of Bariatric Surgery (ABS) Study, a longitudinal cohort study of patients who sought bariatric surgery evaluation at 2 academic centers in Boston (not to be confused with the Longitudinal Assessment of Bariatric Surgery or LABS consortium). Among the primary aims of the ABS study were to evaluate patients' decision-making and perception of bariatric surgery. Recruitment has been previously described in detail [8]. Eligible patients had to be age 18–65 years of age at the time of recruitment, be English speaking, and had the permission of their physician

for us to contact them. Of the 654 initial participants, 3 withdrew consent after the baseline telephone interview. Of the remaining 651 patients, 531 (82 %) proceeded with bariatric surgery in the form of gastric bypass, vertical sleeve gastrectomy, or gastric banding within 12 months of enrollment (between June, 2008 and October, 2011). A trained research nurse extracted the medical record for clinical data. The institutional review boards at Beth Israel Deaconess Medical Center, Boston Medical Center, and the University of Massachusetts Center for Survey Research (all in Boston, MA) approved the study.

Measures

Demographic factors

Patients were queried about their race and ethnicity, marital status, education, income, and insurance status. Sex, date of birth, and insurance type were abstracted from the medical record review. Age was calculated using date of birth and date of the interview.

Clinical factors and illness burden

We calculated BMI based on pre-operative weight and height as abstracted from the clinical record. Co-morbidities abstracted from the medical record included diabetes, hypertension, asthma, obstructive sleep apnea, gastroesophageal reflux disease (GERD), depression, anxiety, arthritis, chronic back pain, anemia, coronary artery disease, stroke, and peripheral vascular disease. A study nurse conducted a follow-up medical record review to determine whether patients proceeded with surgery within 12 months of enrollment.

Statistical analysis

Descriptive statistics were used to characterize our sample according to whether or not patients proceeded with bariatric surgery at 1 year after enrollment. Wald χ^2 analyses were used to evaluate differences in proportions for categorical variables, and *t* tests were used to evaluate differences in means for continuous variables. In order to delineate patient characteristics associated with who proceeded with surgery, we conducted multivariable logistic regression models and classified those who had surgery within 12 months of enrollment as having the outcome.

Factors we considered included sex, race, age, BMI, income, education, health insurance status, and medical comorbidities. To characterize the differences between ethnic minorities compared to Caucasian patients who proceeded with bariatric surgery, we conducted additional multivariable models which examined the association between

various clinical and demographic factors and being African-American (outcome) or Hispanic (outcome) versus being Caucasian. For our models, we used a stepwise selection process ($p < 0.10$ for entry, $p < 0.05$ for retention in model) to determine which co-morbid conditions to include.

Results

Characteristics of our study sample have been previously described [8]. Table 1 characterizes our overall sample stratified by race and ethnicity. Table 2 presents the characteristics of those who proceeded with surgery across various socio-demographic and clinical characteristics. Prior to adjusting for demographic factors, minority patients and those with a higher BMI were less likely to proceed with surgery than their respective counterparts. Social disadvantage (as reflected by income level and insurance status) and having certain co-morbidities were also associated with not proceeding with surgery. However, after adjusting for demographic factors, African-American and Hispanic patients were no longer significantly less likely to undergo surgery. Interestingly, arthritis was the only co-morbidity significantly associated with whether patients proceeded with bariatric surgery after adjustment. The percentage of patients who did not proceed with surgery ranged from 15 to 36 % according to race/ethnicity.

Table 3 compares the characteristics of those patients who did proceed with bariatric surgery within 12 months from the baseline interview by race and ethnicity. Compared to Caucasian patients, African-Americans and Hispanics were younger, less educated, had lower income, and had a lower likelihood of having private medical insurance; differences in income persisted after adjustment. Contrary to our hypothesis, African-American patients had a lower prevalence of several co-morbidities at the time of surgery than Caucasian patients. After adjusting for demographic factors, African-Americans were overrepresented relative to Caucasians among those with anemia but underrepresented among those with depression and GERD whereas Hispanic patients were not overrepresented or underrepresented with respect to co-morbidities (Table 4).

Discussion

Our study found demographic differences between those who proceeded with surgery and those who did not among more than 650 patients who sought surgery at 2 bariatric surgery centers 1 year after study enrollment. Before adjustment, African-American and Hispanic patients were less likely to proceed with surgery. However, these racial

Table 1 Baseline characteristics of patients seeking bariatric surgery by race and ethnicity

	Caucasian (<i>n</i> = 432)	African-American (<i>n</i> = 114)	Hispanic (<i>n</i> = 76)
Mean age	45.6	42.4	37.2
Mean BMI (kg/m ²)	46.5	49.3	47.2
Sex			
Male (%)	27	13	25
Female (%)	73	87	75
Education			
High school or less (%)	23	29	46
Some college or 2-year degree (%)	35	50	32
4-year college diploma or more (%)	43	21	22
Income ^a			
≤\$20,000 (%)	12	32	39
\$20,001–\$60,000 (%)	27	47	38
\$60,001–\$100,000 (%)	27	16	15
>\$100,000 (%)	34	6	8
Insurance			
Private (%)	79	49	50
Medicaid (%)	8	33	39
Medicare (%)	9	16	8
Other (%)	4	2	3
Co-morbidities			
Diabetes (%)	31	37	30
Hypertension (%)	55	60	45
CAD/heart disease/stroke/ PVD (%)	9	11	3
Asthma (%)	22	26	36
Obstructive sleep apnea (%)	50	39	42
GERD (%)	50	35	36
Depression (%)	55	41	62
Anxiety (%)	41	29	41
Arthritis (%)	30	27	22
Chronic back pain (%)	41	54	53
Anemia (%)	10	32	16

Results delineated in bold indicate statistically significant differences across the variable by specified race/ethnicity group compared to Caucasian at $p < 0.05$. We used *t* tests to compare differences in means for continuous variables and Wald χ^2 tests for differences in proportions between Caucasian and AA and between Caucasian and Hispanic patients

^a There were 22 patients who did not report an income on the survey, and were not included in the percentages for income

differences largely dissipated after adjusting for clinical and socioeconomic factors. Moreover, minorities who proceeded with surgery did not clearly have a higher illness burden than their Caucasian counterparts.

Table 2 Factors associated with the likelihood that patients did not undergo bariatric surgery at 1 year

	Proportion who did not undergo surgery ^a (<i>n</i> = 120)	Odds ratio (95 % CI) ^b
Age, each decade higher	–	1.2 (1.0, 1.5)
BMI, 5 points higher	–	1.1 (0.9, 1.2)
Sex		
Male (%)	22	1.4 (0.8, 2.3)
Female (%)	17 (Ref)	Ref
Race/Ethnicity		
Caucasian (%)	15 (Ref)	Ref
African-American (%)	24	1.3 (0.7, 2.3)
Hispanic (%)	24	1.2 (0.6, 2.4)
Other (%)	36	2.6 (1.1, 6.3)
Education		
High school or less (%)	23	–
Some college or 2-year degree (%)	21	–
4-year college diploma or more (%)	12 (Ref)	–
Income		
≤\$20,000 (%)	34	2.5 (1.1, 5.6)
\$20,001–\$60,000 (%)	18	1.4 (0.7, 2.7)
\$60,001–\$100,000 (%)	9	0.7 (0.4, 1.6)
>\$100,000 (%)	13 (Ref)	Ref
Insurance		
Private (%)	14 (Ref)	Ref
Medicaid (%)	32	1.7 (0.9, 3.2)
Medicare (%)	22	1.0 (0.5, 2.1)
Other (%)	36	3.2 (1.1, 9.0)
Co-morbidities		
Diabetes (%)	23	–
Hypertension (%)	21	–
CAD/heart disease/stroke/PVD (%)	33	–
Asthma (%)	22	–
Obstructive sleep apnea (%)	19	–
GERD (%)	17	–
Depression (%)	19	–
Anxiety (%)	17	–
Arthritis (%)	14	0.6 (0.3, 1.0)
Chronic back pain (%)	19	–
Anemia (%)	16	–

^a Refers to the percentage of patients who did not undergo surgery 1 year after referral

^b This model is adjusted for variables with estimates presented in the relevant columns and includes all significant co-morbidities using a stepwise selection process with a $p < 0.1$ for entry and a $p < 0.05$ for retention in the model. Results delineated in bold refer to statistically significant variables relative to the reference group (ref) at $p < 0.05$. When income was introduced in the model, education became non-significant and was dropped from the model

Bariatric surgery utilization has increased throughout the US, but rates are still lower in ethnic minority populations despite the relatively high prevalence of obesity in these groups [10, 11]. In general, our study supports the results of previous studies which suggest that lower utilization of bariatric surgery among persons who are socially disadvantaged [4]. In a recent survey of more than 330 primary care patients, Wee and colleagues found that physicians are less likely to recommend surgery to minority patients even though these patients are as likely as Caucasian patients to seriously consider undergoing bariatric surgery if recommended by their physician [9]. Our current work extends these findings by suggesting that minority patients who are being evaluated for bariatric surgery are as likely to proceed with surgery when economic factors are accounted for. In contrast to the primary care study by Wee and colleagues, this study confirms that socioeconomic factors play a major role in whether those seeking weight loss surgery eventually undergo it [6].

This study suggests that once socioeconomic factors are addressed, race does not play an independent role in who will proceed with bariatric surgery. Moreover, minority patients who proceed with surgery are not necessarily sicker. Nevertheless, there is still substantial variation with who is recommended and referred for surgery at the primary care level. Reasons for this variation may be more complicated than simple economic barriers. The study by Wee et al. suggest that high perceived risk was the most important deterrent to patients in considering surgery; socioeconomic or insurance coverage reasons were rarely cited [8]. Taken together, these findings suggest that greater efforts are needed not only to eliminate socioeconomic barriers, but also to reduce potential knowledge gaps on the risks and benefits of bariatric surgery. Since many patients who could benefit from weight loss surgery are not referred by their physicians, the latter barrier is best addressed at the primary care level.

One must interpret our study in the context of its limitations. While our study was conducted in two large academic centers in Boston, our findings may not generalize to centers in different geographic regions and to those in non-academic settings. Perhaps our greatest limitation was that our study was underpowered to detect small but potentially important differences among our different subgroups.

Conclusion

This study demonstrates that there are differences in patients who proceed with bariatric surgery, even among those who seek surgery. Income and insurance status were independent predictors of who proceeded with bariatric

Table 3 Characteristics of patients who underwent bariatric surgery by race and ethnicity

	Caucasian <i>n</i> = 367	African-American <i>n</i> = 87	Hispanic <i>n</i> = 58
Mean age	45.6	41.9	35.8
Mean BMI (kg/m ²)	46.2	48.7	47.6
Sex			
Male (%)	26	11	24
Female (%)	74	89	76
Education			
High school or less (%)	21	27	47
Some college or 2-year degree (%)	34	48	29
4-year college diploma or more (%)	44	26	24
Income			
≤\$20,000 (%)	10	23	33
\$20,001–\$60,000 (%)	26	51	42
\$60,001–\$100,000 (%)	29	20	19
>\$100,000 (%)	35	6	5
Insurance			
Private (%)	81	55	53
Medicaid (%)	7	28	36
Medicare (%)	9	15	9
Other (%)	3	2	2
Co-morbidities			
Diabetes (%)	29	37	29
Hypertension (%)	52	60	43
CAD/heart disease/stroke/PVD (%)	8	6	0
Asthma (%)	21	25	36
Obstructive sleep apnea (%)	49	37	41
GERD (%)	52	31	36
Depression (%)	55	38	66
Anxiety (%)	41	29	43
Arthritis (%)	32	26	22
Chronic back pain (%)	41	52	55
Anemia (%)	10	36	17

Results delineated in bold indicate statistically significant differences across the variable by specified race/ethnicity group compared to Caucasian at $p < 0.05$. We used t tests to compare differences in means for continuous variables and Wald χ^2 tests for differences in proportions between Caucasian and AA and between Caucasian and Hispanic patients

surgery, but race and ethnicity were not. These findings indicate that efforts to reduce racial variation in the use of weight loss surgery should focus on eliminating socio-economic barriers and educating patients before they are referred to surgery.

Table 4 Adjusted differences between African-American and Caucasian patients and between Hispanic and Caucasian patients who proceeded with surgery

	Odds ratios (95 % CI)	Odds ratios (95 % CI)
	African-Americans versus Caucasians	Hispanic versus Caucasians
Age, a decade higher	0.9 (0.7, 1.1)	0.5 (0.4, 0.7)
Sex		
Male	0.5 (0.2, 1.3)	1.8 (0.8, 3.8)
Female	Ref	Ref
BMI, 5 points higher	1.2 (1.0, 1.4)	0.9 (0.8, 1.2)
Income		
≤\$20,000	5.8 (1.8, 18.8)	16.0 (4.1, 62.4)
\$20,001–\$60,000	7.2 (2.6, 20.0)	7.9 (2.2, 28.3)
\$60,001–\$100,000	3.2 (1.1, 9.6)	4.3 (1.1, 16.3)
>\$100,000	Ref	Ref
GERD	0.4 (0.2, 0.7)	–
Depression	0.4 (0.2, 0.7)	–
Anemia	4.8 (2.4, 9.6)	–

Results delineated in bold refers to statistically significant variables in the model at $p < 0.05$. Odds ratio refers to whether patients with that characteristic are more likely to belong to the minority group compared to the Caucasian group. When the demographics and significant co-morbidities were entered into the models, insurance and education were no longer significant and were dropped from the models

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