



Role of Ethnicity on Weight Loss and Attrition After Bariatric Surgery

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Published online: 14 June 2019

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Abstract

Ethnicity has been shown to affect weight loss outcome and attrition after bariatric surgery. We analyze data from a multiethnic urban cohort of patients ($n = 570$) followed up to 12 months after either gastric bypass (RYGB) or gastric banding (AGB) surgery. Percent total weight loss was greater at 1 year after RYGB (35%) compared with that of AGB (13%), regardless of ethnicity. Hispanics were more likely to undergo RYGB (77.3% vs. 61.2% of African-Americans and 50.4% of Caucasians). Ethnicity had no effect on attrition after RYGB, but Hispanics had better follow-up rate after AGB. Our data do not support an effect of ethnicity on surgical weight loss at 1 year.

Keywords Gastric bypass · Gastric banding · African-American · Hispanic · Caucasian · Ethnicity · Weight loss · Attrition

Introduction

Although African-Americans and Hispanics are disproportionately affected by obesity [1], they are less likely than Caucasians to undergo bariatric surgery, the most effective treatment for severe obesity and associated comorbidities [2]. Weight loss outcomes vary by surgery, with greater weight loss after Roux-en-Y gastric bypass (RYGB) than after adjustable gastric banding (AGB) surgery [2]. Previous studies suggest less favorable weight loss outcomes for African-Americans compared with Caucasians and Hispanics after RYGB [3, 4], AGB [4, 5], or sleeve gastrectomy (SG) [4]. A recent study with the largest sample size to date ($> 14,000$) showed that African-American patients lost 3% less body weight at 1 year compared with Caucasians [4]. Another study however showed that weight loss after AGB and RYGB did not differ by ethnicity in adolescents, 32% of whom were non-Caucasians [6]. However, minority groups are often under-represented in

bariatric cohorts, with less than 30% African-American representation in studies included in a meta-analysis [3] and only 10.9% of non-Caucasians in the large multicentric bariatric study [7]. Choice of surgery type may also vary by ethnicity; however, to our knowledge, this has not been reported. Younger age [8] and surgery type [9] have been associated with greater attrition following bariatric surgery. Compared with Caucasians, African-Americans had a lower rate of follow-up at 1 year (41.6% vs. 58.4%) after RYGB, AGB, and SG [4]. Ethnicity, however, had no effect on attrition when analyzed by surgery type [8, 9]. High attrition rate, up to 50% at 2-year post-surgery [9, 10], coupled with low representation of minority groups [3], may result in reporting bias of ethnic differences in surgical outcomes [10]. We wish to assess the role of ethnicity on weight loss and attrition after either RYGB or AGB surgery, in an ethnically diverse urban cohort largely comprised of Medicaid-insured patients. We hypothesized that neither weight loss nor attrition vary by ethnicity.

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Methods

This is a retrospective observational longitudinal study of 570 individuals with severe obesity who underwent either laparoscopic RYGB or AGB at St. Luke's Roosevelt Hospital in New York, NY, between 2006 and 2009. After a waiver of consent was obtained from the institutional review board, weight data were obtained prior to surgery and at 1, 3, 6, and 12 months after surgery, at the time of regularly scheduled clinical visits with the bariatric team. Ethnicity was self-defined as either Hispanic (H), non-Hispanic African-American (AA), or non-Hispanic Caucasian (C). The primary outcomes were percent total weight loss (%TWL) and attrition, defined as no-show at scheduled post-surgery follow-up visits. ANOVA with post hoc analysis was used to compare means between the three ethnic groups. Chi-square analysis assessed differences in ethnic and gender distributions in the two surgery groups. Log-rank tests were used to assess curve difference between groups.

Results

Patients were predominantly Hispanic (45% H; 32% AA; 23% C; $p < 0.001$) and female (86.7%), had a mean pre-surgery BMI of 47.3 ± 7.9 kg/m², and mean age of 39.8 ± 11.6 years. Hispanics had the lowest pre-surgery BMI (H, 46.8 ± 8.0 kg/m²; AA, 48.4 ± 8.4 kg/m²; C, 46.7 ± 7.0 kg/m²; $p = 0.073$) (Table 1) and were younger (H, 38.1 ± 11.0 years; AA, 41.4 ± 11.1 years; C, 41.1 ± 12.8 years; $p = 0.004$). The majority of patients, regardless of ethnicity, underwent RYGB (66%). Hispanics were both more likely to undergo RYGB (77.3% vs. 61.2% of AA and 50.4% of C) and were the largest represented group in RYGB (H, 53%; AA, 30%; C, 17%; $p < 0.001$) (Table 1). The ethnic distribution was more evenly split for AGB (H, 30%; AA, 37%; C, 33%; $p = 0.520$). Hence, Hispanics had the greatest %TWL at 1 year (H, $29.1 \pm 12.0\%$; AA, $24.7 \pm 14.0\%$; C, $21.6 \pm 14.6\%$; $p < 0.001$). While ethnic distribution differed between surgery groups, age ($p = 0.171$) and gender distribution ($p = 0.540$) did not. Patients in the RYGB group had a greater pre-surgery BMI (48.3 ± 8.4 kg/m²; AGB 45.2 ± 6.6 ; $p < 0.001$). There was no effect of ethnicity on gender distribution in either surgery type ($p = 0.774$) (Table 1). As expected, RYGB resulted in greater 1 year %TWL than AGB ($34.5 \pm 8.9\%$ vs. $13.1 \pm 8.5\%$; $p < 0.001$) (Fig. 1). Therefore, the greater weight loss at 12 months for Hispanics (Fig. 1a) disappeared when the data were analyzed by surgery type: %TWL 1 year after RYGB (H, $35.4 \pm 6.9\%$; AA, $34.1 \pm 10.2\%$; C, $32.3 \pm 11.0\%$; $p = 0.263$) or AGB (H, $14.0 \pm 7.5\%$; AA, $12.5 \pm 7.2\%$; C, $12.9 \pm 10.8\%$; $p = 0.693$) (Fig. 1b). As expected, attrition at 12 months also differed by surgery type with

greater attrition after RYGB than AGB (48% vs. 32%; $p < 0.001$). Attrition also differed by age, with higher rates in younger patients ($51.2\% < 40$ years vs. $38.9\% > 40$ years; $p = 0.001$), which is consistent with analyses by others [9, 10]. Ethnicity did not affect attrition after RYGB (H, 50%; AA, 45%; C, 49%; $p = 0.599$), consistent with previous findings [8, 9]; however, Hispanics had lowest attrition than Caucasians and African-Americans after AGB (H, 29%; AA, 32%; C, 39%; $p = 0.0447$).

Conclusion

Our data show an absence of ethnic difference in weight loss outcome after either RYGB or AGB. This is contrary to previous reports [3–5], but in agreement with our hypothesis and with previous findings in adolescents [6]. Previous reports of greater weight loss in Caucasians after bariatric surgery may have been biased by the relatively low representation of African-Americans and/or Hispanics [3, 5]. Interestingly, ethnicity influenced the selection of surgery type; Hispanics were more likely to choose RYGB than AGB. Our data confirm that attrition was high and, as shown by others, affected by surgery type [9] and age [8]. Ethnicity affected attrition solely after AGB, but not after RYGB. Of note, the sample size of the AGB group was relatively small and repeat analysis with a larger sample size is warranted. Others showed no effect of ethnicity after RYGB, AGB, and SG, in a cohort similar to ours in size and ethnic mix (H, 318; AA, 199; C, 89) [9]. In a previous report of higher attrition for African-Americans compared with Caucasians [4], the data were not analyzed by surgery type which affects attrition rate [9].

The strengths of our study include a large cohort with high representation of two minority groups, longitudinal data up to 12 months, and after two types of surgeries. Limitations include high attrition rate, self-identification of ethnicity, and lack of data on factors that may have influenced outcomes including socioeconomic status, language, distance between home and bariatric center, and surgical complications. Although the sample size was sufficient, a type 2 error cannot be ruled out, as the number of patients was uneven amongst ethnic groups, and significantly lower for the African-American and Caucasian groups. Future large-scale studies should identify the determinants of surgery selection, compare RYGB with SG, a surgery that has largely replaced AGB, and differentiate between ethnicity and race through both self-identification and genetics/ancestor lineage. Understanding ethnic differences in access, selection of surgery, weight loss, and resolution of comorbidities after bariatric surgery is critical to develop interventions targeted to high-risk population and to ensure the absence of bias.

Table 1 Pre-surgery patient characteristics by ethnicity and surgery type

	All	Hispanic	African American	Caucasian	p
n	570	256 (45%)	183 (32%)	131 (23%)	<0.001
Age (yr)	39.8±11.6	38.1±11.0	41.4±11.1	41.1±12.8	0.006
Height (cm)	164.7±8.8	163.5±8.7	166.1±8.0	164.9±9.7	0.008
Weight (kg)	128.9±27.8	125.8±27.8	133.8±27.6	127.9±27.5	0.011
BMI (kg/m²)	47.3±7.9	46.8±8.0	48.4±8.4	46.7±7.0	0.073
Male:Female (%M)	76:494 (13%)	35:221 (14%)	22:161 (12%)	19:112 (14%)	0.797
RYGB (66%)					
n	376	198 (53%)	112 (30%)	66 (17%)	<0.001
Age (yr)	39.3±10.9	37.7±10.4	40.7±11.3	42.1±10.7	0.004
Height (cm)	165.2±8.8	163.6±8.4	167.2±8.2	166.7±10.1	0.001
Weight (kg)	132.6±29.5	128.3±28.5	138.0±29.8	136.1±30.3	0.011
BMI (kg/m²)	48.3±8.4	47.7±8.3	49.3±9.0	48.6±7.4	0.263
Male:Female (%M)	53:323 (14%)	27:171 (14%)	14:98 (13%)	12:54 (18%)	0.554
AGB (34%)					
n	194	58 (30%)	71 (37%)	65 (33%)	0.520
Age (yr)	40.8±12.8	39.6±13.1	42.5±10.8	40.1±14.6	0.389
Height (cm)	163.3±8.7	163.3±9.6	164.5±7.5	163.1±9.0	0.603
Weight (kg)	121.6±22.8	117.2±23.9	127.2±22.2	119.5±21.5	0.029
BMI (kg/m²)	45.2±6.6	43.7±6.0	47.0±7.2	44.8±6.0	0.014
Male:Female (%M)	23:171(12%)	8:50 (14%)	8:63 (11%)	7:58 (11%)	0.859

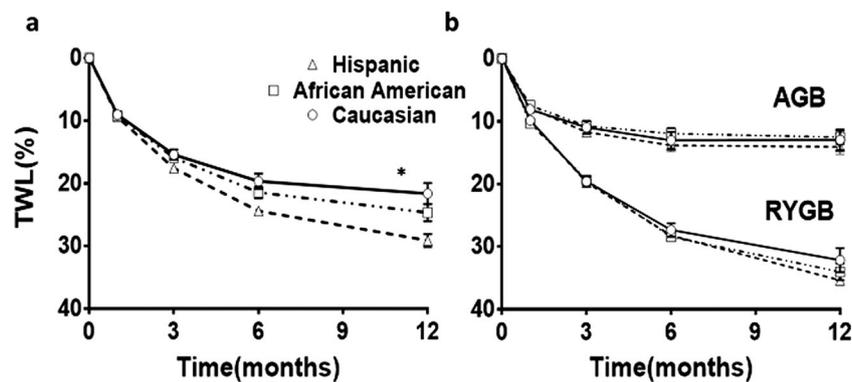


Fig. 1 Weight loss trajectories. Percent total weight loss (%TWL) in Hispanics (triangle), African-Americans (square), and Caucasians (circle) for the entire cohort ($n = 570$) (a) and by surgery type, AGB (top, $n = 194$), and RYGB (bottom, $n = 376$) (b). Mean \pm SEM. * $p < 0.05$

Funding Information No commercial support was received for this work. Authors 2, 3, and 5 were in part supported by R01DK098056; author 4 was supported by F32DK113747.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflicts of interest.

Informed Consent A waiver of consent was obtained by our Institution Review Board.

Ethical Approval A waiver of consent was obtained by our Institution Review Board.

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