Letters

RESEARCH LETTER

Validity of Self-reported Weights Following Bariatric Surgery

Obtaining standardized weights in long-term studies can be difficult. Self-reported weights are more easily obtained but are less accurate than those from a calibrated scale and may be inaccurately reported. Previous studies have reported that women tend to underreport their weight more than men with the degree of misreporting related to body mass index (BMI), whereby overweight individuals tend to underreport and underweight individuals tend to overreport.[1-4] However, in a study of female gastric bypass candidates, self-reported presurgical weights averaged 0.3 kg more than measured weights and misreporting was not significantly related to BMI.[5]

This study investigated whether self-reported weights following bariatric surgery differed from weights obtained by study personnel using a standard scale.

Methods | The Longitudinal Assessment of Bariatric Surgery-2 is an observational cohort study of 2458 adults undergoing an initial Roux-en-Y gastric bypass (RYGB), laparoscopic adjustable gastric band (LAGB), or other bariatric procedure at 10 centers.[6] This report uses data collected between April 2010 and November 2012 at annual assessments conducted 1 to 5 years after RYGB or LAGB. Each center had institutional review board approval and all participants provided written informed consent.

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Annually, participants were asked to report on mailed questionnaires 2 postoperative weights and the dates that those weights were measured: (1) weight from last medical office or weight loss program visit (self-reported medical weight) and (2) last self-weight (self-reported personal weight). Self-reported weights could be from any scale with or without shoes or bulky clothing.

Using standardized data collection protocols, study personnel measured height before surgery using a stadiometer and measured weights before surgery and annually afterward on a standard scale (Tanita Body Composition Analyzer model TBF-310, Tanita Corporation of America Inc) without shoes and bulky clothing (measured weight).

Participants with postoperative measured weights and self-reported weights from no more than 30 days before the measured weight were included. If both self-reported weights met this criterion then both were included. If participants had self-reported and measured weights meeting this criterion at multiple time points, weights from 1 randomly selected time point were used. Selected participants are a convenience sample of the total cohort who met the inclusion criterion.

Statistical significance of weight differences was assessed using *t* tests for each type of self-reported weight and normal mixed models for all self-reported weights combined. Analyses were conducted using SAS statistical software version 9.2 (SAS Institute Inc). Two-sided *P* values of less than .05 were considered statistically significant.

Results | Of the 992 participants with weights meeting the inclusion criteria, 4 were excluded because of suspected recording error. The 988 participants included 164 with a self-reported medical weight, 580 with a self-reported personal weight, and 244 with both self-reported weights. The characteristics of the included participants appear in the **Table**.

Across the 2 types of self-reported weight, women and men underreported their weight by an average of 1 kg or less (range, underreported by 10.9 kg to overreported by 11.8 kg) and the degree of underreporting was not significantly different between women and men (Table). Self-reported medical weights were significantly closer to measured weights than were self-reported personal weights for both women and men. Weight differences did not vary systematically by measured BMI or percentage of weight change from baseline (**Figure**).

Discussion | Small differences between self-reported and measured weights were found and may be due to differences in clothing, inaccurate personal scales, time between measurements, or intentional misrepresentation. In a general population survey, obese men and women underreported their weight, on average, by 1.32 kg and 2.99 kg, respectively.[3] We found smaller differences. Self-reported weights after bariatric surgery may be more accurate because participants who undergo surgery to lose weight may be especially attentive to their weight.

A limitation of this study is that it used a convenience sample of participants whose self-reported weights were no more than 30 days before a measured weight. Those participants who anticipated being weighed by study personnel may have been more likely to report accurately.

In conclusion, self-reported weights following bariatric surgery were close to measured weights. This suggests that self-reported weights may not unduly affect study results of surgically induced weight change and can be used when measured weights are not available.

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Table. Participant Characteristics at Time of Measured Weight and Validity of Self-reported Weights Following Bariatric Surgery

	Women (n = 808)	Men (n = 180)	*P* Value
Age, mean (range) [SD], y	49 (21 to 79) [11]	55 (28 to 80) [11]	<.001
Body mass index, mean (range) [SD][a]	33.0 (19.0 to 63.2) [7.0]	34.6 (23.2 to 52.6) [5.8]	.002
Weight change, mean (range) [SD], %	−28.3 (−58.3 to 13.0) [12.3]	−24.3 (−49.5 to 11.3) [11.2]	<.001
Bariatric procedure, No. (%)			
Roux-en-Y gastric bypass	603 (74.6)	131 (72.8)	.61
Laparoscopic adjustable gastric band	205 (25.4)	49 (27.2)	
Validity of all self-reported weights			
Measured, mean (range) [SD], kg	89.6 (45.0 to 194.1) [20.2]	111.6 (74.1 to 180.0) [20.7]	<.001
Self-reported, mean (range) [SD], kg	88.9 (44.5 to 195.9) [20.3]	110.6 (72.7 to 184.1) [21.0]	<.001
Difference, mean (95% CI) [SD] {range}, kg[b]	−0.69 (−0.81 to −0.56) [1.9] {−10.9 to 6.8}	−0.96 (−1.34 to −0.59) [2.7] {−10.9 to 11.8}	.09
P value[c]	<.001	<.001	
Relative difference, mean (95% CI) [SD] {range}, %[d]	−0.79 (−0.93 to −0.65) [2.1] {−11.8 to 10.4}	−0.92 (−1.24 to −0.59) [2.3] {−8.9 to 8.7}	.46
P value[c]	<.001	<.001	
Validity of self-reported medical weights	**(n = 329)**	**(n = 79)**	
Measured, mean (range) [SD], kg[e]	90.1 (45.0 to 194.1) [21.9]	115.1 (77.3 to 180.0) [22.6]	<.001
Self-reported, mean (range) [SD], kg	90.0 (44.5 to 195.9) [22.0]	115.1 (76.4 to 184.1) [23.1]	<.001
Difference, mean (95% CI) [SD] {range}, kg[b]	−0.06 (−0.26 to 0.13) [1.8] {−6.8 to 6.8}	0.08 (−0.56 to 0.72) [2.8] {−10.5 to 11.8}	.67
P value[c]	.53	.80	
Relative difference, mean (95% CI) [SD] {range}, %[d]	−0.09 (−0.31 to 0.13) [2.0] {−6.4 to 10.4}	0.02 (−0.49 to 0.52) [2.2] {−6.6 to 8.7}	.70
P value[c]	.42	.95	
Validity of self-reported personal weights	**(n = 673)**	**(n = 151)**	
Measured, mean (range) [SD], kg[e]	89.3 (49.1 to 182.7) [19.5]	110.6 (74.1 to 170.0) [19.7]	<.001
Self-reported, mean (range) [SD], kg	88.4 (48.2 to 181.8) [19.5]	109.1 (72.7 to 172.7) [19.8]	<.001
Difference, mean (95% CI) [SD] {range}, kg[b]	−0.93 (−1.07 to −0.79) [1.8] {−10.9 to 6.8}	−1.48 (−1.87 to −1.08) [2.4] {−10.9 to 3.6}	.01
P value[c]	<.001	<.001	
Relative difference, mean (95% CI) [SD] {range}, %[d]	−1.06 (−1.22 to −0.90) [2.1] {−11.8 to 7.3}	−1.37 (−1.72 to −1.03) [2.2] {−8.9 to 3.3}	.11
P value[c]	<.001	<.001	

[a] Calculated as weight in kilograms divided by height in meters squared.

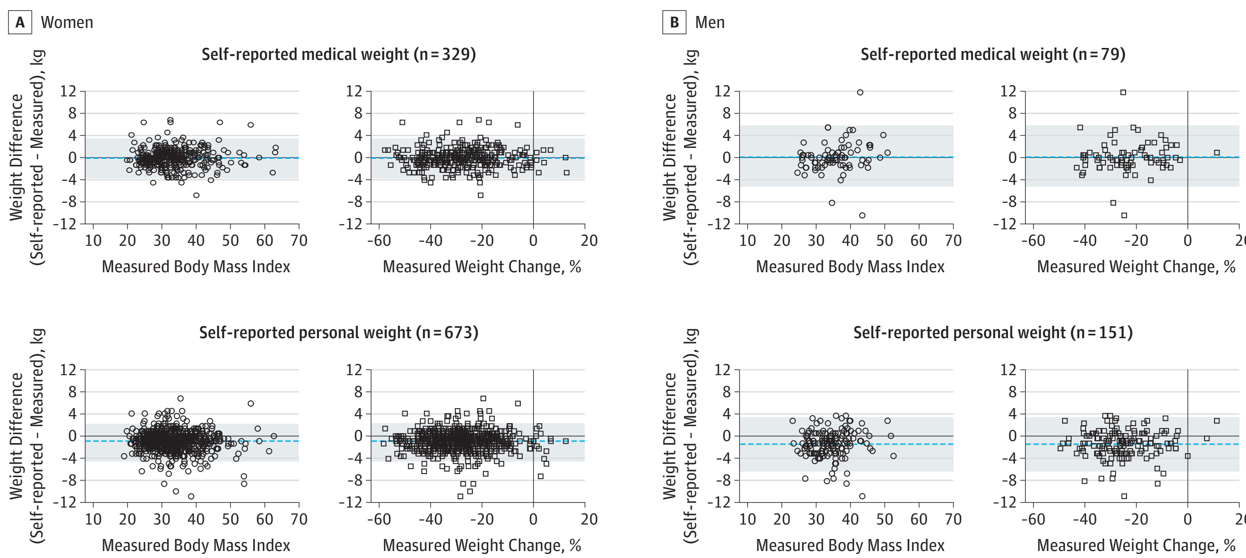
[b] Calculated as self-reported weight − measured weight.

[c] Comparison of the mean difference or mean relative difference with 0.

[d] Calculated as [(self-reported weight − measured weight)/measured weight] × 100.

[e] Weights of those participants with the corresponding self-reported weight.

Figure. Difference Between Self-reported and Measured Weights vs Measured Body Mass Index and Percentage Weight Change by Sex



Body mass index was calculated as weight in kilograms divided by height in meters squared. The dashed blue line indicates the mean weight difference. About 95% of the points are expected to fall within 2 SDs of the mean, indicated by the blue shaded areas. For women, self-reported medical weight, the mean ± 2 SD is −3.7 to 3.5 and is −4.6 to 2.8 for self-reported personal weight. For men, self-reported medical weight, the mean ± 2 SD is −5.6 to 5.8 and is −6.4 to 3.4 for self-reported personal weight.

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Acquisition of data: Courcoulas.
Analysis and interpretation of data: Christian, King, Yanovski, Courcoulas, Belle.
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COMMENT & RESPONSE

Differences in Breast Cancer Survival by Race

To the Editor Dr Silber and colleagues[1] reported survival differences among black and white women with breast cancer. However, screening overdiagnosis may weaken the results of this and prior studies on the topic.

For example, cases detected through screening mammography are sometimes diagnosed as breast cancer even though they would never be noticed otherwise. These overdiagnoses can lead to unnecessary treatments.[2] Recent studies have prompted disagreement about the extent of overdiagnosis.[3] Despite this attention, the effect of overdiagnosis on survival disparities is unclear.

Here is a simplified example to explain how overdiagnosis could alter survival. Silber and colleagues[1] reported 5-year survival of 55.9% for black patients and 59.5% for treatment-matched white patients, a 3.6% difference (Table 2 in article). For illustrative purposes, suppose 7.5% of black patients and 15% of matched white patients were overdiagnosed with harmless tumors and did not die over the next 5 years. Survival for true breast cancer is estimated by subtracting the percentage of overdiagnosis from survival numerators and denominators. Specifically, estimates would be (55.9−7.5)/(100−7.5) = 52.3% and (59.5−15)/(100−15) = 52.3% for black and matched white patients respectively, a 0% disparity. Conversely, supposing 15% of black patients and 7.5% of matched white patients were overdiagnosed, the corrected survival difference would be 8.1%, which is more than twice the estimate by Silber and colleagues.

For clarity, we made several simplifications in this example. It ignores lead-time bias and assumes that overdiagnosed patients have little risk of death. Yet with Bleyer and Welch[4] reporting that 31% of breast cancers were overdiagnosed as of 2008, we believe our example illustrates how estimates of survival disparities are sensitive to the precise extent of overdiagnosis. In the study by Silber and colleagues,[1] it appears that unrecognized overdiagnosis could significantly alter the results.

Overdiagnosis bias is equally relevant to past studies of breast cancer survival disparities, including those based on randomized controlled trials. Indeed, the meticulous approach used by the authors appears more robust than previous studies because matching tumor characteristics lessens differences in screening, which could reduce bias from overdiagnosis. Perhaps the authors could recreate Table 2 including only patients known not to have been screened recently before their diagnoses.

For 25 years, it has been reported that much of the difference in breast cancer survival between black and white women is unexplained, but a variety of studies have concluded that the disparity is largely unrelated to differences in treatments.[1,5] Yet overdiagnosis may have obscured the real burden of inequalities in care.

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