


What's Age Got to Do With It? A Comparison of Bariatric Surgical Outcomes Among Young, Midlife, Older and Oldest Adults

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Abstract

Bariatric surgery has become an accepted method to treat obesity and its related diseases in adults; nevertheless, few bariatric surgery follow-up studies compare changes in body mass index (BMI), disease outcomes, and side effects among age groups. This study compares bariatric surgery outcomes across four adult age groups by comparing changes in milestone BMIs such as highest and lowest BMI, perceived existing disease outcomes, and symptoms related to those diseases. Data were obtained using a 40-item questionnaire that was mailed to 2,520 patients of a Midwestern weight management center who were at least 18 months post-bariatric surgical procedure. The 534 respondents were divided into four age groups in years: 18 to 49 ($n = 171$), 50-59 ($n = 148$), 60-69 ($n = 138$), and ≥ 70 ($n = 77$). There were no differences among the age groups for lowest ($p = .93$) and current BMI ($p = .51$). Significant improvement in eight chronic diseases occurred across all age groups. There were no differences between age groups in reported occurrence of incontinence ($p = .65$), diarrhea ($p = .22$), flatulence ($p = .46$), heartburn ($p = .73$), and indigestion ($p = .22$). Constipation rarely occurred among the oldest adults ($p < .001$). Bariatric surgery should be considered an option for weight loss and disease management for older adults as much as it is for younger adults.

Keywords

older adults, bariatric surgery, age groups, disease outcomes, BMI

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Introduction

The prevalence of obesity in the older adult population (age 60 and older) is one of the greatest public health concerns (Salihu, Bonnema, & Alio, 2009). Obesity in older Americans was estimated to increase from 24% in 1990 to 37% in 2010 (Hardy & Kuh, 2006; Salihu et al., 2009). The baby boomer generation, those born between 1946 and 1964, weighed more and became obese at younger ages than any previous generation (Leveille, Wee, & Iezzoni, 2005). As a result, chronic diseases associated with obesity are on the rise. The chronic diseases that are most commonly associated with obesity include asthma or respiratory disease, hypertension, type 2 diabetes, renal failure, heart disease, fatty liver disease, arthritis, gall bladder disease, and depression (Mathus-Vliegen, 2012; Zamosky, 2013). As individuals live longer, chronic health concerns greatly affect their quality of life. So, instead of enjoying greater longevity, obese older adults may be struggling with years of pain, discomfort, and poorer quality of life due to chronic diseases (Han, Tajar, & Lean, 2011). However,

unintended surgical side effects such as vomiting and diarrhea can also have an effect on a person's life satisfaction.

Bariatric surgery has become an accepted method to treat obesity and its related diseases (Puzziferri et al., 2014). In fact, bariatric surgery is now the leading form of treatment for overall long-term weight loss for the morbidly obese (Grimaldi & Van Etten, 2010). Historically, the older adult population has few reports of bariatric surgery outcomes, as the National Institute of Health's previous recommendation was to exclude bariatric surgery for patients 60 years of age and older (Marihart, Brunt, & Geraci, 2014). In 2006, the National Institute of Health removed age restrictions from their

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recommendations for bariatric surgery. Medicare also opted to include bariatric surgery as a covered procedure for Medicare participants (Henrickson, Ashton, Windover, & Heinberg, 2009; Yuan et al., 2009). Age restrictions were initially in place because it was believed that the health risks associated with bariatric surgery exceeded beneficial outcomes for aging patients (Pratt, McLees, & Pories, 2006; Quebbemann, Engstrom, Siegfried, Garner, & Dallal, 2005). A number of studies have demonstrated that bariatric surgery is safe for older adults (Ewing, Thompson, Wachtel, & Frezza, 2011; Mathus-Vliegen et al., 2012). Bariatric surgery can offer patients of all ages an effective and long-lasting treatment for obesity and its related diseases (Adams et al., 2006; Neff, Olbers, & Le Roux, 2013).

There are gaps in the literature; there is limited published research that examines the outcomes of bariatric patients who are past the first-year post-surgery. Much of the research on bariatric surgery focuses on immediate health-related outcomes. For example, bariatric patients can frequently stop taking diabetes medications before leaving the hospital (Dunkle-Blatter et al., 2007; Saeidi et al., 2013). There is very limited research that investigates the health impacts of bariatric surgery with older adults compared with younger age groups (Algul et al., 2009; Huberman, 2008).

The purpose of this research was to compare body mass indexes (BMIs; highest, lowest, current, and day of surgery) of bariatric patients at least 18 months post-surgery among four age groups: young adult—ages 18 to 49, midlife adult—ages 50 to 59, older adult—ages 60 to 69, and oldest adult ages 70 and greater. A comparison of perceived improvement of existing chronic diseases and health symptoms (side effects) post-surgery was also completed.

Method

The study design was a survey method, using a cross-sectional, self-reported questionnaire. Institutional review board (IRB) approval was given by North Dakota State University for this research.

After an exhaustive search, the researchers found no existing bariatric questionnaire that met their needs. Therefore, they developed a bariatric questionnaire addressing the surgical outcomes of patients who were at least 18 month post-bariatric surgery. The questionnaire included demographic information such as age, height, 4 milestone weights, and type of surgery. The 4 milestone weights were the highest weight before surgery, weight on surgery day, lowest weight after surgery, and current weight. Likert-type questions were designed which focused on disease and side effect outcomes. The questionnaire was reviewed by education and health professionals for content and readability. The instrument was revised and pilot tested with a sample of 12 bariatric patients to test clarity. No further revisions were made.

Bariatric patients who were at least 18 months post-surgery were recruited from a Midwestern weight management center in the United States which specializes in bariatric surgery. Additional criteria included being above the age of 18 years. To ensure privacy, hospital personnel mailed paper questionnaires with the option to complete the questionnaire online. The questionnaires were returned with no identifying information to researchers. The questionnaires were then coded and entered into Qualtrics (Survey Software, Provo, UT, version 60,114). Approximately 12 weeks after the questionnaires were mailed, the data collection was stopped.

The data were analyzed using Statistical Analysis Software (SAS, Cary, NC, Version 10.3) Analyses included frequency and ANOVA. BMI was calculated using the four milestone weights and height. Weight lost was calculated using the difference between surgery weight and current weight. The diseases and symptoms were collapsed from a 5 point comparison scale to 3 points.

Results

Of the 2,520 mailed questionnaires, 534 were completed and 178 returned as undeliverable. This was a 22.8% response rate. The mean age was 55.2 ± 12.4 ranging from 24 to 81 years. As seen in Table 1, the 534 respondents were divided into four age groups: 24 to 49 years ($n = 171$), 50 to 59 years ($n = 148$), 60 to 69 years ($n = 138$), and ≥ 70 years ($n = 77$). The majority were female ($n = 442$; 82.8%) and married ($n = 350$; 65.7%). Employment status varied with part-time work ($n = 254$; 47.7%), and full-time work ($n = 66$; 12.4%), and a large number of retired participants ($n = 160$; 30.1%). The majority had some college ($n = 252$; 47.3%) or a college degree ($n = 142$; 26.4%), and the majority of all participants underwent gastric bypass surgery ($n = 511$; 96.2%) rather than the gastric sleeve ($n = 4$; 0.8%), gastric band ($n = 15$; 2.8%) or another alternative ($n = 1$; 0.1%).

As seen in Table 2, participants lost weight as expected, and most experienced some weight regain regardless of age. The young adults had a larger mean highest BMI of $>50 \text{ kg/m}^2$ compared with a mean BMI of 46.3 kg/m^2 for the oldest group ($p = .03$). Although not significant, overall each mean milestone BMI was larger for the young group and progressed in chronological order with the oldest age group having the lowest milestone BMIs in all four areas.

Nevertheless, there were differences between some of the milestone BMIs and various age groups. There were significant differences for the highest BMI between the oldest and midlife groups ($p = .05$) as well as the oldest and young ($p = .005$). Moreover, there were differences between the older and young group for highest BMI ($p = .015$). For surgery day BMI, there were significant differences between the oldest and midlife ($p = .046$) and oldest and youngest ($p = .006$). There were

Table 1. Demographic Characteristics Overall and by Age Group.

Characteristic	Overall N = 534	Young (24-49) n = 171	Midlife (50-59) n = 148	Older (60-69) n = 138	Oldest (≥70) n = 77
Gender					
Woman	442 (82.8)	153 (89.4)	123 (83.1)	103 (74.6)	63 (81.8)
Man	92 (17.2)	18 (10.5)	25 (16.9)	35 (25.4)	14 (18.2)
Education					
< high school	8 ^a (1.5)	0	2 (1.4)	3 (2.2)	3 (3.9)
High school/GED	131 (24.6)	30 (17.5)	32 (21.8)	38 (27.5)	31 (40.3)
Some college	252 (47.3)	91 (53.2)	64 (43.5)	63 (45.7)	34 (44.2)
College degree	142 (26.4)	50 (29.2)	49 (33.3)	34 (24.6)	9 (11.7)
Marital status					
Single/never married	48 (9.0)	30 (17.5)	13 (8.8)	4 (2.9)	1 (1.3)
Married	350 (65.7)	100 (58.5)	105 (71.0)	92 (67.2)	53 (68.8)
Domestic partnership	5 (0.9)	2 (1.2)	1 (0.7)	1 (0.7)	1 (1.3)
Separated	6 (1.1)	5 (2.9)	0	0	1 (1.3)
Divorced	86 (16.1)	32 (18.7)	27 (18.2)	24 (17.5)	3 (3.9)
Widowed	38 (7.1)	2 (1.2)	2 (1.4)	16 (11.7)	18 (23.4)
Employment status					
Caregiver at home	22 (4.1)	13 (7.7)	7 (4.8)	1 (0.7)	1 (1.3)
Work part-time	254 (47.7)	119 (70.0)	94 (63.5)	40 (29.0)	1 (1.3)
Work full-time	66 (12.4)	22 (12.9)	17 (11.5)	22 (15.9)	5 (6.6)
Retired	160 (30.1)	1 (0.6)	19 (12.8)	72 (52.2)	68 (89.5)
Other	30 (5.6)	15 (8.8)	11 (7.4)	3 (2.2)	1 (1.3)
Surgery type					
Gastric bypass	511 (96.2)	162 (94.7)	143 (98.0)	132 (96.4)	74 (96.1)
Gastric sleeve	4 (0.8)	3 (1.8)	0	1 (0.7)	0
Gastric band	15 (2.8)	6 (3.5)	2 (1.4)	4 (2.92)	3 (3.9)
Biliopancreatic diversion	1 (<0.01)	0	1 (0.7)	0	0

Note. GED = General Educational Development.

^aSome characteristics may not add to total sample size due to non-response by some participants.

Table 2. Mean BMI Milestones and Percent Weight Change Overall and by Age.

BMI milestone	Overall N = 534 M ± SD	Young (24-49) n = 171 M ± SD	Midlife (50-59) n = 148 M ± SD	Older (60-69) n = 138 M ± SD	Oldest (≥70) n = 77 M ± SD	p-value difference between groups
Highest	48.4 ± 8.2	50.5 ± 8.7	49.1 ± 8.5	47.8 ± 7.5	46.3 ± 8.0	.03
Surgery day	46.9 ± 7.7	48.7 ± 7.4	47.5 ± 8.3	46.3 ± 7.0	44.9 ± 8.0	.28
Lowest	26.5 ± 5.1	26.9 ± 5.4	26.8 ± 5.5	26.6 ± 5.1	25.8 ± 4.2	.93
Current	30.2 ± 6.1	31.2 ± 6.2	30.7 ± 6.1	30.2 ± 6.1	28.8 ± 5.8	.51
% weight loss	35.0 ± 0.11	35.1% ± 0.11	34.5% ± 0.10	35.1% ± 0.11	34.8% ± 0.12	.91

Note. BMI = body mass index.

also differences between the older (60-69 years) and youngest groups ($p = .026$). There were no significant differences between the age groups at lowest BMI; however, at current BMI, there are significant differences between young and oldest ($p = .026$). The percentage of weight loss ($[(\text{surgery day} - \text{current weight}) / \text{surgery day} \times 100]$) was almost the same for all age groups.

Participant perceptions regarding their current control of chronic diseases compared with pre-procedure status are found on Table 3. There were significant improvements in self-reported diagnosed diseases across all age groups. The older and oldest age groups reported

similar outcomes as did the young and midlife age groups for most conditions. Arthritis, depression, type 2 diabetes, hypertension, and sleep apnea were reported by more than 40% of the participants; whereas, fewer than 40% reported fatty liver disease, asthma/respiratory disease, and heart disease.

Approximately 88% reported arthritis as a health concern. Almost two thirds of these participants (64.5%) reported reductions in joint pain and arthritis; however, as age increased, the percentage of those who reported improvement in their conditions steadily declined ($p = .01$).

Table 3. Number and Percentage of Participants Reporting Changes in Existing Chronic Diseases Overall and by Age Group.

	Overall	Young (24-49)	Midlife (59-59)	Older (60-69)	Oldest (≥ 70)	<i>p</i> value ^a
	%	%	%	%	%	
Arthritis/joint pain	<i>n</i> = 468 ^b	<i>n</i> = 98 ^b	<i>n</i> = 120	<i>n</i> = 104	<i>n</i> = 52	.01
Worse/much worse	12.4	19.4	11.7	19.2	9.6	
About the same	23.1	18.4	28.3	29.8	48.1	
Better/much better	64.5	62.2	60	51	42.3	
Depression	<i>n</i> = 321	<i>n</i> = 117	<i>n</i> = 96	<i>n</i> = 68	<i>n</i> = 40	.52
Worse/much worse	15	18.8	14.6	14.7	5	
About the same	30.2	28.2	28.1	33.8	35	
Better/much better	54.8	53	57.3	51.5	60	
Type 2 diabetes	<i>n</i> = 321	<i>n</i> = 117	<i>n</i> = 96	<i>n</i> = 60	<i>n</i> = 34	.10
Worse/much worse	2.7	2.9	1.9	0	8.8	
About the same	9.8	8.6	16.7	6.7	5.8	
Better/much better	87.4	88.6	81.5	93.3	85.3	
Hypertension	<i>n</i> = 347	<i>n</i> = 80	<i>n</i> = 103	<i>n</i> = 99	<i>n</i> = 65	.02
Worse/much worse	3.8	10	1.9	2	1.5	
About the same	14.4	11.3	15.5	19.2	9.2	
Better/much better	81.4	78.8	82.5	78.8	89.3	
Sleep apnea	<i>n</i> = 224	<i>n</i> = 55	<i>n</i> = 69	<i>n</i> = 69	<i>n</i> = 31	.05
Worse/much worse	6.2	9.1	1.5	10.1	3.2	
About the same	21	12.7	31.9	18.9	16.1	
Better/much better	72.8	78.2	66.7	71	80.7	
Asthma/respiratory disease	<i>n</i> = 140	<i>n</i> = 36	<i>n</i> = 51	<i>n</i> = 32	<i>n</i> = 21	.88
Worse/much worse	5.7	8.3	3.9	6.3	4.8	
About the same	35	36.1	29.4	40.6	38.1	
Better/much better	59.3	55.6	66.7	53.1	57.1	
Fatty liver disease	<i>n</i> = 99	<i>n</i> = 29	<i>n</i> = 43	<i>n</i> = 18	<i>n</i> = 9	.02
Worse/much worse	8	24.1	0	5.6	0	
About the same	30.3	20.7	37.2	27.8	33.3	
Better/much better	61.6	55.2	62.7	66.7	66.7	
Heart disease	<i>n</i> = 97	<i>n</i> = 13	<i>n</i> = 29	<i>n</i> = 35	<i>n</i> = 22	.42
Worse/much worse	8.3	15.4	3.5	8.6	9.1	
About the same	37.1	46.2	51.7	22.6	31.8	
Better/much better	54.6	58.5	44.8	62.9	59.1	

^aThe *p* values are chi-square values and are comparisons of age groups for all three responses.

^bNumber who responded to the questions.

Approximately 60% of all participants reported depression as a health problem. Depression was improved in more than half of these participants (54.8%), whereas only 15.0% perceived that depression was worse than before surgery; Although there were no significant differences between age groups for changes in depression ($p = .52$), the most improved age group was the oldest group at 60% who reported experiencing less depression.

Overall, 321 of the respondents (60.1%) reported type 2 diabetes. Compared with the chronic conditions that were assessed, type 2 diabetes showed the largest improvement for all ages at 87.4% with the older group at the high rate of 93.3% compared with the midlife group at 81.5%; however, these levels were not significant ($p = .10$).

Overall, hypertension was reported to be better or much better by 81.1% of those who reported hypertension (65%). Hypertension was most improved in the

oldest group at 89.3% compared with the young group at 78.8% ($p = .02$).

Overall, sleep apnea was reported to have improved in 72.8% of those who reported sleep apnea (41.9%). Sleep apnea was most improved in the oldest group showing an 80.7% improvement compared with the least improved which was the midlife group showing a 66.7% improvement ($p = .05$).

Although fewer individuals reported the remaining chronic conditions, the perceived improvement was high among those who reported those conditions. The older and oldest age groups reported marked improvement with fatty liver disease, heart disease, compared with the young and midlife age groups. Although not significantly different among the age groups ($p = .88$), asthma was most improved by the midlife group at 66.7% with least improvement of 53.1% for the older group. In regard to fatty liver disease, the older and oldest groups improved by 66.7% as compared with the

Table 4. Number and Percentage of Participants Reporting Symptoms/Side Effects by Age Groups.

	Overall	Young (24-49)	Midlife (59-59)	Older (60-69)	Oldest (≥ 70)	<i>p</i> value ^a
	%	%	%	%	%	
Bladder problems/incontinence	<i>n</i> = 527 ^b	<i>n</i> = 171	<i>n</i> = 146	<i>n</i> = 134	<i>n</i> = 76	.65
Never/rarely	76.5	77.8	79.5	73.1	73.7	
Sometimes	16.7	14.0	14.4	20.9	19.7	
Most of the time/always	6.8	8.2	6.2	6.0	6.6	
Constipation	<i>n</i> = 532 ^b	<i>n</i> = 171	<i>n</i> = 147	<i>n</i> = 137	<i>n</i> = 77	.000
Never/rarely	60.2	45.6	62.6	65.0	79.2	
Sometimes	28.6	39.2	23.1	28.5	15.6	
Most of the time/always	11.3	15.2	14.3	6.6	5.2	
Diarrhea	<i>n</i> = 531 ^b	<i>n</i> = 171	<i>n</i> = 147	<i>n</i> = 136	<i>n</i> = 77	.22
Never/rarely	46.9	41.5	46.9	47.8	57.1	
Sometimes	37.9	38.6	37.4	39.7	33.8	
Most of the time/always	15.3	19.9	15.7	12.5	9.1	
Gallbladder Problems/gallstones	<i>n</i> = 531 ^b	<i>n</i> = 171	<i>n</i> = 148	<i>n</i> = 137	<i>n</i> = 75	.07
Never/rarely	91.9	87.1	92.6	94.9	96.0	
Sometimes	3.0	3.5	4.1	2.2	1.3	
Most of the time/always	5.1	9.4	3.4	2.9	2.7	
Gas/belching/flatulence	<i>n</i> = 530 ^b	<i>n</i> = 169	<i>n</i> = 148	<i>n</i> = 136	<i>n</i> = 77	.46
Never/rarely	21.3	17.8	22.3	22.8	24.7	
Sometimes	41.5	38.5	42.6	41.9	45.5	
Most of the time/always	37.2	43.8	35.1	35.3	29.9	
Hair loss	<i>n</i> = 529 ^b	<i>n</i> = 170	<i>n</i> = 147	<i>n</i> = 136	<i>n</i> = 76	.12
Never/rarely	54.1	47.7	58.5	61.0	47.4	
Sometimes	28.2	29.4	27.2	25.7	31.6	
Most of the time/always	17.8	22.9	14.3	13.2	21.1	
Heartburn	<i>n</i> = 532 ^b	<i>n</i> = 171	<i>n</i> = 148	<i>n</i> = 136	<i>n</i> = 77	.73
Never/rarely	81.4	79.5	82.4	82.4	81.8	
Sometimes	13.7	13.5	14.9	12.5	14.3	
Most of the time/always	4.9	7.0	2.7	5.2	3.9	
Indigestion	<i>n</i> = 530 ^b	<i>n</i> = 170	<i>n</i> = 147	<i>n</i> = 136	<i>n</i> = 77	.22
Never/rarely	67.4	67.7	64.6	69.9	67.5	
Sometimes	26.2	22.4	31.3	25.7	26.0	
Most of the time/always	6.4	10.0	4.1	4.4	6.5	
Nausea in the last year	<i>n</i> = 532 ^b	<i>n</i> = 171	<i>n</i> = 148	<i>n</i> = 136	<i>n</i> = 77	.02
Never/rarely	59.4	53.2	63.5	63.2	58.4	
Sometimes	33.8	34.5	31.1	33.8	37.7	
Most of the time/always	6.8	12.3	5.4	2.9	3.9	
Vomiting	<i>n</i> = 531	<i>n</i> = 170	<i>n</i> = 148	<i>n</i> = 136	<i>n</i> = 77	.84
Never/rarely	70.2	68.8	73.0	69.9	68.8	
Sometimes	24.5	24.7	23.7	23.5	27.3	
Most of the time/always	5.27	6.47	3.38	6.62	3.9	

^aThe *p* values are chi-square values and are comparisons of age groups for all three responses. Number who responded to the questions.

least improved which was the young group at 55.2% ($p = .02$). Although not significantly different among the age groups ($p = .42$), heart disease was most improved with the older group by 62.9%, and then the oldest group at 59.1% with the least improved being the midlife group at only 44.8%.

As seen in Table 4, the overall results reflected high percentages for limited frequency of negative symptoms and/or side effects after bariatric surgery for all age groups. Overall, a low percentage of the participants reported high level of frequency of bladder problems/

incontinence (6.8%), gallbladder/gallstones (5.1%), heartburn (4.9%), indigestion (6.4%), nausea over the past year (6.8%), and vomiting (5.2%). Gas belching/flatulence (37.2%) were the most commonly identified negative side effect. Although not reported by about half of the participants, hair loss and diarrhea were reported by 17.8% and 15.3%, respectively.

The older and oldest age groups seemed to have fewer symptoms and/or side effects after surgery than the young and midlife age groups. On reviewing Table 4, there is less occurrence of constipation, lower frequency of diarrhea,

gall bladder or gallstone problems, and gas, for older, and oldest age groups but is only significant for constipation ($p < .000$) and nausea within the past year ($p = .02$).

Discussion

All age groups lost weight after bariatric surgery. All groups experienced some weight regain as indicated by the current BMI being higher than the lowest BMI. This agrees with previous research (Clough, Layani, Shah, Wheatley, & Taylor, 2011) who found excess BMI loss was 44.1% after 5 years for patients age 60 and above with limited major complications in patients who had gastric banding. The older and oldest age groups were as successful at losing weight and keeping it off as the young and midlife age groups. Clough and colleagues (2011) further reported improvement in diabetes, hypertension, depression, and hyperlipidemia similar to those reported in the current study.

There were significant improvements in chronic diseases across all age groups. The older and oldest age groups had comparable or better outcomes as did the young and midlife age groups on most chronic diseases like arthritis, hypertension, sleep apnea, and fatty liver disease. This coincides with T. D. Adams et al. (2012) who found high rates of diabetes remission and lower risks of cardiovascular problems continued 6 years after gastric bypass in patients above age 60. Similarly, others have found that bariatric patients above 55 years of age had weight loss and health gains comparable with the general bariatric population (Fatima et al., 2006; Lynch & Belgaumkar, 2012).

The overall low frequency of side effects or symptomatology for all age groups after bariatric surgery is a positive finding in this quantitative study. For adults above 60 years to show that they had fewer overall side effects is encouraging to many who feared the possibilities of dealing with negative consequences of bariatric surgery procedures. O'Keefe, Kemmeter, and Kemmeter (2010) also found significant weight loss and low complication rates for patients 65 years old and older. Nevertheless, future research is warranted to determine whether age is a comprising factor for those whose BMI is ≥ 50 .

The researchers of this study strongly recommend that anyone considering bariatric surgery learn about the potential risks and side effects that can occur following the surgery. They should also consider the consequences if they choose to do nothing. That being said, as there are such great disease improvements with apparent limited long-term side effects, bariatric surgery should be considered when all other traditional methods have been exhausted.

Of significant concern is that at all four of the weight milestones, the young and midlife adults were more overweight than the older and oldest adults. This research is a compelling wake-up call that early intervention and ongoing remedies are necessary to avoid the onset of many chronic diseases. One limitation is the sample was

from only one Midwestern weight management center in the United States, so there is limited diversity within the population sample so generalizability could be affected. Another limitation is that the participant responses were self-reported and although the response rate was good, it is unclear whether their outcomes are accurately reported and may not represent the entire sample. Selection error could have taken place by less satisfied patients failing to return their surveys so thereby not being represented in the outcomes. Not everyone answered the disease questions which may limit the results, perhaps because the question was unclear or the participants did not have the condition before surgery, so no improvement was needed. It should be noted however that almost everyone answered the symptoms/side effects question. Another limitation is that we failed to collect objective data regarding current medication usage.

In conclusion, "What's Age Got to Do with It?" the answer seems to be that age does not negatively affect weight loss/BMI changes, weight regain, existing disease improvement, or symptomatology. These results indicate that age should not be a consideration when deciding to have bariatric surgery. Outcomes for weight loss, reduction of co-morbidities, and negative side effects for older and oldest adults compared with young or midlife adults are similar or better. There are many positive outcomes in this study which indicates adults of all ages benefit from the weight loss that accompanies bariatric surgery. Bariatric surgery should be considered for older adults for disease management as much as it is for younger adults, along with other health criteria. A patient must be healthy enough to sustain such a surgical procedure and have exhausted all other non-surgical measures such as diet modification and exercise programs first.

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Declaration of Conflicting Interests

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