The Effects of Pre-Operative Patient Education on Bariatric Outcomes

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BACKGROUND

Obesity is associated with many comorbidities, including, but not limited to, cardiovascular disease, pre-diabetes and type 2 diabetes, osteoarthritis, polycystic ovarian syndrome (PCOS), infertility, sleep apnea, and insomnia. Mental and social health are also negatively affected[1, 2]. As of 2023, The Centers for Disease Control and Prevention (CDC) reports obesity in 42.4% of all US adults[3]. Though bariatric surgery has proven itself to be safe and effective for sustained weight loss, complications still exist. Some of these complications include infection, stomach obstruction, anastomotic leak, chronic nausea and vomiting, and weight gain or inability to lose weight. Some institutions have created pre-operative educational programs in efforts to decrease post-operative complications and maximize post-operative outcomes. This study aims to identify the effects of pre-operative education on bariatric outcomes.

METHODS

- Retrospective review analyzing post-operative outcomes was performed on patients who received either a sleeve gastrectomy or Roux-en-Y between 2019 and 2022 at a single institution. Prior to operation, patients completed the “Pre-Op Pathway”, consisting of an initial appointment with the surgeon, visit at the two-month mark with the Advanced Practice Provider to assess progress and draw labs, and a Zoom class with a Registered Dietician (RD). All patients also had 3-6 months of individual visits with RDs based on insurance requirements and were required to be cleared by the RDs prior to the pre-op appointment. Additionally, patients were required to be cleared by a psychologist. Following completion of the Pre-Op Pathway, patients were given a 10-question quiz to assess their understanding of their surgery and post-operative restrictions and expectations. Quizzes were reviewed with patients in the office and were graded after the patient had left.
- Post-operative outcomes were examined by recording post-op HbA1c, BMI, total body weight, pre vs post op number of medications, pre vs post op presence of hypertension (HTN), and pre vs post op presence of DM with insulin requirement.
- To describe the data in the study, n, and percent (%) were reported for the discrete variables and means for continuous variables. We performed Paired T-tests to compare the means of two groups i.e., pretreatment variables and the post treatment variables to analyze the significance. We performed the contingency table analysis to calculate the proportion of patients with pre-op education under each of the BMI measurements taken at 3, 6 and 12 months. This method helps to find the difference between BMI categorical variables overtime in order to analyze the reclassification status. Linear regression was performed using PROC GLM as we have both continuous and categorical variables. All statistical analysis was performed using SAS version 9.4.

RESULTS

Characteristics	Unweighted n 177	Overall Mean or Proportion 100%
Gender		
Male	18	10.17
Female	159	89.83
Race		
White	82	46.33
Black	92	51.98
Unavailable/Unknown	3	1.69
DM/Insulin		
No	141	79.66
Yes	36	20.34
Post-Op DM/Insulin		
No	141	79.66
Yes	36	20.34
Hypertension		
No	72	40.68
Yes	105	59.32
Post-Op Hypertension		
No	93	52.54
Yes	84	47.46
Quiz Score (Pre-Op Education)		
30	2	1.13
40	2	1.13
50	7	3.95
60	13	7.34
70	30	16.95
80	49	27.68
90	52	29.38
100	22	12.43
Preoperative HbA1c	171	5.89
Postoperative HbA1c	177	5.45
HbA1c change	171	-0.43
BMI at 3 months	164	40.26
BMI at 6 months	158	38.67
BMI at 12 months	142	37.80
Preoperative use of meds	176	5.89
Post operative use of meds	177	4.72

Table 1. Demographic characteristics of Patients with Bariatric Surgery.

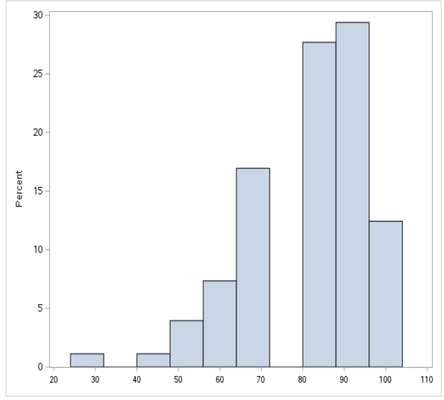


Figure 1. Proportion of patients under each score

	Estimate	95% Confidence Interval
Intercept	84.0	(74.6, 93.4)
Change in HbA1c	2.3	(-2.3, 6.8)
BMI at 3 months		
Overweight	-7.6	(-29.3, 14.1)
Obese – Class 1	4.8	(-8.5, 18.2)
Obese – Class 2	-.04	(-10.7, 10.6)
Obese – Class 3	Reference	-
BMI at 6 months		
Normal	28.2	(-11.5, 67.8)
Overweight	-8.4	(-30.6, 13.8)
Obese – Class 1	-0.3	(-17.2, 17.8)
Obese – Class 2	-6.7	(-19.2, 5.8)
Obese – Class 3	Reference	-
BMI at 12 months		
Normal	14.7	(-7.9, 37.3)
Overweight	0.1	(-16.8, 17.0)
Obese – Class 1	-.5	(-13.9, 12.8)
Obese – Class 2	-2.1	(-12.0, 7.7)
Obese – Class 3	Reference	-
Post-Op DM/Insulin		
[No]	-1.9	(-9.3, 5.4)
[Yes]	Reference	-
Post-Op HTN		
[No]	4.8	(-1.2, 10.8)
[Yes]	Reference	-
Post-Op Medication at 1 year	-0.4	(-1.1, .2)

Table 2. Effects of Changes in Quiz score on the following categories [BMI - Categorical]

The change in quiz scores is explained using the tables above (Table 2). The intercept (84.0) estimates the mean quiz score change in patients belonging to Class 3 obesity with diabetes and hypertension. The confidence interval (CI) of (74.6, 93.4) clearly denotes that the mean quiz score change is statistically significant and not equal to zero. Our results show that quiz score has no significant effect on any measured outcomes, including change in HbA1c, BMI at 3, 6, and 12 months, post-op DM/insulin requirement, post-op HTN, and post-op use of medications at 1 year. BMI was split into category of obesity[4] for clarity and ease of assessing better outcomes at intervals. Of note, even with a continuous BMI measurement, rather than categorical, we could not find any significance regarding quiz score.

In table 1, for every 10-point increase in quiz score, there is a 4.8 kg/m2 decrease in BMI with Class-1 obesity compared to the patients with class-3 obesity at 3 months that are diabetic and has hypertension. However, CI of (-8.5, 18.2) makes this result statistically insignificant. Similarly, for every 10-point increase in quiz score, there are nearly 2 patients that developed controlled diabetes compared to the patients with uncontrolled diabetes belonging to Class 3 obesity with hypertension. But based on the CI of (-9.3,5.4) this result is not significant.

DISCUSSION

Based on this study, there was not an association between quiz scores and bariatric outcomes, including changes in HbA1c, changes in BMI at 3 months, 6 months, and 12 months, post-op DM/insulin requirement, post-op presence of HTN, and post-op number of medications at 1 year. Based on these results, there is no need to establish any consequences for participants who do not meet a certain cutoff for quiz scores. For example, initiation of remediation courses for those who scored below 50 is not necessary because lower quiz scores were not found to have a significant effect on above listed variables. While patient education should be continued based on the principle of patient-centered care and to increase patient compliance, it cannot be said that there is a direct correlation to these studied bariatric outcomes.

CONCLUSION

While we saw no significant association between quiz score and bariatric outcomes, limitations of this study include sample size, missing data of various participants, and outliers that were found in the data.
Data can continue to be collected over the coming years to determine if greater sample size will yield a different result. Additionally, future studies can be done to determine if quiz score has any effect on complication rate or type.

Acknowledgements

Thank you to MCG, Dr. Lisa Hilton for her guidance, and Bhargav Doddala for running our statistics.

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