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Do insurance-mandated precertification criteria and insurance plan type determine the utilization of bariatric surgery among individuals with private insurance?

Hamlet Gasoyan, DMD, MPH¹, Rohit Soans, MD², Jennifer K. Ibrahim, PhD, MPH¹, William E. Aaronson, PhD¹, David B. Sarwer, PhD³

¹Department of Health Services Administration and Policy, College of Public Health, Temple University, Philadelphia, Pennsylvania

²Bariatric Surgery Program, Temple University Hospital, Philadelphia, Pennsylvania

³Center for Obesity Research and Education, College of Public Health, Temple University, Philadelphia, Pennsylvania

Abstract

Background: Access to bariatric surgery is restricted by insurers in numerous ways, including by precertification criteria such as 3-6 months preoperative supervised medical weight management and documented 2-year weight history.

Objectives: To investigate if there is an association between the aforementioned precertification criteria, insurance plan type, and the likelihood of undergoing bariatric surgery, after controlling for potential sociodemographic confounders.

Research Design—The study was conducted using the Pennsylvania Health Care Cost Containment Council's data in 5 counties of Pennsylvania in 2016 and records of preoperative insurance requirements maintained by the Temple University Bariatric Surgery Program.

Privately insured bariatric surgery patients and individuals who met the eligibility criteria but did not undergo surgery were identified and 1:1 matched by sex, race, age group, and zip code (n = 1,054). Univariate tests and logistic regression analysis were utilized for data analysis.

Results—The insurance requirement for 3-6 months preoperative supervised medical weight management was associated with smaller odds of undergoing surgery (odds ratio [OR] = 0.459, 95% confidence interval [CI] 0.253-0.832, P = 0.010), after controlling for insurance plan type and the requirement for documented weight history.

Preferred provider organization (OR = 1.422, 95% CI 1.063-1.902, P = 0.018) and fee-for-service (OR = 1.447, 95% CI 1.021-2.050, P = 0.038) plans were associated with greater odds of undergoing surgery, compared with health maintenance organization plans, after controlling for the studied precertification requirements. The documented weight history requirement was not a significant predictor of the odds of undergoing surgery (P = 0.132).

Conclusions—There is a need for consideration of insurance benefits design as a determinant of access to bariatric surgery.

Keywords

bariatric surgery; health insurance design; medical weight management; access to care

Introduction

Bariatric surgery is recognized as the most effective treatment for obesity in individuals with class III obesity (Body Mass Index [BMI] ≥ 40 kg/m²) and those with class II obesity (BMI 35–39.9 kg/m²) and at least one obesity-related comorbidity, such as type II diabetes, hypertension, sleep apnea, non-alcoholic fatty liver disease, and osteoarthritis.^{1–4} The majority of patients lose 25–30% of their body weight and experience clinically significant improvements in weight-related comorbidities.^{5,6} Nevertheless, bariatric surgery remains underutilized in the United States. Over 32 million Americans meet the basic eligibility criteria for bariatric surgery (class III obesity and class II obesity with comorbidities).⁷ However, only 228,000 individuals (or less than 1%) underwent the surgery in 2017.⁸

Several factors likely contribute to the underutilization of bariatric surgery. These include limited knowledge and negative attitudes towards bariatric surgery by patients and referring physicians, barriers in patient-physician communication, stigma related to weight loss surgery, high cost of the surgery (\$8,678–\$14,082), as well as insurance coverage and benefits design-related issues.^{7,9,10} For example, Kim and colleagues (2018) estimated that if patient cost-sharing for bariatric surgery was decreased from 6% (2014 average estimate) to 0%, surgery uptake among patients with class III obesity and type 2 diabetes mellitus could increase from 121.3 to 141.9 cases per 100,000 patients.¹¹ Such an increase in the utilization of surgery within this patient subgroup was projected to result in \$7.07 million in monetary returns at the US population level as a result of gained quality-adjusted life-years.¹¹

While bariatric surgery is underutilized, insurance coverage for the procedures has expanded over the past decade.^{12,13} As of 2018, Medicare, 49 state Medicaid programs, 43 state employee programs, individual and small-group insurance markets in 23 states, and most commercial insurers offered coverage for one or more bariatric procedures.^{12,14,15} However, expansion of insurance coverage alone might not be enough to warrant greater access to bariatric surgery. For example, the inclusion of bariatric surgery as an essential health benefit within the individual and small-group insurance plans in 23 states did not result in a significantly greater increase of bariatric surgery utilization in those states compared to control states.¹² The complexity of insurance plan design for bariatric surgery might account for the lack of change in utilization. Particularly, access to bariatric surgery is generally restricted by the third-party payers in numerous ways, including by precertification criteria such as a referral from a primary care provider, documented 2-year weight history, as well as through extensive preoperative testing and consultations with medical specialists that can total to 8 in-person visits to program providers prior to surgery.^{12,16}

Many insurance plans, for example, require preoperative supervised medical weight management prior to surgery.¹² Over a period of 3-6 months, patients are encouraged to learn and practice the dietary and behavioral requirements of surgery through monthly visits with a physician or dietitian within the bariatric surgery program. Ideally, these programs are designed to produce a modest (5%) weight loss and enhance perioperative outcomes. There is only modest evidence to support the benefit of this requirement.¹⁷⁻²⁰ In a recent study, the amount of weight lost preoperatively was not associated with 30-day readmission, reoperation, or mortality.¹⁹ The intensity and length of the preoperative testing and consultation period were not found to be associated with early postoperative weight loss, further suggesting that these preoperative requirements are not enhancing postoperative outcomes for most patients.¹⁸

Previous work by Gasoyan and colleagues in 2019 demonstrated that the type of insurance plan (e.g. health maintenance organization, preferred provider organization, point of service, fee-for-service), as opposed to more general payer type (e.g. Medicare, Medicaid, Commercial), was more strongly associated with the utilization of bariatric surgery.²¹ The Medicare Advantage preferred provider organization plan was associated with greater odds of undergoing bariatric surgery compared with the Medicare Advantage health maintenance organization plan.²¹ Similarly, patients with Blue Cross preferred provider organization, Blue Cross fee-for-service, and Blue Cross health maintenance organization plans had greater odds of undergoing surgery compared with individuals who had other commercial health maintenance organization plans.²¹

Currently, there is little understanding of the impact of precertification requirements on the likelihood of undergoing bariatric surgery. The current study was undertaken to investigate if there is such a link among individuals covered by private insurance. Insurance-mandated requirements of documented 2-year weight history and involvement in a 3-6 month-long preoperative supervised medical weight management program were predicted to be negatively associated with the odds of undergoing bariatric surgery, after controlling for insurance plan type, patient medical history, and relevant socio-demographic variables.

Methods

Data source and study population

This study used Pennsylvania Health Care Cost Containment Council's inpatient and outpatient care databases for the years 2015-2016 and records of preoperative insurance precertification requirements maintained by the Bariatric Surgery Program at Temple University in 2016. The databases contain clinical and claims data from all hospitals (excluding Veterans Administration Hospitals) and outpatient and freestanding ambulatory surgery centers in the Philadelphia, Bucks, Montgomery, Chester, and Delaware counties in Southeastern Pennsylvania.

The study population consisted of privately insured patients (with known/listed health insurance plans) age 18-73. Under private insurance, we considered all forms of health insurance that were not funded by the government. This study did not include patients whose medical bills were expected to be paid by Workers' Compensation or automobile insurance.

We also were unable to report utilization by insurer type, since our data use agreement does not encourage reporting insurer type by name.

A sample of bariatric surgery patients (referred as a Surgery Group) and those who were eligible for, but did not undergo surgery (referred as a Comparison Group), were identified from Pennsylvania Health Care Cost Containment Council's databases using international classification of disease, ninth and tenth revisions (ICD-9, ICD-10), and clinical modification procedure codes, as well as Healthcare Common procedure Coding System Level I Current Procedural Terminology (HCPCS CPT-4).

The Surgery Group included a sample of adult patients who underwent the most common types of bariatric surgery at an inpatient setting in 2016 and had a diagnosis code for morbid (severe) obesity. Individuals with a diagnosis code for noninfective enteritis and colitis and abdominal neoplasms were excluded from the sample (Table 1).

The Comparison Group included adults from the 2016 outpatient database who met the following criteria: 1) had a diagnosis code for morbid (severe) obesity; 2) did not have a record of any bariatric procedure during 2015-2016 in the inpatient or outpatient databases; 3) and did not have a diagnosis code for heart failure, chronic ischemic heart disease, malignant neoplasms, portal hypertension, Crohn's disease, mental and behavioral disorders due to psychoactive substance use, or Intellectual disabilities since those conditions could decrease the likelihood of undergoing bariatric surgery (Table 1).²² Duplicate records in the inpatient and outpatient databases were identified and removed using a pseudo patient identifier variable.

Study design, variables, and statistical analysis

To control for the potential confounding effects of socio-demographic factors on the odds of undergoing bariatric surgery or having a certain type of insurance coverage, records of surgery patients were 1:1 matched by age group (18-29, 30-35, 36-41, 42-47, 48-53, 54-59, 60-64, 65-76), sex, race, and zip code with those of eligible patients who did not undergo surgery.

The primary outcome variable was whether or not the patient had surgery by the end of 2016 - the period included in the database. Primary predictor variables included insurance-mandated requirements for documented weight history (none or 2-year weight history) and an insurance-mandated requirement for involvement in a preoperative supervised medical weight management program (none or 3-6 months). Insurance plan type (health maintenance organization, preferred provider organization, point of service, fee-for-service) was included as a covariate and to control for the potential influence of the patient's ability within a given plan type to choose doctors/hospitals and out-of-pocket costs.

Pearson Chi-Square tests and multivariable logistic regression analysis were performed to examine the association between precertification criteria, insurance plan type, and the likelihood of undergoing bariatric surgery. An alpha of .05 was used to determine statistical significance. Database management and statistical analysis were conducted using IBM SPSS Statistics for Windows (Version 25.0; Armonk, NY, USA).

Results

The study sample included 1,054 individuals with private health insurance; 527 in the surgery group and 527 in the comparison group, 1:1 matched on sex, race, age group, and zip code. The majority were females (83.3%) and white (65.3%). The mean age was 45.4 ± 10.5 years in the surgery group and 45.6 ± 10.5 years in the comparison group, which did not significantly differ. Additional demographic characteristics are presented in Table 2.

The most common insurance plan type was preferred provider organization ($n = 461$), followed by health maintenance organization ($n = 329$), fee-for-service ($n = 219$), and point of service ($n = 45$). The distribution of insurance plan types in the surgery and comparison groups are presented in Table 3.

The precertification requirement for involvement in a preoperative medical weight management program was associated with whether or not the patient had surgery by the end of the period included in the database, $X^2(2) = 9.5$, $P = 0.009$ (Table 3). More specifically, individuals in the Comparison Group who did not have surgery had a higher rate of insurance products that required 3-6 months of supervised weight loss visits ($n = 202$, 55.0%) than in the Surgery Group ($n = 165$, 45.0%).

Similarly, the requirement for 2-year documented weight history was more commonly seen in the Comparison Group ($n = 169$, 53.7%) as compared to the Surgery Group ($n = 146$, 46.3%). The association between those 2 variables approached, but did not reach, statistical significance, $X^2(2) = 5.8$, $P = 0.055$ (Table 3).

Table 4 presents the results of the multivariable logistic regression model. The requirement for 3-6 months preoperative supervised medical weight management was associated with smaller odds of undergoing bariatric surgery (odds ratio [OR] = 0.459, 95% confidence interval [CI] 0.253-0.832, $P = 0.010$), after controlling for insurance plan type and the requirement for documented weight history.

Privately insured individuals with a preferred provider organization (OR = 1.422, 95% CI 1.063-1.902, $P = 0.018$) and fee-for-service (OR = 1.447, 95% CI 1.021-2.050, $P = 0.038$) plans had greater odds of undergoing bariatric surgery, compared with individuals who had health maintenance organization plans, after controlling for precertification requirements for medical weight management and documented weight history. The requirement for documented weight history was not a statistically significant predictor in the model ($P = 0.132$).

Discussion

This study extends our knowledge regarding the role of insurance plan features in determining access to bariatric surgery. In this study of privately insured bariatric surgery patients and a matched comparison group of individuals who did not undergo surgery, enrollment in more restrictive insurance plans, and the requirement of participation in preoperative medical weight management program, were barriers to utilization of surgery during the study period.

Earlier studies, such as Love and colleagues (2017) reported that an increase in the preoperative diet requirement was associated with surgery dropout (OR = 0.880 per month required, 95% CI 0.839-0.922, $P < .0001$) among patients undergoing bariatric surgery evaluation from 2010-2015.¹⁶ In that study, surgery dropout was defined as not undergoing bariatric surgery by December 2015 among patients who underwent initial bariatric surgery evaluation between January 2010 and May 2015.¹⁶ A 2019 study by Chhabra et al. found that individuals with more generous plans such as preferred provider organization have a higher rate of bariatric surgery utilization (20 per 100,000 insured lives), compared to those in high-deductible health plans (12 per 100,000 insured lives).²³

For most patients, the route to surgery typically involves several steps, including attending an initial information/orientation session with the bariatric surgery program, as well as completing nutritional, psychological, pulmonary, and cardiology evaluations. These evaluations, whether coupled with a preoperative medical weight management requirement or not, can take patients approximately 6 months to complete.¹⁷ Out-of-pocket expenses, such as copayments, parking, public transportation, or childcare expenses, or the lack of sufficient time off from work for health care, maybe indirect barriers to surgery as well. Unfortunately, the database did not include these important, yet often overlooked patient-level variables.

Preferred provider organization and fee-for-service plans are less restrictive in allowing enrollees to select a doctor or hospital and do not require referral for specialized care by primary care providers.^{21,23} Although, beneficiaries with preferred provider organization plans incur lower cost-sharing when using in-network providers.^{21,23} The fee-for-service payment mechanism has been described as a contributor to the overuse of health services and the use of high-cost specialized care since it bases the payments on volume and not the value of provided services.²⁴ In contrast, health maintenance organization plans are generally more restrictive and are more likely to limit enrollees to in-network providers. They also require a referral by a primary care provider for specialty care visits.^{21,23} The intent of the health maintenance plans to restrict the overutilization of health services could have been too restrictive in the case of bariatric surgery. This could explain the associations seen in this study, especially considering the number of pre-operative specialized services that bariatric surgery patients utilize to meet the precertification criteria.

This study did not find a statistically significant association between documented weight history precertification requirements and odds of undergoing surgery. Given the comorbidity profile of bariatric surgery candidates that generally requires medical care²⁵ and the considerable rise of electronic health records use in the United States over the past decade,²⁶ this requirement might pose less of a hurdle for privately-insured candidates for bariatric surgery. Furthermore, the documented weight history requirement was less common compared to the preoperative supervised medical weight management and was found in only 30% of patients in the database.

As with all policies, there is a need to revisit the data supporting the policy to ensure that there is an evidence base to keep the policy in place. As research evolves and costs associated with clinical care change, the need for barriers preventing access to care may no

longer be justified. A holistic approach to the issue may demonstrate that while some pre-authorization is needed to ensure an individual is prepared and committed to sustained change, the 3-6 month supervised medical weight management program requirement may be too restrictive.

The demographic characteristics of the study population were generally comparable to the national trends in bariatric surgery utilization. Women represented 83% of patients in the database; they represent 80% of patients in the United States as of 2016. The mean age of patients in the database was 45 years as compared to 44 years nationally. Differences in race, however, were observed. The percentage of patients in the database who were white (65%) was comparable to the percentage seen nationally (64%). The sample in the database, however, was 34% black and only 1% Hispanic. Nationally, 18% of bariatric surgery patients are black and 14% are Hispanic. This could be explained by the racial/ethnic makeup of the 5 major counties in Southeastern Pennsylvania, where 67.2% of the population is white, 23.2% is black, and 9.6% of individuals are other races.²⁷ Furthermore, the age-adjusted prevalence of severe obesity is 9.3% among adult, non-Hispanic white individuals as opposed to 13.8% among non-Hispanic black individuals.²⁸

The racial makeup of our original bariatric surgery sample (before matching) was 58.9% whites, 35.3% blacks, 3.4% other races, 1.9% unknown, 0.3% Asians; 3.1% of the patients were of Hispanic origin. In this study, each demander (surgery patient) needed to have an exactly matching (by age group, sex, race, and zip code) supplier (comparison patient) to be included in the study sample, hence the slight difference in the racial/ethnic composition between the original and study samples of bariatric surgery patients. It should be also noted that while nationwide demographics data are drawn from all bariatric surgery patients, this study examined a specific group of individuals – those with private insurance coverage.

A strength of this study is its application of stringent inclusion and exclusion criteria used for the two groups, as well as the 1:1 matching on socio-demographic variables to control for their potential confounding effects on the likelihood of undergoing surgery or having a certain type of insurance coverage. This study also has limitations. The mix of insurance providers and plans within this study sample may not be representative of the market share of health insurance providers/plans in other areas of the United States. Therefore, the breakdown of cases where the select precertification requirements were applicable might not be generalizable. Furthermore, since some insurers had varying requirements on the length of the preoperative weight management requirement, we elected to group them as programs that had either a 3-month or 6-month duration, thus making it impossible to examine any potential dose-effect associations.

Conclusions

The main results emphasize the need for consideration of insurance benefits design as a determinant of access to bariatric surgery and possibly other high-cost, nonemergency services. Policymakers and third-party payers should pay close attention to whether insurance-mandated precertification criteria are evidence-based and designed to positively impact patient outcomes and deliver high-value care. The application of value-based

insurance design to bariatric surgery could be another potential solution in that route.⁹ A recent survey of bariatric surgery policies shows that during 2017–2018 some major health insurers removed the requirement for supervised weight loss programs and placed more emphasis on multidisciplinary education sessions and nutritional counseling prior to surgery.¹² This presents an opportunity for further research to determine whether the modification or discontinuation of this longstanding health insurance practice will contribute to enhanced access to needed health services among the beneficiaries of these plans.

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Table 1.

Procedure and diagnostic codes used for identification of bariatric surgery and comparison groups

Procedure or diagnosis code	ICD-9*	ICD-10	HCPCS CPT-4
<i>Inclusion criteria for both surgery and comparison groups</i>			
Diagnosis code for morbid (severe) obesity		E66.01	
<i>Inclusion criteria for the surgery group</i>			
Underwent common types of bariatric surgery	44.39, 44.38, 43.89, 43.82	0D164ZA, 0D160ZA, 0DB64Z3, 0DB60Z3	
<i>Exclusion criteria for the surgery group</i>			
Diagnosis code for non-infective enteritis and colitis		K50 - K52	
Diagnosis code for abdominal neoplasms		C15 - C26	
<i>Exclusion criteria for comparison group</i>			
Underwent bariatric procedures during 2015-2016	43.82, 44.38, 44.68, 44.95, 44.96, 44.97, 44.98	0D160ZA, 0D160ZB, 0D164ZA, 0D164ZB, 0DB60Z3, 0DB60ZZ, 0DB64Z3, 0DV64CZ, 0DV63CZ, 0D164Z9, 0DB64ZZ	43644, 43645, 43770 - 43775, 43842, 43843, 43845 - 43848, 43886 - 43888
Heart failure		I50	
Chronic ischemic heart disease		I25	
Malignant neoplasms of lip, oral cavity, and pharynx; digestive organs; respiratory and intrathoracic organs; bone and articular cartilage; mesothelial and soft tissue; breast; female genital organs; male genital organs; urinary tract; eye, brain and other parts of central nervous system; thyroid and other endocrine glands Melanoma and other malignant neoplasms of skin		C00-C14, C15-C26, C30-C39, C40-C41, C45-C49, C50, C51-C58, C60- C63, C64-C68, C69-C72, C73-C75 C43-C44 C76-C80 C7A C7B	
Malignant neoplasms of ill-defined, other secondary and unspecified sites			
Malignant neuroendocrine tumors Secondary neuroendocrine tumors			
Portal hypertension		K76.6	
Crohn's disease		K50	
Mental and behavioral disorders due to psychoactive substance use		F10-F19	
Intellectual disabilities		F70 - F79	

* Notes: ICD-9 codes apply only to the 2015 inpatient database and were used to identify and remove patients who received bariatric surgery from the comparison group.

Table 2.

Demographic characteristics of bariatric surgery patients and those who were eligible for but did not undergo surgery

Variable	Surgery group (n= 527)	Comparison group (n= 527)
	n (percent within column) [standard deviation]	
<i>Sex</i>		
Female	439 (83.3%)	439 (83.3%)
Male	88 (16.7%)	88 (16.7%)
<i>Race</i>		
White alone	344 (65.3%)	344 (65.3%)
Black alone	179 (34.0%)	179 (34.0%)
Other	2 (0.4%)	2 (0.4%)
Unknown	2 (0.4%)	2 (0.4%)
<i>Ethnicity</i>		
No Hispanic/Latino origin or descent	521 (98.9%)	519 (98.5%)
Hispanic/Latino origin or descent	6 (1.1%)	8 (1.5%)
<i>Mean age</i>	45.4 [10.5]	45.6 [10.5]

Notes: Data source: Pennsylvania Health Care Cost Containment Council's inpatient and outpatient care databases for 2016. Individuals in surgery and comparison groups were 1:1 matched on sex, race, age group, and zip code.

Table 3.

Distribution of precertification requirements and insurance plan profile among bariatric surgery and comparison groups

Variable	Surgery group (n= 527)	Comparison group (n= 527)	Pearson Chi-Square test
n (percent within a row)			
<i>Requirement for preoperative medical weight management</i>			$X^2 = 9.502, df = 2, P = 0.009$
None	357 (53.3%)	313 (46.7%)	
3-6 months	165 (45.0%)	202 (55.0%)	
Unknown	5 (29.4%)	12 (70.6%)	
<i>Requirement for documented weight history</i>			$X^2 = 5.808, df = 2, P = 0.055$
None	376 (52.1%)	346 (47.9%)	
2-year weight history	146 (46.3%)	169 (53.7%)	
Unknown	5 (29.4%)	12 (70.6%)	
<i>Insurance plan type</i>			$X^2 = 6.098, df = 3, P = 0.107$
Health maintenance organization	147 (44.7%)	182 (55.3%)	
Point of service	21 (46.7%)	24 (53.3%)	
Fee for service	117 (53.4%)	102 (46.6%)	
Preferred provider organization	242 (52.5%)	219 (47.5%)	

Notes: Data sources: Pennsylvania Health Care Cost Containment Council's inpatient and outpatient care databases for 2016 and records of preoperative insurance precertification requirements maintained by the Bariatric Surgery Program at Temple University.

Table 4.Association of precertification criteria and insurance plan type with odds of bariatric surgery ($n = 1,037$)

Variable	Odds ratio	95% Confidence interval	P-value
<i>Requirement for preoperative medical weight management</i>			
None		Reference category	
3-6 months	0.459	0.253-0.832	0.010
<i>Requirement for documented weight history</i>			
None		Reference category	
2-year weight history	1.603	0.867-2.962	0.132
<i>Insurance plan type</i>			
Health maintenance organization		Reference category	
Preferred provider organization	1.422	1.063-1.902	0.018
Point of service	1.125	0.591 –2.142	0.719
Fee for service	1.447	1.021-2.050	0.038

Notes: Notes: Data sources: Pennsylvania Health Care Cost Containment Council's inpatient and outpatient care databases for 2016 and records of preoperative insurance precertification requirements maintained by the Bariatric Surgery Program at Temple University. Unknown status for preoperative medical weight management and documented weight history were set as missing values in the model. Outcome variable: whether or not the patient had surgery by the end of 2016. Odds ratio for each predictor variable in the model is estimated controlling for other two variables.