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Surgical Research

Factors Associated with Progress from First Appointment to Surgery in a Public Bariatric Service

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ABSTRACT

Introduction: *Obesity is a major global public health problem with significant psychological and physical impacts as well as associated costs to healthcare systems. Bariatric surgery is an important tool in the treatment of obesity and previous studies have shown poor rates of progression to surgery in patients referred for surgery. The aim of this study was to identify patient and disease factors associated with successful progression from First Specialist Assessment (FSA) to Surgery in our public bariatric service.*

Methods: *This is a retrospective cohort study of patients seen at Waikato Hospital's public bariatric clinic between January 2017 and December 2020. Patient demographics and disease characteristics including BMI and comorbidities were analysed to identify factors associated with progression to surgery.*

Results: *Of 359 patients in total, 92 patients (25.6%) ultimately received surgery and were more likely to be Europeans aged 20-50 years. By ethnicity, rate of progression to surgery was lowest among Māori patients (19.2%).*

Conclusion: *We found a low proportion of patients to progress through to surgery at our publicly-funded bariatric service. Progression to surgery was especially low among Māori patients who made up a significant proportion of our cohort.*

Keywords

Public bariatric surgery, Indigenous Health.

Introduction

Obesity is associated with a diminished quality of life and shortened life expectancy through a range of psychological and physical impacts. These include the association with diabetes, cardiovascular disease and some malignancies. In addition to these impacts on affected individuals, the health costs associated with obesity are significant [1,2].

Prevention is important with obesity, because once established it fails to show a promising or sustained response to lifestyle or pharmaceutical measures. A number of preventative policies have been adopted to varying degrees globally [3]. Despite this, the prevalence of obesity is steadily climbing and was reported by the World Health Organisation as 13.1% of the global population in 2016 [4]. More recently, the New Zealand Health Survey reported the National rate of obesity to be 34.3% with those seen in Pacific and Māori populations being especially high; 71.3% and 50.8%, respectively [5].

Bariatric surgery is an important tool in the treatment of established obesity due to its positive impact on quality of life, durable weight loss and high remission rate of diabetes and other associated co-morbidities [6]. However, previous studies have shown fewer than 50% of patients referred for public-funded bariatric surgery go on to actually receive surgery [7].

Aims

The aim of this study was to identify factors associated with successful progress from first specialist appointment (FSA) through to surgery in the public bariatric surgery service at Waikato, New Zealand.

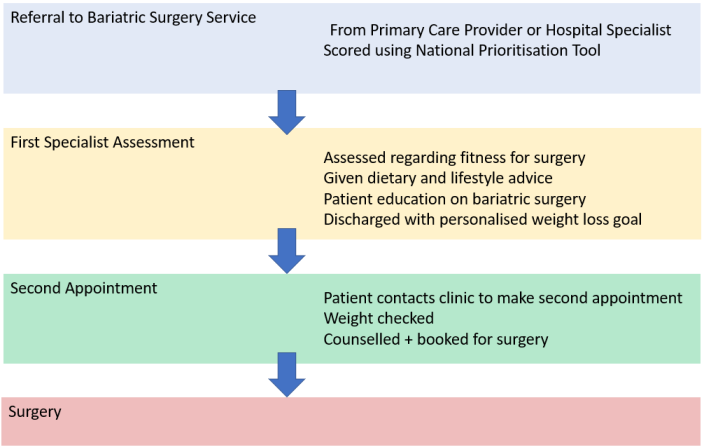
Methods

This was a retrospective cohort study including patients being seen in a Public Bariatric Surgery outpatient clinic between January 2018 and December 2020. The study was based at Waikato Hospital, which is a regional teaching hospital with 673 beds in Hamilton, New Zealand. The service comprises two bariatric surgeons with an annual caseload of 30-40 primary bariatric procedures performed.

Bariatric Service

Patients were referred to the bariatric service from either Hospital Specialists or Primary Care for a First Specialist Assessment (FSA). All referrals were scored according to the Ministry of Health's National Prioritisation online tool which includes the following parameters: medical co-morbidity, diabetes, age and BMI. Absolute contraindications are ASA score of 4 or above and pre-existing non-trivial malignancy. Relative contraindications include significant co-morbidities unlikely to be arrested or improved by bariatric surgery, unstable psychiatric conditions, previous gastric surgery or abdominal irradiation, non-dietary causes of obesity (e.g. Prada-Willi syndrome) and BMI less than 35.

At the FSA, after clinical assessment to ensure a surgical pathway was appropriate, all patients were asked to embark on self-directed weight loss and given a pre-operative weight loss goal. Pre-operative weight loss goals were calculated as a percentage of the total body weight, as measured at the FSA and were largely between 5 and 10%. This practice of goal-setting was not strictly protocolised but based primarily on clinical judgement, with lower weight loss goals being set for low BMI (30-35) patients and diabetics on Insulin. Basic dietary advice was given by the surgeon but there was no ongoing supervision of this by the bariatric team. Following the FSA, all patients were discharged and given written instructions on how to contact the clinic when they had achieved their pre-operative weight loss goal. On contacting the clinic, patients were scheduled for a second appointment where they were reassessed to check their weight, and be counselled for and booked for surgery (Figure 1).



Data Collection

Data was collected retrospectively from electronic medical records. Age, gender, body mass index, ethnicity, goal weight and comorbidities were collected from documentation at the FSA. Patient ethnicity was self-reported. Whether patients subsequently met their target goal weight and attended a second clinic appointment and whether they went on to undergo surgery was also recorded. The dates of first appointment, second appointment and surgery were recorded and the time intervals calculated in months.

Statistical Analysis

IBM SPSS Statistics version 28.0.0.1.1 was used for data analysis. Chi squared test was performed using the two-sided student t-test to compare categorical variables between groups. For continuous variables, the Shapiro-Wilk test was used to determine whether the data distribution was normal and were described in terms of mean and standard deviation (SD) for normally distributed data and compared between groups using the student t test. Otherwise, data were described in terms of the median and interquartile range (IQR) and compared using the Mann-Whitney U test. Multinomial logistic regression was used to identify factors associated with progression from FSA to second appointment and to surgery. Variables with a p value less than 0.1 on univariate analysis were included in multivariate analysis. A p value less than 0.05 was taken as statistically significant.

Ethics and Governance

This study was registered locally as an Audit and engagement with the Māori Health Equity team at the Hospital was sought at each stage of study planning and implementation.

Results

359 patients were seen as at FSA for consideration of Bariatric surgery during the study period. 114 (31.8 %) patients progressed to their second appointment and 92 patients (25.6%) ultimately underwent surgery. The median time from FSA-to-second appointment was 4 months (IQR, 2-9months) and the median time from FSA-to-surgery was 11 months (IQR, 7-17 months). The

demographics of the patients included in the study are outlined in Table 1. The median age was 45 years (IQR, 36-52) and BMI 50.0 (IQR, 44.6-57.20).

Table 1: Patient characteristics of study cohort.

	n 359 (%)
Age, years	
Under 20	3 (0.8)
20-50	250 (69.6)
Above 50	106 (29.5)
Gender	
Male	117 (32.6)
Female	242 (67.4)
Body Mass Index, kgm²	
Under 35	5 (1.4)
35-39	25 (7.0)
40-50	162 (45.1)
Above 50	167 (46.5)
Ethnicity	
European	173 (48.2)
Māori	167 (46.5)
Pacifica	11 (3.1)
Other	10 (2.8)
Co-morbidity	
Hypertension	123 (34.3)
Hyperlipidaemia	20 (5.6)
Obstructive Sleep Apnoea	86 (24.0)
Diabetes	139 (38.7)

Ethnicity

The characteristics between Māori and non-Māori patients were compared and a significantly higher proportion of males and patients with a BMI above 50 were observed among Māori patients (Table 2). The incidence of hypertension, hyperlipidaemia, obstructive sleep apnoea and diabetes mellitus were not significantly different between Māori and non-Māori patients.

Table 2: Comparison of patient characteristics between Māori and non-Māori patients.

	Māori	% (n=167)	Non-Māori	% (n=192)	p value
Age					
Under 20	2	1.2	1	0.5	0.48
20-50	114	68.3	136	70.8	0.6
51 or greater	51	30.5	55	28.6	0.7
Gender					
Male	62	37.1	55	28.6	***0.09***
Female	105	62.9	137	71.4	
BMI					
Under 35	0	0.0	5	2.6	***0.04***
35-39	7	4.2	18	9.4	***0.05***
40-50	66	39.5	96	50.0	***0.05***
50+	94	56.3	73	38.0	***<0.001***
Comorbidity					
Hypertension	63	37.7	60	31.3	0.26
Hyperlipidaemia	12	7.2	8	4.2	0.24
OSA	39	23.4	47	24.5	0.67
Diabetes	66	39.5	73	38.0	0.96

The rate of progression from FSA to second appointment was 35.8% among European patients, 25.5% among Māori patients and 27.3% among Pacifica patients. Eleven patients were classified as 'Other' ethnicity and these included two Chinese patients, one Indian patient, two Fiji Indian patients and four Asian-other patients. The Other ethnicity group had the highest progression from first to second appointment observed of 54.5%, although the group size was small. Progression from second appointment to surgery was observed in 85.4% of European patients, 74.4% of Māori patients, 100% of Pacifica patients and 66.7% of patients of 'Other' ethnicity. 22 patients did not progress from second appointment to surgery and in ten cases the reason was not documented. Of the remaining twelve cases, two patients declined surgery, two patients passed away, two patients regained weight, two patients developed cardiac co-morbidities, one patient became pregnant, one patient was removed from the weight list due to poor diabetic control and two patients could not be contacted to schedule surgery.

Pre-Operative Weight Loss Goal

89 (24.8%) patients in the cohort were given a pre-operative weight loss goal of up to and including 5%, 246 (68.5%) were given a weight loss goal of 5 to 10% and 24 (6.7%) patients were given a target greater than 10% of their starting total body weight. Male gender (p=0.02), advancing age (p<0.001), and diabetes (p<0.001) were associated with being given a higher pre-operative weight loss goal (Table 3).

Table 3: Multivariate analysis of factors associated with pre-operative weight loss goal (% of total starting body weight).

	Pre-operative weight loss goal (%)			p value
	≤5	>5 and ≤10	>10	
Age				
Under 20	1 (33.3)	2 (66.6)	0 (0)	-
20-50	61 (24.4)	174 (69.6)	15 (6.0)	
51 or greater	27 (25.5)	70 (66.0)	9 (8.5)	
Gender				
Male	22 (18.8)	80 (68.4)	15 (12.8)	***0.02***
Female	67 (27.7)	166 (68.6)	9 (3.7)	
BMI				
Under 35	4 (80.0)	1 (20.0)	0 (0)	***<0.001***
35-39	16 (64.0)	9 (36.0)	0 (0)	
40-50	40 (24.7)	121 (74.7)	1 (0.6)	
50+	29 (17.4)	115 (68.9)	23 (13.8)	
Ethnicity				
European	49 (28.3)	115 (66.5)	9 (5.2)	-
Māori	34 (20.4)	120 (71.9)	13 (7.8)	-
Pacifica	3 (27.3)	6 (54.5)	2 (18.2)	-
Other	4 (40.0)	6 (60.0)	0 (0)	-
Comorbidity				
Hypertension	30 (24.4)	83 (67.5)	10 (8.1)	-
Hyperlipidaemia	4 (20.0)	16 (80.0)	0 (0)	-
OSA	24 (27.9)	53 (61.6)	9 (10.5)	-
Diabetes	56 (40.3)	77 (55.4)	6 (4.3)	***<0.001***

Progression from FSA through to surgery

Increasing age (p=0.05) and pre-operative weight loss goal (p<0.001) were identified on multivariate analysis as predictors

of progression from FSA to surgery (Table 4). 29.6% of patients aged between 20-50 years progressed to surgery, compared to 17% of patients aged 51 years and over. 43.8% of patients who were given a pre-operative weight loss goal less than or equal to 5% of their starting body weight progressed to surgery. In contrast to this, only 12.5% of patients required to lose greater than 10% of their starting total body weight progressed to surgery.

Table 4: Multivariate analysis of factors associated with progression through the bariatric surgery service.

	Progression through Public Bariatric Service			**p value**
	FSA	2nd Appointment	Surgery	
Age				
Under 20	3 (100)	0 (0)	0 (0)	
20-50	160 (64.0)	1 (6.4)	74 (29.6)	***0.05***
51 or greater	82 (77.4)	6 (5.7)	18 (17.0)	
Gender				
Male	85 (72.6)	7 (6.0)	25 (21.4)	-
Female	160 (66.1)	15 (6.2)	67 (27.7)	
BMI				
Under 35	5 (100.0)	0 (0)	0 (0)	
35-39	14 (56.0)	2 (8.0)	9 (36.0)	-
40-50	110 (67.9)	6 (3.7)	46 (28.4)	
50+	116 (69.5)	14 (8.4)	37 (22.2)	
Ethnicity				
European	111 (64.2)	9 (5.2)	53 (30.6)	0.59
Māori	124 (74.3)	11 (6.6)	32 (19.2)	0.27
Pacifica	8 (72.7)	0 (0)	3 (27.3)	-
Other	4 (40.0)	2 (20.0)	4 (40.0)	-
Comorbidity				
Hypertension	79 (64.2)	10 (8.1)	34 (27.6)	-
Hyperlipidaemia	14 (70.0)	0 (0)	6 (30.0)	-
OSA	52 (60.5)	6 (7.0)	28 (32.6)	-
Diabetes	88 (63.3)	10 (7.2)	41 (29.5)	-
Pre-operative weight loss goal (% Total starting body weight)				
≤5	45 (50.6)	5 (5.6)	39 (43.8)	
>5 and ≤10	181 (73.6)	15 (6.1)	50 (20.3)	***<0.001***
>10	19 (79.2)	2 (8.3)	3 (12.5)	

Discussion

The main finding of this retrospective study was that of 359 patients seen as new referrals at a Public Bariatric service over three years, only 92 (25.6%) progressed to surgery. This proportion is low by International standards, such as those reported by the Toronto Western Hospital Bariatric Program (TWHBP) of 36.2% and a study in Michigan, USA who reported a rate of 46.5% referred patients going on to receive surgery [10,11]. While these North American healthcare systems are not directly comparable to our own Institution, other New Zealand studies by Taylor et al. and Rahiri et al. reported rates of 46% and 41.7%, respectively [12,13]. Consistent with these studies, we found a lower proportion of Māori patients going on to receive surgery compared to European patients. Furthermore, the proportion of Māori patients making up our study cohort was considerably higher (46.5%) than those of the two aforementioned New Zealand studies (21% and 29.7%, respectively). This in turn may account for the lower progression-to-surgery rates observed in our study.

Overall, 31.8% progressed from FSA to their second appointment. In contrast to this, 80.7% of patients seen at a second appointment went on to receive surgery. These findings suggest the requirement for pre-operative weight loss to be a major obstacle to surgery within our service.

The main rationale for setting a pre-specified weight loss target at our Institution is to promote and establish behavioural change prior to surgery, and to ensure a commitment to make these changes prior to embarking upon surgery. Whilst this contributes to a relatively low rate of patients progressing through the program to surgery, further study is necessary to establish whether this equates to improved long-term weight loss and remission of co-morbidities. Recent reviews of the literature show the evidence in favour of pre-operative weight loss to be inconclusive. The quality of available evidence is generally hindered by heterogeneity of study design and small sample sizes [14,15]. However, an analysis of over 300,000 patients from the Metabolic and Bariatric Surgical Association Quality Improvement Program (MBSAQUIP) found pre-operative weight loss to be associated with lower re-admission rates with abdominal pain but higher readmission rates with urinary tract infection and superficial surgical site infections [16]. The investigators suggest that the increased rate of superficial SSIs and to be related to an element of malnutrition. However, the overall rate of readmission was not affected by pre-operative weight loss. The study did not look into the impact of pre-operative weight loss on long-term post-operative weight loss and remission of obesity-related comorbidities. Another finding of the present study is the observation that % target weight loss varied with ethnicity and was higher among Māori patients. Whilst the standard target weight loss in our program is 10% total body weight, our practice is to give a reduced weight loss target in patients with diabetes mellitus requiring insulin therapy, particularly in the BMI 30-35 group. This practice may explain why higher % weight loss targets were given to Māori patients, who had higher BMIs in our study. This explanation is supported by high BMI, and not Māori ethnicity, being identified as an independent predictor of % TWL on multivariate analysis.

Although the requirement for pre-operative weight loss is widely practiced amongst Bariatric Surgery programs worldwide, there is a need for contemporary, sufficiently-powered studies evaluating the impact of pre-operative weight loss on long-term weight loss and obesity-related comorbidity remission following bariatric surgery [15]. The authors believe that the adherence to behavioural change after surgery can be predicted at least in part by a patient's ability to lose weight preoperatively, however acknowledge that evidence for this internationally is scarce. Rather than removing the requirement for pre-operative weight loss, we propose a drive to provide enhanced and culturally-appropriate support for patients to achieve behavioural change, meet % TWL and successfully progress through to surgery.

A 2019 study by Murphy et al. demonstrated wide regional variation in progression rate to surgery in public-funded bariatric surgery programs across New Zealand [17]. Their study found that public funding for bariatric surgery allocated to each District Health Board (DHB) did not align with their population prevalence of morbid obesity. Waikato was listed as having the second-highest % prevalence of population with a BMI of 40 or greater of the twenty DHBs, but fourth-highest in terms of the number of bariatric procedures performed.

The present study has a number of limitations. Although we inferred inability to meet target weight loss as a major reason for attrition between first and second appointments it would be necessary to contact individual patients to establish their true reasons for attrition. This would provide further data on potential cultural barriers facing our Māori patients. Pre-operative barriers to bariatric surgery previously identified in Pacifica patients include an unsatisfactory patient-practitioner relationship, transport problems and lack of confidence in communicating with health professionals [12]. There may be some applicability of these barriers to Māori patients also, but further study is required to explore this. Another limitation of this study is that socio-economic deprivation was not included in the analyses and is likely to be an important potentially confounding variable. The study also does not evaluate the outcomes of surgery in terms of morbidity, mortality, weight loss and remission of comorbidities. This is important because although the present study found a low rate of progression to surgery, indicating poorer access to healthcare, this may be offset by having improved results in terms of safety and successful outcomes through being an inherently more selective program.

Conclusion

The proportion of patients progressing through to surgery from first appointment was found to be low at our Institution. Progression rates were found to vary by ethnicity and age with European patients below 50 years old having the highest likelihood of receiving surgery. Additionally, our results indicate preoperative weight loss to be a major obstacle to surgery. While this may hamper access to Bariatric surgery, follow-up data is required to evaluate this in the context of long-term post-operative outcomes. The findings of this study highlight a need for increased publicly-funded resources to provide greater culturally-appropriate support to patients to progress to Bariatric surgery.

References

1. Bhaskaran K, dos-Santos-Silva I, Leon DA, et al. Association of BMI with overall and cause-specific mortality: a population-based cohort study of 3·6 million adults in the UK. Lancet Diabetes Endocrinol. 2018; 6: 944-953.
2. MacMahon S, Baigent C, Duffy S, et al. Body-mass index and cause-specific mortality in 900 000 adults: Collaborative analyses of 57 prospective studies. Lancet. 2009; 373: 1083-1096.
3. Lyn R, Heath E, Dubhashi J. Global Implementation of Obesity Prevention Policies: a Review of Progress, Politics, and the Path Forward. Curr Obes Rep. 2019; 8: 504-516.
4. Chooi YC, Ding C, Magkos F. The epidemiology of obesity. Metabolism. 2019; 92: 6-10.
5. Health M of. New Zealand Health Survey 2020/21. URL: https://minhealthnz.shinyapps.io/nz-health-survey-2020-21-annual-data-explorer/. Published online 2021.
6. Carlsson LMS, Sjöholm K, Jacobson P, et al. Life Expectancy after Bariatric Surgery in the Swedish Obese Subjects Study. N Engl J Med. 2020; 383: 1535-1543.
7. Taylor T, Wang Y, Rogerson W, et al. Correction to: Attrition after Acceptance onto a Publicly Funded Bariatric Surgery Program. Obes Surg. 2018; 28: 2508-2508.
8. Srikumar G, Eglinton T, MacCormick AD. Development of the General surgery prioritisation tool implemented in New Zealand in 2018. Health Policy. 2020; 124: 1043-1049.
9. Prioritizing patients for the NZ Ministry of Health. Accessed December 26, 2022. https://www.1000minds.com/health/patient-prioritization-healthcare
10. Pitzul KB, Jackson T, Crawford S, et al. Understanding disposition after referral for bariatric surgery: When and why patients referred do not undergo surgery. Obes Surg. 2014; 24: 134-140.
11. Alvarez R, Matusko N, Stricklen AL, et al. Factors associated with bariatric surgery utilization among eligible candidates: who drops out? Surg Obes Relat Dis. 2018; 14: 1903-1910.
12. Taylor T, Wrapson W, Dewes O, et al. Preoperative bariatric surgery programme barriers facing Pacific patients in Auckland, New Zealand as perceived by health sector professionals: A qualitative study. BMJ Open. 2019; 9: 1-9.
13. Rahiri JL, Coomarasamy C, MacCormick A, et al. Ethnic Disparities in Access to Publicly Funded Bariatric Surgery in South Auckland, New Zealand. Obes Surg. 2020; 30: 3459-3465.
14. Chinaka U, Fultang J, Ali A, et al. Pre-specified Weight Loss Before Bariatric Surgery and Postoperative Outcomes. Cureus. 2020; 12: e12406.
15. Kim JJ. Evidence Base for Optimal Preoperative Preparation for Bariatric Surgery: Does Mandatory Weight Loss Make a Difference? Curr Obes Rep. 2017; 6: 238-245.
16. Tewksbury C, Crowley N, Parrott JM, et al. Weight Loss Prior to Bariatric Surgery and 30-Day Mortality, Readmission, Reoperation, and Intervention: an MBSAQIP Analysis of 349,016 Cases. Obes Surg. 2019; 29: 3622-3628.
17. Murphy R, Ghafel M, Beban G, et al. Variation in public-funded bariatric surgery intervention rate by New Zealand region. Intern Med J. 2019; 49: 391-395.

18. Frizelle F. The present healthcare crises and the delusion of looking for an answer to this in the restructuring of the health system. N Z Med J. 2022; 135: 12-15.

19. Ahuriri-Driscoll A, Lovell S, Kawa D Te, et al. The future of Māori health is here – The 2022 Aotearoa New Zealand health reforms. Lancet Reg Heal West Pacific. 2022; 28: 100589.