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**Letters**

**RESEARCH LETTER**

Differences in the Rates of Treatment of Severe Obesity Using Bariatric Surgery Across Socioeconomic Groups

A socioeconomic gradient in obesity, with greater prevalence observed in more disadvantaged groups, has been reported in most high-income countries. Severe obesity is a substantial and growing problem, affecting 1 in 7 Americans, and is associated with far greater adverse consequences relative to mild obesity (with a body mass index [BMI] of 30.0-34.9 [calculated as weight in kilograms divided by height in meters squared]). Lesser access to treatment for the severely obese in socioeconomically disadvantaged populations would risk further widening inequalities. Bariatric surgery is currently the only evidence-based option available that induces significant and sustained weight loss in severely obese patients. The present study aims to quantify the rates of treatment of severe obesity using bariatric surgery, according to the socioeconomic positions of severely obese Australian adults.

**Methods** Customized data relating to all bariatric surgery episodes undertaken in Australian adults between July 2011 and June 2012 (n = 14 056) were obtained from the National Hospital Morbidity database and provided by the Australian Institute of Health and Welfare. Bariatric surgery episodes were selected based on 3 Australian Refined Diagnosis Related Groups codes (K04A-S, K04B-S, and K07Z-S). For privacy reasons, de-identified, aggregate data were provided to the research team by Medicare. This project was approved by the Deakin University Human Research and Integrity Board (project 2010-116). Customized data relating to the annual estimated number of adults with severe obesity in Australia were provided by the Australian Bureau of Statistics based on results from the nationally representative 2011-2012 Australian Health Survey. Weight status classifications were based on measured height and weight. All data were stratified by Index of Relative Socio-economic Disadvantage quintiles, an arealevel measure of socioeconomic position (a lower quintile represents greater disadvantage).

Bariatric surgery rates were calculated as the observed annual number of bariatric surgery episodes divided by the estimated annual number of adults with severe obesity for each socioeconomic stratum in Australia (2011-2012). Severe obesity was defined as either class II (BMI = 35.0-39.9) or class III obesity (BMI ≥ 40.0) and represented the population potentially eligible to receive bariatric surgery. Equitable treatment across socioeconomic strata would be represented by roughly equal treatment rates.

The statistical significance of these comparisons was assessed using a z score and an associated P value. The z score was calculated as the difference between the annual treatment rate estimates divided by the standard error of this difference, with this standard error calculated as the square root of the sum of the squares of the individual annual treatment rate standard errors (Figure). Associated P values were derived using the standard normal probability distribution: quintile 5 vs quintile 4 (P < .25), quintile 5 vs quintile 3 (P < .17), quintile 5 vs quintile 2 (P < .001), and quintile 5 vs quintile 1 (P < .001).

**Figure. Annual Bariatric Surgery Rate by Socioeconomic Position in Australian Adults, 2011-2012**

Calculated as the observed number of bariatric surgery episodes or the number of Australian adults with severe obesity. Severe obesity was defined as either class II obesity (with a body mass index [BMI] of 35.0-39.9 [calculated as weight in kilograms divided by height in meters squared]) or class III obesity (BMI ≥ 40.0). The 95% CIs (error bars) reflect the variability in the survey estimates of population size. A lower socioeconomic position quintile reflects greater disadvantage. Data on the observed number of bariatric surgery episodes in Australia were obtained from the National Hospital Morbidity database, and data on the estimated number of people with severe obesity were obtained from the Australian Bureau of Statistics National Health Survey.
The present study found socioeconomic differences in the treatment of severe obesity using bariatric surgery among Australian adults. These findings are supported by previous studies in the United States. \(^6\) It is likely that these treatment inequalities will further increase the already large number of socioeconomic inequalities in the prevalence and consequences of severe obesity. A limitation of the present analysis is that the severely obese population potentially eligible for surgery will include a small number of people with class II obesity and no associated morbidity who are currently ineligible.

This analysis relates to Australia, where bariatric surgery is primarily available through the private hospital system (89% of episodes in 2011-2012)\(^7\); eligible patients must have private health insurance and pay an out-of-pocket fee. In the public hospital setting (11% of 2011-2012 episodes), no fees are incurred by patients; however, long wait times are common. Affordability is likely to be a key contributor to the observed socioeconomic inequalities. Other factors, such as geographical access to services and health literacy, may also play a role.

Access to bariatric surgery for disadvantaged groups should be improved so that all members in society can benefit from this treatment. In Australia, this will most likely be achieved by increasing the funding allocated to bariatric surgery in public hospitals. Future research should examine the costs and benefits of bariatric surgery according to socioeconomic strata.

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