



Risk of suicide and non-fatal self-harm after bariatric surgery: results from two matched cohort studies

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Summary

Background Bariatric surgery reduces mortality, but might have adverse effects on mental health. We assessed the risk of suicide and self-harm after bariatric surgery compared with non-surgical obesity treatment.

Methods Suicide and non-fatal self-harm events retrieved from nationwide Swedish registers were examined in two cohorts. The non-randomised, prospective Swedish Obese Subjects (SOS) study compared bariatric surgery (n=2010; 1369 vertical-banded gastroplasty, 376 gastric banding, and 265 gastric bypass) with usual care (n=2037; recruitment 1987–2001). The second cohort consisted of individuals from the Scandinavian Obesity Surgery Registry (SOReg; n=20 256 patients who had gastric bypass) matched to individuals treated with intensive lifestyle modification (n=16 162; intervention 2006–13) on baseline BMI, age, sex, education level, diabetes, cardiovascular disease, history of self-harm, substance misuse, antidepressant use, anxiolytics use, and psychiatric health-care contacts.

Findings During 68 528 person-years (median 18; IQR 14–21) in the SOS study, suicides or non-fatal self-harm events were higher in the surgery group (n=87) than in the control group (n=49; adjusted hazard ratio [aHR] 1.78, 95% CI 1.23–2.57; p=0.0021); of these events, nine and three were suicides, respectively (3.06, 0.79–11.88; p=0.11). In analyses by primary procedure type, increased risk of suicide or non-fatal self-harm was identified for gastric bypass (3.48, 1.65–7.31; p=0.0010), gastric banding (2.43, 1.23–4.82; p=0.011), and vertical-banded gastroplasty (2.25, 1.37–3.71; p=0.0015) compared with controls. Out of nine deaths by suicide in the SOS surgery group, five occurred after gastric bypass (two primary and three converted procedures). During 149 582 person-years (median 3.9; IQR 2.8–5.2), more suicides or non-fatal self-harm events were reported in the SOReg gastric bypass group (n=341) than in the intensive lifestyle group (n=84; aHR 3.16, 2.46–4.06; p<0.0001); of these events, 33 and five were suicides, respectively (5.17, 1.86–14.37; p=0.0017). In SOS, substance misuse during follow-up was recorded in 48% (39/81) of patients treated with surgery and 28% (13/47) of controls with non-fatal self-harm events (p=0.023). Correspondingly, substance misuse during follow-up was recorded in 51% (162/316) of participants in the SOReg gastric bypass group and 29% (23/80) of participants in the intensive lifestyle group with non-fatal self-harm events (p=0.0003). The risk of suicide and self-harm was not associated with poor weight loss outcome.

Interpretation Bariatric surgery was associated with suicide and non-fatal self-harm. However, the absolute risks were low and do not justify a general discouragement of bariatric surgery. The findings indicate a need for thorough preoperative psychiatric history assessment along with provision of information about increased risk of self-harm following surgery. Moreover, the findings call for postoperative surveillance with particular attention to mental health.

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Introduction

In 2014, an estimated 125 million women (5.0%) and 50 million men (2.3%) worldwide had a BMI of 35kg/m² or higher,¹ making them potentially eligible for bariatric surgery. Bariatric surgery reduces the risk of premature death,^{2–4} cardiovascular events,^{5,6} and microvascular and macrovascular complication of diabetes.^{7,8} However, concern is growing about adverse effects on mental health, with increased alcohol and substance misuse reported after some procedures, as well as signals of an increased suicide risk compared with individuals with severe obesity not treated with surgery.^{9,10} Compared with the general population, patients who have had bariatric surgery have been reported to have higher risk of both suicide^{11,12} and non-fatal self-harm.¹³ Non-fatal self-harm events are also more common after than before surgery.^{12–15}

Because suicide is rare, a randomised trial of sufficient size and duration to assess suicide risk after bariatric surgery is unlikely to be done. Furthermore, no observational studies have been reported on suicide that compare patients treated with bariatric surgery with controls with obesity treated non-surgically. The investigators of the Utah Mortality Study² reported an increased risk of death not caused by disease in patients treated with bariatric surgery compared with controls who applied for a driver's licence, matched for age, sex, and BMI. The increased risk of suicide was not significant, but the point estimate was more than twice as high in patients treated with surgery compared with matched controls. In the Utah Obesity Study,¹⁶ no difference in suicide risk over a follow-up time of up to 6 years could be detected in the bariatric surgery group

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Research in context

Evidence before this study

A systematic review for the US National Institutes of Health concluded that emerging data indicate an increased risk of suicide, or deaths not caused by disease, after bariatric surgery. The cited observational studies used comparators with obesity who had applied for a driver's licence or were seeking but did not receive bariatric surgery. To our knowledge, no reports have been published on the risk of suicide after bariatric surgery versus non-surgical weight loss therapy. Furthermore, previous studies have not accounted for baseline differences in psychiatric status, such as history of self-harm, substance misuse, and depression.

Added value of this study

On the basis of two large, long-term, matched, controlled studies of individuals with obesity intending to lose weight, we identified a substantially increased relative risk of suicide or non-fatal self-harm in the surgery group, after accounting for baseline psychiatric status. The excess risk after surgery was not explained by insufficient weight loss or weight regain, as individuals dying by suicide or who had hospital treatment for non-fatal self-harm had similar or greater weight loss during follow-up than other patients. Despite our attempts to match and stratify the analyses by baseline history of self-harm, substance misuse, depression, and anxiety, we cannot rule out

the possibility that the increased risk of suicide or non-fatal self-harm after bariatric surgery in these non-randomised studies is due to different patient characteristics among individuals who chose surgery instead of non-surgical weight loss methods.

Implications of all the available evidence

A randomised trial of sufficient size and duration to assess the risk of suicide between bariatric surgery and a non-surgical intervention is unlikely to be achievable, in view of the rarity of suicide as an outcome. The findings from our matched cohort studies and evidence from previous observational studies suggest that bariatric surgery is associated with an increased risk of suicide. Importantly, the absolute suicide risk is small and the association might be affected by selection bias and residual confounding. However, the relative risk of suicide and non-fatal self-harm is considerable even when accounting for multiple known suicide risk factors. The reported association of bariatric surgery (especially gastric bypass) with an increased risk of alcohol and substance misuse provides a plausible mechanism for an increased risk of suicide. For the general postbariatric population, the benefits of bariatric surgery, including lower mortality, outweigh our finding of an increased risk of suicide and self-harm. However, our findings could help to improve guidelines regarding how surgery candidates are selected and followed up over time.

(four suicides) versus a control group with severe obesity who sought but did not receive bariatric surgery (no suicides). Neither study^{2,16} accounted for baseline psychiatric status (which is likely to be associated with both bariatric surgery exposure and the suicide outcome) in the surgery and control groups, nor had they included a non-surgically treated obese control group. A Danish cohort study¹⁵ excluded patients with a history of contact with hospital-based psychiatric services and showed no difference in suicide frequency between patients treated with bariatric surgery and those admitted to hospital with a diagnosis of obesity but who had not undergone bariatric surgery.

We aimed to compare the risk of suicide and non-fatal self-harm in patients with obesity attempting to lose weight with bariatric surgery versus those treated without bariatric surgery, accounting for baseline psychiatric status, in two matched cohort studies in Sweden linked to outcome data from nationwide health-care registers.

Methods

Study design

Matched cohort designs were used to analyse the association between bariatric surgery and the outcomes suicide and non-fatal self-harm. The cohorts used for our analysis were the Swedish Obese Subjects (SOS) study³ and a nationwide register linkage study combining the Scandinavian Obesity Surgery Registry (SOReg)¹⁷ and the Itrim Health Database, a register including individuals

treated with intensive lifestyle modifications.⁶ Our rationale for using two studies was that SOS and SOReg plus Itrim have complementary strengths. SOS provides longer follow-up than any other existing controlled study, but used older surgical techniques. SOReg plus Itrim included the currently used surgical technique and an intensively treated control group, but had shorter follow-up.

Participants in SOS and SOReg plus Itrim were linked to nationwide health registers with the Swedish personal identity number, which is unique for each resident. The linkage was done by officials at the National Board of Health and Welfare and at Statistics Sweden. Seven regional ethical review boards approved the study protocol for the SOS study and written or oral informed consent was obtained from all patients. The register linkage of SOReg plus Itrim was approved by the regional ethics committee in Stockholm, Sweden, and all analyses were done on deidentified data.

Setting

The Swedish health-care system is tax funded and offers universal access to physicians, psychologists, dietitians, and other health-care specialists. In 2014, the adult prevalence of a BMI of 35 kg/m² or higher in Sweden was estimated to be 5–6%.¹ Globally, Sweden had one of the highest percentages of bariatric procedures for the total population in 2013 (0.08%, compared with 0.04% in the USA and Canada).¹⁸ In individuals undergoing bariatric surgery, the prevalence of depression, self-harm,

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