

The effect of bariatric surgery on healthcare costs and labour market attachment

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Aim

- To estimate the total, attributable long-term cost of bariatric surgery in Denmark by use of a novel case-control matching procedure.

Introduction

- Bariatric surgery is currently considered the most effective treatment for severe obesity.
 - It is known to cause a sustained weight loss and a reduction in both obesity-related comorbidities and mortality (1).
- Previous research is not consistent on whether this has positive socioeconomic implications (2).
- For that reason, it becomes relevant to estimate the direct and indirect costs associated with bariatric surgery.

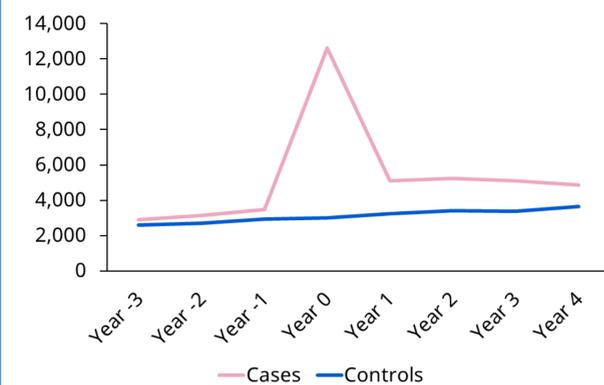
Methods

- The study population included all Danish citizens (≥18 years) who have received bariatric surgery, identified in the Danish National Patient Register in the period from 2002-2018 (N = 14,009).
- Cases were matched with three controls who would receive bariatric surgery six years later from index date (N = 40,298) on gender, year of birth and region of residence.
- We estimated actual costs as cases' and controls' average costs in year *t* (relative to the date of surgery for the case).
- Costs attributable to bariatric surgery were estimated as the difference between cases' actual costs and controls' actual costs in year *t*, minus the difference between actual costs the year before the case received surgery.
- Direct costs consisted of healthcare costs, including consumption of prescription medicines. Indirect costs covered gross earnings and receipt of transfer payments.

Results

- Figure 1** presents average individual total healthcare costs per year for cases and for their matched controls in the period from three years prior to and five years after the date of surgery.
- Average annual healthcare costs were significantly higher in all years after the patients received surgery compared with their matched controls.
 - In the year of surgery (year 0), total healthcare costs amounted to EUR 12,612 per patient, which is 71% higher than the average diagnosis-related group (DRG) rate for bariatric surgery (DRG rate is EUR 7,387).
 - Receiving surgery caused direct costs to increase by EUR 9,046 (285%) per patient in the year of surgery and by EUR 1,112 (35%) per patient on average per year from one to four years after surgery for patients receiving bariatric surgery compared with controls. This implies a total attributable healthcare cost in the five years after surgery of EUR 13,493 per patient.

Figure 1: Healthcare costs increase in the year of surgery and remain higher in the years following
Total healthcare cost from three years before surgery to five years after, EUR



Key result

Table 1: Mean healthcare cost per person from year 0-4, EUR

	Cases	Controls	Difference	P-value
Non-obesity-related inpatient hospitalisations	11,076	5,157	5,919 (115%)	<0.001
Non-obesity-related outpatient contacts	6,014	5,086	928 (18%)	<0.001
Obesity-related inpatient hospitalisations	9,311	706	8,605 (1,219%)	<0.001
Obesity-related outpatient contacts	1,119	465	654 (140%)	<0.001
GP visits	2,310	2,207	103 (5%)	<0.001
Psychiatry-related inpatient	1,024	667	357 (54%)	0.933
Psychiatry-related outpatient	680	648	32 (5%)	0.950
Prescription medicine	1,364	1,715	-351 (-20%)	0.003
Anti-obesity medication	17	32	-15 (-47%)	0.425
Total	32,898	16,651	16,247	<0.001

- Table 1** presents the mean healthcare cost for cases and controls by cost category from year 0 to year 4.
- Mean cost for year 0 to year 4 amounted to EUR 32,898 among cases and EUR 16,651 among controls.
 - Obesity-related inpatient hospitalisations accounted for 28% of the total costs for the cases and for 53% of the difference in total costs between cases and controls.
- As presented in **Figure 3**, our results suggest that the difference in total healthcare costs for patients receiving bariatric surgery compared with their matched controls is 2.2 times higher than the DRG rate of the surgery.

- Figure 2** presents the estimates of the attributable receipt of transfer payments and gross earnings in the years following surgery from the difference-in-difference estimation strategy.
 - Receiving surgery led to a reduction in earnings in the year of surgery of EUR 233 and an increase in receipt of transfer payments of EUR 114.
 - In contrast, there was a statistically significant increase in average annual earnings of EUR 1,550 and a reduction in receipt of transfer payments of EUR 1,214 in the period of four years after the cases received surgery.

Throughout the study period, we found that bariatric surgery increased cases' earnings by EUR 5,967 and reduced cases' receipt of transfer payments by EUR 4,444.

In total, this implied an attributable benefit, as measured by wages and public transfers, of EUR 10,121 during the first five years after surgery.

Figure 2: Bariatric surgery reduces receipt of transfer payments and increases earnings per year from year 1-4
Attributable transfer payments and gross earnings from year of surgery to five years after, EUR

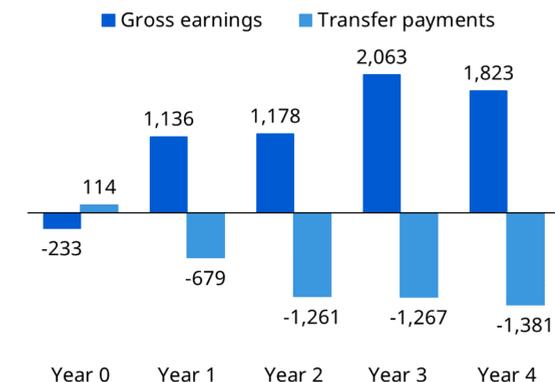


Figure 3: The total healthcare cost of bariatric surgery is much higher than the DRG rate for the surgery
Difference in total healthcare cost from year 0 to 4 divided by the DRG rate for bariatric surgery



Key result

Discussion

- The presented results stand in contrast to findings from the study by Larsen and co-authors (3), who were unable to detect statistically significant changes in direct and indirect costs for Danish patients receiving bariatric surgery.
- The strengths of this study lies in the innovative definition of the control group.
- This, as well as our ability to increase the study population, which improved the statistical power of the study, may explain the differences in the results presented in this poster compared to the aforementioned study.

Conclusion

- We found that the cost of surgery was 2.2-fold higher than the respective DRG rate, suggesting that use of DRG rates might not capture the true cost of bariatric surgery.

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Presented at the ECO 2021 conference, 13 May 2021, virtual congress.

References:
(1) Borisenko et al. Obesity Surgery 2015; 25:1408-1416; (2) Smith et al. JAMA Surgery 2019; 154; (3) Larsen et al. Obesity surgery 2008:28.2:338-348.