

# Bariatric Surgery, Employment, and Productivity Outcomes

## A Systematic Review

Qing Xia, PhD; Thomasina Donovan, PhD; Jiahao Diao, PhD; Xiao Yang, MMed; Xingzhong Jin, PhD; Stella T. Lartey, PhD; Hannah E. Carter, PhD

**IMPORTANCE** Bariatric surgery is widely recognized for its health benefits; however, its association with work productivity and employment participation, though frequently reported, has not been systematically synthesized. This evidence is crucial to inform the economic evaluation of bariatric surgery.

**OBJECTIVE** To systematically analyze the evidence on occupational outcomes of bariatric surgery.

**EVIDENCE REVIEW** A systematic literature search was conducted in 5 online databases to identify empirical studies on bariatric surgery–related employment and productivity outcomes published up to April 2024. Two coauthors independently screened the literature, and all coauthors contributed to data extraction and validation. Differences in occupational outcomes were compared before vs after surgery and between surgery vs nonsurgery groups. Comparisons were categorized into 3 groups: improvement, no difference, and worse. Where possible, summary values of occupational outcomes (eg, the average employment rate) were synthesized for each observational time point. Reported barriers and enablers to employment return or productivity were also identified.

**FINDINGS** A total of 42 studies from 15 countries were included. Studies were published between 1977 and 2023, with most conducted in high-income countries. Roux-en-Y gastric bypass was the most frequently studied procedure. The most commonly evaluated metrics were employment and unemployment rates and absenteeism and sick leave. Bariatric surgery was associated with improvements in presenteeism and work hours and ability and short-term absenteeism and employment rates. However, the long-term employment rate followed a reversed U-shape trajectory, with employment rates initially increasing postsurgery but returning to baseline levels after about 5 years. Key barriers to improved occupational outcomes included insufficient weight loss, female sex, older age, preoperative comorbidities, lower quality of life, and a lack of prior work experience.

**CONCLUSIONS AND RELEVANCE** Bariatric surgery demonstrates positive short-term impact on productivity and employment, but its long-term occupational benefits remain uncertain. Certain subgroups, such as females and older adults, may require tailored postsurgery support to sustain employment and productivity gains. These findings highlight the critical need for long-term strategies to sustain the occupational benefits postsurgery and to develop targeted interventions for at-risk populations.

*JAMA Surg.* 2026;161(1):84–94. doi:10.1001/jamasurg.2025.3611  
Published online October 1, 2025.

[+ Supplemental content](#)

[+ CME at \[jamacmelookup.com\]\(http://jamacmelookup.com\)](#)

**Author Affiliations:** Author affiliations are listed at the end of this article.

**Corresponding Author:** Qing Xia, Australian Centre for Health Services Innovation and Centre for Healthcare Transformation, School of Public Health and Social Work, Faculty of Health, Queensland University of Technology, 60 Musk Avenue, Kelvin Grove, Brisbane 4059, Queensland, Australia ([qing.xia@qut.edu.au](mailto:qing.xia@qut.edu.au)).

**B**ariatric (metabolic or weight-loss) surgery is widely recognized as the most clinically effective intervention for severe and resistant obesity.<sup>1,2</sup> Beyond its immediate health benefits, bariatric surgery also holds the potential to alleviate the societal economic burden of obesity, particularly by reducing the indirect, productivity-related costs associated with morbidity and premature mortality.<sup>3</sup> Cost-effectiveness investigations of bariatric surgery highlight its long-term economic values in managing patients with morbid obesity, especially those with type 2 diabetes<sup>3</sup>; however, these findings have primarily been analyzed from a health care system perspective that excludes productivity impact.<sup>3</sup>

Comprehensive reviews of health economic evaluations indicate that the adoption of a broader societal perspective has the potential to modify the cost-effectiveness results as well as the conclusions regarding implementation, when compared with a more narrowly defined health system perspective.<sup>4-7</sup> Unfortunately, many economic evaluations do not account for societal costs, in particular productivity costs, because of practical challenges in their estimation, such as the quantification of presenteeism.<sup>8-10</sup> This lack of information limits the ability of health care decision-makers to make fully informed decisions from a societal perspective, especially given the wide-ranging impact of obesity and its associated comorbidities.

Numerous studies have explored the impact of bariatric surgery on occupational outcomes such as employment status, return to work (RTW), absenteeism (sick leave), and presenteeism; however, results have been mixed, particularly regarding the surgery's impact on patients' employment status.<sup>11-14</sup> This review aims to synthesize the evidence on the impact of bariatric surgery on employment and productivity. These findings may be useful in providing a comprehensive summary of societal cost inputs for future economic evaluations of obesity interventions.

## Methods

The protocol was registered in PROSPERO (CRD42023397967). This systematic review adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) reporting guideline.<sup>15</sup>

### Systematic Literature Search

A comprehensive literature search was conducted using 3 biomedical databases (MEDLINE, Embase, and Scopus) and 2 economic databases (EconLit and the Centre for Reviews and Dissemination). The initial search was conducted on February 13, 2023, with an updated search on April 6, 2024.

Search strategies were developed in consultation with a research librarian at the Queensland University of Technology. The search terms included (1) bariatric metabolic surgery, and (2) occupational outcomes, including (un)employment rate, RTW, sick leave, absenteeism, presenteeism, and work ability. Detailed strategies for all databases are available in the eTable 1 in Supplement 2.

The inclusion criteria were the following:

- Empirical research studies published as full text, with no restrictions placed on study setting, language, or time of publication.
- Patients with obesity (body mass index [BMI]  $\geq 30$ , calculated as weight in kilograms divided by height in meters squared) who

## Key Points

**Question** What is the impact of bariatric surgery on employment and productivity outcomes?

**Findings** In this systematic review of 42 studies, bariatric surgery demonstrates positive impact on work productivity and short-term work return. However, the long-term employment rate followed a reversed U-shape trajectory, with the rate initially increasing postsurgery but returning to baseline levels after about 5 years.

**Meaning** Bariatric surgery offers broad economic and social benefits above and beyond its immediate health benefits, but the long-term sustainability of these outcomes remains uncertain, indicating a need for research into effective postsurgical support strategies and the societal value of long-term investment.

were at least 18 years old and had a history of any form of bariatric surgery.

- The intervention was any type of bariatric surgery, such as Roux-en-Y gastric bypass (RYGB), adjustable gastric banding (AGB), or sleeve gastrectomy (SG).
- The comparison made in the study was occupational difference between surgery and nonsurgery or occupational changes before vs after surgery.
- Primary outcomes included bariatric surgery-related employment status (ie, employment rate, percentage RTW, and percentage with disability pension) or productivity (ie, absenteeism/sick leave, presenteeism, work impairment, and work hours and incomes). The secondary outcomes were reported enablers or barriers influencing occupational outcomes.

For multiple articles referring to the same study population, the most recent publication with the largest sample size was retained.

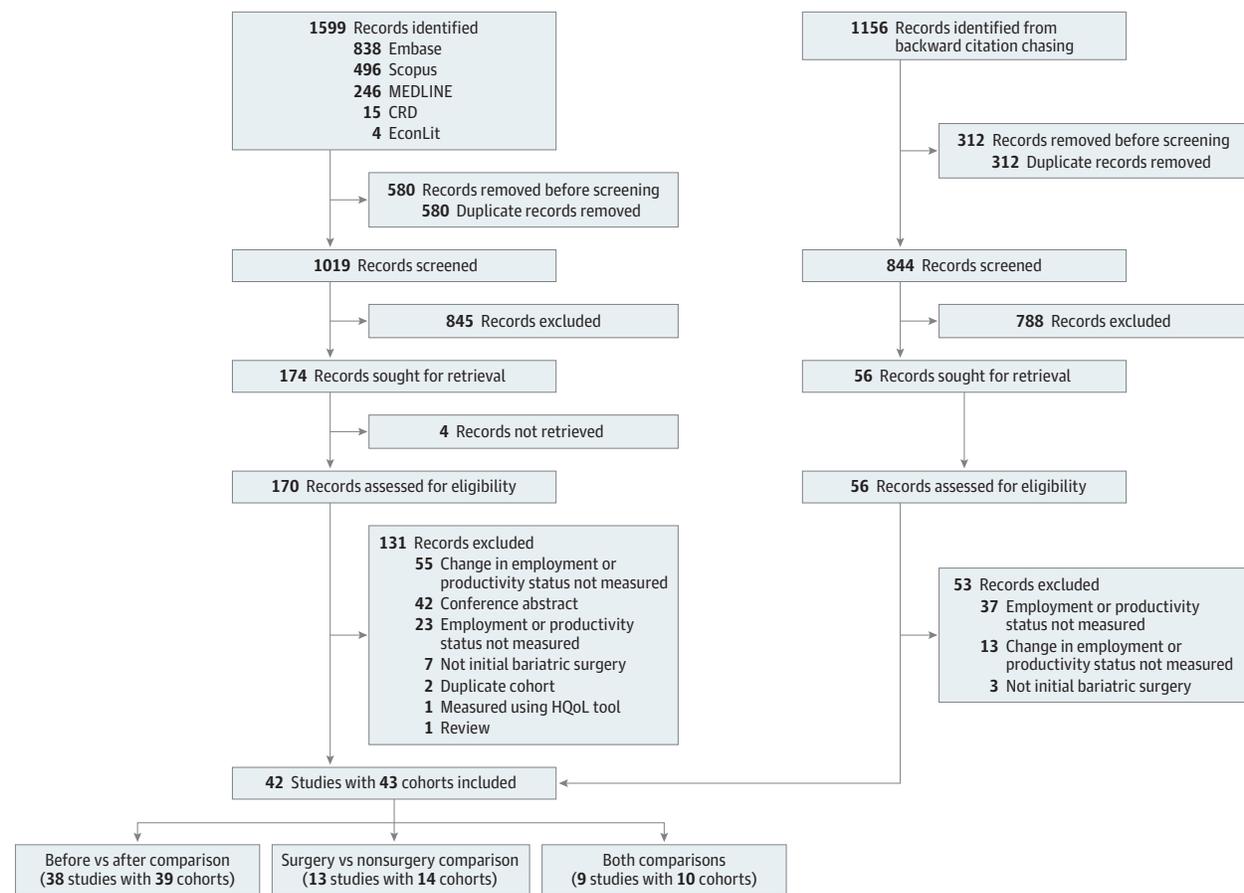
Studies were excluded if they:

- Investigated patients who were seeking bariatric surgery, on a waiting list, or underwent revisional bariatric surgery or body-contouring surgeries.<sup>16</sup>
- Did not report on occupational status changes related to bariatric surgery or had no information to calculate requisite data.<sup>17</sup>
- Considered presurgery productivity/employment status as a predictor for postsurgical effectiveness such as weight loss and regain.<sup>18</sup>
- Collected productivity/employment outcomes indirectly as part of an instrument such as a health-related quality-of-life assessment tool.<sup>19</sup>
- Were systematic reviews, meta-analyses, protocols, conference abstracts, comments/editorials, letters, or case reports.

### Study Selection

Study screening and selection were conducted using a web and mobile app for systematic reviews (Rayyan). Retrieved studies were screened for inclusion in a 2-step process: initial screening was performed based on titles and abstracts to check for inclusion eligibility, and marked include, exclude, or unsure; this was followed by in-depth screening to identify articles meeting eligibility criteria by reviewing full-text copies of each publication. Two reviewers (Q.X. and T.D.) independently screened and compared results, with any remaining discrepancies resolved by consensus.

Figure 1. Flowchart of Study Selection Process



To ensure literature saturation, a keyword search of Google Scholar and backward-citation searching of all selected articles and relevant reviews were scrutinized to obtain additional eligible publications and to ensure the comprehensiveness of the search.

### Data Extraction

To ensure the accuracy of data extraction, a data collection form was initially used to extract data from 10% of studies. Then, 4 reviewers (T.D., J.D., X.Y., and X.J.) independently extracted data using the improved form, with another reviewer (Q.X.) responsible for final data quality. Discrepancies were resolved during consensus meetings involving another 2 coauthors (S.T.L. and H.E.C.). All 7 coauthors were involved in the final data checking and validation from December 2024 to January 2025.

The list of extracted data is displayed in eTable 2 in Supplement 2. Where studies did not report requisite employment status data, corresponding authors were contacted with a request for further information.

### Data Analysis

A narrative review was conducted to comprehensively summarize the study characteristics. The changes in occupational outcomes in both before vs after and surgery vs nonsurgery comparisons were categorized into 3 groups: improvement, no difference, and worse. If multiple follow-up periods applied, the findings were deter-

mined based on the longest follow-up time. Where possible, occupational outcomes (eg, employment rate) were synthesized and reported as average values by observational periods via line charts. Any reported barriers and enablers (both significant and nonsignificant factors) relating to employment return or productivity were identified and summarized in bar charts. Subgroup analysis by surgery type was also conducted. A risk-of-bias assessment was not conducted because of heterogeneity in study designs and lack of a standardized quality assessment tool for studies examining productivity or employment impact.

## Results

### Eligible Studies

The electronic database search yielded a total of 1599 records, from which 580 duplicates were removed (Figure 1). Of the remaining 1019 records, 845 were excluded in the title/abstract screening, leaving 174 for full-text screening. A total of 1156 additional records were identified through backward citation chasing, and 56 of them were eligible for full-text screening. Following a review of the full text of the remaining 230 records, 180 records were excluded, resulting in the final analysis of 42 studies with 43 cohorts.<sup>11-14,20-57</sup> One study from Sweden investigated employment outcomes for 2 distinct cohorts: a BMI-matched cohort and a sister-matched cohort.<sup>43</sup>

Table 1. Summary of Study Characteristics (N = 42)

Characteristic	No. of studies (%)
Decade of study	
1970s	1 (2.4)
1980s	0
1990s	8 (19.0)
2000s	7 (16.7)
2010s	15 (35.7)
2020s	11 (26.2)
Country	
Europe	29 (69.0)
Sweden	6 (14.3)
United Kingdom	4 (9.5)
Denmark	3 (7.1)
France	3 (7.1)
Norway	3 (7.1)
Germany	3 (7.2)
The Netherlands	3 (7.1)
Belgium	1 (2.4)
Greece	1 (2.4)
Italy	1 (2.4)
Switzerland	1 (2.4)
North America	10 (23.8)
United States	8 (19.0)
Canada	2 (4.8)
South America (Brazil)	2 (4.8)
Australia	1 (2.4)
Journal	
<i>Obesity Surgery</i>	18 (42.9)
<i>Surgery for Obesity and Related Diseases</i>	4 (9.5)
<i>International Journal of Obesity</i>	3 (7.1)
<i>American Journal of Clinical Nutrition</i>	2 (4.8)
Other journals	15 (35.7)
Surgery type	
RYGB	18 (42.9)
Mixed procedures	14 (13 RYGB and 8 SG) (33.3)
VBG	4 (9.5)
GB	2 (4.8)
DS	1 (2.4)
SG	0
Not clear	3 (7.1)
Participant characteristics at baseline	
Age, mean range, y	32.4-49.9
Female, %	54.9-100
BMI range <sup>a</sup>	37.0-56.8

(continued)

As the outcomes were reported separately for each group, we treated them as independent cohorts in our analysis. Therefore, this review included 42 studies comprising 43 cohorts. The list of included studies is displayed in eTable 3 in [Supplement 2](#).

### Study Characteristics

Table 1 summarizes the characteristics of the included studies (full details in eTable 4 in [Supplement 2](#)). The included articles

Table 1. Summary of Study Characteristics (N = 42) (continued)

Characteristic	No. of studies (%)
Sample size, overall (No. in Europe/North America/South America/Australia) [%]	
≤100	16 (10/5/1/0) [38.1]
<100-500	12 (6/4/1/1) [28.6]
<500-1000	5 (5/0/0/0) [11.9]
<1000-5000	3 (2/1/0/0) [7.1]
>5000	6 (6/0/0/0) [14.3]
Comparison type <sup>b</sup>	
Before vs after	38 (90.5)
Surgery vs control	13 (31.0)
Both	9 (21.4)
Occupational outcomes <sup>b</sup>	
Employed	32 (76.2)
Unemployed	19 (45.2)
Return to work	4 (9.5)
Absenteeism, sick leave	10 (23.8)
Presenteeism, work ability, impairment	6 (14.3)
Work hours, incomes, earnings	6 (14.3)
Disability pension, state benefits	8 (19.0)

Abbreviations: BMI, body mass index; DS, duodenal switch; GB, gastric banding; NA, not applicable; RYGB: Roux-en-Y gastric bypass; SG, sleeve gastrectomy; VBG, vertical banded gastroplasty.

<sup>a</sup> Calculated as weight in kilograms divided by height in meters squared.

<sup>b</sup> Percentage exceeds 100% because categories were nonexclusive.

were published between 1977 and 2023 across 15 countries, with 61.9% published in 2010 and onwards. Except for 2 studies from developing settings (Brazil),<sup>12,57</sup> all were conducted in high-income countries in Europe (n = 29), North America (n = 10), and Australia (n = 1). Gastric bypass was the most frequently investigated surgery type (n = 32, with 18 primarily focused on this procedure). While vertical banded gastroplasty was frequently investigated before 2012, there was a trend toward SG after 2015, but with limited sample sizes and no study specifically focusing on the SG procedure.

A total of 159 678 patients were included in the analysis. The sample size for each study ranged from 21 to 54 681, with 38.1% of studies having a sample size of 100 or fewer patients. European studies typically included larger sample sizes, with 13 of 14 studies reporting samples larger than 500. Study populations were heterogeneous regarding demographic and clinical characteristics. The mean age ranged from 32.4 to 49.9 years, and most participants were female in all studies (ranging from 54.9% to 100%). The mean baseline BMI ranged from 37.0 to 56.8. Only 7 studies clearly mentioned the exclusion of "retired" participants from the enrolment or data analysis. Overall, the follow-up times ranged from 0.6 to 20 years.

Occupational outcomes were reported as primary outcomes in 31 studies. Despite inconsistent reporting of occupational outcomes, unemployment and employment rates and absenteeism/sick leave were the most reported. These data were mostly collected through a self-administered questionnaire (n = 22), followed by surgery registry (n = 9) and medical database (n = 6).

Table 2. Summary of Occupational Outcomes Before vs After Bariatric Surgery (n = 38 With 39 Comparisons)

Source	Country	Occupational outcomes <sup>a</sup>							Sample size
		Employment rate	Unemployment rate	RTW	Absenteeism, sick leave	Presenteeism, work ability, impairment	Work hours, incomes, earnings	Disability pension, state benefits	
Crisp et al, <sup>25</sup> 1977	UK	+				+			47
Hawke et al, <sup>32</sup> 1990	Australia	+							310 at Baseline; 240 at 3-y follow-up
Martin et al, <sup>38</sup> 1991	US	+							100
Rabner et al, <sup>46</sup> 1993	US	+	+						33
van Gemert et al, <sup>53</sup> 1999	Netherlands	+	0		+				21
Narbro et al, <sup>40</sup> 1999	Sweden				+				369 Surgically treated patients
Papageorgiou et al, <sup>45</sup> 2002	Greece	0	0						53
Velcu et al, <sup>54</sup> 2005	US	0	0						41
Wolfe et al, <sup>56</sup> 2006	US	0	0						93 (Completed surveys of 194 mailed)
Hawkins et al, <sup>33</sup> 2007	UK	+					+		59
Mathus-Vliegen et al, <sup>39</sup> 2007	Netherlands	0			+				49
Nickel et al, <sup>42</sup> 2007	Germany	+							21 Patients
Wagner et al, <sup>55</sup> 2007 (unemployed cohort)	US			+					38 Patients with medical disability underwent RYGB
Andersen et al, <sup>48</sup> 2010	Norway	+	+						51
Date et al, <sup>26</sup> 2013	UK	+							51 (23 With morbid obesity, 28 with super obesity)
Mariano et al, <sup>12</sup> 2013	Brazil	-	-						30
Turchiano et al, <sup>50</sup> 2014 (unemployed cohort)	US		+		+				72 Unemployed surgical patients
Andersen et al, <sup>20</sup> 2015	Norway	0	0		+				224
Durand-Moreau et al, <sup>27</sup> 2015	France	0	+						803
Hanvold et al, <sup>31</sup> 2015	Norway		0						165
Jönsson et al, <sup>34</sup> 2017	Sweden				0				4971 Surgery patients
Riccò et al, <sup>47</sup> 2017	Italy	+							30
Tarride et al, <sup>49</sup> 2017	Canada	0					+		304 (138 Returned the questionnaire)
Zubiaurre et al, <sup>57</sup> 2017	Brazil				+				140 Surgery group
Courtney et al, <sup>24</sup> 2018	UK	+	+						1011 (746 With employment data before and after)
Mancini et al, <sup>37</sup> 2018	France	+							238
Kantarovich et al, <sup>35</sup> 2019	Canada						+		211
Gornsen et al, <sup>11</sup> 2020 <sup>b</sup>	Denmark	0 <sup>b</sup>	0 <sup>b</sup>		0				749
Cohen et al, <sup>23</sup> 2021	France	+	+						133
Juhl et al, <sup>13</sup> 2021 <sup>b</sup>	Denmark	0 <sup>b</sup>	+						5008 Cases
Norrbäck et al, <sup>43</sup> 2021 (sister-matched cohort)	Sweden	0							1400 Bariatric patients

(continued)

Table 2. Summary of Occupational Outcomes Before vs After Bariatric Surgery (n = 38 With 39 Comparisons) (continued)

Source	Country	Occupational outcomes <sup>a</sup>					Follow-up time	Sample size
		Employment rate	Unemployment rate	RTW	Absenteeism, sick leave	Presenteeism, work ability, impairment		
Norrback et al, <sup>43</sup> 2021 (BMI-matched cohort)	Sweden	0 <sup>b</sup>					1, 2, 3, 4, 5 y	2967 Bariatric patients
Bramming et al, <sup>21</sup> 2022	Denmark		+		0		1, 3, 5 y	9126 Bariatric patients
Claassen et al, <sup>22</sup> 2022 (unemployed cohort)	Germany			+			1, 2 y	782
Halvachizadeh et al, <sup>30</sup> 2023 <sup>a</sup>	Switzerland	0 <sup>b</sup>	0 <sup>b</sup>				6 mo; 1, 2, 4, 5 y	623 (239 Employed and 384 unemployed)
King et al, <sup>14</sup> 2022	US	-			0 <sup>b</sup>	+	1-5, 7 y	1491
Van den Eynde et al, <sup>51</sup> 2022	Belgium	+				+	1-3 y	16 276
Köhler et al, <sup>36</sup> 2023	Germany	0			0 <sup>b</sup>	+	6 mo; 1, 4 y	197
Norrback et al, <sup>44</sup> 2023 <sup>c</sup>	Sweden				0 <sup>b</sup>	+	1, 2, 3, 4, 5 y	15 828 Patients

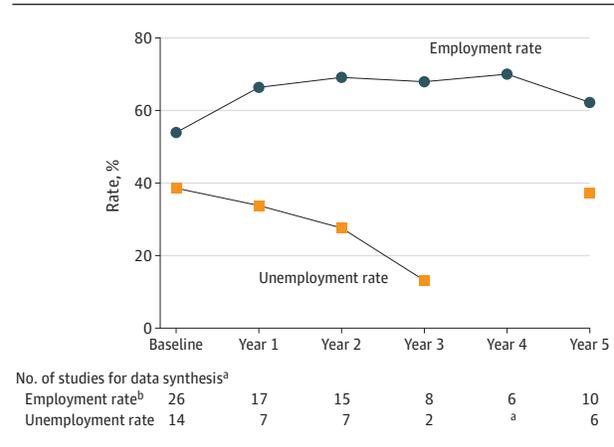
Abbreviations: 0, no substantial change in outcome; +, improvement in outcome; -, worse in outcome; BMI, body mass index; RTW, return to work; RYGB, Roux-en-Y gastric bypass.

<sup>a</sup> Based on the longest follow-up time if multiple times applied.

<sup>b</sup> This occupational outcome was determined based on the longest observational time point. An improvement in occupational outcome was found in the short-term period, however, it diminished in the long-term period (U-shape trajectory).

<sup>c</sup> This study reported the annual work loss (the sum of days of sick leave and disability pension).

Figure 2. Employment Trajectory of Bariatric Surgery From Baseline to Postsurgery Follow-Up



No. of studies for data synthesis<sup>a</sup>

Employment rate <sup>b</sup>	26	17	15	8	6	10
Unemployment rate	14	7	7	2	<sup>a</sup>	6

<sup>a</sup>The employment rate at year 6 (63.2%) and year 7 (70.5%) postsurgery and the unemployment rate at year 4 (10.0%) postsurgery were not drawn because of the smaller number of included studies (n < 2).

<sup>b</sup>The 3 studies with unemployed cohorts (100% unemployed at the enrolment) were not considered in this analysis.

Before vs after comparisons were reported in 38 studies, surgery versus nonsurgery comparisons in 13 studies, and both comparisons in 9 studies (Table 1 and eTable 3 in Supplement 2).

**Occupational Outcomes Before vs After Surgery**

Overall, 38 studies with 39 comparisons investigated occupational outcomes before vs after surgery. The results were summarized in Table 2 and eFigure 1A in Supplement 1, with full details in eTable 5 in Supplement 2.

**Employment Status**

Among the 29 comparisons for employment rates, 14 concluded positive changes, 13 showed no change, and 2 reported negative changes. Positive changes were primarily reported in earlier studies with relatively shorter follow-up times and smaller sizes. Of particular note, among the 13 studies indicating no changes in employment rates, 4 recent studies indicated a short-term positive effect that diminished over longer follow-up periods.<sup>11,13,30,44</sup> Two of these studies observed similar short-term improvements in unemployment status after bariatric surgery.<sup>11,30</sup>

Figure 2 depicts the trajectory of employment and unemployment rates after bariatric surgery, based on pooled results from 27 studies. These findings suggested a substantial improvement in overall short-term employment rates, from 54.4% at baseline to 66.4% at the first year after surgery, remaining stable until the fourth year before slightly decreasing by the fifth year postsurgery. Similarly, the pooled results of unemployment rates echo this trend where the unemployment rates decreased from 38.8% to 34.0% in the first year and 27.6% in the second year postsurgery but returned to the baseline level at the fifth year. Given the smaller number of studies contributing data at year 5, these long-term trends should be interpreted with caution, considering the limited data and heterogeneity among studies.

Table 3. Summary of Occupational Outcomes Between Surgery vs Nonsurgery Groups (n = 13 With 14 Comparisons)

Source	Country	Occupational outcomes <sup>a</sup>				Disability pension, state benefits	Follow-up time	Sample size	Matched variables including baseline BMI
		Employment rate	Unemployment rate	Presenteeism, work ability, activity	Work hours, income, earnings				
Näslund et al, <sup>41</sup> 1991	Sweden	+			+	≥1 y (1-5 y)	79 Surgery patients; 54 nonsurgery (waitlist)	Including baseline BMI	
Greenstein et al, <sup>28</sup> 1994	US	+	+		+	≥9 mo	17 Surgery patients, 11 conventional diet group	Not matched for BMI	
van Gemert et al, <sup>52</sup> 1998	Netherlands		+			85.9 ± 48.1 mo (6-168 mo)	62 Surgery patients, 20 patients with morbid obesity	Characteristics of control group matched those of the postoperative group closely, including baseline BMI	
Narbro et al, <sup>40</sup> 1999	Sweden			0	+	6 mo, 1, 2, 3, 4 y	369 Surgically treated patients and 371 matched controls with obesity	Matching considered 18 variables related to mortality; BMI was balanced between groups	
Nickel et al, <sup>42</sup> 2007	Germany	+				3, 4, 5, 6 y	21 Patients, 29 controls	No essential differences were found between the 2 groups	
Wagner et al, <sup>55</sup> 2007 (unemployed cohort)	US		+			44 mo (14 to 97) and 32 mo (15 to 62)	38 Patients with medical disability underwent RYGB, 16 controls	Not matched for BMI	
Gripeteg et al, <sup>29</sup> 2012	Sweden				+	6 mo, 1, 2, 3, 4, 6, 8, 10, 15, 20 y	2010 Surgery group, 2037 control group	Matched control group of 2037 created using sex and 18 other variables	
Turchiano et al, <sup>50</sup> 2014 (unemployed cohort)	US	+	+			1 y	72 Unemployed surgical patients, 121 unemployed patients with severe obesity	Not matched for BMI	
Jönsson et al, <sup>34</sup> 2017	Sweden				-	3 y (3-mo intervals)	4971 Surgery patients, 49 710 reference population	Not matched for BMI (general population as reference group)	
Juhl et al, <sup>13</sup> 2021 <sup>a</sup>	Denmark	- <sup>b</sup>	+			1, 2, 3, 4, 5, 6, 7 y	5008 Cases, 10 148 controls	Not matched for BMI (general population as reference group)	
Norrback et al, <sup>43</sup> 2021 (sister-matched cohort)	Sweden	- <sup>b</sup>				1, 2, 3, 4, 5 y	1400 Bariatric patients, 1400 patients with obesity	Not matched for BMI (general population as reference group)	
Norrback et al, <sup>43</sup> 2021 (BMI-matched cohort)	Sweden	0 <sup>b</sup>				1, 2, 3, 4, 5 y	2967 Bariatric patients, 2967 patients with obesity	Variables used for matching were BMI, birth year, education, and previous hospitalization with a cardiovascular, psychiatric, or a musculoskeletal diagnosis	
Bramming et al, <sup>21</sup> 2022	Denmark		0		-	1, 3, 5 y	9126 Bariatric patients, 10 328 patients with obesity	Propensity scores based on all potential cofounders, including age, gender, BMI, and employment status	
Norrback et al, <sup>44</sup> 2023 <sup>c</sup>	Sweden				- <sup>c</sup>	1, 2, 3, 4, 5 y	15 828 Patients, 15 828 general population	Not matched for BMI (general population as reference group)	

Abbreviations: 0, no substantial difference in outcome; +, improvement in outcome; -, worse in outcome; BMI, body mass index; RTW, return to work.

<sup>a</sup> Based on the longest follow-up time if multiple times applied.

<sup>b</sup> This occupational outcome was determined based on the longest observational time point. An improvement in occupational outcome was found in the short-term period, however, it was diminished in the long-term period (U-shape trajectory).

<sup>c</sup> This study reported the annual work loss (the sum of days of sick leave and disability pension).

**Return to Work**

All 3 unemployment cohorts investigating RTW outcomes indicated an improvement in job participation postsurgery. Wagner et al<sup>55</sup> found that 37% of patients with morbid obesity and Medicaid coverage returned to work after RYGB at a mean follow-up of 44 months. Turchiano et al<sup>50</sup> reported that bariatric surgery facilitated full-time employment for previously unemployed patients with obesity, with 24% becoming gainfully employed postsurgery. Claassen et al<sup>22</sup> showed that more than a third of previously unemployed patients were employed 1 year after surgery.

**Short-Term Work Loss (Absenteeism, Sick Leave, Work Hours, and Incomes)**

Among 10 comparisons for absenteeism/sick leave, 5 showed a decrease (ie, an improvement) in absenteeism and/or sick leave days post-surgery. The remaining 5 studies found no changes in absenteeism or sick leave days post-surgery; however, two of them identified short-term positive effects.<sup>14,44</sup> King et al<sup>14</sup> found that absenteeism (ie, missed work due to health) initially decreased after surgery, but rebounded by year 3 and remained stable thereafter. Norrbäck et al<sup>44</sup> reported that the annual work loss (the sum of days of sick leave and disability pension) decreased from 2.5 months to 1.99 months the first year postsurgery but returned to the baseline level at the fifth year.

Four of 5 comparisons reported increases in work hours<sup>38,49,57</sup> or incomes<sup>44</sup> postsurgery, with the remaining 1 reporting a slightly and insignificant increase in average paid work participation per week (31.2 hours at baseline vs 32.8 hours at year 2 postsurgery;  $P = .51$ ).<sup>48</sup>

**Work Capacity (Presenteeism, Work Ability Index, Work Impairment)**

All 4 comparisons investigating work capacity showed positive outcomes. To illustrate, Kantarovich et al<sup>35</sup> reported significant improvements in employment outcomes 2 years following surgery, with 68% of participants reporting decreased employment impairment and 44% reporting increased work productivity. Additionally, Köhler et al<sup>36</sup> observed improved work ability index scores at the fourth-year postsurgery, indicating enhanced productivity and capacity to work. King et al<sup>14</sup> found that presenteeism increased from year 3 to year 7 postsurgery and then remained better than preoperative levels (eg, participants reporting any at 7 years: 43%; preoperatively: 63%).

**Long-Term Work Loss (Disability Pension, State Benefits)**

The result of disability pension and state benefits was mixed, with 2 improved, 3 indifferent, and 2 worse outcomes. Gormsen et al<sup>11</sup> (with 749 patients undergoing laparoscopic RYGB) reported the percentage of patients post-RYGB receiving a disability pension or flex benefit increased significantly from 8% preoperatively to 11% after 5 years. Van den Eynde et al<sup>51</sup> (with 16276 bariatric patients) found a consistent reduction of inactive population during the 5-year follow-up. Norrbäck et al<sup>44</sup> found a reduction of annual work loss (sum of disability and absenteeism) at the first year after surgery, which then returned to the baseline level at the fifth year.

**Subgroup Analysis**

Subgroup analyses by surgery type for the before vs after comparison are presented in eTable 6 in Supplement 2, with studies of RYGB or mixed procedures (mostly comprised of RYGB) driving the main

results reported above. More positive outcomes were found in studies with other procedures; however, these involved smaller sample sizes and were conducted in earlier years.

**Occupational Outcomes Between Surgery vs Nonsurgery Groups**

Overall, 13 studies with 14 comparisons investigated outcomes in surgery vs nonsurgery groups. The results are summarized in Table 3 and eFigure 1B in Supplement 1, with full details in eTable 7 in Supplement 2. Sample sizes were smaller in earlier studies, and half of the studies ( $n = 7$ ; 53.8%) failed to match BMI between groups.

**Employment Status**

Among the 7 comparisons for employment rates, 4 comparisons (from 4 early studies with smaller sample sizes) concluded positive changes for surgical patients in the short term, while the remaining 3 comparisons (from 2 larger recent studies)<sup>13,43</sup> showed short-term effects but indifferent or worse long-term outcomes. For example, Juhl et al<sup>13</sup> demonstrated a significant positive but modest effect on employment status from baseline to the first year after surgery, but this was not sustained after 7 years of follow-up.

Consistent trends were observed for unemployment rates. Four of 5 comparisons indicated lower unemployment rate in the surgical group; however, these studies were subject to small sample sizes without BMI matching. The remaining study by Bramming et al<sup>21</sup> in Denmark (9126 bariatric patients and 10 328 patients with obesity) showed that the unemployment rate was similar between groups, especially for the men, but significantly higher in women at 5 years after surgery.

**Return to Work**

Higher RTW rates were observed in the surgical group in 2 unemployed cohorts. Wagner et al<sup>55</sup> reported a significant number of patients with morbid obesity and Medicaid coverage returning to work postsurgery (37%) compared with patients in the nonoperative control group (6%). Turchiano et al<sup>50</sup> revealed that up to 24% of unemployed patients with severe obesity became gainfully employed 1 year after bariatric surgery, compared with 9% who did not have surgery.

**Short-Term Work Loss (Absenteeism, Sick Leave, Work Hours, and Incomes)**

The surgical group exhibited more days of absenteeism or sick leave in 3 of 5 included studies. Bramming et al<sup>21</sup> in Denmark (with propensity scores matching for age, gender, BMI, and employment status between 9126 bariatric patients and 10 328 patients with obesity) showed that the risk of absence due to sickness was higher for both men and women postsurgery compared with matched controls. The 2 more recent studies from Sweden found consistent higher absenteeism or work loss in the bariatric groups from the presurgery to postsurgery stages than the general population without obesity. Despite the larger sample size, these 2 studies used general population controls without matching BMI between groups.<sup>34,44</sup> The remaining 2 studies from Sweden that matched BMI indicated no difference and improvements in sick leave days.<sup>40,41</sup>

Only 2 studies investigated work incomes. Näslund et al<sup>41</sup> reported higher average monthly income among the surgical group, while Norrbäck et al<sup>44</sup> found no evidence of improvement.

**Work Capacity**

Only 1 study investigated work functioning between groups, with improvements more pronounced in the surgical group. However, this study was published in 1990s with only 28 participants.

**Long-Term Work Loss (Disability Pension, State Benefits)**

Three studies reported the disability pension, with 2 improved outcomes and 1 worse outcome. The significantly lower disability pension days in the surgically treated group were observed in both Narbro et al<sup>40</sup> and Gripeteg et al<sup>29</sup> studies. However, Norrbäck et al<sup>44</sup> (with 15 828 patients and 15 828 from the general population) reported that the annual work losses (sum of disability and absenteeism) were consistently higher in bariatric patients. Despite the larger sample size, this study used the general population as reference without matching BMI between groups.<sup>44</sup>

**Subgroup Analysis**

Subgroup analyses by surgery type for surgery vs nonsurgery groups are presented in eTable 8 in [Supplement 2](#). Negative occupational results were mostly found in more recent studies of RYGB, while more positive outcomes were reported in studies investigating other procedures with smaller sample sizes and published in earlier years.

**Reported Predictors of Occupational Outcomes After Bariatric Surgery**

eFigure 2 in [Supplement 1](#) and eTable 9 in [Supplement 2](#) summarize the reported enablers and barriers influencing postsurgery employment outcomes. Achieving less weight loss,<sup>21,22,30,50</sup> being female,<sup>13,20-22,34</sup> being older (generally aged >50 years),<sup>20,25,46,51</sup> having preoperative comorbidities,<sup>12,26,34,55</sup> having lower quality of life,<sup>11,23,35</sup> and not participating in paid work before surgery<sup>21,24,28</sup> were predictors to poor occupational outcomes after bariatric surgery.

**Discussion**

This systematic review synthesized the evidence from 42 observational studies regarding the impact of bariatric surgery on employment and productivity outcomes. Over the past decade, the growing number of studies reflects increasing interest in understanding the broader socioeconomic implications of these procedures. Notably, most studies were conducted in high-income countries, with gastric bypass being the most investigated surgery type. Despite inconsistencies in reporting employment outcomes, employment and unemployment rates and absenteeism/sick leaves were the most frequently evaluated metrics. Bariatric surgery has shown positive effects on work productivity and short-term workforce participation, although evidence on long-term employment outcomes remains limited. Key barriers to postsurgical occupational outcomes included achieving insufficient weight loss, female sex, advanced age, preoperative comorbidities, lower quality of life, and preoperative unemployment.

The key finding from this review is the consistent positive impact of bariatric surgery on work productivity, particularly by improving presenteeism, work hours, and overall work capacity. Bariatric surgery is also reported to be associated with improved short-term employment participation, particularly within the first

1 to 2 years postoperatively. These early gains, often referred to as a honeymoon effect, are likely driven by rapid weight loss, alleviation of obesity-related comorbidities, and improved physical and psychological functioning,<sup>20,34</sup> which together enhance work ability and capacity.<sup>36</sup> However, sustaining these occupational benefits remains a significant challenge beyond the early postoperative phase.<sup>58</sup> Longitudinal data reveal that postoperative employment rates tend to peak and subsequently decline, forming a reversed U-shaped trajectory,<sup>11,13,14,30</sup> with many individuals returning to baseline employment levels after approximately 5 years. The underlying causes of this decline remain unclear but likely reflect the chronic, relapsing nature of obesity and the complex social, physical, and psychological barriers that patients face long term after surgery.<sup>59</sup> These observations emphasize that obesity is a chronic and lifelong condition requiring sustained management, rather than a 1-time intervention.<sup>60,61</sup> We hypothesize that long-term employment gains could be better preserved or even enhanced through ongoing postsurgical support, for example, integrating long-term pharmacological therapies (eg, GLP-1 receptor agonists) and implementing coordinated, multidisciplinary care (incorporating nutritional counselling, physical activity programs, and psychosocial support), to maintain health improvements and maximize societal and economic benefits.<sup>14,36</sup>

Our findings indicated that certain groups of patients, such as females, older adults, and those with preoperative comorbidities or limited work experience, are particularly vulnerable to suboptimal employment outcomes after bariatric surgery. To mitigate these risks, tailored interventions are essential. Female patients, especially women of reproductive age, for example, may benefit from maternal leave support programs that address specific career barriers.<sup>13,21,44,51,52</sup> Older patients might require additional rehabilitation and career counselling to reenter or remain in the workforce.<sup>13,22,25,46</sup> Furthermore, career training and job placement services for those who were not employed before surgery could enhance overall employment outcomes, reducing the economic burden of obesity and maximizing the societal benefits of bariatric surgery.<sup>20,24,34,44</sup>

**Limitations of Previous Work and Recommendations for Future Research**

This review highlighted several gaps in previous work, including a lack of research in low- to middle-income settings; limited evidence on the increasingly common SG procedure; a scarcity of randomized trial designs, which reduces the comparability and strength of causal inferences; inconsistent measurement of occupational outcomes; insufficient long-term follow-up; and a lack of comparative effectiveness data between bariatric surgery and novel GLP-1 receptor agonists such as semaglutide and tirzepatide. Future studies should aim to address these gaps by conducting randomized or well-controlled surgery vs control comparisons with BMI-matched cohorts, focusing on SG-specific outcomes, incorporating GLP-1 therapies as comparators, including participants from underrepresented regions, undertaking longitudinal analyses of career progression, and adopting standardized outcome measures to enhance comparability and evidence quality. A detailed list of limitations and recommendations is provided in eTable 10 in [Supplement 2](#).

## Strengths and Limitations of This Review

This study provides a comprehensive overview of the impact of bariatric surgery on occupational outcomes, synthesizing evidence across multiple studies over multiple decades. However, the review is also limited by the heterogeneity of the included studies, particularly regarding the different definitions of occupational outcomes and variations in surgery types across multiple countries. Second, small sample sizes and short follow-up times raised concerns about data reliability. Third, the reclassification of the occupational outcomes in this study is subjective. For example, the work hours missed was classified as "short-term work loss"; however, it is not clear if some of these hours were attributed to longer-term disability or early retirement.

Despite these limitations, rigorous inclusion criteria, exhaustive literature searches, and validated data synthesis methods enhance the robustness of this review. This project highlights the

critical need for long-term strategies to maintain and amplify the occupational benefits postsurgery and to develop targeted interventions for at-risk populations.

## Conclusions

Bariatric surgery may offer broad economic and social benefits above and beyond its immediate health benefits. This review demonstrates the short-term impact of bariatric surgery on workforce productivity and participation, while the long-term sustainability of these outcomes remains uncertain. Certain subgroups, such as females and older adults, may require additional postsurgery employment support. This study highlights the need for continued research into effective postsurgical support strategies and the social value of long-term investment.

### ARTICLE INFORMATION

**Accepted for Publication:** July 14, 2025.

**Published Online:** October 1, 2025.  
doi:10.1001/jamasurg.2025.3611

**Author Affiliations:** Australian Centre for Health Services Innovation and Centre for Healthcare Transformation, School of Public Health and Social Work, Faculty of Health, Queensland University of Technology, Brisbane, Queensland, Australia (Xia, Donovan, Carter); School of Mathematics and Statistics, University of Melbourne, Parkville, Victoria, Australia (Diao); Shanghai Yangpu District Center for Disease Control and Prevention, Shanghai, China (Yang); Centre for Big Data Research in Health, University of New South Wales, New South Wales, Australia (Jin); Precision Statistics Pty Ltd, Artarmon, New South Wales, Australia (Jin); Department of Public Health Sciences, College of Behavioural, Social, and Health Sciences, Clemson University, Clemson, South Carolina (Lartey).

**Author Contributions:** Dr Xia had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

**Concept and design:** Xia, Lartey, Carter.  
**Acquisition, analysis, or interpretation of data:** Xia, Donovan, Diao, Yang, Jin, Lartey.  
**Drafting of the manuscript:** Xia.

**Critical review of the manuscript for important intellectual content:** All authors.

**Statistical analysis:** Xia, Diao, Yang, Jin.

**Obtained funding:** Xia.

**Administrative, technical, or material support:** Xia, Donovan, Diao.

**Supervision:** Carter.

**Conflict of Interest Disclosures:** None reported.

**Funding/Support:** This project is funded by the 2023 Queensland University of Technology Centre for Healthcare Transformation grant.

**Role of the Funder/Sponsor:** The funder had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; preparation, review, or approval of the manuscript; or decision to submit the manuscript for publication.

**Additional Contributions:** We thank Cameron Rutter, a librarian who previously served at the School of Public Health and Social Work,

Queensland University of Technology (QUT), for assistance with developing the search strategy for this review. Special thanks to the QUT Centre for Environment and Society Early-Middle Career Researchers for providing the opportunity to finalize the manuscript.

### REFERENCES

- Chang SH, Stoll CR, Song J, Varela JE, Eagon CJ, Colditz GA. The effectiveness and risks of bariatric surgery: an updated systematic review and meta-analysis, 2003-2012. *JAMA Surg.* 2014;149(3):275-287. doi:10.1001/jamasurg.2013.3654
- Buchwald H, Avidor Y, Braunwald E, et al. Bariatric surgery: a systematic review and meta-analysis. *JAMA.* 2004;292(14):1724-1737. doi:10.1001/jama.292.14.1724
- Xia Q, Campbell JA, Ahmad H, Si L, de Graaff B, Palmer AJ. Bariatric surgery is a cost-saving treatment for obesity: a comprehensive meta-analysis and updated systematic review of health economic evaluations of bariatric surgery. *Obes Rev.* 2020;21(1):e12932. doi:10.1111/obr.12932
- Aranda-Reneo I, Rodríguez-Sánchez B, Peña-Longobardo LM, Oliva-Moreno J, López-Bastida J. Can the consideration of societal costs change the recommendation of economic evaluations in the field of rare diseases? an empirical analysis. *Value Health.* 2021;24(3):431-442. doi:10.1016/j.jval.2020.10.014
- Duevel JA, Hasemann L, Peña-Longobardo LM, et al. Considering the societal perspective in economic evaluations: a systematic review in the case of depression. *Health Econ Rev.* 2020;10(1):32. doi:10.1186/s13561-020-00288-7
- Rodríguez-Sánchez B, Aranda-Reneo I, Oliva-Moreno J, Lopez-Bastida J. Assessing the effect of including social costs in economic evaluations of diabetes-related interventions: a systematic review. *Clinicoecon Outcomes Res.* 2021;13:307-334. doi:10.2147/CEOR.S301589
- Rodríguez-Sánchez B, Daugbjerg S, Peña-Longobardo LM, et al. Does the inclusion of societal costs change the economic evaluations recommendations? a systematic review for multiple sclerosis disease. *Eur J Health Econ.* 2023;24(2):247-277. doi:10.1007/s10198-022-01471-9
- van Baal PH, Wong A, Slobbe LC, Polder JJ, Brouwer WB, de Wit GA. Standardizing the inclusion of indirect medical costs in economic evaluations. *Pharmacoeconomics.* 2011;29(3):175-187. doi:10.2165/11586130-000000000-00000
- Xia Q, Campbell J, Palmer AJ. The need for an improved evidence base to inform the health care decision-making process. *JAMA Surg.* 2021;156(4):398-399. doi:10.1001/jamasurg.2020.6378
- Xia Q, Campbell JA, Ahmad H, Palmer AJ. Comment on: Bariatric surgery is expensive but improves co-morbidity: 5-year assessment of patients with obesity and type 2 diabetes. *Br J Surg.* 2021;108(8):e280. doi:10.1093/bjs/zxab164
- Gormsen J, Gögenur I, Helgstrand F. Quality of life and occupational outcomes after laparoscopic Roux-en-Y gastric bypass surgery. *Surgery.* 2020;168(3):471-477. doi:10.1016/j.surg.2020.04.002
- Mariano MLLM, Monteiro CS, de Paula MAB. Bariatric surgery: its effects for obese in the workplace [in Portuguese]. *Rev Gaúcha Enferm.* 2013;34(3):38-45. doi:10.1590/s1983-14472013000300005
- Juhl CB, Holst R, Mundbjerg LH, Stolberg C, Gran JM, Thomsen GF. Effect of bariatric surgery on employment status: a 7 years controlled nationwide registry study. *BMJ Open.* 2021;11(6):e042845. doi:10.1136/bmjopen-2020-042845
- King WC, Hinerman AS, White GE. A 7-year study of the durability of improvements in pain, physical function, and work productivity after Roux-en-Y gastric bypass and sleeve gastrectomy. *JAMA Netw Open.* 2022;5(9):e2231593. doi:10.1001/jamanetworkopen.2022.31593
- Page MJ, McKenzie JE, Bossuyt PM, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ.* 2021;372(71):n71. doi:10.1136/bmj.n71
- Hernæs UJ, Andersen JR, Norheim OF, Våge V. Work participation among the morbidly obese seeking bariatric surgery: an exploratory study from Norway. *Obes Surg.* 2015;25(2):271-278. doi:10.1007/s11695-014-1333-8
- Raman SR, Franco D, Holover S, Garber S. Does transumbilical single incision laparoscopic adjustable gastric banding result in decreased pain medicine use? a case-matched study. *Surg Obes Relat Dis.* 2011;7(2):129-133. doi:10.1016/j.soard.2010.09.027
- Jambhekar A, Maselli A, Robinson S, Kabata K, Gorecki P. Demographics and socioeconomic status as predictors of weight loss after laparoscopic sleeve gastrectomy: a prospective cohort study. *Int*

- J Surg.* 2018;54(pt A):163-169. doi:10.1016/j.jisu.2018.04.025
19. Karlsson J, Sjöström L, Sullivan M. Swedish obese subjects (SOS)-an intervention study of obesity: two-year follow-up of health-related quality of life (HRQL) and eating behavior after gastric surgery for severe obesity. *Int J Obes Relat Metab Disord.* 1998;22(2):113-126. doi:10.1038/sj.jjo.0800553
20. Andersen JR, Hernæs UJV, Hufthammer KO, Våge V. Employment status and sick-leave following obesity surgery: a five-year prospective cohort study. *PeerJ.* 2015;3:e1285. doi:10.7717/peerj.1285
21. Bramming M, Becker U, Jørgensen MB, Neermark S, Bisgaard T, Tolstrup JS. Bariatric surgery and risk of unemployment and sickness absence. *Obes Surg.* 2022;32(3):720-728. doi:10.1007/s11695-021-05802-2
22. Claassen K, Kügler K, Celesnik J, Senkal M, Jäger P. Does the selection of the procedure impact the return to work in unemployed patients undergoing bariatric surgery? *Obes Surg.* 2022;32(9):2960-2965. doi:10.1007/s11695-022-06164-z
23. Cohen R, Benavenga R, Fysekidis M, Bendacha Y, Catheline JM. Social isolation but not deprivation involved in employment status after bariatric surgery. *PLoS One.* 2021;16(9):e0256952. doi:10.1371/journal.pone.0256952
24. Courtney MJ, Mahawar K, Burnell P, et al. Occupational outcomes of obesity surgery: do the employed return to work, and do the unemployed find work? *Obes Surg.* 2018;28(4):963-969. doi:10.1007/s11695-017-2963-4
25. Crisp AH, Kalucy RS, Pilkington TR, Gazet JC. Some psychosocial consequences of ileojejunal bypass surgery. *Am J Clin Nutr.* 1977;30(1):109-120. doi:10.1093/ajcn/30.1.109
26. Date RS, Walton SJY, Ryan N, Rahman SN, Henley NC. Is selection bias toward super obese patients in the rationing of metabolic surgery justified? a pilot study from the United Kingdom. *Surg Obes Relat Dis.* 2013;9(6):981-986. doi:10.1016/j.soard.2013.01.022
27. Durand-Moreau Q, Gautier A, Bécouarn G, Topart P, Rodien P, Sallé A. Employment and professional outcomes in 803 patients undergoing bariatric surgery in a French reference center for obesity. *Int J Occup Environ Med.* 2015;6(2):95-103. doi:10.15171/ijom.2015.502
28. Greenstein RJ, Rabner JG, Taler T. Bariatric surgery vs. conventional dieting in the morbidly obese. *Obes Surg.* 1994;4(1):16-23. doi:10.1381/096089294765558845
29. Gripegteg L, Lindroos AK, Peltonen M, Sjöström L, Narbro K. Effects of bariatric surgery on disability pension in Swedish obese subjects. *Int J Obes (Lond).* 2012;36(3):356-362. doi:10.1038/sj.jjo.2011.15
30. Halvachizadeh S, Muller D, Baechtold M, Hauswirth F, Probst P, Muller MK. Bariatric metabolic surgery eliminates body mass index as a risk factor for unemployment. *Surg Obes Relat Dis.* 2023;19(4):356-363. doi:10.1016/j.soard.2022.10.017
31. Hanvold SE, Løken EB, Paus SF, et al. Great health benefits but no change in employment or psychopharmaceutical drug use 2 years after Roux-en-Y gastric bypass. *Obes Surg.* 2015;25(9):1672-1679. doi:10.1007/s11695-015-1583-0
32. Hawke A, O'Brien P, Watts JM, et al. Psychosocial and physical activity changes after gastric restrictive procedures for morbid obesity. *Aust N Z J Surg.* 1990;60(10):755-758. doi:10.1111/j.1445-2197.1990.tb07469.x
33. Hawkins SC, Osborne A, Finlay IG, Alagaratnam S, Edmond JR, Welbourn R. Paid work increases and state benefit claims decrease after bariatric surgery. *Obes Surg.* 2007;17(4):434-437. doi:10.1007/s11695-007-9073-7
34. Jönsson E, Ornstein P, Goine H, Hedenbro JL. Diabetes resolution and work absenteeism after gastric bypass: a 6-year study. *Obes Surg.* 2017;27(9):2246-2252. doi:10.1007/s11695-017-2642-5
35. Kantarovich K, Wnuk S, Cassin S, Hawa R, Sockalingam S. Employment outcomes 2 years after bariatric surgery: relationship to quality of life and psychosocial predictors. *Obes Surg.* 2019;29(9):2854-2861. doi:10.1007/s11695-019-03905-5
36. Köhler H, Bollenbach IA, Gruner-Labitzke K, et al. Improvement of work ability after weight loss surgery: results of a longitudinal study of patients suffering from extreme obesity before and 4 years after bariatric surgery. *Obes Surg.* 2023;33(5):1347-1355. doi:10.1007/s11695-023-06548-9
37. Mancini A, Borel AL, Coumes S, Wion N, Arvieux C, Reche F. Bariatric surgery improves the employment rate in people with obesity: 2-year analysis. *Surg Obes Relat Dis.* 2018;14(11):1700-1704. doi:10.1016/j.soard.2018.06.026
38. Martin LF, Tan TL, Holmes PA, et al. Preoperative insurance status influences postoperative complication rates for gastric bypass. *Am J Surg.* 1991;161(6):625-634. doi:10.1016/0002-9610(91)91244-d
39. Mathus-Vliegen EMH, de Wit LT. Health-related quality of life after gastric banding. *Br J Surg.* 2007;94(4):457-465. doi:10.1002/bjs.5607
40. Narbro K, Ågren G, Jonsson E, et al. Sick leave and disability pension before and after treatment for obesity: a report from the Swedish Obese Subjects (SOS) study. *Int J Obes Relat Metab Disord.* 1999;23(6):619-624. doi:10.1038/sj.jjo.0800890
41. Näslund I, Ågren G. Social and economic effects of bariatric surgery. *Obes Surg.* 1991;1(2):137-140. doi:10.1381/096089291765561132
42. Nickel MK, Loew TH, Bachler E. Change in mental symptoms in extreme obesity patients after gastric banding, part II: six-year follow up. *Int J Psychiatry Med.* 2007;37(1):69-79. doi:10.2190/X40R-712P-8J44-0L3H
43. Norrbäck M, Neovius M, Ottosson J, Näslund I, Bruze G. Earnings and employment for women after bariatric surgery: a matched cohort study. *Int J Obes (Lond).* 2021;45(4):766-775. doi:10.1038/s41366-021-00737-1
44. Norrbäck M, Neovius M, Ottosson J, Näslund I, Bruze G. Earnings and work loss from 5 years before to 5 years after bariatric surgery: a cohort study. *PLoS One.* 2023;18(5):e0285379. doi:10.1371/journal.pone.0285379
45. Papageorgiou GM, Papakostantinou A, Mamplekou E, Terzis I, Melissas J. Pre- and postoperative psychological characteristics in morbidly obese patients. *Obes Surg.* 2002;12(4):534-539. doi:10.1381/096089202762252307
46. Rabner JG, Dalton S, Greenstein RJ. Obesity surgery: dietary and psychosocial expectations and reality. *Mt Sinai J Med.* 1993;60(4):305-310.
47. Riccò M, Marchesi F, Tartamella F, et al. The impact of bariatric surgery on health outcomes, wellbeing and employment rates: analysis from a prospective cohort study. *Ann Ig.* 2017;29(5):440-452. doi:10.7416/ai.2017.2176
48. Andersen JR, Aasprang A, Bergsholm P, Sletteskog N, Våge V, Karin Natvig G. Health-related quality of life and paid work participation after duodenal switch. *Obes Surg.* 2010;20(3):340-345. doi:10.1007/s11695-009-9837-3
49. Tarride JE, Breau R, Sharma AM, et al. The effect of bariatric surgery on mobility, health-related quality of life, healthcare resource utilization, and employment status. *Obes Surg.* 2017;27(2):349-356. doi:10.1007/s11695-016-2298-6
50. Turchiano M, Saunders JK, Fernandez G, Navie L, Labrador L, Parikh M. Bariatric surgery may improve employment status in unemployed, underserved, severely obese patients. *Obes Surg.* 2014;24(5):692-695. doi:10.1007/s11695-013-1140-7
51. Van den Eynde A, De Cock D, Fabri V, et al. Back to work after bariatric surgery? a Belgian population study. *Obes Surg.* 2022;32(8):2625-2631. doi:10.1007/s11695-022-06118-5
52. van Gemert WG, Adang EM, Greve JW, Soeters PB. Quality of life assessment of morbidly obese patients: effect of weight-reducing surgery. *Am J Clin Nutr.* 1998;67(2):197-201. doi:10.1093/ajcn/67.2.197
53. van Gemert WG, Adang EMM, Kop M, Vos G, Greve JWM, Soeters PB. A prospective cost-effectiveness analysis of vertical banded gastroplasty for the treatment of morbid obesity. *Obes Surg.* 1999;9(5):484-491. doi:10.1381/096089299765552792
54. Velcu LM, Adolphine R, Mourelo R, Cottam DR, Angus LD. Weight loss, quality of life and employment status after Roux-en-Y gastric bypass: 5-year analysis. *Surg Obes Relat Dis.* 2005;1(4):413-416. doi:10.1016/j.soard.2005.04.007
55. Wagner AJ, Fabry JM Jr, Thirlby RC. Return to work after gastric bypass in Medicaid-funded morbidly obese patients. *Arch Surg.* 2007;142(10):935-940. doi:10.1001/archsurg.142.10.935
56. Wolfe BL, Terry ML. Expectations and outcomes with gastric bypass surgery. *Obes Surg.* 2006;16(12):1622-1629. doi:10.1381/096089206779319473
57. Zubiaurre PR, Bahia LR, da Rosa MQM, et al. Estimated costs of clinical and surgical treatment of severe obesity in the Brazilian public health system. *Obes Surg.* 2017;27(12):3273-3280. doi:10.1007/s11695-017-2776-5
58. Lynch A. "When the honeymoon is over, the real work begins": gastric bypass patients' weight loss trajectories and dietary change experiences. *Soc Sci Med.* 2016;151:241-249. doi:10.1016/j.socscimed.2015.12.024
59. Watson T. Fat cells have a 'memory' of obesity - hinting at why it's hard to keep weight off. *Nature.* 2024;635(8040):798. doi:10.1038/d41586-024-03614-9
60. Eisenberg D, Shikora SA, Aarts E, et al. 2022 American Society for Metabolic and Bariatric Surgery (ASMBS) and International Federation for the Surgery of Obesity and Metabolic Disorders (IFSO): indications for metabolic and bariatric surgery. *Surg Obes Relat Dis.* 2022;18(12):1345-1356. doi:10.1016/j.soard.2022.08.013
61. Ma R, Jiang PQ, Liu SY, Yang DQ, Jiao Y. Obesity-surgery is not the end. *World J Gastrointest Surg.* 2024;16(12):3643-3646. doi:10.4240/wjgs.v16.i12.3643