



Employment and Professional Outcomes in 803 Patients Undergoing Bariatric Surgery in a French Reference Center for Obesity

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Abstract

Background: Very few studies have been performed on small populations about the links between employment and bariatric surgery.

Objective: To determine if rates of employment are increased among patients who have undergone bariatric surgery, to assess their post-operative health consequences (post-prandial weakness, diarrhea), and patients' ability to maintain post-operative advice (*ie*, 30 minutes of daily physical activity, 6 small meals daily) compared to non-employed post-surgical patients.

Methods: This cross-sectional study was performed in the Regional Reference Centre for Obesity, which is a partnership between the University Hospital and a clinic in Angers, France during 2012 using a self-administrated questionnaire completed by patients hospitalized for post-operative follow-ups after bariatric surgery. Issues investigated were their professional situation before and after the surgery, compliancy to post-operative advice, and any post-operative side effects.

Results: Employment rates were 64.4% before and 64.7% after the surgery ($p=0.94$). Of these, 30.6% maintained 30 minutes of daily physical activity vs. 41.0% of non-workers ($p=0.02$). 50.5% of employed patients and 57.3% of non-workers maintained 6 small meals a day after surgery ($p=0.09$). 8% of working patients reported post-prandial weaknesses and 8% reported diarrhea that caused problems at work.

Conclusion: Employment rate remained stable after surgery. Having a job seemed to be an obstacle to managing 30 minutes of daily exercise, especially among women, but not maintaining 6 small meals a day. Therefore, working environment needs to be assessed to improve job quality and retention for patients who have undergone bariatric surgery.

Keywords: Bariatric surgery; Employment; Obesity, morbid; Occupational health; Motor activity; Postoperative period

Introduction

The relationships between occupation and obesity have been widely studied. Several studies have inves-

tigated the particular problems overweight people face at work: their personal protective equipment that may not fit their anthropometric characteristics,¹ the main professions that are associated with obe-

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sity, especially men working in transport,² professional factors, especially the impact of shift work, which increases the risk of being overweight,³⁻⁵ macroeconomic consequences,⁶ and increased work injuries and absenteeism.^{3,6-10} Obese people often undergo discrimination at work.^{7,11-13} Programs of intervention to reduce weight have been also tested by companies with short-term but not long-term efficiency.^{3,14-18}

In contrast, very few studies have investigated the links between occupation and bariatric surgery. To our knowledge, only two research teams have published reports on this issue. Changes in employment rates among patients who have undergone bariatric surgery have only been documented in relatively small groups of patients.

Wagner, *et al*,¹⁹ performed a retrospective survey in a disabled population in the USA who received support from Medicare. They compared 38 patients who had undergone Roux-en-Y gastric bypass (RYGB) with a control group of 16 patients who were not eligible to RYGB. Thirty-seven percent of patients returned to work after RYGB, compared to 6% of the non-surgical control group ($p=0.02$). The authors concluded that RYGB resulted in significant rehabilitation in a morbidly obese population. Hawkins, *et al*,²⁰ performed a retrospective survey on 59 patients to investi-

gate the number of patients who returned to work and the state benefits claimed after a RYGB or laparoscopic adjustable gastric band (LAGB). The authors found a 32%-increase in respondents who were employed after surgery ($p<0.05$), and that these patients claimed fewer state benefits ($p<0.01$).

Bariatric surgery has several post-operative consequences, such as dumping syndrome, *ie*, late post-prandial hypoglycemia or diarrhea,²¹ which can lead to difficulties at work. The French National Authority for Health has published guidelines concerning bariatric surgery²² in which it is recommended that patients have six small meals a day and carry out 30 minutes of physical activity daily. These recommendations help patients to maintain their weight loss, improve their corporal composition, decrease their food intake and minimize the risk of post-prandial hypoglycemia.²³⁻²⁶ However, patients who are working can have problems maintaining these recommendations. To our knowledge, these aspects have not been evaluated before.

In this context, we assessed the consequences of bariatric surgery on employment rate and the health effects from bariatric surgery on maintaining paid work (post-prandial weakness, diarrhea), the ability to have six daily meals, and 30 minutes of daily physical activity.

Patients and Methods

This cross-sectional study included patients hospitalized for a post-operative follow-up, regarding guidelines provided by the French National Authority for Health,²² at the Regional Reference Centre for Obesity in Angers, France, which is a partnership between the University Hospital and a clinic.

All patients had undergone bariatric surgery—RYGB, LAGB, Duodenal Switch (DS), or Sleeve Gastrectomy (SG). The

TAKE-HOME MESSAGE

- Literature about working issues of patients who underwent obesity surgery showed an increase in the employment rate after surgery in studies performed with small populations.
- We showed no change in the employment rates of patients after bariatric surgery.
- Workers were less likely to practice daily exercise but not maintaining six small food intakes a day as recommended.

time between surgery and the hospital follow-up varied from 6 to 60 months or more. All hospitalized patients received a self-administrated questionnaire. They were free to complete the questionnaire or refuse. They signed an informed written consent and their anonymity was guaranteed.

The questionnaire was created specifically for the study by the authors. The investigated domains concerned the patients' professional status at one month before the surgery and at the time of their follow-up (*ie*, at 6, 12, 24, 36, 48, 60 months or more), any difficulties encountered maintaining six small meals a day, managing 30 minutes of daily physical activity, and the repercussions of post-prandial weakness and diarrhea at work.

The questionnaire was offered to all patients hospitalized for a follow-up between January 1, and December 31, 2012. Only patients who signed the informed consent, approved by the local ethics committee, and who completed the questionnaire were included. Patients hospitalized for a 6-month follow-up were excluded because they would have been over-represented if they had also had a 12-month follow-up during the same year. For the same reason, patients seen twice in 2012 were excluded.

To collect information on patients' jobs, we used the French national classification of occupations (PCS 2003, "*Professions et catégories socioprofessionnelles*") from the French National Institute for Statistics and Economic Studies. This classification is divided into six groups: farmers, shopkeepers and independent workers, managers and higher intellectual professions, intermediate occupations, employees, and blue collar workers.

Our main study outcome was the employment rate of the studied population, calculated using the declarative data given by the participants. Ability to maintain six meals per day was compared between

workers and non-workers. Those who declared in the questionnaire having a job, regardless of the number of working hours, were considered "workers." Those who declared they had no job, including those who were unemployed, retired, disabled or had other status (*eg*, students, housewives...) were considered "non-workers."

Levels of physical activity (≥ 30 minutes a day, < 30 minutes a day, or no physical activity) were compared between workers and non-workers. We also assessed the reported difficulties associated with diarrhea and post-prandial weakness at work.

Statistical Analysis

The results were collated and analyzed using R ver 2.14.2 (R Development Core Team, Vienna, Austria). χ^2 or Fisher's exact test was used to compare differences between categories, whenever appropriate. *Student's t* test for independent samples was used to compare means of a normally distributed variable between two groups. A *p* value < 0.05 was considered statistically significant.

Results

During the study period, 1153 patients were hospitalized in the Regional Reference Centre for Obesity for a bariatric post-operative follow-up; 1040 patients completed a questionnaire (response rate of 90.2%). Of these, 237 patients were excluded (230 had come for a 6-month follow-up, and seven patients were visited twice). A total of 803 patients was included in the final analyses. The characteristics of the study population are shown on Table 1.

Workers

There was no significant difference in the employment rate between patients before and after the surgery (64.4% *vs* 64.7%, *p*=0.94; Table 2).

Of 511 employed patients before the sur-

Table 1: Characteristics of the study population

Parameters	Total	Women	Men	p value
n (%)	803 (100)	682 (84.9)	121 (15.1)	
Number of patients at follow-up, n (%)				
12 months	226 (28.1)	193 (28.3)	33 (27.3)	
24 months	227 (28.3)	189 (27.7)	38 (31.4)	
36 months	148 (18.4)	125 (18.3)	23 (19.0)	0.82
48 months	106 (13.2)	90 (13.2)	16 (13.2)	
≥60 months	96 (12.0)	85 (12.5)	11 (9.1)	
Type of surgery*, n (%)				
RYGB	653 (81.3)	567 (83.1)	86 (71.0)	
SG	83 (10.3)	57 (8.4)	26 (21.5)	
DS	61 (7.6)	52 (7.4)	9 (7.4)	<0.001
LAGB	6 (0.7)	6 (0.9)	0 (0)	
Mean (SD) age at baseline (yrs)	45.6 (11.2)	45.1 (11.2)	45.6 (10.8)	0.005
Mean (SD) BMI [†] at baseline (kg/m ²)	44.9 (6.9)	44.8 (6.9)	45.6 (6.9)	0.25
*RYGB: Roux-en-Y gastric bypass; SG: Sleeve gastrectomy; DS: Duodenal switch; LAGB: Laparoscopic adjusted gastric band				
[†] BMI: Body mass index				

gery, 437 (85.5%) kept a job—334 (76.4%) kept the same job, 16 (3.7%) had retired, 15 (3.4%) became unemployed, 13 (3.0%) stopped working or were disabled; other participants had other status (eg, students, housewives...).

There were no significant differences in the distribution of occupational categories before and after the surgery, among both women (p=0.91) and men (p=0.88) (Table

Table 2: Employment rates before and after bariatric surgery

Participants	Before surgery	After surgery	p value
Women (n=682)	426 (63.1%)	431 (64.8%)	0.55
Men (n=121)	85 (71.4%)	76 (63.9%)	0.27
Total (n=803)	511 (64.4%)	507 (64.7%)	0.94

3).

Non-workers

Table 4 shows the status of non-workers before and after the surgery. The distribution of non-workers was significantly (p=0.04) different before and after the surgery (Table 4). The number of unemployed people was lower after surgery; more had retired.

After surgery of the 283 non-working patients, 204 (72.1%) were still non-workers, however, 69 (24.4%) found a job.

Abiding by Post-operative Advice

There was no significant (p=0.09) difference in maintaining six small meals daily after surgery between workers (50.5% managed to do so) and non-workers (57.3% managed to do so). Among the 507 employed patients who underwent bariatric surgery, 69 (13.6%) reported having difficulties in maintaining the meals during working hours. Workers were less able to maintain physical activity compared to non-workers (p=0.02; Table 5). This difference remained significant among women (p=0.04), but not among men. Amongst all workers who underwent bariatric surgery, 207 (40.8%) attributed their difficulty in maintaining physical activity to their work.

Post-operative Side Effects

There was no significant difference in the frequency of post-prandial weakness (p=0.97) or diarrhea (p=0.60) between workers and non-workers. Among all the workers, 106 had post-prandial weakness after surgery—23.1% of RYGB patients, 12.5% of DS patients, 8.3% of SG patients, and none of AGB patients suffered from weakness (p=0.09). Among these 106 workers, 40 (7.9% of all working patients) said it affected their professional activities. The main problems reported by workers were absenteeism, cessation of work, fa-

tigue and impaired concentration, need to lie down and rest for a variable period, and need to go home.

Of studied workers, 110 had diarrhea after surgery; 48.5% of DS patients, 22.2% of RYGB patients, 5.7% of SG patients, and none of AGB patients had diarrhea ($p < 0.001$). Among these 110 workers, 40 (7.9% of all working patients) said the diarrhea caused some work problems. Sometimes, they needed to go to the toilet that interrupted their activities. This ultimately caused some of the workers changed their professional activity. Some patients said that they needed to determine the location of toilets before attending a meeting and if they could not do so, they preferred not to go to the meeting. The humiliation by coworkers associated with the annoying smells was also mentioned by some patients.

Discussion

The proportions of patients who were working before and after bariatric surgery were the same in our survey. This contrasts with the results of studies conducted by Wagner, *et al*, and Hawkins, *et al*.^{19,20} Both these studies showed there was a significant increase in employment at post-surgery of, respectively, 37% and 32% of workers. However, both studies only assessed small populations. Wagner's survey concerned a Medicaid-funded population, who were earning $\leq 150\%$ than the American poverty level. The quality of this study was criticized by Tishler, *et al*, because of

Table 3: Frequency distribution of occupational categories among working patients, before and after the surgery. Values are n (%).

Job category	Women*		Men*	
	Before	After	Before	After
Employees	243 (57.7)	252 (58.7)	8 (9)	4 (5)
Blue collar workers	77 (18.3)	68 (15.9)	35 (41)	35 (46)
Intermediate occupations	57 (13.5)	67 (15.6)	16 (19)	11 (14)
Shopkeepers and independent workers	18 (4.3)	18 (4.2)	13 (15)	14 (18)
Managers and higher intellectual professions	18 (4.3)	17 (4.0)	12 (14)	11 (14)
Farmers	8 (1.9)	7 (1.6)	1 (1)	1 (1)
Missing values	5 (1.2)	2 (0.5)	0 (0)	0 (0)
Total	426 (100)	431 (100)	85 (100)	76 (100)

*There was no significant ($p > 0.88$) difference in distribution of job categories

the small size of its population.²⁷ Therefore, generalization of Wagner's results is not possible.

Our study included a large population ($n=803$), without any age or income exclusion criteria. We also had a high response rate (90.2%), probably because the questionnaire was completed during hospitalization and not by mail. Our survey also included all the main available surgical options—RYGB, LAGB, DS, and SG.

Sixty-nine (15.5%) patients who had work before surgery lost their job after the operation. On the other hand, 69 (24.4%) patients who did not have any work before surgery found a job after the opera-

Table 4: Work status of non-working patients. Values are n (%). The post-operative values had a significantly ($p=0.04$) difference with the pre-operative values.

Time	Unemployed	Retired	Work cessation	Other	Missing values	Total
Before surgery	76 (27.8)	61 (22.3)	74 (27.1)	62 (22.7)	10 (3.5)	283 (100)
After surgery	60 (23.1)	87 (33.5)	65 (25.0)	48 (18.5)	17 (6.1)	277 (100)

Table 5: Level of physical activity after surgery

Level	All Participants* (n=803)		Women* (n=682)		Men (n=121)	
	Workers	Non-workers	Workers	Non-workers	Workers	Non-workers
≥30 min/day	151 (30.6)	107 (41.0)	126 (30.1)	88 (40.0)	25 (33.3)	19 (46.3)
<30 min/day	283 (57.3)	128 (49)	243 (58.0)	108 (49.1)	40 (53.3)	20 (48.8)
No physical activity	60 (12.1)	26 (10.0)	50 (11.9)	24 (10.9)	10 (13.3)	2 (4.9)
Missing values	13 (1.6)	16 (2.0)	12 (1.8)	14 (2.1)	1 (0.8)	2 (1.7)

*There was a significant ($p < 0.05$) difference between the level of physical activity between workers and non-workers.

tion. Focusing on non-workers, we found there was an increase in the prevalence of retired people (22.3% vs 33.5%) and a decrease in the frequency of unemployed people (27.8% vs 23.1%) when we compared data before and after the surgery. These two parallel changes may partially explain the steady numbers of workers within our study.

The data concerning the outcomes of patients who were employed before the surgery showed that most of participants kept their job (85.5%), some had retired (3.1%), but some had lost their job (2.9%), become disabled, or had a long-term work cessation (2.5%).

Even though the job status did not seem to degrade for most of the patients who underwent bariatric surgery, few actually lost their jobs. The current economic crisis may partially explain our results. However, in some cases, the patient's health deteriorated so that they were not able to work anymore. We need to pay specific attention to these patients. They may need to consult with an occupational physician to adapt to their work situation.

Our analysis showed no significant differences in the distribution of occupational categories before and after the surgery. In comparison with data provided by the French National Institute for Statistics and Economic Studies for year 2009 for the en-

tire population of the Pays de la Loire region, we noticed that women who underwent bariatric surgery were less likely to have an intermediate profession (25.8% in the general population vs 15.6% after the surgery), and more likely to work as employees (47.1% in the general population vs 58.7% after the surgery). Indeed, the prevalence of obesity for women is higher among those who have the lowest socioeconomic status.²⁸

We thought that workers would have more difficulty in maintaining many small meals a day compared to non-workers, as job constraints may not always permit extra meal breaks. However, there was no significant difference between workers and non-workers in this regard. Although 13.6% of working patients declared having professional difficulties in maintaining six small meals a day, they all seemed to manage it. These people can ask for working time to be adjusted by an occupational physician to enable them manage the six required meals a day.

In contrast, workers were less able to maintain 30 minutes of exercise a day compared to non-workers. Subgroup analyses showed that this difference occurred among women, but not among men. This may be attributed to the lower number of men in our study, which could generate non-significant results. It is also possible

that working women, who mainly do the household chores, have less time to practice 30 minutes of daily physical activity. Of all working patients who underwent bariatric surgery, 40.8% said they had professional difficulties in practicing daily physical activity. Companies could solve this problem by encouraging workers to do more physical activity. However, this is not as easy as it seems. Sport is sometimes used by companies as a way to manage or control their employees.²⁹ It may be perceived as an intrusion by employers on personal practice. Nonetheless, most of all, the problem must not be considered as patients' unwillingness to practice physical activity. Long working hours, the organization of work, and work-overload situations may inhibit people from practicing daily physical activity. Therefore, some elements could be improved concerning work organization.

The proportion of employed patients who had postprandial weakness or diarrhea that adversely affected their work was 7.9%. The participants described how these impacted on their work activities. Some patients explained that they were not able to interrupt their work to go to the toilet; and some described they felt humiliated by their coworkers for the annoying smells. Unfortunately, no medical treatment is effective to improve the latter complaint. However, the French Labor Code does stipulate that work should be organized in a way that allows workers to go to the toilet when they need to (article L3121-33).

Our study has some limitations. Due to the design of the survey, we mixed patients at several follow-up times (from one to more than five years). The cross-sectional nature of the study does not allow us to comment on the trend of the employment rate after surgery. Limiting the inclusion of patients who were approaching retirement age was not possible since we had no

possibility to determine a valuable threshold. We also know that with the passage of time between pre- and post-operative follow-ups, the number of retired people increases. However, in the meantime, the employment rate of young patients normally increases because the unemployment rate is expectedly higher among the younger patients. Furthermore, our study used a self-administered questionnaire based on declarative data. We have no evidence that how well patients abided by post-operative recommendations. Nevertheless, our follow-up allows a comparison between what they declared and the objective data on their own corporal composition and weight evolution. Since 2007 to 2013, 21.7% of the patients had bariatric surgery in our center and did not follow up at all. We have no information about the employment status of these patients. To have a simple and short questionnaire, we did not ask patients about their comorbidities. We supposed that working patients are less likely to suffer from comorbidities because of a healthy worker effect. This has to be studied in further surveys. The number of effective working hours was not required. We did not pay attention whether workers occupied a full- or part-time job. Categorization between workers and non-workers was also self-reported. This might influence the employment rate. But by having the same categorization before and after surgery, we minimize a potential effect. Despite all these limitations, this study is the first one on this issue performed in a large population.

Our data are only benchmark indicators and, although encouraging, they are not enough. They provide no information on what these patients really do at work. The important changes that occur in patients' appearance and mind after bariatric surgery may also have professional positive or negative consequences that were not evaluated in the current study. For example,

discrimination against obesity may decline after surgery, but the need for patients to have six meals a day may cause problems—it may be difficult for colleagues to understand that an ex-obese person needs to eat more frequently. This may also disrupt the overall work flow. Other issues, such as job satisfaction compared before and after undergoing bariatric surgery may be studied. Therefore, further studies are needed, especially qualitative surveys, to investigate these important issues.

The post-operative consequences on work should not be regarded as just the patient's responsibility. It is not just a question of a person being unwilling to perform physical activity or being unmotivated to apply for a job. An ergonomic vision needs to integrate a global vision of the work situation. Some elements could be changed by companies to improve quality of job and retention issues. This may benefit not only the person who undergoes surgery, but also all other workers in the company.

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