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ORIGINAL CONTRIBUTIONS

Back to Work After Bariatric Surgery? A Belgian Population Study

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Abstract

Introduction Aside from an impact on health, obesity is also associated with higher social and economic costs such as impaired productivity, increased work absenteeism, and higher rates of unemployment. The aim of this study was to assess the effect of bariatric surgery on employment status in a large nationwide database, using data from all patients that underwent bariatric surgery in Belgium.

Methods This is a retrospective analysis of all Belgian patients that underwent bariatric surgery between 2014 and 2015. The work status of these patients was examined yearly: 4 years before and 3 years after surgery. Increased employment after surgery was defined (1) as a reduction in days of unemployment and incapacity and (2) as the resumption of work among the unemployed.

Results In total, 16,276 patients were included. The number of working people rose from 49.7% before to 61.2% 3 years after bariatric surgery, i.e., an increase of 11.5% between pre- and post-surgery. The largest improvement in reduction in unemployment was found in individuals who were absent from work for more than 9 months, namely, a reduction from 13.4 to 7.2%. In the population of unemployed patients, 20.9% became employed after bariatric surgery.

Conclusion We found an increase in employment rate and a decrease in work incapacity and unemployment after bariatric surgery. Higher rates of employment after bariatric surgery may also contribute to an increased cost-effectiveness of bariatric surgery. It would be interesting to research possible targeting strategies to increase the employment rate even more after bariatric surgery.

Keywords Obesity · Bariatric surgery · (Un)employment · Sick leave

Introduction

Obesity is a leading public health concern, and its prevalence continues to increase worldwide [1–3]. The relationship between obesity and chronic health-related conditions such as hypertension, type 2 diabetes, and depression has been well documented [4–6]. Aside from an impact on health, obesity is also associated with higher social and economic costs such as impaired workplace productivity, increased work absenteeism, and higher rates of unemployment [7–11].

Bariatric surgery promises long-term weight loss results and improvement in obesity-associated comorbidities and mental health. An improved understanding of the relationship between occupational outcomes and bariatric surgery is essential because the majority of bariatric patients are of working age. Weight control and employment seem to reinforce each other. Research suggests that employment rates improve following bariatric surgery [12, 13]. On the other hand, employment status is thought to be associated with improvements in physical activity post-bariatric surgery and possibly helps to avoid weight regain in the long term [14].

Key Points
- Obesity is known to be associated with lower socio-economic status.
- Bariatric surgery improves comorbidities of obesity and enhances employment rates.
- Bariatric surgery contributes to downsizing the economic cost of obesity.

Agnès Leclercq and Bart Van der Schueren contributed equally and share the place of the last author.

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A British study found that bariatric patients, who were employed prior to surgery, were approximately 90% more likely to maintain employment at 30 months post-operatively. In the same study, rates of employment increased by 40% post-operatively in the unemployed population pre-operatively [15]. The number of employed patients increased in all working-age groups. A large, nationwide macro-economic analysis in Brazil [16] showed correlations between the number of public surgical procedures including public bariatric surgeries, and the unemployment rate, as well as the public healthcare expenditure per capita. However, a Norwegian study [17] suggests that undergoing bariatric surgery is not associated with higher employment rates over time, although it may reduce the number of days of sick leave, from 63 to 26 days on average. This study also determined pre-operative risk factors for unemployment after surgery including being female, being older, having a lower education level, receiving disability pension, and being unemployed. Still, only a limited number of studies have researched the relationship between weight control and employment.

Therefore, this study aims to assess the effect of bariatric surgery on employment status in a large nationwide database, using Belgian national health insurance data of all bariatric patients in Belgium. Secondly, predictive factors for being employed after bariatric surgery were examined.

Patients and Methods

Study Population

Study participants were all patients that underwent bariatric surgery in Belgium between 2014 and 2015 registered in the IMA-AIM database (IMA-AIM Intermutualistisch Agentschap—Agence Intermutualiste). Information about employment status was retrieved from their health insurance file. The work status of these patients was examined yearly; 4 years before and 3 years after surgery.

Measures

Demographic data consisting of gender, age, employment status, and presence of chronic illness was collected by IMA-AIM. The “chronic illness” status is assigned to people who have high health expenses on a regular basis. Employment type was divided into different categories following IMA-AIM guidelines: active, employment status, unemployment, disability, and total disability (sick leave or disability during more than 1 year). An “active” status means that the person has made social security contributions on his or her professional income. The duration of the period of being disabled was also included.

The main study outcome of employment status after bariatric surgery was determined 3 years post-operatively. This moment was chosen as data from previous Belgian research [18] showed that post-operative problems such as weight regain or non-compliance with nutritional and vitamin supplements usually occur within 2 years after surgery. Because of limited differences in employment in the years before surgery, increase in incapacity the year before surgery, and to limit the impact of difficulty to find a first job at the end of schooling among the youngest, 2 years before surgery was chosen as reference time because this concerns the middle of the studied period before surgery.

Increased employment after surgery was defined as (1) a decrease of at least 6 months in total number of days of unemployment or incapacity in the 2 years post-operatively and (2) a resumption of employment activity after surgery for persons being inactive before surgery. The article will further refer to (1) as a reduction in days of unemployment and incapacity and (2) as the resumption of work among the unemployed.

Statistical Analysis

Descriptive data were presented as numbers (proportion). To investigate possible predictors for being employed defined as (1) or (2) after bariatric surgery, a logistic regression model was constructed. The backward selection method was used to only retain the variables statistically significantly related to being employed post-operatively. The software program SAS was used to perform the statistical analyses.

Results

Patient Inclusion and Characteristics

All patients that underwent bariatric surgery in Belgium between 2014 and 2015 and were registered in the IMA-AIM database ($N=22{,}255$) were screened for the study. Figure 1 illustrates the inclusion or exclusion of individuals in the study. Patients under the age of 20 or over the age of 65 were excluded from the analysis ($N=1153$). Of the 21,092 patients of working age, 84% ($N=17{,}777$) had an active working status: blue and white-collar worker, self-employed, or assisting spouse in a self-employed business. After having excluded all persons who are outside insurance for work incapacityand are not registered for health insurance permanently, the total study population included $N=16{,}276$ patients with an age between 25 and 55 years old at the time of surgery (2014–2015). Civil servants have job security and incapacity insurance, but not health insurance, and are excluded from the study population. Patients under the age of 25 and over the age of 55 were excluded to limit

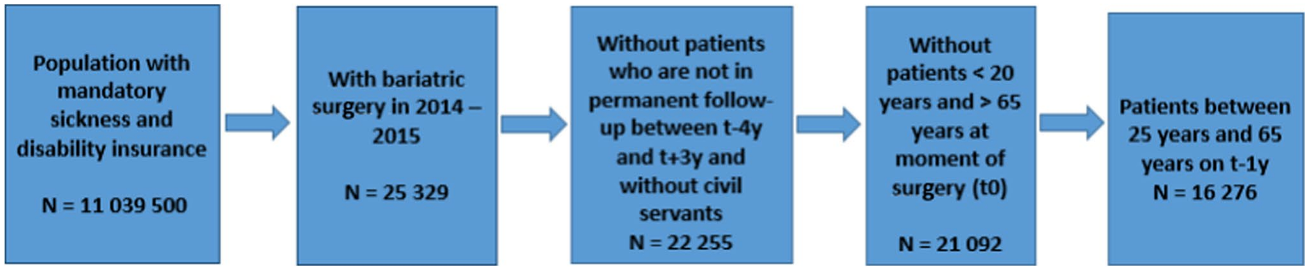

Fig. 1 Flowchart illustrating the selection of the study population

Table 1 Participant characteristics ($N=16,276$)

	%	*N*
Age		
25–29 years	13.3%	2165
30–39 years	31.8%	5169
40–49 years	36.4%	5923
50–55 years	18.5%	3019
Sex		
Female	73.4%	11,954
Male	26.6%	4322
Health status		
Chronically ill status patient	26.1%	4249
No chronically ill status patient	73.9%	12,027
Hospitalization (long or frequent) during the year of surgery		
Long hospitalization	7.6%	1243
Not a long hospitalization	92.4%	15,033

the impact of first jobs and early retirement in the Belgian labor market. Table 1 summarizes the characteristics of the study sample. The sample population aged 25 to 55 was predominantly female (73.4%), between 30 and 49 years old (68.2%), and without formal registration of a chronic illness (73.9%).

Employment Outcomes Post-bariatric Surgery

Figure 2 and Table 2 summarize developments in employment or disability status. The periods of unemployment are divided into classes of 3 calendar months.

Two years before surgery, 49.7% of persons had no unemployment or incapacity days, 15.7% had less than 78 working days (i.e., less than 3 calendar months), 13.4% were incapacitated or unemployed for more than 9 months, and 9.1% were not in the labor market. The number of working people without loss of employment or sick leave rose from 49.7% 2 years before surgery to 61.2% in the third year after bariatric surgery, i.e., an increase of 11.5% between pre- and post-surgery. In total, we can conclude from the evolution in Fig. 2 that people without disability or unemployment increased by 11% when comparing unemployment rates 2 years before surgery with unemployment rates 2 years after bariatric surgery and even an increase of 22% when comparing unemployment rates 1 year before surgery with 2 years after bariatric surgery.

From the patients who were inactive before surgery (9.1%, $N=1487$), 64.9% (6.8%*1440/9.1%*1487) remained inactive until the third year after surgery. Of all patients ($N=16,276$), 38.8% remained fully active (without any period of unemployment or disability) between 2 years before surgery until 3 years after surgery. In contrast, 17.1% saw their work inactivity increase, with longer periods of illness or unemployment (17.1% change of at least 3 months and 4.7% at least 6 months).

In total, 12.3% ($N=2002$) see their inactivity decrease by at least 6 months compared to 2 years before surgery. This is therefore an improvement for 24% (12.3%/51.3%) of those who had periods of unemployment, disability, or were inactive 2 years before surgery. That is an improvement for 43.6% (12.3%/28.2%) of those whose inactivity was greater than 6 months 2 years before surgery (including inactive persons). Conversely, 5.1% (4.7%/91.9%) of those active 2 years before surgery saw a deterioration in their activity through an increase in their duration of disability and unemployment of at least 6 months.

The second indicator is the return to work for inactive persons ($N=1487$, 9.1% of the total population). In total, 20.9% (1.9%/9.1%) of the totally inactive population returned to work between 2 years before and 3 years after surgery with at least 6 months less of disability or unemployment 3 years after surgery. Altogether, 25.3% (2.3%/9.1%) of inactive persons return to work at least 3 months in the 3 years after surgery and with less than 9 months of disability or unemployment in those 3 years.

Prediction Model: Probability of Increased Activity After Bariatric Surgery

Within the first indicator of evolution in employment (reduction in days of unemployment and incapacity) for the overall population except for inactive patients, several predictive factors

Table 2 Comparison of activity from 2 years before bariatric surgery to 3 years after bariatric surgery for 25–55 years olds ($N = 16,276$).

	2 years before surgery	3 years after surgery	Evolution towards better activity		Evolution towards less activity	
			At least 3 months difference	At least 6 months difference	At least 3 months difference	At least 6 months difference
No disability or unemployment	49.7%	61.2%			10.9%	3.5%
Disability + unemployment < 3 months	15.7%	13.8%	8.5%		2.9%	1.0%
Disability + unemployment > 3 months and < 6 months	6.4%	4.7%	4.7%		1.2%	0.2%
Disability + unemployment > 6 months and < 9 months	5.7%	3.8%	4.3%	3.1%	1.0%	
Disability + unemployment > 9 months	13.4%	7.2%	9.0%	7.4%	1.1%	
Non active	9.1%	9.3%	2.3%	1.9%		
Total	100%	100%	29.0%	12.3%	17.1%	4.7%

% always expressed in relation to the total of $N = 16,276$ patients.

Green cells = positive development in patients who were non-active at t-2y before surgery (second indicator from the study).

were found. Patients with chronic ill status before surgery had a better chance of a decrease in unemployment or disability. On the other hand, being female, having an Omnio status (statute for low-income families who do not meet the requirements for receiving the increased allowance) as well as being on disability at least 14 days prior to surgery reduce the chances of experiencing an improvement in activity level. However, the predictive power of this model is weak (a concordance rate of 59.6%) (Fig. 3).

Within the second model of evolution in employment (the resumption of work among the inactive population), the probability of becoming active 3 years after surgery (when inactive 2 years before surgery) was explained. Among the patients between 25 and 55 years old, there were 381 active patients 3 years after surgery for 1487 inactive patients 2 years before surgery, i.e., a rate of return to work of 25.6%. The most predictive model is presented below in Fig. 4. Its predictive power is relatively good with a concordance rate of 79.7%. Advancing age, being female, having a chronic disease, and BIM/Omnio status reduced the chances of being employed 3 years after surgery.

Discussion

In our large nationwide study, a substantial increase (of at least 6 months) in employment was found 3 years after bariatric surgery for 12.3% of patients, compared to their employment status 2 years before surgery. This total increase is caused both by a decrease in the total number of days being unemployed and incapacitated (40.4% of patients) and by 1.9% inactive patients pre-surgery returning to work after surgery. We also determined that being younger of age, being male, receiving chronic care before surgery, and having a higher social-economic status are predictors of increased employment after bariatric surgery.

Our findings are not directly comparable to either the British study [15] that found a 40% increase in work activity after bariatric surgery, nor the Norwegian study [17] that found no significant increase in employment (54% at baseline versus 58% at follow-up) after bariatric surgery. However, both these studies were relatively small in sample size compared to ours, as our study included 16,276 patients compared to 224 patients in the Norwegian study [17] and 1011 patients in the British study [15].

During 2015, 60% of the Belgian population between 25 and 55 years were working without any disability. Within the population that underwent bariatric surgery, 50% were without any disability or unemployment before surgery and 61.2% after surgery. In 2015, 22.7% of the Belgian population 25–55 years old were inactive, with incapacity or unemployment for more than 6 months in 1 year. Within the population that underwent bariatric surgery, 28.2% were on the same situation before surgery and 20.3% after surgery. These data suggest an improvement in work activity in patients after bariatric surgery. However, there is still substantial room for improvement in terms of employment. It would be interesting to detect susceptible groups of patients

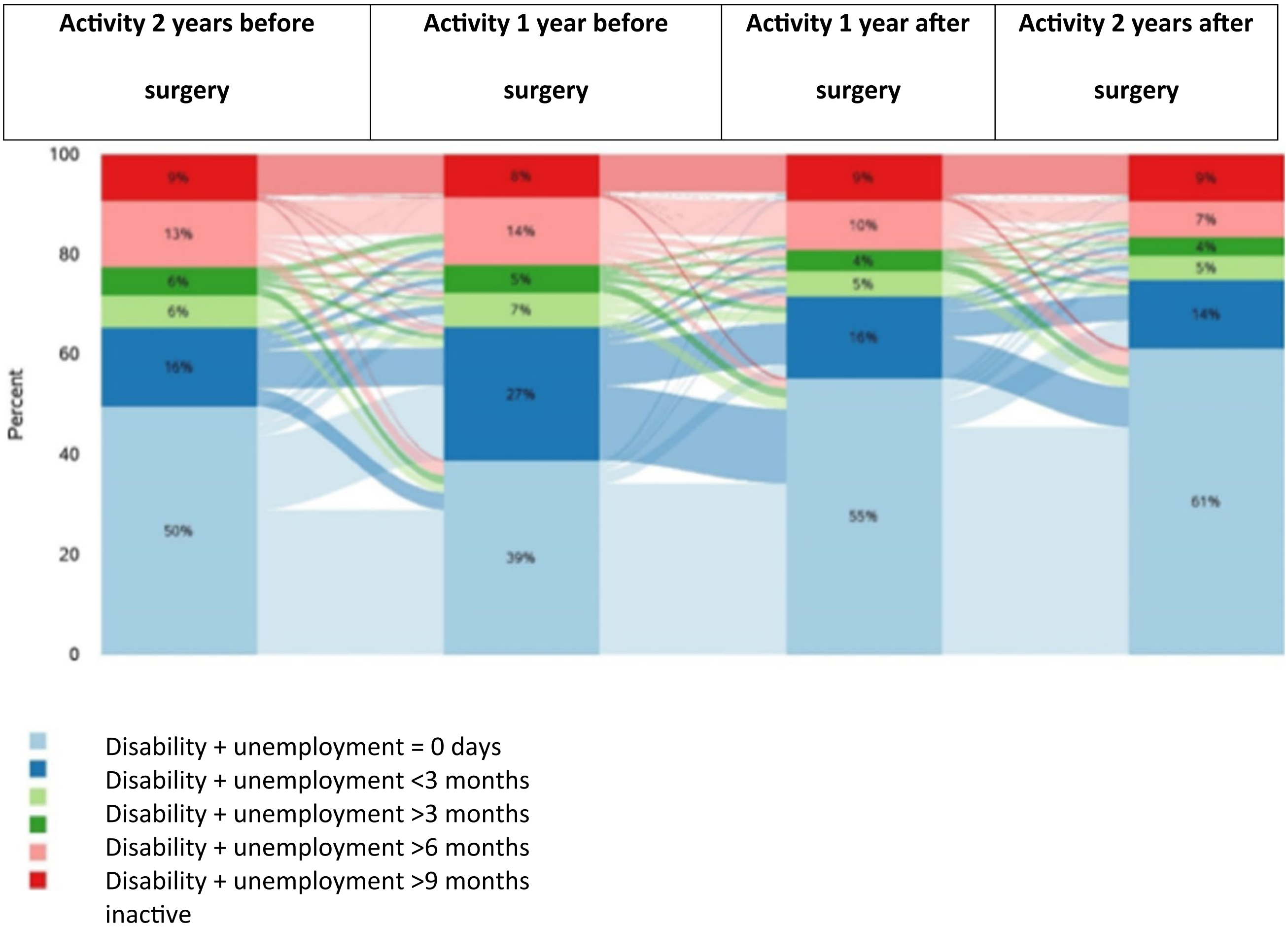

Fig. 2 Evolution in activity between 2 years pre-operative and 2 years post-operative within the patient group from 25 to 55 years old (rounded numbers)

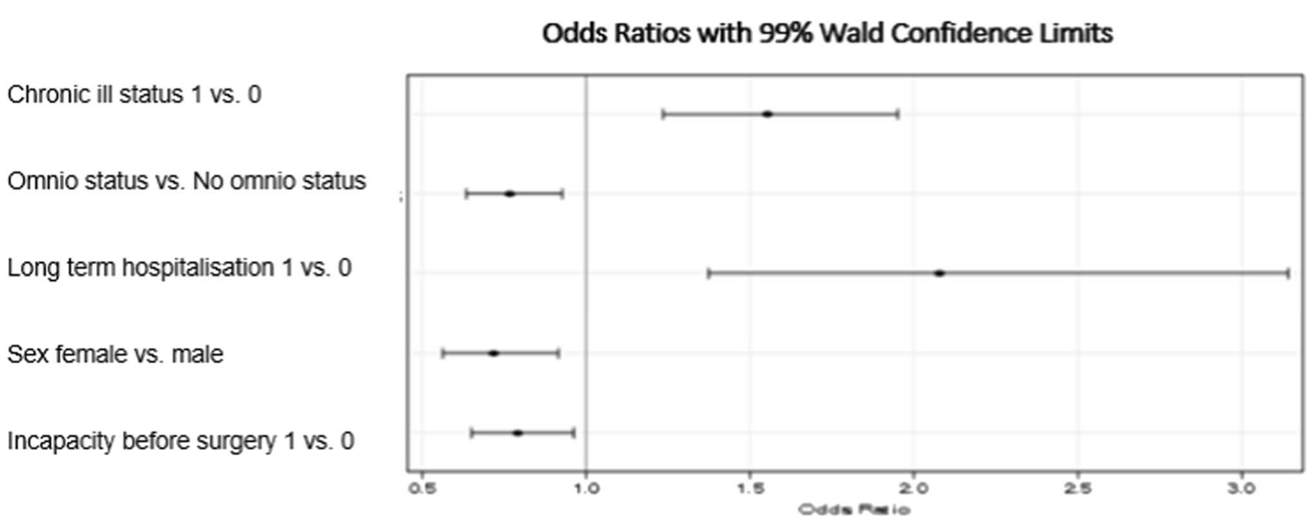

Fig. 3 Reduction in days of unemployment and incapacity: odds ratios with 99% profile-likelihood confidence limits

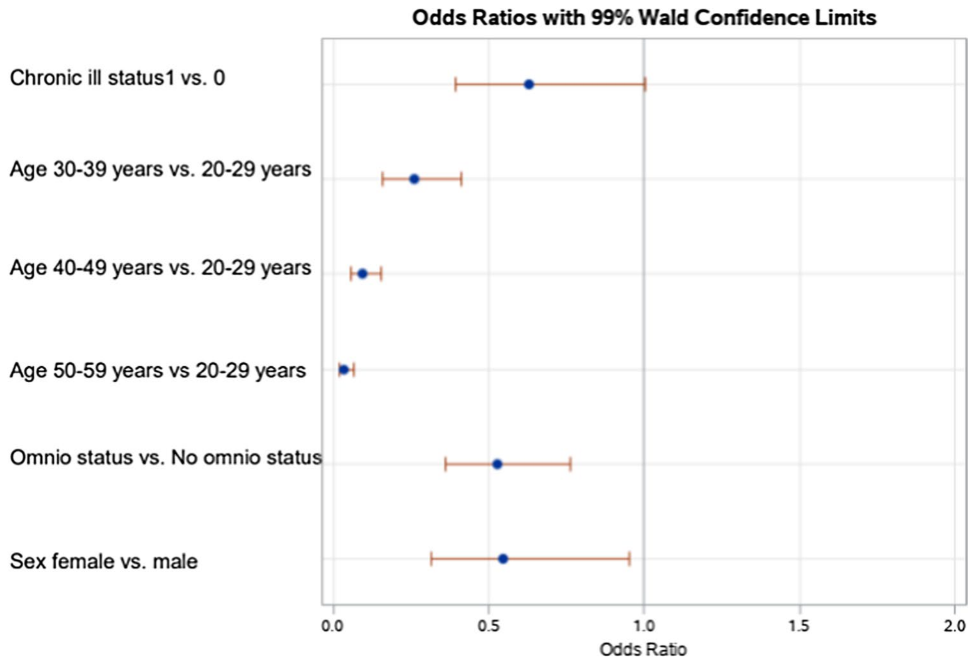

Fig. 4 Resumption of work among the unemployed: odds ratios with 99% profile-likelihood confidence limits

and targeting strategies to further increase the employment rate after bariatric surgery.

A cost-effectiveness analysis of bariatric surgery in Belgium [19] showed that surgery produced savings of € 9332, an additional 1.1 life years, and 5.0 QALYs (quality adjusted life years). Bariatric surgery was cost-effective at 10 years post-surgery and dominant over conservative treatment [19]. In our study, the largest improvements in employment are seen in patients long-term not being employed (decrease from 13.4% before surgery to 7.2% after surgery). Bariatric surgery could possibly contribute to downsizing the economic cost of obesity even more.

Concerning limitations of the data in this study, there are no available data of the incidence of metabolic syndrome and pathologies secondary to obesity (i.e., type 1 or type 2 diabetes, hypertension, sleep apnea, etc.) from the patients of our study. Hence, there is no knowledge how the post-surgery evolution of these secondary diseases could play a role in the resumption of professional activity after bariatric surgery.

The information available to us indicated the annual number of days of inactivity due to unemployment or incapacity for work, work full-time or part-time, globally during a calendar year. We could not determine whether they were working full or part time.

Finally, there was no information about why people could not work, for example, whether it was for medical or psychological reasons or information about the presence and distribution of type 1 or type 2 diabetes in our population of bariatric patients. This could aid the interpretation of our results.

In addition, it would be of added value to investigate why predictive factors (as defined in the study: age, gender, being a chronically ill patient, and social economic status) influence work activity. We also have no data on which surgical technique was used (e.g., sleeve gastrectomy or gastric bypass). It would be interesting to be able to distinguish between the different surgical techniques in future studies.

Lastly, it is not known how generalizable our results are, as employment status can be strongly influenced by the national context, such as support for disabled or chronically ill patients and the employment rate of the population.

Conclusions

In conclusion, the employment rate increased, and the work incapacity and unemployment decreased after bariatric surgery. Further increasing rates of employment after bariatric surgery may also contribute to improve the already demonstrated cost-effectiveness of bariatric surgery even more. It would be interesting to research possible targeting strategies on how to increase employment rate further after bariatric surgery.

Declarations

Ethics Approval For this type of study, formal consent is not required.

Consent to Participate Informed consent does not apply.

Conflict of Interest The authors declare no competing interests.

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