

# Impact of the COVID-19 Pandemic on the Patient's Decision About Bariatric Surgery: Results of a National Survey.

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## Research Article

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# Abstract

## Background

The COVID-19 pandemic and the implemented restrictions have changed the functioning of healthcare systems worldwide. The purpose of the study was to evaluate the impact of the present epidemiological situation on their decisions about undergoing weight loss surgery.

## Methods

Data was collected with a national online survey from 906 bariatric patients.

## Results

In spite of the pandemic and the associated risk of developing COVID-19, 443 responders (48.9%) would decide to undergo bariatric surgery in the current situation. Awareness of negative impact of obesity on the COVID-19 treatment had only marginable impact on decision making (76.59% vs 75.26%;  $p < 0.80$ ). Responders who had contact with people potentially infected with COVID-19 would prefer not to undergo surgery at the moment (3.02% vs 4.40%;  $p < 0.55$ ). There was a positive correlation between the BMI and the willingness for bariatric surgery ( $37.43 \pm 9.06$  vs  $34.93 \pm 8.67$ ;  $p < 0.001$ ).

## Conclusion

The level of consciousness about the advantages of operative treatment is high among bariatric patients. Therefore, a large proportion of patients is determined to have bariatric treatment even during the pandemic, being aware of the increased risk of worse pace of COVID-19 disease in case of obesity and related diseases.

## Background

The major global health concern for the previous few months has been COVID-19 pandemic. To date, almost 100 million cases have been detected worldwide (January 22, 2021) and more than 2,000,000 people have died due to COVID-19 infection [1].

The pandemic forced reorganization of the healthcare systems all over the world. Since the World Health Organization (WHO) declared COVID-19 pandemic on March 11, 2020, most countries around the world have implemented epidemiological restrictions [2,3]. The vast majority of national health systems have directed most available forces and resources to combat the pandemic. One of the handicaps of the situation is the suspension of elective surgery except for oncological procedures, and life-saving operations [4]. Bariatric operations were suspended in the vast majority of countries following the recommendations of the International Federation for the Surgery of Obesity and Metabolic Disorders (IFSO) [5]. It can be assumed that about 60,000 bariatric operations per month might have been canceled worldwide [6].

Since the beginning of May 2020, some countries have decided to reduce the restrictions considering social intercourse and reopened some of the shops and public places. Some hospitals have returned to carrying out elective operations, even though the risk of COVID infection associated with hospitalization remains increased.

The aim of this study was to investigate by means of a national survey the impact of COVID-19 pandemic on patient's decisions about undergoing bariatric surgery.

## Methods

This study includes data collected with a national Internet survey conducted among pre- and post-bariatric surgery patients via Google Forms. The survey started on 9th April 2020 and was open until 28th April 2020. The online survey was published and distributed via social media (Facebook) in cooperation with Polish Bariatric Patients Society (CHLO). The questionnaire included multiple choice and open questions, divided into three chapters: general information about the patient, life during COVID-19 pandemic and bariatric care during COVID-19 pandemic. Survey is shown in Appendix 1. The project was supported by the Metabolic and Bariatric Chapter of Polish Surgeons' Association (SCMiB). The data was completely anonymized and contained no patient identification data.

## Statistical analysis

Results are presented as means with standard deviation or medians with interquartile range. We performed the statistical analysis using Statistica 13 (StatSoft Inc., Tulsa, OK, USA). Normality of the data was tested with Shapiro–Wilk test. Continuous variables were compared with the Student's t test for normally distributed or Mann–Whitney U test for non-normally distributed data. Categorical variables were compared using the  $\chi^2$  or Fisher test. Statistical significance was set at  $p < 0.05$ .

## Ethical considerations

The study was anonymous, performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its latter amendments (Fortaleza). Participants were informed about the aim of the study and informed consent was obtained electronically prior to the beginning of the survey.

## Results

There were 906 participants, mostly female (87.86%), 596 responders after bariatric surgery (65.79%). Median BMI was 36.06 ( $\pm 8.88$ ). Most patients admitted at least concomitant disease. The most common reported comorbidity was osteoarthritis, followed by hypertension, insulin resistance, type 2 diabetes mellitus, obstructive sleep apnea and dyslipidemia.

The demographic characteristics of the study population is presented in Table 1.

Table 1  
Baseline characteristics of the study population

No (%)	906 (100%)
Median age, years (SD)	39.09 (± 8.7)
Males/Females, no (%)	109/789 (12.14%/87.86%)
Median BMI, kg/m <sup>2</sup> (SD)	36.06 (± 8.88)
Patients before/after bariatric surgery, no (%)	310/596 (34.21%/65.79%)
Osteoarthritis and joint pain, no (%)	300 (33.11%)
Hypertension, no (%)	294 (32.45%)
Insulin resistance, no (%)	291 (32.12%)
Type 2 diabetes mellitus, no (%)	102 (11.26%)
Obstructive sleep apnea, no (%)	77 (8.5%)
Dyslipidemia, no (%)	73 (8.06%)
Co-morbidities, no (IQR)	1 (0–2)
SD: standard deviation; BMI: body mass index; IQR: interquartile range	

In spite of the pandemic and the associated risk of developing COVID-19, 443 responders (48.9%) would decide to undergo bariatric surgery in the current situation if they were given the choice. People remaining in personal contact with relatives and friends potentially infected with COVID-19 (6.05% vs 6.93%,  $p < 0.61$ ) and patients aware of the negative impact of obesity on the course of COVID-19 disease were less likely to have chosen undergoing surgery during the pandemic (70.81% vs 75.48%,  $p < 0.12$ ). A significantly higher proportion of men than women would positively decide about bariatric treatment at present (15.23% vs 9.11%;  $p < .006$ ). There was a positive correlation between the BMI and the willingness to undergo bariatric surgery ( $37.43 \pm 9.06$  vs  $34.93 \pm 8.67$ ;  $p < 0.001$ ). The dispersion of responses is presented in Table 2.

Table 2  
Decision about bariatric surgery during the COVID-19 pandemic.

	Would you decide to undergo bariatric surgery during COVID-19 pandemic?		
	Yes	No	p- value
Males, no (%)	67/440 15.23%	38/417 9.11%	p < .006
Median age, years (SD)	39.0 ± 8.03	38.7 ± 9.01	p < 0.63
Median BMI, kg/m <sup>2</sup> (SD)	37.43 ± 9.06	34.93 ± 8.67	p < 0.001
Type 2 diabetes mellitus, no (%)	57/443 12.87%	38/420 9.05%	p < 0.08
Insulin resistance, no (%)	138/443 31.15%	141/420 33.57%	p < 0.45
Arterial hypertension, no (%)	134/443 30.25%	145/420 34.52%	p < 0.18
Obstructive sleep apnea, no (%)	42/443 9.48%	31/420 7.38%	p < 0.27
Arthritis/Joint pain, no (%)	159/443 35.89%	125/420 29.76%	p < 0.06
Dyslipidemia, no (%)	38/443 8.58%	33/420 7.86%	p < 0.71
Co-morbidities, no (IQR)	1.28 ± 1.2 vs	1.22 ± 1.16	p < 0.51
SD: standard deviation; BMI: body mass index; IQR: interquartile range			

Among the group of patients before bariatric surgery, 206 (66.45%) patients would positively decide about the surgery in the current situation. Responders who had contact with people potentially infected with COVID-19 would prefer not to undergo surgery at the moment (3.02% vs 4.40%; p < 0.55). Awareness of negative impact of obesity on the COVID-19 treatment had only marginable impact on decision making (76.59% vs 75.26%; p < 0.80). Hypertension had a statistically significant positive influence on the decision about bariatric treatment in the time of pandemic (27.67% vs 39.18%; p < 0.05) decided to undergo surgery during the pandemic era. Further analysis is presented in Table 3.

Table 3  
Decision about bariatric surgery during the COVID-19 pandemic – pre-operative patients.

	Would you decide to undergo bariatric surgery during COVID-19 pandemic?		
	Yes	No	p- value
Males, no (%)	25/205 12.20%	14/96 14.58%;	p < 0.57
Median age, years (SD)	38.09 ± 8.24	37.35 ± 8.83	p < 0.48
Median BMI, kg/m <sup>2</sup> (SD)	43.50 ± 7.66	44.57 ± 7.25	p < .026
Type 2 diabetes mellitus, no (%)	26/206 12.62%	7/97 7.21%;	p < 0.16
Insulin resistance, no (%)	76/206 36.89%	36/97 37.11%;	p < 0.97
Arterial hypertension, no (%)	57/206 27.67%	38/97 39.18%;	p < 0.05
Obstructive sleep apnea, no (%)	19/206 9.22%	11/97 11.34%;	p < 0.57
Arthritis/Joint pain, no (%)	84/206 40.78%	35/97 36.09%;	p < 0.44
Dyslipidemia, no (%)	18/206 8.74%	9/97 9.28%	p < 0.88
Co-morbidities, no (IQR)	1.36 ± 1.11	1.40 ± 1.20	p < 0.88
SD: standard deviation; BMI: body mass index; IQR: interquartile range			

Significantly more pre-operative patients preferred not to undergo surgery if they were aware that their bariatric center was in a hospital responsible for treatment of COVID-19 patients (38.39% vs 63.79%; p < 0.003). The group of responders, who felt more anxiety/fear about their health/life in regards to epidemiologic state also preferred to delay their bariatric treatment (72.06% vs 84.53%; p < 0.03).

Data about pre-operative bariatric patients is presented in Table 4.

Table 4  
Patients before bariatric surgery and decision-making factors.

	All	Would you decide to undergo bariatric surgery during COVID-19 pandemic?		
		Yes	No	p-value
Do any of your relatives or friends is currently contracted with COVID-19 or in quarantine?	Yes 10/307  No 285/307  I don't know 12/307	6/199 3.02%	4/91 4.40%	p < 0.55
Does bariatric center that treats you is currently treating COVID-19 patients?	Yes 81/307  No 90/307  I don't know 136/307	43/112 38.39%	37/58 63.79%	p < 0.003
Do you feel more anxiety/fear about your health/life in regards to current epidemiologic state?	Yes 233/306  No 73/306	147/204 72.06%	82/97 84.53%	p < 0.03
Are you aware of the fact that obesity is important risk factor impairing the course of infection of COVID-19?	Yes 234/308  No 74/308	157/205 76.59%	73/97 75.26%	p < 0.80
Did you changed eating habits due to the epidemic?	Yes 143/309  No 166/309	95/206 46.12%	47/97 48.45%	p < 0.72
Has your physical activity changed due to the limited possibilities of going outside, closing places of recreation and sports facilities?	Decreased 187/303  Same 93/303  Increased 23/303	129/206 62.62%	58/97 59.79%	p < 0.74
		63/206 30.58%	30/97 30.93%	
		14/206 6.80%	9/97 9.28%	

	All	Would you decide to undergo bariatric surgery during COVID-19 pandemic?		
		Yes	No	p-value
How the pandemic influenced your body weight?	Increased 140/303	103/206 50.0%	37/97 27.84%	p < 0.14
	Same 136/303	87/206 42.23%	49/97 50.52%	
	Decreased 27/303	16/206 7.77%	11/97 11.34%	
Do you currently have the option of continuing bariatric treatment?	Yes 34/298	23/205 11.22%	11/93 11.83%	p < 0.88
	No 264/298			
Do you have the opportunity to contact doctors providing bariatric treatment, e.g. online consultations, tele-consultations, social media?	Yes 181/299	120/203 59.11%	61/96 63.54%	p < 0.53
	No 118/299			
Have you used online support groups during a pandemic?	Yes 164/301	109/205 53.17%	55/96 57.29%	p < 0.54
	No 137/301			
How important is support of patients' organizations during a COVID-19 pandemic [1–10]	7.83 ± 2.39	7.71 ± 2.44	8.09 ± 2.26	p < 0.26
Has the situation of limited access to bariatric care caused any health problems to you?	Yes 84/302	64/206 31.07%	20/96 20.83%	p < 0.08
	No 218/302			

## Discussion

Our survey showed that bariatric patients have different points of view regarding the possibility of undergoing bariatric surgery during the pandemic.

Despite international recommendations to postpone elective surgery until after the epidemic, [7] there is a large proportion of patients who would like to continue bariatric surgical treatment. Nearly half of bariatric patients would positively decide about their bariatric surgery during COVID-19 pandemic, more than two thirds of pre-operative patients wanted to undergo surgery despite higher risk of severe coronavirus infection course.

Women, compared to men are less susceptible to viral infections based on a better innate immunity, levels of steroid hormones and factors related to sex chromosomes. [8] Despite the similar incidence of COVID-19 infection in both sexes, men have a worse prognosis.[9] In our study, among all the responders men were more likely to decide about undergoing bariatric surgery, but in group of pre-operative patients the result was opposite.

A higher number of comorbidities, in particular type 2 diabetes, arthrosis and joint pain had a positive correlation with a decision about bariatric surgery in present situation. Contrarily, among the group of preoperative patients, patients hoping for surgery during the pandemic had fewer comorbidities and less often suffered from type 2 diabetes, insulin resistance or osteoarthritis. Both patients scheduled for bariatric surgery in a COVID-19 treating center and those who felt more anxiety/fear due to pandemic would rather not decide about operative treatment during pandemic. Although lockdown and isolation undoubtedly negatively affected dietary regimens, daily physical exercises and often resulted in increase in body weight, these factors did not significantly influence the decision of undergoing bariatric surgery in time of increased epidemiological risk. Only a small number of patients reported health deterioration during the pandemic, but this fact did not affect their decision about the surgery.

Obesity is known to increase the vulnerability to infections and there are already studies suggesting that higher BMI is associated with an impairment of curability of may be a risk factor for COVID-19 disease and related mortality. [10,11,12] In our study, patients with higher BMI were more likely to decide positively about the operation despite for pandemic; contrarily, the subgroup of pre-operative patients had an opposite opinion.

Simonnet et al. reported a higher prevalence of obese patients in the group with severe acute respiratory COVID-19 syndrome who required invasive mechanical ventilation. [13] In our study, about 75% of patients who were positive about undergoing operation during pandemic, were aware of worse postoperative course in case of coronavirus infection.

Telemedicine allows to personal contact and decreases the risk of COVID-19 infection transmission; therefore, in this peculiar period telemedicine got promoted to a new level of utility. [14] In our study, more than a half patients before bariatric surgery had remote access to the doctors providing bariatric treatment and profited from online support groups during the pandemic, although these possibilities did not influence their decision about bariatric surgery during the current epidemiological situation.

It has taken China around 100 days to start getting back to 'normal' and early signals from other countries follow, seemingly indicating a slowdown of the pace of pandemic. [15] In most countries the morbidity is still rising and it cannot be predicted how long the pandemic and the consequent restrictions on the elective surgery will last.

There are couple of limitations associated with this publication. The study include recallbias and the subjectivity of patients in stating their opinions. The survey was limited to members of the Polish Association of Bariatric Patients (CHLO) that is why may not reflect the entire bariatric population.

## Conclusions

Our study showed that bariatric patients had different points of view regarding the possibility of undergoing bariatric surgery during COVID-19 pandemic. Bariatric surgery presents the only chance of recovery for a large group of patients, to help them achieve remission of comorbidities and reduce body weight. The level of consciousness about the advantages of operative treatment is high among bariatric patients. Therefore, a large proportion of patients is determined to have bariatric treatment even during the pandemic, being aware of the increased risk of worse pace of COVID-19 disease in case of obesity and related diseases.

## Abbreviations

WHO - World Health Organization

IFSO - International Federation for the Surgery of Obesity and Metabolic Disorders

SCMiB - Metabolic and Bariatric Chapter of Polish Surgeons' Association

## Declarations

*Ethics approval - the study was approved by the Bioethics Committee of University (1072.6120.103.2020).*

*Consent to participate - participants were informed about the aim of the study and informed consent was obtained electronically prior to the beginning of the survey.*

*Consent for publication - Not applicable*

*Availability of data and materials - the data that support the findings of this study are available from the authors, upon reasonable request.*

*Competing interests - all authors (Maciej Walędziak, Anna Róžańska-Walędziak, Paweł Bartnik, Joanna Kacperczyk-Bartnik, Andrzej Kwiatkowski, Piotr Major) declare no conflict of interest.*

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*Authors' contributions - MW, ARW and PM conceived the idea for this study and led the process of conducting all research activities. All co-authors (MW, ARW, PB, JKB, AK, MJ, PK, PM) contributed to the design and planning of the study. MW and ARW wrote the first draft of the manuscript. All co-authors reviewed, provided critical revisions for, and approved the final version of the manuscript.*

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