

## **Assessment of health behaviors, nutritional behaviors, and self-efficacy in patients with morbid obesity**

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### **Summary**

**Aim.** The objective of the study was to assess the frequency of health and nutritional behaviors concerning emotional, habitual, and restrictive eating as well as to evaluate self-efficacy in patients with morbid obesity and determine the correlation between patients' BMI index and their health behaviors as well as self-efficacy.

**Material and methods.** The study included 37 patients diagnosed with class two and three obesity, aged 18–62 ( $M = 39.94$ ;  $SD = 12.20$ ). Patients' BMI ranged from 36 to 60 kg/m<sup>2</sup> ( $M = 43.50$ ;  $SD = 5.36$ ). Research tools used in the study: the Inventory of Lifestyle Behaviors (ILB), the Dietary Behaviors Questionnaire (DBQ), and the General Self-Efficacy Scale (GSES).

**Results.** Patients with morbid obesity were characterized by medium (men; a sten score of 5) and low (women; a sten score of 4) intensity of health behaviors. Subjects showed a tendency for negative nutritional behaviors, emotional and habitual eating as well as dietary restrictions. General self-efficacy ranged between sten scores of 4 to 10, with mean at a high level (a sten score of 7).

**Conclusions.** Patients with morbid obesity need health, nutritional, and psychological education.

**Key words:** morbid obesity, nutritional behaviors, self-efficacy

### **Introduction**

Excessive body mass has been becoming an epidemic on a global scale. It concerns an increasing number of people of all ages both in developing and developed countries [1, 2]. Obesity is not qualified for psychiatric disorders, as are other disorders of the nutritional spectrum. It belongs to the category of endocrine, nutritional and

metabolic diseases (E00–E90). Obesity is a condition marked by an increase of body mass associated with a growing amount of body fat (over 25% in men and over 30% in women), which is caused by hypertrophy and/or hyperplasia of adipose tissue [3]. In 2014, 39% of adults aged 18 years and over were overweight and 13% were obese [1]. Epidemiological studies show that between 1980 and 2013 overweight and obesity increased by 27.5% in adults and by 47.1% in children worldwide. There are areas where the percentage of people suffering from obesity exceeds 50%. In the United States of America, Canada and some Arabic countries obese people constitute about 30% of the population. In Western and Central Europe over 60% of men and almost 50% of women are overweight, and about 20% of citizens are obese. Likewise, it is the case in Poland [2]. The WOBASZ study has proven that morbid obesity concerns 0.6% of men and 5% of women [4].

The World Health Organization has recognized obesity as the most dangerous chronic disease, with its numerous possible complications and comorbidities: not only type 2 diabetes, essential hypertension, cardiovascular diseases, dyslipidemia, osteoarthritis, non-alcoholic fatty liver disease, calculus of gallbladder, sleep apnea, and certain types of cancer [5–8], but also social and psychological problems [9]. Obesity lowers quality of life of patients and heightens the risk of premature death [10–14]. Obesity is diagnosed when the Body Mass Index (BMI) exceeds  $30 \text{ kg/m}^2$ , and morbid obesity when BMI is greater than  $40 \text{ kg/m}^2$  [14, 15]. In the last several years, with regards to the increasing amount of patients with an extremely high BMI, subcategories have been introduced. Therefore, when BMI ranges from 50 to  $59.9 \text{ kg/m}^2$ , the condition is called the class IV obesity (super obesity), and in the case of people with  $\text{BMI} \geq 60 \text{ kg/m}^2$  we can speak of the class V obesity (super-super obesity) [16]. Not only environmental and biological but also socio-cultural and psychological factors affect obesity [14, 17]. Conservative treatment is the most frequent method applied. However, in the light of research, non-invasive methods of treating obesity are often unsuccessful and have no lasting effects [18]. Bariatric surgery, recognized as the most effective method of weight reduction, brings with it better chances of treatment to severely obese patients [12, 13, 19, 20].

From the biological perspective, eating is an urge resulting from hunger; the objective of consuming food is fulfillment of physiological needs of an organism. Currently, food is widely accessible and it ceases to perform only its physiological function of sustaining life; often eating serves to satisfy psychological needs [17]. Excessive consumption causes an accumulation of energy in the form of fat tissue and can engender a too high increase in body mass. Taking into account the enormity of the problem and its negative consequences, effective treatment of overweight, obese, and morbidly obese patients is of the utmost importance.

### **Aim**

The objective of the study was to assess the frequency of health behaviors as well as the incidence of negative habits, emotional eating and dietary restrictions; furthermore, the researchers aimed to evaluate self-efficacy in patients suffering from

morbid obesity. Moreover, the correlations between patients' BMI, pro-health behaviors, negative nutritional habits, and self-efficacy were analyzed.

### Material and methods

The study included not only patients with diagnosed class II obesity ( $BMI \geq 35 \text{ kg/m}^2$ ) and its complications as well as comorbidities, but also patients with morbid obesity ( $BMI \geq 40 \text{ kg/m}^2$ ) qualified for surgical stomach reduction by *sleeve gastrectomy* or *gastric bypass* methods. 37 patients participated in the study: 15 men and 22 women aged 18–62 ( $M = 39.94$ ;  $SD = 12.20$ ). Patients' BMI ranged from 36 to 60  $\text{kg/m}^2$  ( $M = 43.50$ ;  $SD = 5.36$ ). The majority of the subjects (65.5%) had higher education, 27.6% – secondary education, and the remaining 6.9% had vocational education or did not provide their level of education.

The study was conducted in July and August 2016 in one of Warsaw clinics specializing in the surgical treatment of morbid obesity. Data were collected with the use of research tools such as: the Inventory of Lifestyle Behaviors (Inwentarz Zachowań Żywieniowych, IZZ), the General Self-Efficacy Scale (GSES) [21], and the Dietary Behaviors Questionnaire (Kwestionariusz Zachowań Związanych z Jedzeniem, KZZJ) [22]. Participation in the study was voluntary (subjects submitted written consent in order to enter the project). Patients answered questions included in all three inventories according to attached scales. So that their privacy is protected, their personal data were encoded.

#### Inventory of Lifestyle Behaviors (IZZ)

The Inventory of Lifestyle Behaviors IZZ (Inwentarz Zachowań Żywieniowych) by Zygryd Juczyński [21] consists of 24 statements. Each of the statements is scored on a scale ranging from one to five, where one means “almost never” and five – “almost always”. Scores are added in order to obtain a general index of frequency of health behaviors. The higher the score, the greater is the frequency of pro-health behaviors. Raw scores are converted to standardized sten norms. The inventory is comprised of four subscales: positive nutritional habits (PNH), prophylactic behaviors (PB), pro-health practices (PP), and positive psychological attitude (PPA). It is intended for both healthy and not-healthy adults. It is used in prophylaxis programming, modifying lifestyle behaviors and monitoring changes in health habits.

#### General Self-Efficacy Scale (GSES)

The General Self-Efficacy Scale (GSES), adapted to Polish by Zygryd Juczyński [21], is designed for measuring the intensity of a person's general belief in their own capability to cope with difficult situations. It consists of ten statements scored on a five-point Likert scale where one means “not at all true”, two – “hardly true”, three – “moderately true”, and four – “exactly true”. The general index of self-efficacy is the sum of answers to all the questions. The higher the general score, the stronger is patient's self-efficacy. The GSES guide include sten norms.

### Dietary Behaviors Questionnaire (KZZJ)

The Dietary Behaviors Questionnaire (Kwestionariusz Zachowań Związanych z Jedzeniem, KZZJ) by Nina Ogińska-Bulik and Leszek Putyński [22] consists of 30 statements. Each statement is answered by choosing “yes” or “no”. Every diagnostic answer scores one point. The general result is the sum of diagnostic answers. The sum of points allows determining a general tendency for negative nutritional behaviors (0–30 points). Overeating involves three distinct factors, and there are ten questions dedicated to each of them: habitual eating (0–10 points), emotional eating (0–10 points) and a tendency for dietary restrictions (0–10 points). A higher score signifies a greater frequency of negative nutritional behaviors. The Dietary Behaviors Questionnaire enables to diagnose eating disorders, predict susceptibility to weight gain, and is used to choose an appropriate weight-loss intervention.

The resulting empirical data were submitted to quantitative analysis with the help of SPSS 23.0 statistical package.

## Results

### Health behaviors in the study group of bariatric patients

Descriptive statistics and normality of distribution for frequency of pro-health behaviors in the surveyed group of patients with morbid obesity is presented in Table 1. Data distribution in IZZ: positive nutritional habits, prophylactic behaviors and pro-health practices subscales as well as in the global index was normal. The global index of frequency of health behaviors in patients with morbid obesity ranged between the sten scores of one and nine, and the mean fell in the fifth sten for men (which denotes a medium level), and in the fourth sten for women (which denotes a low level). Not including positive nutritional habits, particular subscales' means lay close to the middle point in the questionnaire answers scale, which means that subjects presented those behaviors “from time to time” or more often than that. Positive nutritional habits reached the level of 2.77 on average, which is below the midpoint of the scale; it shows that they are implemented less frequently than “from time to time”.

Table 1. Descriptive statistics and values of the normality test for IZZ health behaviors dimensions in the surveyed group of bariatric patients

IZZ Scale	N	Min.	Max.	M	SD	Shapiro-Wilk Test	Significance level
Positive nutritional habits	37	1.33	4.67	2.77	0.82	0.974	0.538
Prophylactic behaviors	37	1.50	4.83	3.16	0.75	0.980	0.719
Pro-health practices	37	1.83	4.00	3.12	0.55	0.958	0.169
Global IZZ index	37	46.00	102.0	74.57	12.37	0.982	0.804

M – arithmetic mean; SD – standard deviation

## Nutritional behaviors of surveyed bariatric patients

Subjects with morbid obesity showed a high frequency of detrimental nutritional behaviors (see Table 2).

Table 2. **Descriptive statistics and values of the normality test for KZZJ factor analysis and nutritional dysfunctions global index in the surveyed group of bariatric patients**

Factor	N	Min.	Max.	M	SD	Shapiro-Wilk Test	Significance level
Habitual eating	37	0.00	10.00	5.70	3.41	0.893	0.002
Emotional eating	37	2.00	10.00	6.54	2.05	0.952	0.111
Dietary restrictions	37	2.00	10.00	5.43	2.23	0.952	0.113
Nutritional behaviors global index	37	6.00	30.00	17.68	5.34	0.979	0.689

M – arithmetic mean; SD – standard deviation

Data distribution in two KZZJ subscales: emotional eating and dietary restrictions, as well as in the nutritional behaviors global index was normal. In terms of both subscales, it showed that the subjects were involved in five to seven dysfunctional behaviors for each subscale involving ten such behaviors. Moreover, the global index indicated that they displayed the majority ( $M = 17.68$ ) of all 30 negative nutritional behaviors included in the questionnaire. Data distribution in the habitual eating subscale differs significantly from the normal distribution: it is rectangular, which means that the scores ranging from zero to ten are equally probable to appear. The nutritional behaviors global index for surveyed patients turned out to be statistically significantly higher than for overweight subjects ( $M = 15.88$ ;  $SD = 8.23$ ) included by Ogińska-Bulik and Putyński [22], the authors of the KZZJ questionnaire ( $t(36) = 2.05$ ;  $p = 0.048$ ). Table 3 shows the results of both studies.

Table 3. **Descriptive statistics of KZZJ factors and nutritional behaviors global index in the surveyed group of bariatric patients and groups of overweight patients and patients with normal weight [22]**

KZZJ	Patients with morbid obesity *		Overweight subjects **		Subjects with normal weight **	
	M	SD	M	SD	M	SD
Habitual eating	5.70	3.41	4.64	3.12	2.94	2.68
Emotional eating	6.54	2.05	6.27	2.58	4.67	2.54
Dietary restrictions	5.43	2.23	4.97	2.52	3.37	2.53
Nutritional behaviors global index	17.68	5.34	15.88	6.63	10.98	6.25

\*source – authors' own research; \*\* Ogińska-Bulik, Putyński [22]. M – arithmetic mean; Me – median; SD – standard deviation

In comparison to research conducted by the authors of the Dietary Behaviors Questionnaire, patients diagnosed with morbid obesity ate habitually more frequently (statistically significant difference at a tendency level  $t(36) = 1.89$ ;  $p = 0.066$ ) than overweight subjects. In contrast, surveyed patients did not differ significantly from overweight people in the frequency of emotional eating ( $t(36) = 0.80$ ;  $p = 0.427$ ) and in implementing dietary restrictions ( $t(36) = 1.26$ ;  $p = 0.215$ ). Figure 1 shows the frequency distribution of answers confirming displaying particular nutritional behaviors included in the KZZJ questionnaire. It can be observed that almost every subject (97.3%) declared the desire to lose weight, the majority (81.1%) reported dissatisfaction with their body or worried about their weight (78.4%). To almost three quarters (70.3%) of the subjects eating constituted an important part of their lives, their eating habits were dependent on their mood, and they felt anxiety whenever they ate too much. More than 60% of patients admitted that eating lightened their mood (67.6%), they had the impression that their stomach was like a bottomless pit (62.2%), and that they wanted to do away with the excess food after a bigger meal (62.2%).

#### Self-efficacy in the surveyed group of bariatric patients

The distribution of the general self-efficacy index in the study group was normal, with mean  $M = 31.46$ ;  $SD = 3.94$  and a minimum of 22.00 and a maximum of 38.00. The results in the study group ranged between sten scores of 4 to 10, with mean at a sten score of 7, i.e. at high level. This means that the surveyed group of bariatric patients was characterized by high results of a general self-efficacy. When applying the standards of the self-efficacy, it must be taken into account that the age range in the surveyed group of patients was wider (18–62 years) than in the GSES standardization group (30–55 years,  $M = 41.2$ ), however, the mean age was similar ( $M = 39.9$ ), and standardization studies did not show any significant differences related to age [21].

#### Correlations between health and nutritional behaviors and self-efficacy and Body Mass Index

A correlation analysis was conducted in order to determine whether there was a correlation between subjects' self-efficacy and the frequency of their dysfunctional health and nutritional behaviors. For variables with normal distribution, the Pearson's  $r$  correlation coefficient was calculated. For variables without normal distribution, the Spearman's rho coefficient was used instead. A linear regression analysis was performed for variables explaining dysfunctional nutritional behaviors, including gender and age as predictors in addition to the GSES index. The results of the correlation and regression analysis are presented in Table 4.

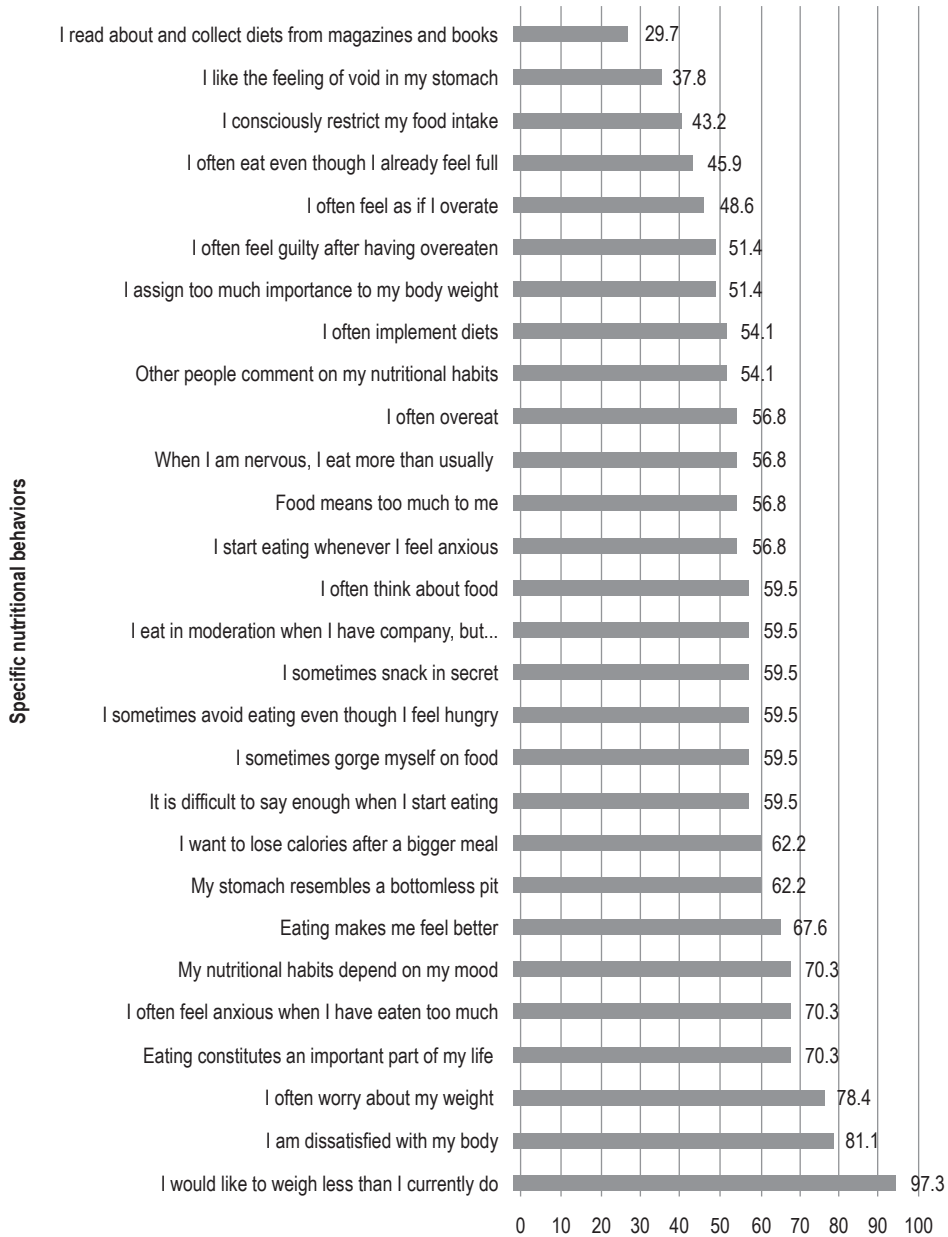


Figure 1. Percentage of bariatric patients declaring particular nutritional behaviors in the KZZJ questionnaire

Table 4. Results of the correlation and regression analysis of variables of assessed nutritional behaviors and KZZJ global index with self-efficacy in bariatric patients ( $N = 37$ )

Habitual eating	Emotional eating	Dietary restrictions	Nutritional behaviors global index
$\rho = -0.436^{***}$	$r = -0.317$	$r = 0.059$	$r = -0.324^{**}$
GSES $\beta = -0.597^{***}$	GSES $\beta = -0.459^{**}$	Gender $\beta = -0.433^{**}$	GSES $\beta = -0.602^{***}$
Gender ns; Age ns	Gender ns; Age ns	GSES ns; Age ns	Gender ns; Age ns

\*\*\* statistically significant correlation,  $p < 0.01$ ; \*\* statistically significant correlation,  $p < 0.05$ ; \* statistically significant correlation,  $p < 0.1$  (tendency); ns – not significant

Patients' self-efficacy was moderately negatively correlated not only with habitual and emotional eating but also with the nutritional behaviors global index. The higher was patients' self-efficacy, the lower was frequency of dysfunctional nutritional behaviors, habitual and emotional eating. Self-efficacy was also an important predictor in the regression model for these indicators, lowering their levels. The impact of gender and age in this model was not significant. The intensity of dietary restrictions did not correlate significantly with the GSES index, nor was the regression coefficient associated with this variable significant. On the other hand, a significant predictor of nutritional restrictions was gender. The negative sign of the coefficient (when coded: 1 – woman, 2 – man) means that the surveyed women used restrictive diets more often than men.

There were no significant correlations between self-efficacy and the subscales of Inventory of Lifestyle Behaviors as well as its global index. Therefore, it can be concluded that taking care of their own health was not related to self-efficacy of morbidly obese patients. Furthermore, Body Mass Index did not show any correlation with general self-efficacy ( $\rho = 0.073$ ;  $p = 0.685$ ) or any of the subscales of the Inventory of Lifestyle Behaviors. However, the KZZJ dietary restrictions subscale turned out to be statistically significantly negatively correlated with BMI ( $\rho = -0.434$ ;  $p = 0.012$ ). The patients who implemented dietary restrictions more often had lower Body Mass Index values.

## Discussion

The issue of excessive body mass is associated not only with fulfillment of physiological hunger, but it also concerns meeting human psychological needs. This can affect the health condition [17, 23].

Health behaviors constitute all practices concerning one's health which can result in either positive or negative consequences for a person's health [24]. Pro-health behaviors improve one's health, while detrimental health behaviors have negative impact on it and are at the root of numerous diseases. Pro-health behaviors include: sleeping regularly for about seven to eight hours a day; avoiding illegal substances, alcohol and cigarettes; physical activity; regular meals. These practices improve people's health. On the other hand, overeating, smoking and alcohol abuse increase the risk of diseases of affluence, including diet-related diseases [25].



The surveyed group of bariatric patients presented medium (in men) and low (in women) frequency of pro-health behaviors. Pro-health behaviors were practiced “from time to time” by most of the subjects, and positive nutritional habits even less frequently than “from time to time”. Similar results can be found in a study by Szczepańska and Brończyk-Puzoń [26]. Likewise, a study by Ostrowska et al. shows that nutritional behaviors are one of environmental factors associated with overweight and obesity [27].

Nutritional behaviors are defined as all actions the goal of which is to acquire and consume food. From the biological perspective, nutritional behaviors are a response to hunger and their objective is fulfillment of physiological needs of the organism. It is the hunger and satiety mechanism, localized in hypothalamus, which regulates food intake. Unfortunately, more and more often nutritional behaviors cease to have a physiological function; instead, more often they satisfy one’s psychological needs. Nutritional behaviors can be a form of expressing love, friendship, or togetherness; likewise, they can satisfy needs for security, gaining attention, as well as serve as a reward or punishment, or an opportunity to maintain social relationships [17]. Another reason why people overeat might be stress or negative emotions [28, 29]. People experience discomfort that they want to reduce. Some people manage tension by eating even though they do not feel hunger (emotional eating). Excessive body mass gain might also result from involuntary consumption of foods during a number of activities, such as reading books, using the computer or watching television (habitual eating). In both cases people do not monitor neither quality nor quantity of ingested food; as a consequence they may implement dietary restrictions in order to reduce their body mass. Consequently, these actions might result in loss of control and body mass gain. Individuals’ nutritional behaviors often become compensational in form, satisfying their psychological needs, thus contributing to excessive consumption and, in turn, obesity.

The surveyed patients suffering from morbid obesity displayed tendency for negative nutritional behaviors. In the case of emotional eating and dietary restrictions, patients manifested from five to seven dysfunctional behaviors out of ten; in the global KZZJ scale it was 18 behaviors out of 30 on average. Habitual eating occurred with the same probability in the range between one and ten behaviors, and the mean of six out of ten behaviors.

The nutritional behaviors global index in the study group was statistically significantly higher than that in overweight people included in the study conducted by the authors of the KZZJ questionnaire [22]. In the case of emotional eating and dietary restrictions, this difference was not significant. The study by Ogińska-Bulik and Pułyński [22] demonstrated that women with excessive body mass displayed a stronger tendency for emotional and habitual overeating as well as dietary restrictions than women with normal weight. Likewise, a different research on patients eligible for bariatric surgery showed a number of their detrimental lifestyle behaviors, including negative health and nutritional behaviors [30].

Subjects suffering from class II and III obesity experienced discomfort in terms of both psychological and physical well-being. The majority of the patients claimed that eating constituted an important part of their lives; they would like to weigh less than they did; were dissatisfied with their body; were concerned with their body mass; their

eating habits were dependent on their mood; and they experienced anxiety whenever they ate too much. More than half of patients admitted that eating lightened their mood, yet they had the impression that their stomachs were like bottomless pits, and that they wanted to do away with the excess food after every bigger meal. The surveyed patients had a negative image of their own body, and the experienced affective states were associated with excessive consumption as a strategy for coping with emotions. The results of this study are supported by subject literature [31, 32]. Baumeister et al. [33] indicate that when people experience increased emotional tension, self-regulatory processes collapse and therefore detrimental nutritional behaviors escalate. Another reasons for negative nutritional behaviors are habitual eating and implementing dietary restrictions which consist in imposing limits on the amount of consumed food in order to reduce body mass, and in consequence increase the probability of overeating [34]. All the aforementioned factors result in excessive consumption and might result in excessive body mass gain and experiencing both discomfort and lowered mood [35]. Moreover, it can be the most important reason of weight gain after bariatric surgery [36].

Oddly enough, the surveyed patients displayed high levels of general self-efficacy. The theory on influence (significance) of self-efficacy was developed by Albert Bandura. The author postulates that “beliefs of personal efficacy play a central role in personal change. This focal belief is the foundation of human motivation and action. Unless people believe they can produce desired effects by their actions, they have little incentive to act or to persevere in the face of difficulties. Whatever other factors may serve as guides and motivators, they are rooted in the core belief that one has the power to produce desired changes by one’s actions” [37, p. 143–164].

In the study group, self-efficacy was significantly negatively correlated with the nutritional dysfunctions global index, increased habitual and emotional behavior, and was a significant predictor in the regression model taking into account gender and age. There was no significant correlation between the GSES index and the intensity of dietary restrictions. On the other hand, gender was an important predictor of these behaviors – women used dietary restrictions more frequently than men. Self-efficacy was not linked to the incidence of health behaviors or BMI. It is probable that the obtained results represent personal resources which are useful in managing difficult situations in a variety of aspects of life. According to Bandura, the author of the discussed theory, it would be more beneficial to assess self-efficacy only in a particular area of human functioning than to evaluate global self-efficacy. In light of their observations, Chambliss and Murray [38] indicated that individuals with excessive body mass who displayed high levels of self-efficacy react better to behavioral therapy compared to those who displayed low levels of self-efficacy. Also Juczyński [39] emphasized the importance of self-efficacy in the self-regulatory processes involved in weight control. The increase in self-efficacy in managing difficult situations might positively affect the excessive body mass reduction process and result in increased efficacy of all undertaken interventions as well as become a significant predictor of lasting body mass reduction as a result of bariatric surgery.

The results of this study provide guidance on aspects which should be taken into consideration when preparing and treating patients with clinically diagnosed obesity.

It seems appropriate to repeat the study with a larger group of respondents, and to conduct a repeated measurement with other observational variables, such as stress measurement and coping strategies.

### Conclusions

On the basis of the conducted research one can indicate that:

1. Pro-health behaviors and nutritional habits did not reach a satisfactory level in the study group of bariatric patients; in fact, in women their level was low.
2. People with morbid obesity display a tendency for health-impairing nutritional behaviors.
3. Subjects suffering from morbid obesity manifested high levels of self-efficacy which was significantly negatively correlated with the frequency of not only emotional and habitual eating but also with global index of nutritional behaviors. The higher the sense of self-efficacy, the lower the level of dysfunctional nutritional behaviors, emotional and habitual eating. There was no significant correlation between self-efficacy, the frequency of dietary restrictions and pro-health behaviors.

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