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The imaginary picture of one's own body in overweight woman and its influence on weight reduction therapy

Wyobrażenie własnego ciała u kobiet z nadwagą i jego wpływ na redukcję masy ciała

ABSTRACT

INTRODUCTION. The aim of the study was to determine how obese people imagine their own figure, if it has an impact on the effectiveness of weight reduction therapy, and if it changes following the weight reduction.

MATERIAL AND METHODS. 150 overweight women participated in a 3-month weight reduction therapy. Forty-nine participants, who had lost 15% of their baseline body weight, were evaluated. Three research methods were used: questionnaire, silhouettes test, and description of imaginary figure.

RESULTS. There was an initial difference between imagined figures and: current age of participants ($p < 0.001$), current body weight ($p < 0.001$), and current BMI ($p < 0.001$). There was a positive correlation between time of onset of participant's overweight and age of imagined figure ($p < 0.001$). There was significant body weight reduction during the treatment ($p < 0.001$), but there was no change in age and BMI of participants' imagined figures. Initial values of variables: position of imagined figure in silhouette test ($p < 0.001$) and BMI of imagined figure ($p < 0.01$) can explain 15% body weight reduction in the evaluated patients. **CONCLUSIONS.** In obese people, the imagined figure of one's own body can be slimmer and younger than in reality. Their own

body image is not altered by weight reduction therapy. Visualization of the obese patient's own body as slimmer than in reality and awareness of the excessive weight promotes the effectiveness of weight reduction therapy.

Key words: body image, imagination, obesity, weight-loss

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STRESZCZENIE

WSTĘP. Celem pracy było określenie jak osoby z nadwagą wyobrażają sobie własną sylwetkę, czy wyobrażenie to ma wpływ na efektywność kuracji odchudzającej oraz czy zmienia się wraz z redukcją masy ciała.

MATERIAŁ I METODY. Wyjściowo grupę badawczą stanowiło 150 kobiet z nadwagą. Do drugiego etapu badania zakwalifikowano 49 osób, które zredukowały 15% wyjściowej masy ciała. Zastosowano trzy metody badawcze: ankietę, test sylwetek, opis wyobrażonej postaci.

WYNIKI. Wyjściowo zaobserwowano różnicę pomiędzy wiekiem osób badanych a wiekiem wyobrażanych postaci ($p < 0,001$), masą ciała osób badanych a masą ciała wyobrażanych postaci ($p < 0,001$) oraz BMI osób badanych a BMI wyobrażanych postaci ($p < 0,001$). Zaobserwowano pozytywną korelację pomiędzy wiekiem początkowym wystąpienia nadwagi u osoby badanej, a wiekiem wyobrażanej przez nią postaci ($p < 0,001$). W trakcie kuracji odchudzającej nastąpił istotny spadek masy ciała osób badanych ($p < 0,001$), nie zmieniły się natomiast wiek ani BMI wyobrażanych postaci. Początkowe wartości zmiennych: pozycja wyobrażonej postaci w Teście Sylwetek ($p < 0,001$) oraz BMI wyobrażonej postaci ($p < 0,01$) wyjaśniają około 15-procentowej redukcji wyjściowej masy ciała osób badanych w trakcie kuracji odchudzającej.

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WNIOSKI. Wyobrażony obraz własnego ciała może być u osób otyłych szczuplejszy i młodszy, niż w rzeczywistości. Wyobrażenie własnego ciała u osób otyłych nie zmienia się pod wpływem obiektywnej redukcji masy ciała. Wyobrażenie sobie przez osobę otyłą własnego ciała jako szczuplejszego niż w rzeczywistości, przy jednoczesnej świadomości nadmiernej masy własnego ciała, sprzyja efektywności kuracji odchudzającej.

Słowa kluczowe: obraz ciała, wyobrażenie, otyłość, odchudzanie

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Introduction

Together with a constant increase in the population of obese people, there is a requirement for effective methods of body weight reduction. At the same time, a search is being conducted for psychological factors that can influence the genesis, maintenance, and reduction of overweight. In this respect, the image of one's own body is important, which is in accordance with the classic definition — sensual image of sizes, shapes, and forms of the body as well as feelings regarding the mentioned features of the whole body or one of its specified parts [1].

The body image consists of two dimensions: body percept and body concept. Body percept is an internal, visual image of a body shape and size; neuronal representation determining bodily experience; may be adequate to the reality or inadequate to the reality [2, 3]. The body concept is an attitude towards one's own body as a whole and its particular parts. It is the level of satisfaction one has from a body's appearance. It may be positive or negative [2–4].

Critical periods for one's own body creation are childhood and adolescence. Of most important influence to body image are the following factors [5–8]: bodily experiences (state of health, physiological processes, physical activity), observation of changes in one's appearance, objective knowledge regarding appearance and body functioning, comparison with others, information from others, and the influence of the media and cultural attractiveness standards.

Researchers of body image issues have different opinions regarding the constancy of body image at the turn of a person's life. Some of them consider that the body image is basically invariable [4, 6, 9, 10] while others claim that it changes even under the influence of a mood or assessment contest [8, 11].

Subjective assessment of the weight and size of one's own body has an important influence on the psychical and social functioning of a person, particularly on one's attitude towards oneself in relation to other people, as well as the assessment of one's state of health, level of happiness, or undertaken life activity [12–14].

In certain situations, the body image may be deformed or completely disturbed. This may be the result of, among others: improper intellectual development, damage of central nervous system, reduced or limited physical fitness, chronic somatic illnesses, or social factors (family's attitude, assessment of other people). A connection between the body image and the attitude towards oneself is a mutual dependence — objective and subjective factors may disturb the perception of one's own body, and this disturbed perception may cause changes in beliefs, emotions, and activities regarding oneself.

On the basis of scientific reports of other researchers [4, 7, 15] and our own clinical experience, it was assumed that, most of all, the sensory experience and cognitive schemes are the essence of the perceptive and postural model of the body; a visual perception has a secondary meaning. For that reason, for the purposes of the presented research, the imaginable picture of one's own figure was used as a stimulus activating the image of one's own body. The aim of the present study was to examine how obese people imagine their own figure, if it has an impact on the effectiveness of weight reduction therapy, and if it changes following weight reduction.

Material and methods

The subjects comprised 150 obese women (BMI 37.1 ± 6.4 kg/m²; body weight 97.9 ± 16.4 kg; mean age 42.9 ± 13.5 yrs), who participated in weight reduction therapy. Most of the patients had secondary education and during the treatment were vocationally non-active.

The treatment started with a group educational meeting. The discussion included reasons and consequences of excessive body weight and indications regarding proper nutrition and physical activity. Afterwards each patient visited a physician once a month and a dietician (if needed). Weight reduction therapy consisted of: body weight control, a 1000–1200 kcal/day balanced diet, advice related to diet and physical activity, and pharmacotherapy, if necessary. All subjects were informed about the nature of the study and signed an informed consent form. Participation in the research was voluntary.

The period of treatment participation was unlimited, but the research was ended after 15 months. In this time, 49 patients achieved 15% reduction of initial body weight. These participants were initially 43.4 ± 12.4 years old, their initial mean body weight was 99.1 ± 15.2 and mean BMI was 38.3 ± 5.8 , they had secondary education, were employed in physical work, and had one child.

At the beginning and after the treatment, body weight and height were measured using an electronic

Table 1. Difference between real participant and imaginary Self at beginning of therapy

| | Variable | M | SD | Test* | | |
|-----------|-----------|-------|-------|--------|-----|--------|
| | | | | t | df | p |
| Age | Objective | 42.97 | 13.55 | 13.234 | 149 | <0.001 |
| | Imaginary | 31.81 | 12.70 | | | |
| Body mass | Objective | 97.94 | 16.47 | 17.733 | 149 | <0.001 |
| | Imaginary | 73.43 | 17.06 | | | |
| BMI | Objective | 37.17 | 6.42 | 17.774 | 149 | <0.001 |
| | Imaginary | 27.86 | 6.34 | | | |

*n=150

scale, and their BMI was calculated. Two research methods were used: silhouette test and description of imagined figure. The silhouette test is an image test that was first described by Furhnam and Alibhai [16]. The test included 3, 5, 7, or 9 different human silhouettes with respect to body weight volume. Scientific reports prove that the most accurate is the tool including 7 ± 2 silhouettes. In the presented study, a test with 9 silhouettes was used.

By using the method of competent judges (60 randomly chosen women, mean age 28.3 ± 9.7 years, W. Kendall's coefficient of conformity: 0.94127), the silhouettes were divided into the following categories (in accordance with body mass volume): 1) slim silhouettes Nos. 1 and 2; 2) average silhouettes 3 and 4; 3) overweight silhouettes 5 and 6; 4) obese silhouettes 7, 8, 9. Subsequently, based on medical tables, a proper scope of BMI was assigned to each silhouette:

- BMI < 18 kg/m²;
- BMI 18–19 kg/m²;
- BMI 20–21 kg/m²;
- BMI 22–24 kg/m²;
- BMI 25–26 kg/m²;
- BMI 27–29 kg/m²;
- BMI 30–34 kg/m²;
- BMI 35–40 kg/m²;
- BMI >40 kg/m².

An imagined body picture was evoked among the subjects by using the following instruction: "Please close your eyes and imagine yourself (a few seconds pause). Now open your eyes and mark on the test a silhouette which illustrates in the best way your figure from your imagined picture". For questions regarding whether the subject imagined the real figure or the desired one, the answer was "maintain the first picture that spontaneously occurs after closing your eyes". The description of the imagined figure considered its estimated age (in years) and body weight (in kilograms).

Table 2. Correlation between onset of obesity and selected features of imaginary Self (R-Spearman)

| | Onset of obesity |
|-----------------------|------------------|
| Age of imaginary Self | 0.399* |
| BMI of imaginary Self | 0.030 |

*Correlation is statistically important at the level of 0.01 (bilateral)

Additionally, in the first stage of the research we used our own questionnaire regarding demographic and medical data.

All values presented in the text and tables are expressed as means \pm S.D. All analyses were performed using an SPSS package. The results were analyzed using the t-Student test, Spearman's correlation analysis, variation analysis ANOVA, and multiple regression analysis. p values < 0.05 were considered statistically significant.

Results

At the beginning of the weight reduction treatment a significant difference between: current age, weight, and BMI of examined subjects and age, weight, and BMI of imagined figures was observed ($t = 13.2$; $p < 0.001$; $t = 17.7$; $p < 0.001$, $t = 17.774$; $p < 0.001$; respectively) (Table 1).

There was a positive correlation between time of onset of overweight in examined subjects and age of imagined figure ($R = 0.399$; $p < 0.001$). There was no relationship between the onset of overweight and BMI of imagined figure (Table 2).

There was a significant body weight reduction during the weight loss treatment ($F = 987.03$; $p < 0.001$) (Table 3).

Together with body weight reduction, neither age ($F = 1.349$ [3.144]; $p = 0.260$) nor BMI ($F = 2.130$ [3.144]; $p = 0.098$) of the figures imagined by the examined people changed (Tables 4 and 5).

Table 3. Changes of objective BMI during weight loss therapy

| Stage | M | SD | ANOVA test* | | | |
|-------|--------|-------|-------------|----|-----|--------|
| | | | F | df | df | p |
| 1 | 38.306 | 6.778 | 987.038 | 3 | 144 | <0.001 |
| 2 | 36.356 | 6.420 | | | | |
| 3 | 34.444 | 6.106 | | | | |
| 4 | 32.443 | 5.790 | | | | |

*n = 49

Table 4. Changes of age of imaginary Self during weight loss therapy

| Stage | M | SD | ANOVA test* | | | |
|-------|--------|--------|-------------|----|-----|-------|
| | | | F | df | df | p |
| 1 | 31.490 | 12.560 | 1.349 | 3 | 144 | 0.260 |
| 2 | 33.367 | 12.706 | | | | |
| 3 | 31.429 | 12.780 | | | | |
| 4 | 31.469 | 11.988 | | | | |

*n = 49

Table 5. Changes of BMI of imaginary Self during weight loss therapy

| Stage | M | SD | ANOVA test* | | | |
|-------|--------|-------|-------------|----|-----|-------|
| | | | F | df | df | p |
| 1 | 27.782 | 6.481 | 2.130 | 3 | 144 | 0.098 |
| 2 | 28.792 | 5.113 | | | | |
| 3 | 27.791 | 5.660 | | | | |
| 4 | 27.464 | 4.628 | | | | |

*n = 49

Table 6. Elements of body image at beginning of therapy as predictors of body mass reduction size. Results of multiple regression

| Explained variable | | Size of body mass reduction | | |
|------------------------------------|-----------------------------------|-----------------------------|--------|---------|
| | | Beta | B | p |
| Subjective estimation of body mass | Imaginary Self in Silhouette test | -0.430 | -1.711 | < 0.001 |
| | BMI of Imaginary Self | 0.318 | 0.191 | 0.007 |
| Statistics of model | | R = 0.384 | | |
| | | R ² = 0.148 | | |

n = 150

As presented in the following table (Table 6), about 15% of the reduction ($R^2 = 0.148$) of initial body weight of the examined people during the weight loss treatment can be explained by the initial values of variables: the position of the imagined figure in the Silhouette Test ($\beta = -0.430$; $p < 0.001$) and the BMI of the imagined figure ($\beta = 0.318$; $p < 0.01$). Third important variable (not discussed in presented study)

was the position of perceived body image in the Silhouette Test ($\beta = -0,256$; $p < 0,01$).

Discussion

The results of the studies regarding the body image of obese people are not consistent. Especially con-

cerning perception of the construction of the body, which is the internal, visual image of body shape and size. Some authors indicate that obese people slightly overrate the size of their body – the same as most people, regardless of their body weight. Others claim that this overrating is much higher in the case of obese people. The rest suggest that obese people underrate their body mass [17–19].

It should be underlined that most of the conducted research regarding the rating of one's own body size — both in the case of obese people and people with normal body weight — use methods based on visual (mirror, photography, video) or declarative (belief) images of one's own body. This raises some concerns because, as noted by Shafran and Fairburn [11], the reflection of a silhouette in the mirror has a dimension half the size in comparison to the natural size, so it does not provide reliable material for evaluation.

Moreover, obese people participating in such studies give answers more quickly in comparison to slim people, which indicates that they follow the image stored in their minds rather than what they see in reality [17].

In the present study, the imagination of a person was used as the main impulse activating one's own body image. Imagination, as compared with perception, is a picture: creative, less stable, less expressive, and less detailed but more artistic, fragmentary, designed “from the inside”, with a small dynamic of changes [20]. The ability of imaginary transformation manifests in childhood - at the end of the kindergarten period — and is connected with raised activity of the right cerebral hemisphere. In accordance with the Cognitive and Experiential Self Theory of Seymour Epstein [21], imagination is a product of an experiential system of information processing. This system works at the preconscious level and predominates over the rational system, significantly influencing the functioning of an individual — both in the world of internal experiences and in the outside world.

The results of our study show that the imagination of oneself (more precisely: the imagination of one's own body) in the examined people differs from their real appearance. Their imaginary figures were both younger and slimmer. Aristotle claimed (IV B.C.) that imagination is something different from perception and thinking, even though it does not arise independently from perception. He considered that the imagination is a kind of a movement and can arise independently from a perception, and that is why it does not always reflect the truth [22]. Differences between imaginary Self and a real Self may also be explained by the definition of imagination itself. It is described as: “a picture in head,

one of three subclasses of consciousness, beside impressions and emotions; mental representation of earlier sensory experience, its copy” [23].

In the present study, it was also observed that the sooner obesity occurred, the younger the imaginary figure was. Despite the excess weight of the examined people, in most cases the imagined figure was slimmer, which suggests that it represents the image from before significantly putting on weight or represents an idealistic picture of the examined person. The first assumption is more likely because, as resulted from the examined people's declarations, in most cases (96%) their imagined figure was real, *i.e.* represented the former person's appearance. Maybe the establishment of an advantageous image of oneself is connected with psychological protective mechanisms, especially with suppression. It allows an unpleasant matters to be maintained — in this case connected with socially and medically unaccepted excess body weight — beyond the area of awareness [24].

In the case of the examined subjects, the established or fixed image of oneself can be discussed in terms of the weight loss treatment — despite the significant body weight reduction, the imagined picture stayed unchanged. This applied to both age and body weight.

Some authors' reports confirm that in one's early life period the established image of one's body appearance has a tendency to remain the same, despite objective changes in appearance [6, 10]. The study of Adami et al. [6, 10] proved that in the case of people who were obese since childhood and managed to lose weight, the sense of being obese is still present as well as a sense of being shapeless, conspicuous, or discredited. In accordance with the authors, the image of one's body created earlier, based on being obese, is established and remains unchanged despite physical changes. This may suggest that if normal weight individuals establish images of themselves as a slim person, they may have a problem with perception of changes in the case of an increase in body weight. It may explain, among other things, the lack of motivation of many obese people to undertake weight loss treatment or to continue it.

Being unaware of one's appearance seems to be a paradox; however, circumstantial reports of other authors have proven its occurrence. For example, the NATA POL PLUS study showed that, despite the fact that 72% of men and 60% of women aged between 20 and 74 have a BMI over 25 kg/m², only 37% of them are aware of that situation — especially young, well-educated subjects from urban areas [25]. One patient's statement is a good illustration of this matter: “You know, I caught a glimpse of myself in the mirror this morning,

and I was surprised at how fat I have become. It made me feel that it's time to get some of this weight off.”*

The results of the present study show that one's body image influences the effectiveness of weight loss treatment. The body weight reduction in the examined women was higher if their imagined figure was slimmer at the beginning of the treatment and if the body weight assigned to it was higher (in kilograms).

That effect is probably associated with a complicated psychological process, the mechanism of which is still unclear. Probably it was because in the minds of the examined subjects there were two contrary pieces of information that caused increased emotional motivation to take up weight reduction therapy. On one hand, it was the awareness of excess of body weight, and the imagined figure was overweight too, and on the other hand, the imagined figure of the examined subjects was more attractive and slimmer than in the real world. It can be assumed that the occurrence of

these two factors (awareness of the problem and the visualization of the target) become the motivation for the examined subjects to take up weight reduction therapy, and determined its effectiveness.

To prove this relationship we need further investigations that analyze the influence of controlled notions on the effectiveness of weight reduction therapy.

Conclusions

1. In obese subjects, the imaginary picture of their body is slimmer and younger than in reality.
2. In obese subjects, the image of their own body does not change following body weight reduction.
3. In obese subjects, the imagination of their body as slimmer than they really are, as well as the awareness of the excessive body weight, favours weight loss treatment.

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