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IMPROVING PERSONALIZED APPROACHES TO LIFESTYLE MODIFICATION FOR PATIENTS WITH OVERWEIGHT AND OBESITY

Kiro L. S., Zak M. Yu., Kushnirenko I. V.

INTRODUCTION

According to the WHO, about 800 million people worldwide live with obesity. Data from the STEPS Study: Prevalence of Risk Factors for Noncommunicable Diseases in Ukraine in 2021 found that only two-fifths (39.6 %) of the population in Ukraine had a normal weight, and almost three-fifths (59.1 %) were overweight and adiposity[1]. According to economists, the economic consequences of obesity by 2025 are staggering and will amount to a fantastic amount of 1 trillion dollars. Separately, it is worth noting that the problem of obesity has become even more urgent in the era of the coronavirus disease (COVID 19) pandemic[2]. This supports the fact that obesity is a risk factor for severe infection, as evidenced by an increased risk of death and double the number of hospitalizations for COVID 19 among obese people. Diseases of the cardiovascular system, diabetes, disorders of the musculoskeletal system, high cholesterol, reproductive disordes are much more common in people who have problems with excess weight 9–10. Reports from the International Agency for Research on Cancer (IARC) and the World Cancer Research Fund (WCRF) found evidence that obesity is associated with such common types of cancer as endometrial cancer, esophageal adenocarcinoma, colorectal cancer, breast cancer, prostate cancer, and kidney cancer[3]! Million Women Study, showed that 50 % of cancer cases in the postmenopausal period are related to obesity! 90,000 cancer deaths per year could be avoided if the adult population maintained a normal weight (BMI < 25.0 kg/m^2). Statistics of deaths from

[1] Caballero B. Humans against Obesity: Who Will Win? Adv Nutr. 2019 Jan 1; 10 (suppl_1):S4–S9. doi: 10.1093/advances/nmy055. PMID: 30721956; PMCID: PMC6363526.

[2] Neshteruk C. D., Zizzi A., Suarez L., Erickson E., Kraus W. E., Li J. S., Skinner A. C., Story M., Zucker N., Armstrong S. C. Weight-Related Behaviors of Children with Obesity during the COVID-19 Pandemic. Child Obesity. 2021 Sep; 17 (6):371–378. doi: 10.1089/chi.2021.0038. Epub 2021 Apr 26. PMID: 33902326.

[3] Lauby-Secretan B., Scoccianti C., Loomis D., Grosse Y., Bianchini F., Straif K.; International Agency for Research on Cancer Handbook Working Group. Body Fatness and Cancer- Viewpoint of the IARC Working Group. N Engl J Med. 2016 Aug 25; 375 (8):794–8. doi: 10.1056/NEJMsr1606602. PMID: 27557308; PMCID: PMC6754861.

diseases, the development of which is associated with obesity, are increasing every year. Recommendations of the European Society of Endocrinology (ESE, 2020)[4], Canadian recommendations for the management of patients with obesity (2020), order of the Ministry of Health of Ukraine (from October 4, 2021 No. 2150): Standards of medical care for childhood obesity[5], The European Association for the Study of Obesity (from 23.01.2019) is far from the entire list of documents regulating the management and lifestyle modification of obese patients, but the number of patients with this pathology continues to grow rapidly.

1. The problems prerequisites emergence and the problems formulation

The main problem of the modern health care system is a rapid increase in the number of cases of obesity[6], relapse and ineffectiveness of long-term maintenance of the desired weight, the development of non-psychotic mental disorders, as the main component of obese patients is caused primarily by the fact that most leading health care specialists continue to consider and correct obesity only from the perspective of somatic pathology[7], forgetting the role of psychological factors[8] and the need for primary impact on the patient's psycho-emotional sphere.

[4] Ng M., Fleming T., Robinson M., Thomson B., Graetz N., Margono C., et al. Global, regional, and national prevalence of overweight and obesity in children and adults during 1980–2013: a systematic analysis for the Global Burden of Disease Study 2013. Lancet. 2014 Aug 30; 384 (9945):766–81. doi: 10.1016/S0140-6736(14)60460-8. Epub 2014 May 29. Erratum in: Lancet. 2014 Aug 30; 384 (9945):746. PMID: 24880830; PMCID: PMC4624264.

[5] Flynn M. A., McNeil D. A., Maloff B., Mutasingwa D., Wu M., Ford C., Tough S. C. Reducing obesity and related chronic disease risk in children and youth: a synthesis of evidence with 'best practice' recommendations. Obes. Rev. 2006 Feb 7 Suppl 1: 7–66. doi: 10.1111/j.1467-789X.2006.00242.x. PMID: 16371076.

[6] Thoma N., Pilecki B., McKay D. Contemporary Cognitive Behavior Therapy: A Review of Theory, History, and Evidence. Psychodyn Psychiatry. 2015 Sep; 43 (3):423–61. doi: 10.1521/pdps.2015.43.3.423. PMID: 26301761.

[7] Roberts J. S., Ferber R. A., Funk C. N., Harrington A. W., Maixner S. M., Porte J. L., Schissler P., Votta C. M., Deldin P. J., Connell C. M. Mood Lifters for Seniors: Development and Evaluation of an Online, Peer-Led Mental Health Program for Older Adults. Gerontol Geriatr Med. 2022 Aug 10; 8: 23337214221117431. doi: 10.1177/23337214221117431. PMID: 35966640; PMCID: PMC9373139.

[8] Rimmer J. H., Wilroy J., Galea P., Jeter A., Lai B. W. Retrospective evaluation of a pilot eHealth / mHealth telewellness program for people with disabilities: Mindfulness, Exercise, and Nutrition To Optimize Resilience (MENTOR). Mhealth. 2022 Apr 20; 8:15. doi: 10.21037/mhealth-21-34. PMID: 35449508; PMCID: PMC9014229.

2. The analysis of existing methods for solving the problem and formulating a task for optimal technical development

Taking into account all of the above, the aim of the study was to improve personalized approaches to lifestyle modification[9] for obese patients and correction of neuropsychiatric disorders by introducing cognitive-behavioral training[10] at the early stage of treatment.

To achieve the set goal of the program, the main tasks were formulated and implemented:

- At the Department of Therapeutic Disciplines of the Medical Institute of the Petro Mohyla National University of Ukraine to start a patient school for the correction of excess weight and eating behavior.
- Implement a mandatory course of cognitive-behavioral training at the initial stage of treatment of overweight and obese patients, with the aim of motivating, developing and consolidating healthy CB skills in overweight and obese patients; and the second and third component of assistance was the provision of recommendations regarding diet therapy and physical activity.
- Develop an individual meal plan and physical exertion for patients, depending on the initial indicators of the patient's metabolic and active exchanges.
- To analyze the effectiveness of cognitive-behavioral therapy by comparing initial (before the start of the CBT course) and final anthropometric, physiological indicators; the dynamics of changes in the course of the neuropsychological sphere of patients.

3. Materials and methods of research

85 patients (42 women, 43 men) were examined on the basis of the University Clinic of the Black Sea National University named after Peter Mohyla and the Polyclinic of the State University "Territorial Medical Association of the Ministry of Internal Affairs of Ukraine in the Mykolaiv Region". The age of women varied from 19 to 60 years (average age 41.5±11.2 years), the age of men – from 22 to 60 years (average age – 42.3±12.3 years). All patients were divided into two clinical groups: *group 1 (research group)* – 48 people (24 women and 24 men), patients with NAFLD and obesity of the 1st degree with BMI from 31.0 kg/m^2 to 34.1 kg/m^{2,} average BMI=32.55±1.07 kg/m^{2,} *who*

[9] Blüher M. Adipose tissue dysfunction in obesity. Exp Clin Endocrinol Diabetes. 2009 Jun; 117 (6):241–50. doi: 10.1055/s-0029-1192044. Epub 2009 Apr 8. PMID: 19358089.

[10] Paris J. The mistreatment of major depressive disorder. Can J Psychiatry. 2014 Mar; 59 (3):148–51. doi: 10.1177/070674371405900306. PMID: 24881163; PMCID: PMC4079242.

underwent a course of CBT, diet therapy, and physical activity for 6 months*; the control group* – 37 people of NAFLD (19 women and 18 men) with abdominal obesity of the 1st degree (BMI from 30.0 kg/m^2 to 33.9 kg/m$^{2;}$ average BMI=31.95±1.03 kg/m^2), patients who followed only diet therapy, recommended physical activity, *without involvement in cognitive-behavioral training* (information about obesity was obtained from brochures and mass media).

The general clinical examination of patients consisted of measuring anthropometric and physiological indicators, studying the dynamics of changes in the course of anxiety, depressive and somatized disorders.

The anthropometric study included: determination of body height and weight, calculation of the body mass index (kg/m^2), measurement of the circumference of the waist and hips, the index "waist circumference/hip circumference" (OT/OS); physiological: measurement of blood pressure (presence of arterial hypertension), heart rate, BH.

Patients who met the following criteria were included in the experiment: exclusion of alcohol consumption ≥30 g/day in the case of a man and ≥20 g/day in the case of a woman; individual and family anamnesis of diabetes, hypertension and cardiovascular diseases were analyzed in detail, BMI, waist circumference, changes in body weight were calculated; laboratory-confirmed negative results for markers of HBV and HCV infection; excluding the use of steatogenic drugs; slight or moderate increase in the activity of ALT and AST (AST/ALT<1) and GGT (≈50 % of cases, according to ultrasound (increased echogenicity (steatosis) of the liver, rarely hepatomegaly; in cirrhosis, symptoms of portal hypertension). Considering technical difficulties in the presence of obesity, mainly due to the impossibility of visualizing minor steatosis (<20 % of the liver mass), the inability of ultrasound to differentiate simple steatosis of NASP from NASH), MRI is recommended for group 2 patients with abdominal obesity, which assesses minor steatosis (5–10 % of hepatocytes). Theoretically, 1H-MRS is the only proven method for quantifying liver fat content. Extended diagnostics based on the initial assessment of probability or research results included: determination of ferritin concentration, saturation of transferrin with iron; research to detect celiac disease, thyroid gland diseases and polycystic ovary syndrome; research to identify rare liver diseases – Wilson-Konovalov disease, autoimmune diseases, α1-antitrypsin deficiency.

To assess the presence of somatized disorders, the SOMS-2 (Somatized Disorders Questionnaire) adapted to the purpose of the study was used (Screening for Somatoform Symptoms). Patients were asked to answer "yes" or "no" to 53 questions about whether these complaints had occurred in the

past 2 years (long or short) or were present. Syndrome-complete somatized disorder is diagnosed >20 points in men and >25 points in women.

The modified Beck questionnaire was used to study the presence and severity of the course of depressive disorders. Patients of all clinical groups were asked to answer 21 questions of the Beck questionnaire, taking into account their well-being during the last 2 weeks. Each answer was evaluated from 0 points (in the absence of complaints) to 3 points (in the presence of a large number of complaints). The obtained points were added and interpreted: 0–13 – absence of depression; 14–19 – mild depression; 20–28 – moderate depression; 29–63 – severe depression.

The diagnosis of depressive disorder was established in the presence of two given lower symptoms:

- reduced mood for at least 2 weeks (most days, more part of the time);
- loss interest in life and usual activity and lack of feeling pleasure;
- decrease energy and expressed fatigue.

In addition, there must be at least one symptom of given below:

- decrease self – confidence;
- sense guilt or excessive self-blame;
- suicidal thoughts or actions;
- decrease concentration attention or indecisiveness;
- agitation or inhibition;
- disorder sleep;
- decrease appetite.

Diagnosis lung depression appropriate, if in sum 5 symptoms were noted and insignificant the loss working capacity. About moderate depression you can to speak in the presence of 6 and more symptoms which _ are accompanied significant loss working capacity.

Taylor test, which consisted of 60 statements to which the examinee must answer “yes” or “no”. The statements were selected from the set of statements of the Minnesota Multifaceted Personality Questionnaire (MMPQ). The selection of items for the test was based on an analysis of their ability to distinguish individuals with “chronic anxiety reactions.” The duration of testing was 15–30 minutes. The results were interpreted as follows: 40–50 points – an indicator of a very high level of anxiety; 25–40 points – indicates a high level of anxiety; 15–25 points – about an average (with a tendency to high) level of anxiety; 5–15 points – about an average (with a tendency to low) level of anxiety; 0–5 points – about a low level of anxiety.

Patients of all clinical groups followed the recommendations for a healthy diet and physical activity. RK included: reducing the daily calorie content of food, in which the daily calorie content of food for women is 1200–1400 kcal, and for men – 1400–1600 kcal; the amount of fats used with food did not exceed 29 % of the daily caloric intake of food, 30–50 %

of consumed fats consisted of polyunsaturated fatty acids, the source of animal fats was lean fish, poultry (without skin), lean beef tenderloin was occasionally allowed; the share of carbohydrates accounted for 50–60 % of the number of kilocalories consumed daily, to enrich food with calcium in the diet it was recommended to introduce milk or kefir 0.5 %, table salt was limited to 4.5 g per day. In the presence of violations of carbohydrate metabolism, it was also recommended to countbread unit (BU), with obesity of the 1st degree (BMI=35–40 kg/m^2) the daily rate is –10 BU, obesity of the 2nd degree (BMI above 40 kg/m$^{2)}$ – 6–8 BU).

A sample menu for obesity of the first degree for a week

Sunday days	Break-fast #1	Break-fast #2	Dinner	Noon	Supper	Before bedtime
1	2	3	4	5	6	7
MONDAY	A glass of kefir (100 ml) + an 1 egg	A piece of boiled beef (about 100 g) + green peas + a cup of coffee + an apple.	Vegetable soup (200 g) + fresh cucumber + a piece of boiled meat (50 g) + compote (1 glass of fresh fruit).	Apple	100 g of cod (boiled) + potatoes (boiled) + cabbage salad + tea.	Kefir (100 ml)
TUESDAY	Kefir (100 ml) + a piece of boiled beef (50 g).	An apple + a cup of coffee + an egg.	Borscht (without meat, vegetable broth – 200 ml) + potatoes (mashed in water – 2–3 boiled potatoes) + a piece of boiled beef (100 g) + compote (100 ml)	apple	100 g of boiled chicken + 20 g of green peas + tea	Kefir (100 ml).
WEDNES-DAY	100 g of boiled meat + kefir	Steamed souffle (carrot) + cup of coffee + apple	Borscht (without meat, vegetable broth – 200 g) + potatoes (boiled) + compote + a piece of boiled cod.	Baked apple	100 g of boiled poultry + tea (you can add milk, sugar is prohibited	Kefir

End of Table

1	2	3	4	5	6	7
THURS-DAY	Kefir (1 cup) + egg	A piece of boiled meat (50 g) + toast + a cup of coffee (no sugar)	Vegetable soup + fresh cucumber + 100 g of boiled beef + compote	apple	Potatoes (boiled) + 200 g of boiled cod + salad (fresh cabbage) + tea	Kefir (100 ml)
FRIDAY	Egg + marinated fish 200 g + tea	Apple + kefir (100 ml)	Vegetable soup (150 g) + stew (vegetables, meat-100 g) + compote	apple	Egg	Sour milk (1 cup)
SATUR-DAY	Egg + coffee (no sugar) + steamed cutlets (fish) – 150 g	A glass of milk	vegetable soup with pearl barley (200 g) + sauerkraut + beef stroganoff (boiled meat – 100 g) + compote	Berries (150 g)	50 g of boiled meat + tea (unsweetened, with milk) + egg	Sour milk (1 cup)
SUNDAY	Potatoes (boiled) + a piece of boiled cod (150 g) + salad (fresh cabbage) + coffee	Kefir 1 cup	Vegetable soup + 100 g of boiled poultry + cucumbers + compote	200 g of berries + rosehip decoction	Egg + boiled meat (about 100 g) + tea	Sour milk (1 cup)

Physical activity was recommended mainly due to aerobic exercise: patients with a BMI of up to 40 kg/m^2 – it was recommended to start with walking at an average pace – 100 steps per minute, for 30 minutes, 3–4 times a week, gradually increasing the pace of walking to a high (160 steps per minute), duration – up to 45–60 minutes, frequency – up to 1 time per day; in patients with a BMI of 40 kg/m^2 or more, start with walking at a slow pace (65 steps per minute) for 10 minutes 3 times a week. Gradually, the intensity of the load is increased to an average level – 100 steps per minute for 30–45 minutes 4–7 times a week).

1 group (research) – 48 people (24 women and 24 men), patients with NAFLD and obesity of the 1st degree with an average BMI=32.55±1.07 kg/m ^{2}, took an active part in CBT. The total number of meetings with patients was 2 times a week, the duration of one coaching session was 30 minutes, a total of 48 sessions. The components of CBT were: motivational interview; the stage of actual cognitive-behavioral training (psychoeducation); the final stage is consolidation of the acquired attitudes and prevention of withdrawal relapses.

4. The stages of treatment of patients with NAFLD against the background of abdominal obesity

We conventionally divided the entire period of treatment of our patients into three stages.

4.1. The structure and methodology of the first (preparatory) phase of treatment

The first stage is preparatory. At this stage, during the first consultation with the patient, a declaration of consent to treatment was stolen and information was provided about the list of necessary examinations that the patient must undergo before starting therapy, in order to assess the initial physical and mental state of the patient. An individual treatment protocol was also developed for each patient, where anamnestic information (excerpt from medical history or outpatient card) and examination results were recorded.

Recommended examination methods:

GENERAL CLINICAL EXAMINATION:

– Determination of body height and weight, calculation of body mass index (kg/m^2).

– Waist and hip circumference, index "waist circumference/hip circumference" (OT/OS).

– Body proportions.

– Sexual development.

– Blood pressure (presence of arterial hypertension), heart rate, BH.

LABORATORY EXAMINATION:

Mandatory:

– General analysis of blood and urine.

– Determination of fasting blood glucose followed by an oral glucose tolerance test (OGTT) (glucose – 1.75 g/kg of body weight, but not more than 75 g), glycosylated hemoglobin.

– Level of insulin in the blood, calculation of the NOMA-IR index.

– Blood lipid spectrum (total cholesterol (C) and triglycerides (TG), low-density lipoprotein (LDL), very low-density lipoprotein (LDL), and high-density lipoprotein (HDL), atherogenic factor).

– Concentrations of total protein and protein fractions of blood plasma.
– The level of potassium, sodium, calcium, phosphorus.
– Bilirubin, AST, ALT, alkaline phosphatase (AL), amylase, prothrombin index (PTI), GGT.
– Urea, creatinine.
– Coagulogram.

Additional:

– Thyroid hormones (TSH, with an increase in TSH – blood analysis for T3v., T4v., BP to TH, BP to TPO).
– With signs of sexual dysfunction – sex hormones: in men – blood testosterone level, in women – blood estradiol and progesterone. FSH, LH, Prolactin blood – both in women and in men.
– With signs of hypercorticism – ACTH, blood cortisol, ultrasound of the adrenal glands.
– If neurogenic obesity is suspected – MRI or computed tomography of the brain, consultation of a neurosurgeon.
– With signs of pseudohypoparathyroidism – determination of the level of calcium, phosphorus in the blood and parathyroid hormone.
– ECG, with a persistent increase in blood pressure – Echocardiography.
– Ultrasound of the thyroid gland, adrenal glands, organs of the abdominal cavity, for women, if necessary, ultrasound of the pelvic organs.
– X-ray of the skull (Turkish saddle).

If indications are available, consultation of university specialists.

PATIENT QUESTIONNAIRE (the goal is to determine the type of CP and the presence of non-psychotic mental disorders). In a convenient format for 20–25 minutes. the patient gives answers to the suggested questions of the questionnaire DEBQ (Netherlands), SOMS-2, Beck's questionnaire, Taylor's test.

To detail the type of nutrition, we developed and tested additional questions, which were also necessarily included in the patient survey:

- The amount of food consumed and its composition.
- What is the frequency of meals.
- The time of the evening meal and its composition.
- Is there a night meal.
- Are there often different kinds of feasts.
- Attempts and methods of losing weight in the past.
- The reason for the desire to lose body weight.
- The patient's lifestyle (sedentary or mobile).
- Change in lifestyle and work features.
- Physical load at work.
- Features of leisure activities.

- How often does your emotional state (stress, anxiety, depression) affect appetite (stimulate or suppress)?
- What is the maximum weight you managed to lose? (for what period of time? Will you describe your diet? Why did you stop?).
- Does the surrounding environment (company, family, etc.) have an influence on your HP?
- How many hours does it take you to sleep?
- A possible reason for the increase in body weight, according to the patient.
- Dynamics of body weight gain from birth to the time of examination.
- Family history (determination of heredity from obesity, type 2 diabetes, hypertension, gout).

4.2. Cognitive-behavioral therapy (second phase): components and methods of behavioral training.

Considering that CBT is effective where drugs are ineffective; compared to other types of psychotherapeutic communication treatment, CBT helps to achieve a positive result in a relatively short period of time; the treatment method is clearly structured and allows for use in different formats; CBT forms habits and patterns of behavior that the patient can easily apply independently even after the end of the course of treatment, therefore, training-coaching with CBT was tested for the first time at our department. The recommended duration of the treatment course was 48 sessions (2 times per week) for 30 minutes each. The total duration of the course is 6 months.

The main methods of CBT, which were implemented during coaching trainings:

1. *Cognitive psychotherapy*, in which a person feels insecurity and fear, perceives life as a series of failures. At the same time, the specialist helps the patient develop a positive attitude towards himself, will help him accept himself with all his shortcomings, find strength and hope.
2. *Reciprocal inhibition*. At the same time, all negative emotions and feelings are replaced by other, more positive ones during the session. Therefore, they cease to have such a negative impact on the behavior and life of a person. For example, fear and anger are replaced by relaxation.
3. *Rational-emotive psychotherapy*. At the same time, the specialist helps the person to realize the fact that all thoughts and actions must be reconciled with the realities of life. And unfulfilled dreams are the path to depression and neurosis.
4. *Self-control*. When working with this technique, human reactions and behavior in certain situations are fixed. This method works for unmotivated outbursts of aggression and other inadequate reactions.

5. *"Stop-crane" technique and anxiety control*. At the same time, the person himself says "Stop" to his negative thoughts and actions.

6. *Relaxation*. This technique is more often used in combination with others for the complete relaxation of the patient, the creation of a trusting relationship with the specialist, and more productive work.

7. *Self-instructions.* This technique consists in creating a number of tasks for the person himself and independently solving them in a positive way.

8. *Self-observation.* At the same time, a diary can be kept that will help in tracking the source of the problem and negative emotions.

9. *Research and analysis of threatening consequences*. When a person has negative thoughts, he changes them to positive ones, based on the expected results of the development of the situation.

10. *The method of finding advantages and disadvantages*. The patient alone or together with a specialist analyzes the situation and his emotions in it, analyzes all the advantages and disadvantages, makes positive conclusions or looks for ways to solve the problem.

11. *Paradoxical intention*. This technique consists in the fact that the patient is offered to experience a frightening or problematic situation over and over again in his feelings and received on the contrary. At the same time, a person after some time stops feeling negative emotions related to this situation.

Thus, the treatment process goes through 3 main stages:

- functional analysis;
- formation of new behavior skills in educational conditions;
- changing behavior in real life.

Components of CBT:

- motivational interview;
- the stage of actual cognitive-behavioral training (psychoeducation);
- the final stage- consolidation of acquired attitudes and prevention of relapses.

Motivational interview.

Purpose: to assess the patient's motivation and readiness for change. This stage is the key to obtaining positive results during therapy.

In the process of change, people usually go through different stages of motivation:

- Preliminary contemplation.
- Contemplation.
- Preparation.
- Action.
- Maintenance.

In order to assess the patient's motivation to change, it is necessary to focus on several aspects, as they will be necessary for effective treatment:

1. *Assessment of the patient's readiness to lose weight*. To do this, it is necessary to assess the extent to which the patient is aware that he should lose weight. If the patient is not convinced about the feasibility of weight reduction, it is recommended to increase his awareness by providing information obtained during the medical, behavioral and psychological examination.

2. *Assess whether the current moment is the right moment for the patient to lose weight: taking into account personal, work and/or family factors* (a detailed collection of social, family analysis was carried out, in order to ensure the maximum comfortable environment for weight loss).

3. *Assess the extent to which the patient is aware of his confidence in achieving the set goal and the importance of achieving it.* If the patient shows insecurity and weak-mindedness, practical examples are given to him (for example, weight reduction by 5 % – the result of a 10 mm Hg pressure reduction – the result of a reduction in the risk of MI, etc.).

4. *Evaluate the characteristic signs for good motivation for change.* Some of these characteristics are: desire to lose weight for health reasons, is not currently experiencing stressful events that may interfere with monitoring and achieving treatment goals, is confident that he will achieve goals, is positive about the benefits you will receive from the change, and, finally, family support and your social environment, keeping a record of it.

PSYCHO-EDUCATION

Purpose: development of cognitive thinking, cognitive restructuring[11] and modification of behavior.

Production of cognitive thinking

To develop cognitive thinking in obese patients, we recommended periodically doing the following exercises: take a blank sheet of paper (divide it into 5 equal columns), then:

1st column – enter a problematic situation from your point of view.

2nd column – describe your own feelings and emotions arising in this situation (self-doubt, shyness, depression, depressed mood);

3rd column – indicate the automatic thoughts that most often arise at this moment;

4th column – write down your own beliefs, on the basis of which the automatic thoughts you described arise. Think about what attitudes can cause such thinking;

[11] Craighead W. E., Dunlop B. W. Combination psychotherapy and antidepressant medication treatment for depression: for whom, when, and how. Annu Rev Psychol. 2014; 65:267–300. doi: 10.1146/annurev.psych.121208.131653. Epub 2013 Sep 13. PMID: 24405361.

5th column – try to refute the opinions listed by you in the 4th column. Write down the attitudes of positive orientation.

This technique helps the patient to look at the situation from a different angle, thereby changing his initial position, and as a result, to get rid of negative thoughts.

Cognitive restructuring (CR)

In cognitive restructuring[12], we taught our patient to identify negative thoughts related to their expectations. Due to these negative thoughts, the individual develops a feeling of frustration, which leads to constant defeat in the process of change. Through cognitive restructuring, these negative thoughts and irrational ideas are previously identified in order to replace them with more adaptive and effective ones for change. Each of our patients followed the following stages of CR.

Stages of cognitive restructuring:

- Tracking and writing down negative thoughts and attitudes when you need to take some important action. The patient writes down on paper in order of priority the thoughts that come to him when making a decision.
- Keeping a diary. During the day, the thoughts that occur more often than others are recorded in the patient. A diary helps to keep track of how thoughts affect your well-being.
- Checking the negative installation in action. If the patient claims that "he is not capable of anything", the therapist encourages him to start with small successful actions, then complicates the task.
- Catharsis. The technique of living emotions from the state. If the patient is sad, does not accept himself, the therapist offers to express sadness, for example, by crying.
- Imagination. The patient is afraid or is not confident in his abilities in order to perform an action. The therapist encourages you to imagine and try.
- The method of three columns. The patient writes in the columns: situation-negative thought-corrective (positive) thought. The technique is useful for teaching the skill of replacing a negative thought with a positive one.
- Record of events of the day. The patient may believe that people are aggressive towards him. The therapist suggests keeping a list of observations, where to put "+" "–", during the day at each interaction with people.

[12] Van der Lem R., van der Wee N. J., van Veen T., Zitman F. G. Efficacy versus effectiveness: a direct comparison of the outcome of treatment for mild to moderate depression in randomized controlled trials and daily practice. Psychother Psychosom. 2012; 81 (4):226–34. doi: 10.1159/000330890. Epub 2012 May 11. PMID: 22584117.

Tips that patients should follow in order to maintain the result for a long time:

- Awareness of the fact that there is a problem (relatives, medical workers, mass media, personal critical approach can help in this).
- Motivation[13] (to answer the question: why should I lose weight?).
- The specific goal is to reduce weight (answer the question: how much and for what period do I want to lose weight?). It is important that the goal is rational (according to WHO recommendations: from 0.5–1 kg/week, reducing energy consumption by 500 kcal/day).
- Self-control (keeping food diaries and activity records, weighing, recording situations in which they eat (Table 1)).
- Management or change of stimuli that activate eating (television, buying food).
- Eating style[14] (slowing down the eating process, enjoying the flavors of food, drinking water).
- Motivational reward for following the rules (money, desired purchases, trips).
- Meal planning (in advance).
- Control of physical activity.
- Social support (support of loved ones, change of diet and food traditions in the family).
- Cognitive restructuring (a person eats a piece of pie, choosing further physical activity instead of blaming himself).
- Solutions to problems (how to eat at a party, feast).

4.3. The third stage of treatment: consolidation of acquired attitudes and prevention of relapse

Periodically repeat the course of CBT (1–2 times a year), involve a psychologist and psychotherapist in providing assistance to overweight and obese patients.

After adjusting and motivating the patient to make changes, we began to adjust his diet and physical activity[15].

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[13] Freeman M. P., Mischoulon D., Tedeschini E., Goodness T., Cohen L. S., Fava M., Papakostas G. I. Complementary and alternative medicine for major depressive disorder: a meta-analysis of patient characteristics, placebo-response rates, and treatment outcomes relative to standard antidepressants. J Clin Psychiatry. 2010 Jun; 71 (6):682–8. doi: 10.4088/JCP. 10r05976blu. PMID: 20573327.

[14] Broughton D. E., Moley K. H. Obesity and female infertility: potential mediators of obesity's impact. Fertil Sterile. 2017 Apr; 107 (4):840–847. doi: 10.1016/j.fertnstert. 2017.01.017. Epub 2017 Mar 11. PMID: 28292619.

[15] Brewer C. J., Balen A. H. The adverse effects of obesity on conception and implantation. Reproduction. 2010 Sep; 140 (3):347–64. doi: 10.1530/REP-09-0568. Epub 2010 Apr 15. PMID: 20395425.

The effectiveness of CBT was carried out by comparing the following indicators:

Assessment and comparison of the initial anthropometric and physiological parameters of the patient with the final ones. The anthropometric study included: determination of body height and weight, calculation of the body mass index (kg/m^2), measurement of the circumference of the waist and hips, the index "waist circumference/hip circumference" (OT/OS); physiological: measurement of blood pressure (presence of arterial hypertension), heart rate, BH. Indicators were determined before the start of treatment, after 3 months of therapy and after 6 months of CBT (on the 1st day, 90th day, 181st day).

Intergroup evaluation and comparison of the level of anxiety, depressive and somatiform disorders after 6 months of CBT (for 181 days) was carried out in the form of a questionnaire (each patient underwent a Taylor test, Beck scale, SOMS-2 questionnaire, DEBQ questionnaire (Netherlands); in addition, communication was implemented interview, and for greater credibility, a psychologist was involved in the conversation).

Patients who failed to improve the initial anthropometric and physiological indicators after 3 months, or the changes were insignificant, additionally received drug therapy (bupropion 150 mg once a day, lecithin 350 mg 3 times before meals).

5. Research results

The course of CBT had a positive effect not only on the physical condition of the patients, but primarily on the psycho-neurological sphere. Separately, it was possible to achieve a decrease in the number of depressive disorders of moderate severity by 3.33 times ($D = 0.1837$, $p = 0.0133$) in patients of the 1st group, in comparison with patients of the control group. There are no differences in the frequency of non-psychotic mental disorders for other types of disorders (p – value >0.05) (Table 1).

After the course of the 6-month course of CBT in the patients of the 1st group, an increase in the number of patients with normal blood pressure by 3.17 times ($D = 0.2215$, $p = 0.0047$) was reliably noted, compared to the initial data. In the control group, no statistically significant differences could be established during the entire observation period (all $p > 0.05$) (Table 2).

Table 1

Differences in the distribution of non-psychotic mental disorders in clinical groups, depending on the type of treatment

Types of non-psychotic mental disorders observed after 6 months of treatment	Scores on the Beck Depression Scale and the Taylor Anxiety Disorders Test	1st group, $BMI_{averenge}$ = 32.55 ±1.07 kg/m^2 (n=48)		Control group, $BMI_{averenge}$ = 31.95 ±1.03 kg/m^2 (n=37)		Difference between 1st and control groups	
	scores	n	%	n	%	D	P
Somatized disorders	–	5	11.1	6	17.8	0.6045	0.5214
No depression	0–13	4	8.9	2	2.2	1.5825	0.6927
Mild depression	14–19	20	44.4	4	11.1	5.7750	0.0017
Moderate depression	20–28	3	5.6	10	33.3	0.1837	0.0133
A severe course of depression	29–63	2	4.4	3	8.9	0.4969	0.6488
Low level of anxiety	0–5	8	17.8	3	6.7	2.2462	0.3348
Average level of anxiety	6–25	3	4.4	4	11.1	0.5539	0.6937
High level of anxiety	26–40	2	2.2	3	6.7	0.4969	0.6488
Very high level of anxiety	41–50	1	1.1	2	2.2	0.3767	0.5774

CONCLUSIONS

1. The improved life modification program used by obese patients had a positive effect not only on anthropometric indicators, but also contributed to the normalization of the patient's blood preasure and neuropsychological condition.

2. After the 6-month course of CBT, which was a component of our program, in the patients of the 1st group, an increase in the number of patients with normal blood pressure in 3.17 times (D = 0.2215, p = 0.0047) was reliably noted, in compared with the original data. In the control group, no statistically significant differences could be established during the entire observation period (all $p > 0.05$).

3. After completing the improved program, in 3.33 times (D = 0.1837, p = 0.0133) decrease in the number of depressive disorders of moderate severity was reliably recorded in patients of the 1st group, in comparison with patients of the control group.

Table 2

Blood pressure indicators (BP) in clinical groups, depending on the type of corrective therapy (M±SEM)

Blood preasure indicators (mm Hg) (M±SEM)	1st group (research), BMI $_{averange}$= 32.55 ±1.07 kg/m^2, (n=48)				control group, BMI $_{average}$ =31.95±1.03 kg/m ^{2}, (n=37)				Difference between 1st and Control groups			
	indicators before CBT	indicators after 6 months of CBT	the difference in blood pressure indicators before and after CPT in the 1st group		indicators before CBT	indicators after 6 months	the difference between initial and final BP values in the control group		the difference between the initial blood pressure indicators in the 1st and the control groups		the difference between the final blood pressure indicators in 1st and the control groups	
	n (%)	n (%)	D	P	n (%)	n (%)	D	P	D	P	D	P
<120/80	2 (4.2%)	8 (16.6%)	0.2205	0.0909	3 (8.1%)	7(18.9%)	0.3830	0.3081	0.4969	0.6488	0.8587	0.7832
121-139/81-89	6 (12.5%)	19 (39.6%)	0.2215	0.0047	5(13.5%)	8(21.6%)	0.5707	0.5426	0.9153	1.0000	2.3511	0.1015
140-159/90-99	20 (41.7%)	11 (22.9%)	2.3804	0.0799	13(35.1%)	10(27%)	1.4549	0.6160	1.3144	0.6546	0.8048	0.8006
160-179/100-109	12 (25%)	6 (12.5%)	2.3129	0.1902	10(27%)	8(21.6%)	1.3372	0.7870	0.9011	1.0000	0.5219	0.3772
>180/110	8 (16.6%)	4 (8.4%)	2.1827	0.3553	6(16.3%)	4(10.9%)	1.5867	0.7355	1.0329	1.0000	0.7525	0.7235

4. Thus, the combination of cognitive-behavioral training with the observance of rational nutrition and adequate physical activity helps not only to normalize weight, but also to maintain the desired weight during the long rehabilitation period.

Summary

Obesity complicates not only the course of chronic somatic diseases, but also increases the risk of developing non-psychotic mental disorders in this category of patients (depression, anxiety disorders, panic attacks, etc.). Nonpsychotic mental disorders significantly affect physical, mental, and social functioning and increase the risk of premature death. The problem of diagnosis and treatment of patients with comorbid pathology is becoming particularly acute for the system of organizing medical care on a global scale and requires an urgent solution. The aim of the work was to improve personalized approaches to lifestyle modification for obese patients and correction of neuropsychiatric disorders by implementing cognitive-behavioral training at the early stage of treatment. The results of the work established that the improved life modification program used by obese patients had a positive effect on anthropometric indicators, blood preasure and neuropsychological condition. After the course of the 6-month course of CBT, which was a component of our program, the number of patients of the 1st group with normal blood pressure were increased in 3.17 times ($D = 0.2215$, $p = 0.0047$), compared to initial data; amount of depressive disorders of moderate severity were in 3.33 times decreased ($D = 0.1837$, $p = 0.0133$) in comparison with patients of the control group. Combination of cognitive-behavioral training with proper nutrition and adequate physical activity helps not only to normalize weight, but also to maintain the desired weight during the long rehabilitation period.

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Information about the authors:

Kiro Liudmyla Sergiivna,
Teacher at the Department of Therapeutic Disciplines
of the Medical Institute
Black Sea National University named after Petro Mohyla
10, 68 Desantnykiv Str., Mykolaiv, 54003, Ukraine

Zak Maksym Yuriovych,
Doctor of Medical Sciences, Professor,
Head of the Department of Therapeutic Disciplines
of the Medical Institute
Black Sea National University named after Petro Mohyla
10, 68 Desantnykiv Str., Mykolaiv, 54003, Ukraine

Kushnirenko Inesa Vasylivna,
Doctor of Medical Sciences,
Lecturer at the Department of therapeutic disciplines
of the Medical Institute
Black Sea National University named after Petro Mohyla
10, 68 Desantnykiv Str., Mykolaiv, 54003, Ukraine