



Non-surgical Weight Loss and Body Image Changes in Children, Adolescents, and Adults

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16.1 Overweight and Obesity

Obesity is an increasing problem among adults and children in many developed and developing countries, and it is a major global public health threat [1, 2]. It is a multifactorial disorder characterized by an imbalance between intake and daily requirement of nutrients. The causes of obesity are complex and include genetic, psychological, biochemical, environmental, social, and economic factors. In clinical practice, overweight and obesity are usually defined by the body mass index (BMI, weight in kilograms divided by the square of the height in meters) [3, 4]. According to the World Health Organization (WHO) criteria, overweight is defined as a BMI of 25–29.9 kg/m² and obesity as 30 kg/m² or greater [5].

Obesity results in significant impairment of health and longevity, increasing individuals' risk of illness and reducing life expectancy. Overweight and obesity are major risk factors for serious chronic diseases, such as type 2 diabetes mellitus, cardiovascular disease, hypertension, stroke, and some forms of cancer [1].

It also has an important impact on individual self-esteem and self-image and limits health-related quality of life [4].

16.2 Assessment

To address correctly and effectively the weight-loss strategies, it's important to make a comprehensive initial assessment and then to use clinical judgement to investigate comorbidities and other factors to an appropriate level of detail [6]. The information should be collected depending on the personal characteristics of the

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individual, the timing of the assessment, the degree of overweight or obesity, and the results of previous assessments. It is necessary to manage comorbidities when they are identified and give the patient information on the benefits of losing weight, healthy eating, and increased physical activity.

To propose a weight-loss treatment, it is fundamental to assess the person's view of the weight and the diagnosis, and possible historical and current psychological reasons for weight gain, to explore eating patterns, physical activity levels, any beliefs about eating, physical activity, and weight gain that are unhelpful if the person wants to lose weight.

It is important to find out what the person has already tried and how successful this has been and to assess the person's readiness to adopt changes. Finally it is very important, from a strategical and psychological point of view, to make a clear distinction between losing weight and maintaining the weight loss [6].

16.3 Treatment and Care of Overweight and Obesity in Adults

Treatment and care of overweight and obesity should take into account the person's preferences, initial fitness, health status, and lifestyle [6].

According to NICE guidelines, therapy should be based on a multi-disciplinary multi-step approach: (1) general advice on healthy weight and lifestyle, (2) diet and physical activity, (3) drugs, (4) surgery. It is fundamental to provide patients and their families and/or carers with information about the options for treatment [6].

Non-pharmacological lifestyle interventions can be combined with psychological interventions to improve adherence to treatment and induce permanent change in the obese or overweight individuals [4, 7].

While many interventions have been shown to have a short-term effect in inducing moderate weight loss, only a minority of people are able to maintain their weight loss. On the other hand, weight loss may improve psychological measures and health-related quality of life and allow for a more active lifestyle and increased physical activity [4].

16.3.1 Lifestyle Interventions

Interventions addressing lifestyle should represent a first-line strategy to induce and maintain weight loss. The greatest part of these interventions are attitudes towards a correct lifestyle that should be common acquisitions among general population. They include behavior change strategies to increase people's physical activity levels or decrease inactivity, improve eating behavior and the quality of the person's diet, and reduce energy intake. Treatments should take into account the social circumstance, the experience and the outcome of previous treatments, the person's level of risk and, where appropriate, any comorbidities. It is important to encourage the family to support any weight management program [4, 6, 8].

16.3.2 Dietary

The main aim of the dietetic intervention is the reduction in fat consumption and increase in healthy food intake [1].

It is important to tailor dietary changes to food preferences and allow for a flexible and individual approach to reducing calorie intake, without unduly restrictive and nutritionally unbalanced diets, because they are ineffective in the long term and can be harmful. Moreover, it is necessary to encourage people to improve their diet even if they do not lose weight because there can be other health benefits. The main requirement of a dietary approach to weight loss is that total energy intake should be less than energy expenditure [6]. Dietary modification is superior to exercise in attaining weight loss in overweight and obese adults: they are a more potent method for creating an energy imbalance than physical activity alone [7].

16.3.3 Physical Activity

Exercise has a positive effect on body weight in people with overweight and obesity. Although exercise alone improved weight loss only marginally compared with no treatment, when combined with dietary interventions, the amount of weight-loss diet resulted greater than diet alone and increasing exercise intensity increased the magnitude of weight loss [7]. Exercise combined with diet, independently by weight loss, also has a positive effect on cardiovascular risk factors, compared with sedentary persons, irrespective of weight [1, 7].

Exercise prescriptions include specific recommendations for the type, intensity, frequency, and duration of any physical activity. Finally, after achieving weight loss, it is important to encourage adults to build up to the recommended activity levels for weight maintenance: a key element of intervention based on physical activity is the reduction of time spent inactive, such as watching television, using a computer or playing video games [6].

16.3.4 Pharmacological Interventions

Non-pharmacological methods of obesity therapy, which include dietary modification, exercise, and behavioral modification, have demonstrated short-term effectiveness. Unfortunately, long-term recidivism rates are high, thus drugs should be used in conjunction with non-pharmacological therapy and with lifestyle modification [5].

Drug treatment is being considered in adults who have a BMI of 28 kg/m² or more with associated risk factors, or a BMI of 30 kg/m² or more.

The only approved anti-obesity drugs for long-term use belong to the category of the inhibitors of intestinal fat absorption. Orlistat, a drug that inhibits lipases, is the only agent currently available in this class. Side effects are related to malabsorption of fats including steatorrhea, bloating, and malabsorption of fat-soluble vitamins.

Orlistat has positive effects on lipidic profile, reduces blood pressure and diabetes incidence [6, 9].

Less commonly used medications for weight loss are either approved for short-term use (phendimetrazine, diethylpropion, and phentermine), or used off-label (bupropion, metformin, topiramate, and zonisamide) [4–6, 10].

Fluoxetine is currently used in BED treatment with possible clinical benefit in obesity and overweight. It is a selective serotonin reuptake inhibitor (SSRI), enhancing serotonin activity. Its functional consequences include symptoms such as decreased food intake, altered food selection, endocrine changes, and normalization of unusual eating behaviors (such as the frequency and severity of binge eating episodes that may be associated with obesity).

Although not specifically approved for weight loss, it is being prescribed for this indication, but showed higher efficacy in BED than in non-BED obese population [11, 12].

16.3.5 Psychological Interventions

Body image and obesity are related in important ways. Obesity may affect health not only through physical changes but also through psychological distress, which itself is important because it affects quality of life. Body image is one area where distress occurs, and therefore deserves specific attention [13].

Overweight and obese treatment-seekers demonstrate higher rates of psychopathology, including mood disorders (depression, low self-esteem, anxiety) and eating disorders (binge eating disorder, night eating syndrome, body image dissatisfaction), as well as impaired health-related quality of life [14]. Heavier individuals are also at increased risk of discrimination in employment, health care, education, and in interpersonal relationships. Combined, these negative biopsychosocial outcomes result in significant impairments in health-related quality of life [14].

Prominent cognitive processes are involved in the internalization of the slender beauty ideal, development of beliefs that constitute a thinness schema, and a tendency to compare one's weight and shape to the bodies of various other people, such as peers and celebrities [15].

Helping obese individuals to develop a realistic ideal body shape might be helpful in influencing the perceptual component of body image. Perception of one's own body depends on the integration of bodily signals from the outside (exteroception) and the inside (interoception). These signals contribute to self-image, that is, "the picture we have in our minds of the size, shape, and form of our bodies and to our feelings concerning these characteristics and our constituent body parts." Women with higher BMI have greater body image self-discrepancies. Moreover, obese patients usually report the inability to know when to start and stop eating, i.e., to feel the internal signals of hunger and satiety, resulting in an eating behavior led by external signals. Enhancing their interoception, which is impaired by the stress might, eventually, help them to adopt a healthier eating style [16].

Last but not least, body checking and avoidance are behaviors frequently associated with overweight and body image disturbances [17].

The participation in a weight-loss intervention itself has generally been shown to result in improvements in psychological outcomes in the short- to medium-term [14, 15].

A first-line approach to encourage weight loss is represented by psychoeducation, while a wide range of psychological interventions has been used in the treatment of overweight and obesity. The majority of psychological interventions for overweight and obesity are cognitive-behaviorally based, and are typically used in combination with lifestyle interventions [14]. Cognitive-behavior therapy has been proposed that a good time to address them would be following weight loss, in order to enhance weight maintenance [18].

16.3.6 Psychoeducational Interventions

Psychoeducation provides information about core topics like the factors that predispose, trigger, and maintain eating impulsiveness, negative effects of overweight and unbalanced or restrictive diets, and most effective methods of weight regulation [19]. Treatments are focused on plain symptoms explanation, without adopting strategies to influence unconscious or cognitive maintaining factors at a deep level, unlike to what occurs in psychotherapies [19, 20]. These treatments can be structured in weekly group meetings of limited duration [19]. Patients are taught on the pathogenic mechanisms of the disease, to self-monitor food intake, and about correct lifestyles, sustainable in time [19, 20]. Interventions are focused to promote a general improvement of health and quality of life, rather than on weight loss itself. These interventions have showed a preliminary efficacy on binge reduction and eating impulsivity [19, 20].

16.3.7 Psychotherapies

According to literature data, psychotherapies are the most validated and effective treatments for BED [21–23]. Recent studies [21–23] describe binge eating in BED as the possible result of an immediate breakdown of emotion and impulse regulation caused by sudden increases of negative affect and tension, and/or rapid decrease of positive effect. Therapeutic implications of these findings are represented by the development of response-prevention strategies, such as the acceptance of stressful events or the disclosure of mental states.

Cognitive-behavioral therapies (CBT) are the most evaluated and developed psychological intervention for treating BED [21, 22]. The focus is the etiological basis of bingeing and its relation with a self-esteem excessively dependent from body shape [21, 24]. The most widely used CBT models are adaptations of those developed for BN [21, 23]. CBT is a practical and adaptable intervention, with setting and duration that can be tailored on clinical needs and the possibility of being

carried out independently or in combination with other pharmacological or BWL approaches [21, 25–27]. A number of researchers, led by Cash and Rosen [28, 29], have devised CBT for improvement of body image. In this process, the experience of the body is shifted from a site of vulnerability and shame to a site of knowledge and agency [15]. Long-term effects of CBT approaches include a gradual normalization of eating patterns and reduced relapse occurrence [30–32]. Unfortunately, evidences about effects on weight reduction are still limited and of unclear clinical significance [22, 33, 34].

Dialectic-behavioral therapy (DBT) is another psychotherapeutic approach that has proved its efficacy in BED; it is more focused on emotion regulation and stress tolerance than CBT [23]. This therapy showed to be effective in binge reduction and in lowering concerns about food and body shape similarly to CBT, but it has not provided clear results on weight loss [35, 36].

Another evidence-based psychological treatment is interpersonal psychotherapy (IPT). This technique focuses on personal relations and role transitions that could have a predisposing and maintaining role in EDs, in order to achieve better social interactions and to cope with interpersonal conflicts [23, 37, 38]. Even if it doesn't focus directly eating symptoms, it can be useful because it targets a specific area of impairment in BED patients [38–40].

Other psychotherapeutic interventions that has been used successfully in the treatment of overweight and obesity include psychodynamic therapy, relaxation therapy, hypnotherapy, eye movement desensitization and reprocessing (EDMR), emotion freedom techniques, and emotion-focused therapy [23].

16.4 Overweight and Obesity in Adolescents and Children

The prevalence of obesity and overweight is increasing in child populations throughout the world, presenting a global public health crisis [2, 41]. In addition to the medical consequences already listed for adults, the condition of obesity can affect the child's mental health and lead to early discrimination, low self-esteem, and depression [2, 41].

Differentiate between obese binge eaters and obese non-binge eaters could be helpful in the assessment and treatment for young obese patients. Obese youngsters who binge tend to have greater psychopathology such as depression, low self-esteem, anxiety, and difficulties in social relationships [42].

16.5 Treatment and Care of Overweight and Obesity in Adolescents and Children

The purposes of interventions in children and adolescents are similar to treatment in adults [2, 41].

However, the primary goal of treatment (i.e., weight reduction or deceleration of weight gain) and the recommended mode of intervention is variable and dependent

on the child's age and initial level of overweight, along with other case-specific considerations. The importance of a combined dietary, physical, activity, and behavioral component has been highlighted by several studies [43–56]. Parental involvement has been recognized as an important component of behavioral programs, particularly in pre-adolescent children [2]. Instead at the best of our knowledge, currently there isn't any scientific evidence on the application of psychotherapeutic interventions in the treatment of obesity and overweight during the adolescence or childhood.

16.5.1 Lifestyle Interventions

It is fundamental to create a supportive environment that helps overweight or obese children and their family to make lifestyle changes, tailoring interventions to the needs and preferences of the family system.

The focus may be on either weight maintenance or weight loss, depending on the person's age and stage of growth [6].

16.5.2 Dietary

For overweight and obese children and young people, total energy intake should be below their energy expenditure, but changes should be sustainable. It is recommended not to use unduly restrictive and nutritionally unbalanced diets because they are ineffective in the long term and can be harmful. It is important to encourage young people to improve their diet even if they do not lose weight because there can be other health benefits [6].

16.5.3 Physical Activity

The approach for children is similar to that of adults. Moreover, it is of primary importance to encourage children to reduce inactive behaviors, such as sitting and watching television, using a computer or playing video games.

It has to enlighten the importance of encouraging children and young people to increase their level of physical activity even if they do not lose weight as a result because of the other health benefits exercise can bring [6].

16.5.4 Pharmacological Interventions

Drug treatment is not generally recommended for children younger than 12 years and no drug is approved for this population. Below this age, drug treatment may be used only in exceptional circumstances, if severe comorbidities are present [6, 41].

The only drug approved by the FDA for people over the age of 12 years is Orlistat. However, treatment is only recommended if there are physical comorbidities, and regular review to assess effectiveness, adverse effects, and adherence is recommended [41].

Some off-license drugs used to treat obesity in children and adolescents include fluoxetine and bupropion.

In general, drug interventions can result in a small BMI and weight reduction over the short term. It is unknown whether this is sustainable over the longer term [41].

In any case, it is important to offer support to help maintaining weight loss to people whose drug treatment is being withdrawn; if they did not reach their target weight, in fact, their self-confidence and belief in their ability to make changes may be decreased [6].

16.6 Change in Body Image and Psychological Well-Being During Obesity Treatment

The extent to which someone perceived himself/herself as being overweight was a much better predictor of body dissatisfaction, body esteem, and disordered eating, than the actual BMI [57].

Greater body image dissatisfaction is associated with lower self-esteem, more depressive symptoms, and greater internalization of society's emphasis on the importance of physical appearance. Because of the significant consequences of negative body image in obese individuals, it is important to understand the nature and correlates of body dissatisfaction among individuals who are or who have been overweight. Frequent body checking and avoidance have been documented and shown to be associated with high shape and weight concerns among individuals with obesity or overweight and obese patients with binge eating disorder [18].

Moreover, it has been observed that women with BED suffer from higher levels of body dissatisfaction than women without BED, and they are more exposed to socio-cultural factors that promote the ideal thinness [13, 58].

In a therapeutical and prognostic perspective, body image enhancement should protect against the development of unhealthy behaviors linked to obesity. Therefore, cognitive and affect-related changes that occur during weight management may represent more than positive outcomes and can also influence the effects of an intervention. This is particularly relevant when considering interventions that include regular physical exercise with its well-known positive effects on emotions, self-esteem, depression, and other psychological variables. A recent study conducted by Palmeira and colleagues [59] showed that there might be a predictive role of short-term changes in body size dissatisfaction and self-esteem on long-term weight loss. In fact, individuals who improved self-esteem and body dissatisfaction the most were more likely to obtain long-term weight loss. Therefore, treatments for obesity and overweight should include interventions addressing body image because changes in psychological well-being taking place during weight management programs might independently contribute to long-term success [59].

16.6.1 Body Image, Weight Loss, Dieting, and Qualitative Caloric Intake

Obesity can produce severe psychological consequences. It is sometimes argued that the life dissatisfaction, social abilities, and body image distress produced by obesity are beneficial because they motivate people to lose weight [13].

Instead, body checking and avoidance behavior are major issues in obese patients. The relationship between checking and avoidance behaviors, psychopathology, and weight loss may be particularly important for individuals who are attempting or maintaining behavior change as part of obesity treatment. An overweight person without body dissatisfaction may feel less determined to make health behavior changes than someone with a moderate level of body dissatisfaction. On the other hand, someone with extreme body image distress may be caught in a destructive cycle of negative self-talk that is debilitating and inhibits change [13].

It is often assumed that the key to improving body image is to lose weight. Although a reduction in body weight generally leads to an improvement in body image, the correlation between these variables is not so strong. A possible explanation is that actual changes to the body are less important than perceived changes [60]. In fact, conversely to what is commonly believed, changing body image is more easily achieved by changing the perceptions of one's body and the importance ascribed to that, than by changing body appearance itself. In fact, studies exploring the efficacy of cognitive therapy to body dissatisfaction would indicate that it is possible to improve body image without changing one's appearance [57, 61].

On the other hand, methods based on psychotherapy techniques exist to improve body image and have been applied successfully to obese individuals but these alone do not appear to boost weight loss [13].

More in detail, it has been shown that, when dieting, improvement in body image over treatment is not significantly related to the amount of weight loss. One explanation is that the treatment, rather than weight loss per se, improved body image. Another explanation is that body image improves with relatively small amounts of weight loss, and that further weight loss does not lead to further improvement. Body image, in summary, and other psychological distress such as low self-esteem and binge eating can improve independent of weight loss [13].

When weight loss is obtained through dieting, high levels of dietary restraint and high BMI are associated with low state body image satisfaction after eating. The relationship between dieting, caloric intake, and body image satisfaction appears to be bi-directional: consumption of low calorie foods may induce feelings of body image satisfaction which could support prolonged adherence to a weight-loss diet, whereas consumption of highly caloric food leads to body dissatisfaction. Therefore, body image may be affected also by the way dietary weight-loss is achieved: healthy weight management behaviors, such as a balanced diet with low caloric food intake (and not excessive restrictions or restrictions alternate with high caloric food assumption) improves body image satisfaction and positively reinforce long-term maintenance of weight loss [62].

16.6.2 Body Image and Physical Activity

It has been shown that, like dietary weight-loss interventions, exercise interventions have significant positive effects on body image. In fact, perceived changes to one's body and perceived improvements in one's physical abilities appear to be more consistent correlates of body image change than physique-related changes [60]. It is quite a common finding in studies on body image that body image changes do not always come along with significant changes in body weight, body composition (e.g., fat mass, lean mass), anthropometric variables, or improvement of physical strength (e.g., maximum amount of weight lifted) and endurance (e.g., maximum heart rate, maximum volume of oxygen consumption during exercise) obtained through physical activity. In contrast, body image changes strongly correlate with perceived changes in physical fitness (i.e., body composition, strength, aerobic endurance) and psychological variables such as self-efficacy, conceptualized as confidence in one's abilities to perform activities requiring, aerobic endurance, and muscular strength. Taken together, these findings suggest that how an exerciser perceives changes to her body is a stronger determinant of body image change than the actual magnitude of those changes.

In fact, a review by Martin Ginis et al. [60] demonstrated that perceived change variables emerged as the most consistent unique predictors of body image change. More in detail, perceived body fatness reduction was the most significant predictor of body image improvement. This findings are consistent with the notion that changes in beliefs about one's body, and not actual changes to the body, are the driving force behind body image change in exercise and weight-loss interventions. Even if evidence is scarce, it has been suggested that there is a weight-loss threshold that triggers body image improvements.

Changes in perceived strength also played a significant role in body image change. Strength training may help shift a woman's focus away from her appearance and foster greater awareness of functional aspects of her body. A shift in awareness, coupled with the positive feedback provided by a progressive strength-training regimen may challenge, and ultimately alleviate, negative body image thoughts and feelings. Importantly, these benefits do not seem to diminish over the course of a strength-training intervention, suggesting they play a role in body image change even after the initial period of acute strength increases [60].

About self-efficacy, the finding that aerobic self-efficacy was a stronger predictor of body image than strength self-efficacy likely reflects women placing greater value on aerobic exercise than strength training as a means for losing weight and managing body image concerns. Increased confidence to do aerobic exercise could create the sense that the exerciser is getting closer to the body ideal, thus enhancing body image [60].

Therefore, in treating obese patients, maximizing perceived body changes is more important than obtaining actual body change. Perceived improvements could facilitate patients to develop realistic weight-loss goals that will make them feel good about even relatively small losses. To address body changes perception, it is important to draw patient's attention to improvements in strength

and aerobic endurance rather than to weight and body shape modifications and it may be useful to encourage them to record their aerobic and physical-strength achievements [60].

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