Cognitive-Behavioral Therapy: Current Paths in the Management of Obesity

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Abstract

The treatment of obesity and its related chronic symptoms is one of the major issues that world healthcare systems are facing today. Cognitive-behavioral therapy (CBT) is one of the most effective therapies in the treatment of dysfunctional eating behaviors. In the first part of the chapter, the phenomenon of obesity will be introduced; subsequently, the role of CBT into obesity treatment will be underlined. CBT's core strategies will be presented and analyzed: goal setting, self-monitoring, stimulus control, problem solving technique, and cognitive restructuring technique. The use of these strategies and related results is a major issue, emphasizing the need for further studies on the phenomenon of obesity, given the excellent results available in the short term, with significant weight loss, but the difficulties in keeping the results achieved in the long run. Since obesity is a chronic condition, CBT treatments must focus on different outcomes, considering weight loss as a consequence of a change in the individual's eating style rather than as a major and only result to be pursued. Finally, we will take into account the topic of motivation in the psychological treatment of obesity since patient's motivation assessment seems to be a major prerequisite for successful weight loss therapy.
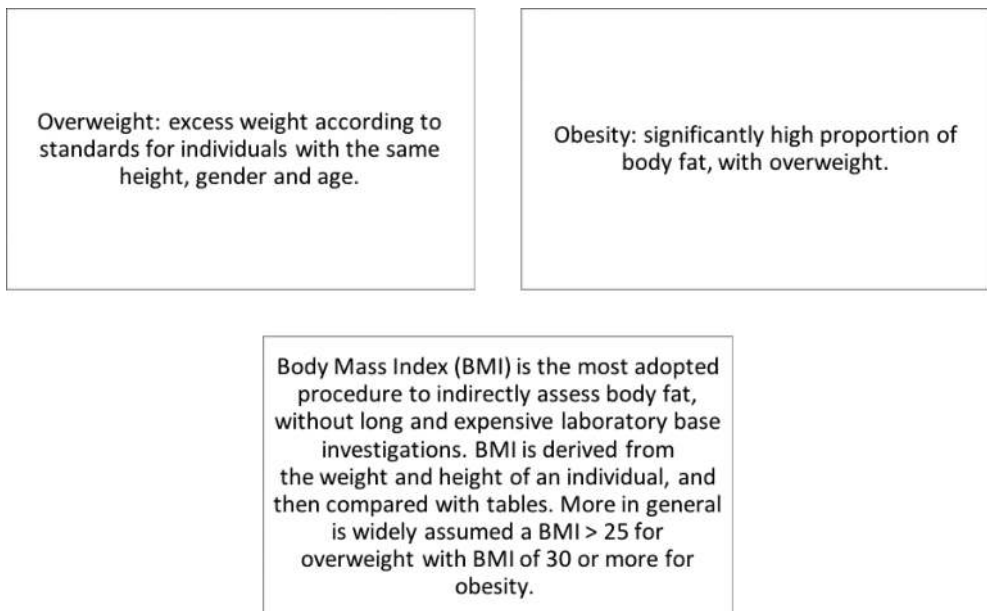
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1. Introduction

1.1. Obesity: a modern global epidemic

Developing new and better treatment for obesity and its related chronic clinical complications is one of the major challenge that world healthcare systems are facing today, both from a clinical and economic perspective [1]. It is well known that obesity is a worldwide chronic disease, whose treatment is complicated by its interaction with other chronic illnesses or chronic disorders [2]. In fact, as excess weight increases, so do risks of developing heart disease, type 2 diabetes, sleep apnea, osteoarthritis, and several types of cancer, among other conditions. The excessive weight gain has a relevant impact on most national health administration policies, creating a significant economic burden and requesting new strategies to be dealt with [3]. For example, evidence from the literature suggest how, in USA, obesity treatment costs have raised from 78.5 $ billion, back in 1998, to 147$ billion, in 2008, affecting the annual US medical's economic balance by 10% of its total. It seems this problem is going to increase over time, unless new health policies will be soon adopted. In recent years, the prevalence of obesity has reached epidemic proportions. Worldwide, over 1 billion people could be considered over weight, with nearly 300 million fitting the criteria for obesity (**Figure 1**). By 2020, nearly half of the USA population could meet the World Health Organization criteria for obesity, and it is estimated that by 2030, up to 90% of the population will be showing a body mass index (BMI) > 25.0. Generally, obesity is explained and understood through two simple factors: dysfunctional feeding and lack of proper physical activity [1]. This interpretation of the phenomenon seems, however, extremely reductive, greatly simplifying a much more complex

Overweight: excess weight according to standards for individuals with the same height, gender and age.

Obesity: significantly high proportion of body fat, with overweight.

Body Mass Index (BMI) is the most adopted procedure to indirectly assess body fat, without long and expensive laboratory base investigations. BMI is derived from the weight and height of an individual, and then compared with tables. More in general is widely assumed a BMI > 25 for overweight with BMI of 30 or more for obesity.

Figure 1. Measure of obesity and overweight.

reality. For example, the recent proliferation of genetic studies has shown that about 5–6% of the obesity's cases can be defined as monogenic, with a single responsible mutation of the patient's clinical picture. Otherwise, genetics determines a predisposition to weight gain that manifests itself only by interacting with environmental factors. It is calculated, however, that genetic factors are relevant in at least 70% of cases. According to Keith et al. [4], obesity treatment should be individually tailored, and realistic goals should be clearly set before starting.

Scientific literature is full of examples about how interventions exclusively aimed at weight loss results in bankruptcy over time, with a regaining of the weight lost during hospitalization within 3 years [5, 6]. It becomes clear that the multifactorial nature of this pathology requires multidisciplinary interventions, able to combine the different needs and urges of each individual, from a clinical, psychological, and social perspective. Psychological factors, in particular, influence both weight loss and, more importantly, long-term weight loss maintenance. Cognitive-behavioral

Binge Eating- is a pattern of dysfunctional eating behavior characterized by episodes of overeating. it has been exstimated how average binge eater consumes between 1500 and 3500 calories in a single episode. A significant percentage of obese patients seeking treatment for obesity presents binge eating criteria. There's a disctinction distinguish between binge eating driven by psychological factors and binge eating driven by. Guilt and regret are usually correlated with binge eating.

Restrained Eating is an eating pattern characterized by voluntary caloric intake's limitation. it is well documented by the modern literature how individuals restraining eating habits are exposed to be at higher risk of relapses of overeating pattern's relapses linked with self-control's disinhibition.

Night Eating-is a maladaptive pattern of eating characterized by consumption of more than 50% of calories after 7:00 p.m. and by an alterated quality of the sleep cycle.

Grazing is a behavioral pattern carachterized by eating for prolonged periods of time without actually consuming a designated meal. Grazing may be intended as a mindless habit, automatic behavior, compulsive or emotionally driven. Individuals are usually uncounscious about the amount and kind of food consumed.

Overeating: An excessive food intake detected by dysfuncional behavior like snacking and/or consumption of large meals. Recent research underlined how internal cues for hunger, satiety, or fullness could impact on the overeating behavior

Figure 2. Dysfunctional eating behaviors.

therapy (CBT) appears as the treatment of choice in psychological therapies for obesity and other eating disorders (**Figure 2**), highlighting significant results even at longitudinal level [7]. Within this chapter, the main therapeutic components of this approach will be presented, in addition to numerous clinical examples to better understand how CBT seems to be the most effective treatment in responding to the multidimensionality of a clinical condition, such as obesity.

Specifically, CBT's core strategies will be presented and analyzed: goal setting, self-monitoring, stimulus control, problem solving technique, and cognitive restructuring technique together with patient expectations for treatment and motivational readiness will be investigated in the context of psychological treatment of the obese subject. The application of these strategies and related results is a major issue, emphasizing the need for further studies on the phenomenon of obesity, given the excellent results achievable in the short term, with significant weight loss, but the difficulties in keeping the results obtained in the long run [7]. As already explained, obesity is a chronic condition, and CBT treatments must focus on different outcomes, considering weight loss as a consequence of a change in the individual's eating behavior rather than as a major and only result to be pursued [7]. Researches in this field have brought to the development of different therapies for the treatment of obesity. They focused on the specific situations and other modalities characterizing the patients' eating behavior. Typical treatments for obesity aim to help patients to change their eating behaviors throughout diets and improvements in their physical activity. They include a number of cognitive-behavioral techniques such as self-monitoring of weight and weight-related behaviors (e.g., caloric intake and physical activity), cognitive restructuring, and social support. Behavioral strategies could be aimed to change bad eating habits while cognitive restructuring and problem solving could improve emotional self-regulation and prevent stress-related relapse. Life style changing support interventions including goal setting and self-monitoring strategies and are central to improve self-control in obese and overweight individuals and are equally important in case of eating disorder to support more emotional oriented component of CBT interventions.

2. Goal setting

A goal is defined as "what one's wants to accomplish." A goal is a mental representation of desired outcomes to achieve [8], setting goals leads people to improve their effort reducing discrepancy between their actual status and what they want to become [9]. Goal setting is an important facilitator of behavior change allowing the determination of the goals one's wants to achieve and the criteria for judging outcomes. Goal striving involves planning and practicing actions to attain goals [10]. Self-regulation begins with the adoption of goals. Several goals can be prefixed, such as small goals or more challenging goals. Goal setting emerged as an effective strategy improving behavior change [11]. In the clinical field, goal setting has been considered as a valid method to obtain behavior change only in recent years [12]. In general, people are unlikely to achieve goals which are inconsistent with their self-image or identity [13]. Furthermore, people adopt goals because they have an intrinsic or an extrinsic motivation doing so [14]. As far as motivation is concerned, studies suggest people are more likely to act goal-directed behavior when intrinsically motivated [14]. Cullen et al. [15] have proposed a

four-step goal-setting program guiding dietitians in the implementation of goal setting strategies in nutritional counseling. The program is based on of four specific steps: recognizing a need for change, establishing a goal, adopting a goal-directed activity and self-monitoring it, and finally self-rewarding goal attainment. Industrial psychology has examined goal characteristics considering properties, components and types. Properties include goal's difficulty, specificity, and proximity. According to Latham [8], proximal, specific, but achievable goals provide higher performance. Components include feedbacks, which improve goals achievement and internal or external rewards, which can motivate goal process. Three kinds of goal setting have yet been investigated: self-set, assigned-prescribed, and participatory-collaborative. When goal difficulty is held constantly, there would be no significant differences between different types of goals [8]. Setting goals is necessary, but it is not enough developing motivation to achieve the goal itself. A person has to be interested in the achieving process and free from significant goal conflicts. Thus, goal setting can lead to higher performances. Setting specific goals in order to achieve a task and providing performance feedback leads to better performances [8, 16]. Setting goal has a positive effect on performance throughout three motivational mechanism/steps, described by Latham [16]: effort, persistence, and concentration. Goal setting helps a person to try hard and for a longer time, with less distraction. This appears to be true when the task is not too challenging or difficult for the person itself. Setting high goals has benefits on cognitive and motivational processes in terms of stimulating strategic analysis [8]. Strategic analysis leads to a fixation on a series of short-term goals easier to reach, helping individuals into the process of achievement of long-term goals. Setting smaller steps to reach bigger goals also provides feedbacks and rewards sooner than longer goals. Strategic analysis is often subject to personal abilities and characteristics. For example, complex tasks are often perceived as impossible to achieve by people who think that it is useless spending energies for something they cannot realize [12]. Perceived self-efficacy influences problem solving and analytic thinking [17]. A person with higher levels of self-efficacy can develop more effective strategies, learns more from feedback, and sets higher goals than other person with lower self-efficacy. The results suggest that greater self-efficacy leads to higher goals, leading to higher performance, leading to greater self-efficacy [12]. Strecher and colleagues [12] provided practical recommendations for the inclusion of goal setting into behavior changes programs. First, it is important to start from an analysis of the problem and the patient's commitment addressing the problem. The second step is to know which tasks are required to address the problem. For complex tasks, every specific behavior which leads to address the problem should be organized in a strategic plan. Furthermore, for each behavior there are levels of self-efficacy perceived by the person that should be determined in order to achieve the behavior. During the goal setting process, it is important to make sure that every selected goal is difficult enough to be achieved eliciting effort from the client. Goal should be considered difficult, but realistic at the same time. Finally, the authors recommend providing feedback regularly, always about an individual's own performance. In the obesity treatment, setting specific goals requires to decide the amount of weight loss per week/month [17]. Short-term goals should be expecting a decrease of body weight by 5–10% within 6 months of therapy. When goals have been achieved, results' maintenance, and if desired further weight loss, become new challenge. Providing constant observation, monitoring, and encouragement for the patients appear to be significantly important in order to prevent relapses.

3. Self-monitoring and new technologies

Self-monitoring is described as a "Cornerstone" of behavioral weight control intervention [18] and one of the most important and effective techniques developed in the area of behavioral therapy applied to obesity's treatment [18, 19]. The processes involved are self-observation, self-evaluation, and self-reinforcement. Self-regulation involves establishing goals, expectations and plans, monitoring the subject's behaviors, and evaluating performances [19]. A person can change his dysfunctional behavior by becoming aware of it [20]. Self-monitoring is positively correlated with self-awareness, playing a crucial role in the eating behaviors. Consistency of self-monitoring is often associated with weight control [21, 22]. Self-monitoring's consistency can help patients managing weight control. Consistency of self-monitoring reflects the frequency, completeness, and quality of self-monitoring. By improving consistency of self-monitoring, patients can learn control their behavior in a better way. Improvements of self-monitoring are associated with a decrease of weight. In addition, self-monitoring seems to impact on self-evaluation and self-regulation of weight. Baker and Kirschenbaum [23] highlighted how high levels of self-monitoring may be helpful for a more significant weight loss. In order to improve self-monitoring, it is necessary to clearly understand the normative levels, monitoring behavior, and therapist and client expectations, regarding the consistency of self-monitoring. The authors consider self-monitoring both as a state and a trait: some people tend to monitor themselves very consistently, whereas other people tend to do it very inconsistently. Furthermore, while some people, under some conditions monitor themselves consistently, others may reduce levels of self-monitoring if they are sick or emotionally distraught. In obesity treatment, self-monitoring plays a crucial role, as demonstrated by Baker and Kirschenbaum [23]. The aim of Baker's study was to know whether specific variables were more linked to weight control than others. The results show that control over any food eaten, all foods eaten, time when food was eaten, quantity of food eaten, and the percentage of fat eaten are directly linked to higher levels of weight control. On the other hand, control of other specific variables, such as water intake, was unrelated to weight control. This study suggests that when subjects self-monitor any food, they tend to control other variables for the whole day. This result confirms that self-monitoring follows the principles of: "all or none." The type of self-control needed in order to prevent failure is defined by Kirschenbaum et al. [22] as "obsessive-compulsive self-regulation." Traditional behavioral weight control programs can be very expensive and require lot of time for participants [24]. Furthermore, these interventions are not always available for everyone [18]. Technology-based behavioral interventions, called "eHealth" interventions, have been developed to address barriers associated with traditional treatment. These interventions use new technologies, such as smartphone applications (apps), websites, and/or online social media networks, to deliver behavioral weight loss treatment. Nowadays, digital health represents a key dimension of healthcare [25]. These new technologies include websites, smartphone applications (apps), and smart scales allowing individuals to view and monitor their weight, caloric intake, and physical activity [26]. New technologies ensure a lot of advantages on treatment, allowing individuals setting own goals, comparing their self-monitoring data, and reinforcing the process of reaching short- and long-term goals. Ross and Wing [26] designed

a study that aimed to investigate the impact of newer self-monitoring technology (compared to traditional self-monitoring tools), provided with and without a brief phone-based intervention, on weight loss in adults with overweight and obesity. As supposed by the authors, findings suggest that newer self-monitoring technology combined with a brief phone-based intervention can improve adherence to self-monitoring and lead to greater weight losses than traditional interventions. Patients who join internet-based programs show greater levels of adherence to self-monitoring than participants of traditional treatments [20]. A study conducted by Krukowski et al. [27] shows that participants who consistently self-monitor during program are more likely to achieve better results in weight loss within 6 months than others. It appears important to continue self-monitoring throughout a 6-month weight loss program. Online self-monitoring appears to be strongly associated with weight loss outcomes. Over many years, review and meta-analysis have highlighted the available evidence for eHealth interventions for weight management [6]; Burke [20] conducted a study in which they compared the use of a personal digital assistant with dietary and exercise software, with and without a feedback message, and a paper diary/record, in order to determine which type of treatment results in greater weight loss and improved self-monitoring adherence. The results showed that all participants had a significant weight loss, but those who received a personal digital assistant with a feedback message lost more than 5% weight compared to other groups. Internet-based weight loss and maintenance programs have shown a small effect in moderating weight loss in obese patients, because of the heterogeneity of the intervention components [28]. Despite efforts to improve outcomes from web-based weight control and maintenance interventions, researches found that weight losses tend to be smaller than 7–10% weight losses obtained in traditional interventions [18]. The small effect obtained has been improved by providing interactivity and other basic characteristics of traditional interventions such as self-monitoring of caloric intake, physical activity, and regular feedback on goal achievement [29]. Other findings suggest that a frequent use of web-based intervention materials has been linked to better weight loss results [28, 30]. Mobile technologies for weight management often include apps, text messaging, wearable sensors, and social media interventions. Personal digital assistants (PDAs) and other smartphone apps promote adherence, self-monitoring, and goal achievement. Users can also contact their remote coach or other participants [31]. This type of interventions appears to be more effective than traditional programs [32]. On the other hand, several studies have not found positive effects of apps over other interventions [31]. Feedback on goal achievement progress or self-monitoring is provided through text messages [33]. Evidences support the effectiveness of text messaging on treatments for weight loss [34]. Adherence to text messaging represents a predictor for weight loss; in other words, if participants respond to text prompts, they tend to lose more weight than others [34]. Social media are a useful device for connecting people taking part in treatments. Social support acts as an important facilitator in the achievement of health behavior change and goals [35]. Recent studies demonstrate the effectiveness of media support to encourage weight loss. For example, Napolitano and colleagues [33] show that participants who interacted with each other throughout Facebook and received intervention material and messages supporting weight loss lost more weight than participants from other control groups. This new line of research requires additional evidences, although it is still too soon to evaluate the efficacy of this new type of interventions [35].

4. Cognitive restructuring

The aim of cognitive-behavioral therapy (CBT) is to promote an emotional change, from a mal-adaptive functioning to an adaptive functioning. Cognitive schemas are defined as internally stored representations of stimuli, ideas, or experiences [36]; managing information-processing systems to provide meaning and engaging other mechanism such as motivational, affective, and physiological ones. This functional feature of human cognition elicits a vicious cycle con-tributing in the symptoms maintenance, since maladaptive beliefs and schemas guide cognitive evaluation [36]. These distorted beliefs are dysfunctional as they appear to be structurally inflex-ible, rigid with negative idiosyncratic thoughts regarding self, world, and interpersonal rela-tions [36]. Assuming schema's pivotal role in psychopathological disorders, maladaptive beliefs' modification is essential for promoting significant emotional change and, consequently, symp-tom reduction [36]. Recent literature has already highlighted the key role plays by dysfunctional thoughts concerning caloric intake, body shape, body image, and weight in ED. However, as they mediate the effectiveness of therapy, focusing and changing core beliefs are still necessary. Moreover, it is assumed that other irrational beliefs may impact eating behavior: low global self-value [37], mood intolerance linked with poor mood-regulation strategies, high levels of clinical perfectionism, and interpersonal issues [38]. Cognitive-behavioral therapy is the treatment-of-choice for BED. Several studies have tested the efficacy of CBT in reducing binge behavior frequency [38]. CBT appears less effective when BED is in association with obesity, especially in long-term weight loss maintenance [1]. Since obesity has a multifactorial etiology, the best intervention approach seems to be an integrated treatment made up of nutritional interven-tion, physical reconditioning program, and cognitive-behavioral psychotherapy [1]. Moreover, in interventions, specifically intended for childhood obesity, family, and peer background must be taken into account in order to promote a long-term weight loss maintenance [38], since they play a key role in shaping and supporting healthy-habits. Cognitive restructuring is the key technique used to promote a change in beliefs and thoughts. It could be defined as a collab-orative intervention focused on the identification, discussion, and substitution of dysfunctional thoughts and appraisals identified as significant factors in the psychopathology development [39]. This intervention aims to modify a dysfunctional content, reducing maladaptive thoughts' activation, and promoting adaptive beliefs' adoption. An effective restructuring intervention is based on three main components: collaborative empiricism, verbal interventions, and empirical hypothesis testing. Collaborative empiricism is a process aiming at setting common treatment goals, in order to promote therapeutic alliance and client engagement. Collaborative empiricism is more effective when clients attribute behavioral change to his own effort rather than to exter-nal intervention. Cognitive disputing is one of the main verbal interventions. It could be defined as an evaluation process focuses on logical coherence, functional and heuristic value, empirical evidence of a theory (e.g., irrational beliefs), and other alternative (e.g., new adaptive thoughts), through use of questions [40]. Depending on the question's content, three types of disputing can be recognized: logic, empiric, and pragmatic. The first type of disputing assess the logical coher-ence of client's beliefs ("Do you think it is logical that the person's value depends on the respect shown by her/his colleagues?"); the empiric disputing verifies if the client's thoughts are coher-ent with the facts and evidence ("What evidence do you have about your intolerance regarding

the lack of respect that your colleagues provide you? You're just alive, right?"); the latter investigates the functional and utility value of dys/functional beliefs ("How useful is it to believe that it's intolerable not to be respected?"). Gearhardt et al. [41] suggests to redirect dysfunctional self-talk due to a training aimed to modify irrational thoughts and beliefs to improve longer term compliance with diet plans and physical activity. Cognitive restructuring, briefly detailed above, improve strategies strictly linked to previously illustrated goal setting and self-monitoring interventions, help overweight persons to the long-term achievement of weight loss. From a cognitive-behavioral perspective, the ability to detect, focus, and directly change irrational beliefs could be strengthen through promotion of distraction, defined as the ability to redirect from food craving to engaging and more functional activities or thoughts. Distraction could play a core role in management of difficult thoughts often linked with different forms of overeating and consist in directly teaching overweight to change activities coherently with emerge of craving. Stress management techniques have to be included in CBT interventions for obesity for individuals showing high level of emotional eating or stress-related craving [13]. Classical approach to stress management is equally effective with more recent mindfulness-based interventions aimed to cope internal or externally perceived stress source. In conclusion, obesity is a complex chronic condition that needs a multidisciplinary, multicomponents approach, but the CBT contribution could not be more central. Self-management techniques and more cognitive-emotional approaches concur to promote lifestyle change in obese individuals, teaching new wave to cope with stress, difficult thoughts, food craving, and to support changes related to eating habits and physical activity patterns. Best practice maximizing long-term weight loss and relapse prevention should include increasing social support, managing emotions, adaptive problem solving, and incorporating reinforcing, rewarding activities, and also exercise, relaxation [6].

Conflict of interest

The authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript.

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