

EVIDENCE FOR A POSSIBLE LINK BETWEEN OBESITY AND BEDMilano Walter¹, Capasso Anna²¹U.O.S.D. Eating Disorder Unit ASL Napoli 2 Nord, Napoli, Italy²Department of Pharmacy, University of Salerno, 84084-Fisciano, Italy*wamilano@tin.it**Abstract**

Obesity is traditionally a medical condition; Binge Eating Disorder (BED) is instead considered a psychiatric disease, described by the DSM-5 between eating disorders (ED) and nutrition. In the clinical reality obesity and BED are often associated and it is necessary to recognize them: during obesity, identify the possible BED, during BED, treat obesity. In the history of evolution the problem of obesity in recent decades is unpublished. Ancient men were selected to store reserves for moments of energy shortage, in periods of scarce and intermittent availability. The obese patients, in the testimonies of the Egyptian papyrus (1500 BC), of Hippocrates (IV century BC) and of Aulus Cornelius Celsus who first spoke of "obesitas" 2000 years ago, were few, noble and rich, with great availability of food and no need to work. In recent decades the evolution of millennia has been displaced by new standards of living. Access to food easier and mechanization of work and transport with less and less waste of energy cause a positive energy balance, while the phylogenetically ancient tendency to accumulate energy rather than to consume it persists. The result is the current global epidemic of obesity ("globesity"). On the other hand, in modern man, ancestral, phylogenetically ancient behaviors persist: among these, compulsively eating large quantities of food in the shortest possible time, which allows the body to take in and conserve energy, when available, in a greater quantity than that necessary to balance the balance of the moment, signaled by the feeling of satiety: the resulting binge eating, induced by states of emotional stress, psychological disorders and by the same dieting, the perennially dieting that favors the ED: known paradox, for which diets, in the end, make you fat.

Keywords: BED; Eating Disorder, Obesity

Introduction

Obesity

Obesity is an evolutionary, chronic and relapsing medical condition, which consists of a pathological accumulation of adipose tissue, in absolute and percentage values, in relation to the lean mass, to such an extent that it negatively affects the state of health. It is a real metabolic disease that compromises appetite regulation and energy metabolism. The term already contains the excess of adipose tissue and the alteration of eating behavior: the Latin expression «obesitas» indicates the condition of who is «fat, big or chubby», in turn derived from «esum», past participle of «eredere» («to eat»), with the addition of the prefix «ob» («for, because of»). Obesity is spreading among adults and children and represents the main cause of preventable death worldwide: it is one of the most serious public health problems of the 21st century.

Globesity is the term coined by the WHO in 2001, from the crisis between the English words of obesity and globality, to indicate the global epidemic of obesity on a planetary level. The fact that in the richest countries, for the first time, the average life expectancy begins to decrease, can also recognize one of the causes in obesity. In 2010 more than 5 million children under the age of 5 were already overweight or obese and over 60% of the world population lives in countries where overweight and obesity kill more than malnutrition (1-3).

Clinical Manifestations and Comorbidity

Overweight and obesity cause physical disability and reduced ability to work and predispose to the onset of numerous chronic diseases related to the metabolic syndrome, of which obesity is a constitutive part. The consequences of obesity fall into two broad categories: pathologies attributable to the effects of increased body fat mass (such as osteoarthritis, obstructive sleep apnea (OSAS), social stigmatization) and those due to the numerical increase of fat cells (diabetes, dyslipidemia, cancer, cardiovascular diseases, non-alcoholic fatty liver disease) (4). Some more frequent clinical problems during obesity are: type 2 diabetes mellitus (5-8), some tumor tumors (9,10), the worst quality of life and

mortality due to obesity (11,12). The discrepancy between excess and energy expenditure remains the basis for understanding the excess weight, even for the purposes of therapeutic indications, but does not fully explain the mechanisms underlying weight gain. The diagnosis of the obese patient includes various aspects of clinical interest, aimed at building the therapeutic plan with the patient, which includes tools for the management of nutrition and physical activity and the difficulties of falling and maintaining weight.

Living, in an obese environment today, the treatment of obesity becomes complex and easily recurring. It is necessary to invest in prevention tools that reduce the impact of the environment on individual people and stimulate the acquisition of skills and self-efficacy in managing unfavorable environmental stimuli and personal difficulties (empowerment), with various modalities (13,14).

Treatment

Objectives of obesity therapy are the decrease and maintenance of the weight achieved, the stable change in food behaviors, physical activity and related psychic processes and the prevention and treatment of related diseases. The evaluation must be based not only on the extent of weight loss but also on other parameters: clinical, psychological, and on the quality of life of the obese patient. However, a modest weight reduction is useful and has more value as long as it remains stable over time.

The treatment of obesity has experienced a remarkable evolution in recent decades. The traditional prescriptive dietary approach, sometimes effective in the short term, in the long term has generally turned out to be bankrupt, because it does not take into account the complexity of individual and environmental factors that favor obesity. Subsequent behavioral therapies based on conditioning theories have allowed an important improvement in results, even in the medium term; it remains a subpopulation of patients but does not respond satisfactorily. Today, the most up-to-date therapy includes lifestyle measures (physical activity and adequate nutrition) and cognitive-behavioral aspects, and also distinguishes between a therapeutic phase aimed at weight loss and a post-maintenance phase. In Figure 1, an example of a

therapy based on a change in lifestyle and cognitive-behavioral therapy (CBT) (15-18).

Service Network

Obesity must be considered a real chronic disease that must be treated to live longer and with a better quality of life. Therefore, an important cultural and clinical step is necessary: to structure at the national level more appropriate treatments, structuring specific PDTAs for obesity. The organization must be network-based, of a multidisciplinary nature with different professionals, involved in integrated teams with regional hubs and various spokes at the territorial level in the different ASLs. In this way it is guaranteed to all patients, the transition from a logic of "episodes of care" to an approach based on "care and assistance pathways". This PDTA model favors not only a multidisciplinary management of the patient but also a whole series of virtuous processes: care in a suitable environment, universalism in access, sustainability and economic rationality, reduction of risks and above all continuity of care. Furthermore, it can be useful to involve patients 'and their families' associations, which can also guarantee the voice of citizens, to avoid that many people turn to unqualified structures or operators or even to the many self-styled healers and sellers of false hopes (19- 21).

Binge Eating Disorder (BED)

The BED, first described by Albert Stunkard in 1959 in a subgroup of patients with obesity and episodes of excessive and uncontrolled feeding, was subsequently ignored. Only in the mid-1980s it was observed that some patients with BN, who had just been identified, did not actually use compensatory mechanisms, such as vomiting, excessive and compulsive physical activity and the same food restriction. Only in 2013 the DSM-5 inserted it among the ED. The specificity of BED is defined by a behavioral aspect, control losses or recurrent bulimic episodes without compensatory mechanisms, and by a specific psychopathological nucleus, the unpleasant experience of binge eating and food (22-25). The latter is different from the specific nucleus of the AN and the BN: concern and self-assessment related to the control of body shape, weight and nutrition. If control is the dominant theme in the AN and in the BN, in the BED prevails the theme of

dietary control, often described as a depressive "equivalent", linked to the difficulty in managing emotions and impulses and to a sense of inadequacy and impotence and low self-esteem. However, there is a subgroup of patients with BED in which the pathological experience of body image must be addressed. In clinical practice, two further problems can complicate the treatment of BED: first of all the wide heterogeneity of the clinical pictures and the underlying psychopathology, in particular the mood disorders, secondly the frequent coexistence of obesity. BED is the most frequent ED, even more so in males and obese patients, it occurs at a later age (peak of onset: 20-30 years) but distributed from childhood to mature age. The incidence is not known (26-32).

Clinical Manifestations

The specific aspects of the BED are the loss of control without compensatory behavior and the discomfort towards binges and food. The heterogeneity and variability of the problems, although not constitutive of the disease, constitute the most intriguing clinical aspect and the source of greatest difficulties in clinical management; they concern bodily discomfort, obesity and complications of the metabolic syndrome, general psychopathology.

It is known that there are no single and proven causes of the onset of EDs. All authors recognize a multifactorial genesis of BED, of a biological, psychological and environmental nature (33). Among the most recent interpretative models, the psychopathological one on a cognitive-behavioral basis, studies the risk factors, precipitants and current maintenance and the modes of operation that support the vicious circles of the disease, to be addressed during the CBT-BED (26- 32). The neurobiological model instead interprets the BED and compulsive behaviors as a consequence of the deficit, at the level of the DA₂ receptors, against the dopaminergic reward system or reward, in analogy with other behavioral or substance dependencies; according to this model, patients suffer from food addiction, above all from hyper-palatable and high-calorie foods, which allow the restoration of normal deficient inhibitory control towards the consumption of substances or food, stimulating the production of dopamine. The therapeutic implications of this model are also discussed (33-37).

A further interpretative criterion, usable in a subgroup of patients with BED and previous history of ED, is provided by the transdiagnostic theory of Fairburn 2008 (30).

Diagnosis

The Diagnostic-Therapeutic-Assistance (PDTA) Plan must be updated over time and include decision-making crossroads to implement multistage therapies for any residual active problems. The primary clinical problem is to pay attention, "thinking about" it, to the various problems that are potentially associated: BED, excessive weight, bodily dysfunction, psychiatric and associated somatic pathologies. For this purpose, the available modularized (31-36) treatments are useful. Figure 2 shows the formulation of the clinical case, including specific psychopathological behaviors and aspects and more generally of maintenance factors (31-36). The psychopathological assessment uses, in addition to the tools of psychological interview and medical and nutritional examination, also a battery of questionnaires and tests. The medical evaluation concerns the diagnosis of any associated obesity, measured by mass index (BMI) and measurement of body circumference, energy balance and individual nutrients, body composition and functionality, internal diagnosis of metabolic syndrome complications.

Treatment of Patients with BED

Also from a therapeutic point of view, the major problems of BED therapy are the complexity and heterogeneity of the constitutive and / or complicating aspects of the BED and the frequent excess weight, which were identified during the assessment and guide the plan welfare. The most recent contributions suggest a therapeutic strategy with combined and "multistage" or sequential therapies (31-36). These tackle in succession the problems of the patient identified through periodic diagnostic reformulations: first, they provide the restructuring of nutrition and cognitive-behavioral tools of awareness and self-management; then, they treat binge eating and living related to food intake; subsequently, if present, they dedicate themselves as an alternative to obesity or the core of bodily concern. Concurrently, possible psychiatric and medical comorbidities related to the metabolic syndrome are addressed. Figure 3 shows an example of a

multistage therapeutic strategy (31-36). As regards the choice to treat obesity with specific treatments in patients with BED, it is supported by evidence, but it requires caution, in particular when there is a serious negative experience of bodily form and a powerful ideal of thinness, with restrictive control behaviors: in this case the treatment of obesity could flare up or activate another ED. Appropriate obesity therapy should not be confused with the usual prescriptive dietary approach; it includes active lifestyle and structured CBT measures, which have as their goals the reduction and maintenance of weight and the modification of nutrition, physical activity and mental aspects inherent to personal care and management of weight loss difficulties.

A further topical issue in the case of patients with BED and severe obesity (BMI > 40 K / sqm or 35 Kg / sqm complicated) concerns the opportunity of restrictive / malabsorptive bariatric surgery: the recent guidelines recall that sometimes it can be indicated, after multidisciplinary evaluation and adequate treatment and in the absence of substantial problems inherent to the body experience (39); a preoperative diagnosis of BED is predictive of minor outcomes and greater difficulties after bariatric surgery, but does not exclude its use. In patients with BED, however, it is necessary, as for all obese people with or without BED who require bariatric surgery, to explore psychological problems and follow them psychologically over time. Regarding the subpopulation of patients with BED and a very active psychopathological nucleus on body image, it must be treated with a therapy comparable to therapy for the other DA, AN, BN and NAS, according to the transdiagnostic theory. CBT-BED and IPT are more effective, in particular on the specific psychopathological nucleus, less on obesity. Therapies focused on weight loss (BWL) are more effective on weight loss, which, however, is frequently recovered after discontinuation of therapy, but are not effective on the psychopathological core. BED treatment also includes drug therapy. Fluoxetine, a drug with serotonergic action, at high doses (60 mg a day, with periodic monitoring of the ECG for QTc) is officially indicated for the therapy of BN and BED; has good antidepressant effect and on compulsive behaviors. Its use does not replace psychotherapy,

but it is frequently useful for enhancing its effects and is also proposed in the long term after the end of psychotherapy. Other drugs that cannot be used in Italy are lysdexamfetamine, approved in the United States, and medications indicated for obesity: orlistat and liraglutide, in addition to metformin, which for obesity is "off label" use. Finally, a consideration concerns the appropriateness of BED treatment settings. The most appropriate setting is undoubtedly the ambulatory one, even if the recent guidelines of SISDCA and SIO suggest possible residential treatments for limited periods in cases resistant to therapy or as the first step for starting the therapy itself in cases of greater severity (38-40). In any case it is necessary that in every setting a multidimensional approach is provided, which includes the internalistic and nutritional, dietary, psychological and psychiatric medical skills, as well as, in some settings, physiotherapists, educators, psychiatric rehabilitation technicians and nurses (23).

Prognosis

In BED, follow-up data are controversial: some studies show high rates of remission, even in the short term, with more rapid improvement in symptoms compared to cases of AN and BN, while others show remission rates similar to those of BN. Patients with BED rarely veer towards the AN or BN. More often we can observe the color change from AN to BN and subsequently to BED (31-36).

Prevention

The generalist prevention programs of ED and obesity must coincide. The first generation programs have adopted a psychoeducational (didactic) approach, which provided information on nutrition, body image, eating disorders and their harmful effects, on healthy or harmful lifestyles. Those of the second generation have more directly addressed some risk factors identified by the research. Those of the third generation have used an interactive and experiential educational approach and strategies aimed at modifying dysfunctional attitudes and unhealthy behaviors. The school programs of prevention that have obtained the best results are those of secondary or selective prevention on groups of girls identified at greater risk, older than 15 years, using multiple meetings, in small groups, conducted by

professionals and focused on acceptance of the body. It is essential to promote early diagnosis of eating disorders, by raising the awareness of general practitioners and freely chosen paediatricians, the creation of counseling desks, the awareness of patients, families and teachers. In addition, preventive interventions should be promoted in high-risk areas, such as the sports, fashion and dance sectors. Evolution from a prevention model based on personal responsibility towards a public health model is desirable. The institutions that deal with public health have the responsibility to implement interventions such as the control of advertising and the diet industry and the promotion of public health programs that target the "toxic" environment, which promotes food intake in excess and sedentary behaviors, stimulating strategies to change lifestyles in the general population, with healthy eating behaviors and healthy physical activity. (38-40).

Conclusions

Obesity is a chronic disease due to an imbalance between calorie intake and energy expenditure. It is associated with an increased risk of various diseases, including type 2 diabetes mellitus, high blood pressure, osteoarthritis and various neoplasms. Obesity is the most common general medical condition in patients with ED, common in people with BED. It may precede the appearance of a feeding disorder (sometimes representing a risk factor for such development) or be the consequence of bulimic episodes with little compensatory behavior. Conversely, the prevalence of BED is much higher in obese patients. It is therefore necessary to regularly search for BED in obese patients and obesity in patients with BED. The ED and obesity, when they coexist, tend to interact negatively with each other and to make the treatment more difficult, as already highlighted previously. When obesity and BED coexist, a treatment that is articulated over time or "multi-stage" is indicated, which addresses with awareness the individual problems in succession, conducted by a competent multidisciplinary team to address both conditions, possibly integrated into a care network that offers various levels of care. Centers that deal with obesity must pay attention to the possible presence of BED in patients. The centers that deal

with the ED should guarantee an advisory service to the treatment centers for obesity, both to evaluate possible indications for a bariatric surgery treatment, and for the identification of the cases in which there is a ED or another psychiatric disorder that may interfere with the treatment of obesity.

References

1. OMS WHO "Obesity and Overweight: fact sheet" N 311 2015
2. OECD "Obesity Update" 2012
3. Country profiles on nutrition, physical activity and obesity in the 53 WHO European Region Member States (2013).
4. Haslam DW e James WP, "Obesity" *Lancet*, vol. 366, n° 9492: 1197–209 2005
5. Peter G. Kopelman, Ian D. Caterson, Michael J. Stock, William H. Dietz "Clinical obesity in adults and children" Blackwell Publishing, pp. 3–11 2005,
6. Shoelson SE, Herrero L, Naaz A "Obesity, inflammation, and insulin resistance" *Gastroenterology*, vol. 132, n° 6:2169–80 2007
7. Shoelson SE, Lee J, Goldfine AB "Inflammation and insulin resistance" *J. Clin. Invest.*, vol. 116, n° 7:1793–801 2006
8. Bray GA "Medical consequences of obesity" *J. Clin. Endocrinol. Metab.* vol. 89, 6: 2583–9 2004
9. Dentali F, Squizzato A, Ageno W "The metabolic syndrome as a risk factor for venous and arterial thrombosis" *Semin. Thromb. Hemost.* vol. 35, n° 5 :451–7 2009
10. Calle EE, Rodriguez C, Walker-Thurmond K, Thun MJ "Overweight, obesity, and mortality from cancer in a prospectively studied cohort of U.S. adults" *N. Engl. J. Med.*, vol. 348, n° 17, 2003
11. Country profiles on nutrition, physical activity and obesity in the 53 WHO European Region Member States, 2013
12. The Global BMI Mortality Collaboration "Body Mass Index and all-cause mortality: individual participant data meta-analysis of 239 prospective studies in four continents" *Lancet* on line 2016
13. Bosello, Cuzzolaro "Obesità" il Mulino 2013
14. Bosello, Di Francesco "L' alimentazione" il Mulino 2007
15. D. Capizzi, F. D. Capizzi "Obesità e chirurgia" CG Edizioni Medico Scientifiche, 2011
16. SIO e ADI "Standard italiani per la cura dell'obesità" 2012
17. Beck et al "Do postoperative psychotherapeutic interventions and support groups influence weight loss following bariatric surgery? A systematic review and meta-analysis of randomized and nonrandomized trials." *Obesity Surgery* 22,n 11:1790-1797 2012
18. Milano W. "L'obesità. Manuale di sopravvivenza" Giovanni Fioriti Ed 2009
19. Molinaro E, Riva G. "Psicologia clinica dell'obesità" Bollati Boringhieri 2004
20. Arnold M, Leitzmann M, Freisling H et al. "Obesity and cancer: An update of the global impact" *Cancer Epidemiol.* 41:8-15 2016
21. Società Italiana di Chirurgia dell'Obesità e delle malattie del metaboliche (SICOB). Linee Guida 2016.
22. American Psychiatric Association: Diagnostic and Statistic Manuale for Mental Disorders Fifth Edition - DSM-5 2013
23. QMS. Quaderni del Ministero della Salute. Appropriatelyzza clinica, strutturale e operativa nella prevenzione, diagnosi e terapia dei disturbi dell'alimentazione. 17/22. 2013
24. Cuzzolaro M. in Ottavio Bosello "Obesità. Un trattato multidimensionale" 2nd Ed. Kurtis Pub. Milano 2009.
25. Milano W ed, I disturbi dell'Alimentazione. Manuale di gestione della complessità. Giovanni Fioriti Ed. Roma. 2015.
26. American psychiatric Association (APA): Practice guidelines for the treatment of patients with eating disorders. Practice guidelines for treatment of psychiatric disorders. 3th ed. 2006
27. National Institute for Clinical Excellence (NICE) Eating disorder: core interventions in the treatment and management of anorexia nervosa, bulimia nervosa and related disorders. Clinical Guideline Number 9. 2004.
28. Hay N, Chinn D, Forbes D, Madden S, Newton R, Sugenor L, Touyz S, and Ward W, Royal Australian and New Zealand College of Psychiatrists clinical practice guidelines for the treatment of eating disorders. *Aust N Z J Psychiatry* 2014 48: 977 DOI: 10.1177/0004867414555814
29. AED Report 2016. 3rd Ed. Eating Disorders: a guide to medical care. www.aedweb.org. 2016
30. Fairburn CG, Cognitive Behavior therapy and eating Disorders. The Guilford Press. New York. 2008.

31. Fairburn CG, Overcoming Binge Eating, 2nd Ed. The Guilford Press. New York. 2013.
32. Dalle Grave R, Disturbo d Alimentazione Incontrollata. Positive Press. Verona. 2014.
33. Dalla Ragione L & Pampanelli S, Prigionieri del cibo. Riconoscere e curare il disturbo da alimentazione incontrollata. Il Pensiero Scientifico Editore. Roma. 2016.
34. Vinai P & Todisco P, Quando le emozioni diventano cibo. Psicoterapia cognitiva del Binge Eating Disorder. Raffaello Cortina Editore. Milano. 2007.
35. McElroy SL, Guerdjikova AI, Mori N, Munoz MR, Keck PE, Overview of the treatment of binge eating disorder. CNS Spectr. 2015 Dec;20(6):546-56. doi: 10.1017/S1092852915000759.
36. Grilo CM.; Masheb RM.; Wilson GT; Gueorguieva R; White M A, Cognitive-behavioral therapy, behavioral weight loss, and sequential treatment for obese patients with binge-eating disorder: A randomized controlled trial. Journal of Consulting and Clinical Psychology, Vol 79(5), Oct 2011, 675-685. <http://dx.doi.org/10.1037/a0025049>
37. Melchionda N, Food Addiction. Sviluppo dei Disturbi Alimentari e delle Obesità. Mucchi Press. Modena. 2014.
38. Volkow ND & O'Brien CP, Issues for DSM-V: should obesity be included as a brain disorder? Am J Pshych. 2007 164: 708-10.
39. Società Italiana di Chirurgia dell'Obesità e delle malattie del metaboliche (SICOB). Linee Guida 2016.
40. Donini LM & al, Obesità e Disturbi dell'Alimentazione. Indicazioni per i diversi livelli di trattamento. Documento di Consensus della Società Italiana dell'Obesità (SIO) e della Società Italiana per lo Studio dei Disturbi dell'Alimentazione (SISDCA). Eating Weight Disord.2010. Suppl 2-1, 15:1-31.

Figure 1 Example of therapy based on the change of the style of life and cognitive-behavioral therapy (CBT-Ob), modularized (Dalle Grave, 2015)

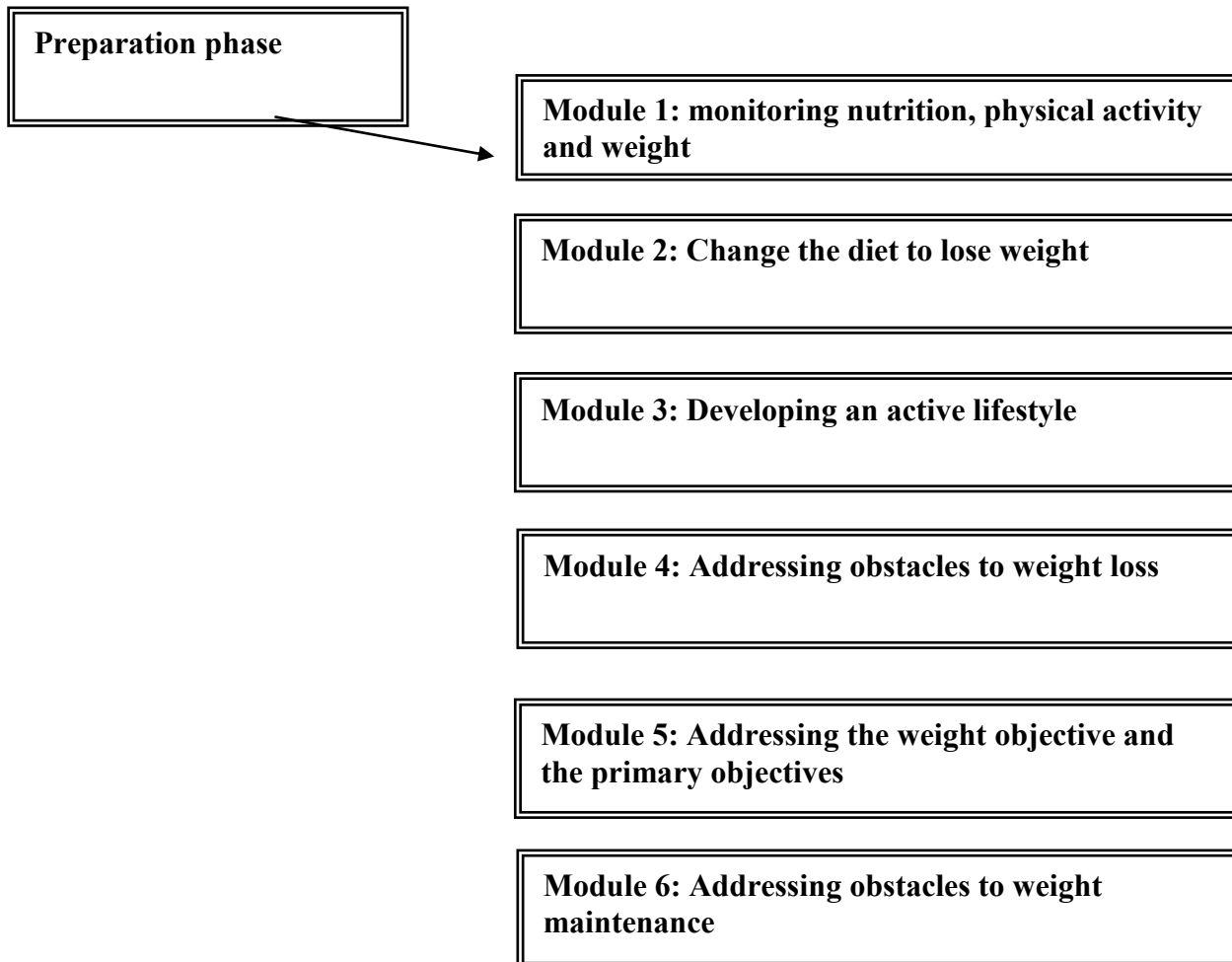


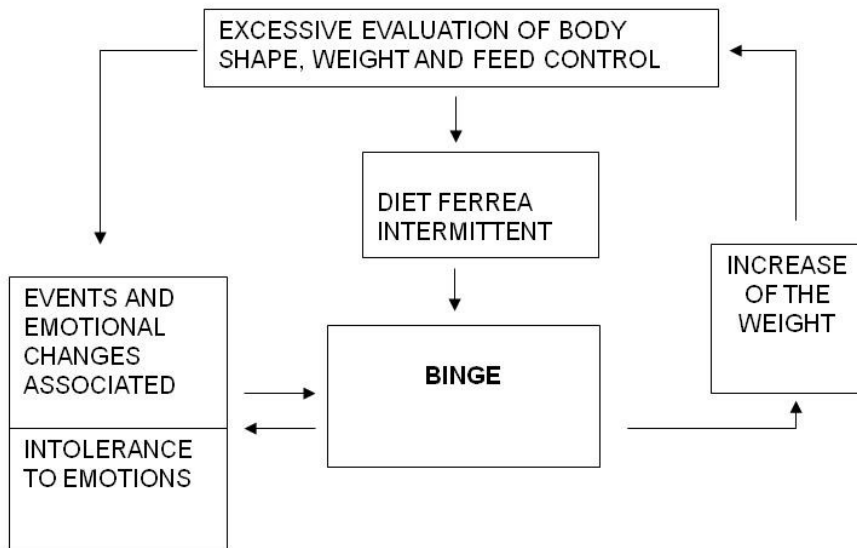
Figure 2: Diagnostic formulation of the binge

Figure 3. BED: Example of BED sequential therapy

Cognitive behavioral therapy (CBT-BED)

