UNIVERSITY OF PADOVA
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The role of diets as triggering factors for binge eating disorder in patients with overweight/obesity

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ABSTRACT

The relationship between dietary choices and eating disorders is an increasingly important topic in the fields of nutrition and public health, particularly in light of the rise of binge eating disorder (BED) among individuals with overweight and obesity. This thesis explores the complex interactions between dietary strategies and BED, aiming to identify nutritional approaches that not only promote weight loss but also support sustainable and healthy recovery, without exacerbating the disorder.

BED is characterized by recurrent episodes of binge eating not followed by compensatory behaviors, such as self-induced vomiting or the use of laxatives. During these episodes, patients experience a loss of control over their food intake, followed by feelings of shame, disgust and guilt. The complexity of the disorder increases when it occurs in individuals suffering of overweight and obesity, as binge eating not only contributes to weight gain but also fuels a dysfunctional cycle that makes effective intervention more challenging.

A key focus of the analysis Is Identifying the risk factors associated with BED. Genetic predispositions, psychological conditions such as anxiety, depression, and stress, along with societal pressure toward unrealistic ideals of thinness, are all factors that can increase vulnerability to the disorder. In particular, severe dietary restrictions and a conflicted relationship with food can lead to binge eating episodes, worsening the clinical situation.

The role of the nutritionist Is therefore crucial In the management of BED. An effective dietary approach should not be limited to calorie restriction but should involve personalized plans that take into account the patient’s psychological needs and dietary history. It is essential to avoid categorization of foods as “good” or “bad” and to promote nutritional education that encourages a balanced relationship with food. Nutritional education, in fact, plays a key role in helping patients overcome false beliefs and develop healthier and more mindful eating habits.

The thesis also examines dietary strategies for patients with BED, highlighting the importance of avoiding the sense of deprivation typical of restrictive diets. It

recommends the inclusion of low-calorie, high-fiber foods and lean proteins to ensure satiety and reduce the risk of binge eating. Additionally, it suggests maintaining dietary variety, allowing for a balanced and satisfying range of food choices without excluding any specific food.

In conclusion, managing BED, particularly among patients with overweight and obesity, requires a multidimensional approach that goes beyond merely achieving an ideal weight, focusing instead on restoring a healthy and mindful relationship with food. An integrated treatment, involving nutritionists, psychotherapists, and other health professionals, is essential to ensure a complete recovery, addressing the physical, emotional, and psychological aspects of the disorder.

RIASSUNTO

Il rapporto tra scelte alimentari e disturbi alimentari è un tema di crescente importanza nel campo della nutrizione e della salute pubblica, soprattutto alla luce dell'aumento del disturbo da alimentazione incontrollata (DAI) tra individui con condizioni di sovrappeso o obesità. Questa tesi esplora in profondità le complesse interazioni tra strategie dietetiche e DAI, con l'obiettivo di identificare approcci nutrizionali che non solo favoriscano la perdita di peso, ma promuovano anche un recupero duraturo e sano, senza aggravare il disturbo.

Il DAI è caratterizzato da episodi ricorrenti di abbuffate non seguiti da comportamenti compensatori, come il vomito autoindotto o l'uso di lassativi. Durante questi episodi, i pazienti sperimentano una perdita di controllo sull'assunzione di cibo, cui seguono sentimenti di vergogna, disgusto e colpa. La complessità del disturbo aumenta quando si manifesta in persone con sovrappeso o obesità, poiché l'abbuffata non solo contribuisce all'aumento di peso, ma alimenta un ciclo disfunzionale che rende più difficile intervenire efficacemente.

Un punto centrale dell'analisi riguarda l'individuazione dei fattori di rischio associati al DAI. Predisposizioni genetiche, condizioni psicologiche come ansia, depressione e stress, e la pressione sociale verso ideali di magrezza irrealistici, rappresentano elementi che possono aumentare la vulnerabilità al disturbo. In particolare, restrizioni alimentari severe e un rapporto conflittuale con il cibo possono portare a episodi di abbuffate, peggiorando la situazione clinica.

Il ruolo del nutrizionista risulta quindi fondamentale nella gestione del DAI. Un approccio dietetico efficace non deve limitarsi alla restrizione calorica, ma deve prevedere piani personalizzati che tengano conto dei bisogni psicologici e della storia alimentare del paziente. È cruciale evitare la categorizzazione degli alimenti come "buoni" o "cattivi" e promuovere un'educazione alimentare che incoraggi un rapporto equilibrato con il cibo. L'educazione nutrizionale, infatti, gioca un ruolo chiave, aiutando i pazienti a superare false credenze e a sviluppare abitudini alimentari più sane e consapevoli.

La tesi esamina anche le strategie dietetiche per pazienti affetti da DAI, evidenziando l'importanza di evitare la sensazione di privazione tipica delle diete restrittive. Si raccomanda l'inclusione di alimenti a bassa densità calorica, ma ricchi di fibre e proteine magre, per garantire sazietà e ridurre il rischio di abbuffate. Inoltre, si suggerisce di mantenere una varietà alimentare che permetta una scelta equilibrata e appagante, senza escludere alcun alimento.

In conclusione, la gestione del DAI, in particolare tra pazienti con condizioni di sovrappeso e obesità, richiede un approccio multidimensionale che vada oltre il semplice raggiungimento del peso ideale, mirando a ristabilire una relazione sana e consapevole con il cibo. Un trattamento integrato, che coinvolga nutrizionisti, psicoterapeuti e altri professionisti della salute, è essenziale per garantire un recupero completo, considerando tutte le dimensioni fisiche, emotive e psicologiche del disturbo.

1 INTRODUCTION

In recent years, more and more people have been paying greater attention to the healthiness of their diet, recognizing food choices as fundamental determinants of their future well-being. This growing interest in healthier eating habits reflects a widespread trend among consumers to prioritize health, especially in a context where overweight and obesity represent major public health concerns. These conditions, characterized by excess body weight that negatively impacts health, are now prevalent worldwide and are associated with various complications, including cardiovascular diseases, diabetes and hypertension (Petrescu et al. 2020).

However, despite the increasing awareness and focus on healthier food choices, there has also been a rise in eating disorders. This phenomenon can be explained by mistaken beliefs about food healthiness, which can significantly influence food intake and weight gain (Provencher et al. 2009). Many consumers, in fact, do not fully understand the multiple factors that determine the healthiness of a diet, creating a discrepancy between perception and reality.

Perceived healthiness is defined by the consumer's expectation regarding a product's influence on their health, often not supported by rigorous scientific validation. This perception can shape eating patterns, but sometimes leads to dietary practices that, although seemingly beneficial, may prove to be less advantageous or even harmful. In contrast, actual healthiness is based on scientific evidence and objective measures of nutritional value, considering factors such as nutrient composition, impact on physiological processes and long-term health effects. This discrepancy between perception and reality is exacerbated by the proliferation of unverified information through social media and online news platforms (Rodrigues et al. 2021, Plasek et al. 2021, Provencher et al. 2009).

Thus, it is not surprising that despite the increasing focus on the healthiness of dietary choices, there is also an increase in eating disorders. Eating disorders are complex conditions that manifest in various forms and are triggered by numerous factors, including genetic influences, psychosocial risk factors, restrictive diets, mood, emotions and cultural influences (Agras et al. 2017).

These disorders are severe mental health issues that have profound effects on both physical health and psychological well-being. Moreover, they are characterized by a persistent disturbance of eating or eating-related behavior that results in the altered consumption or absorption of food.

This thesis aims to address the challenge of managing BED in overweight or obese patients by exploring effective dietary strategies. It begins with an overview of eating disorders, with a particular focus on BED due to its relevance in this context. Understanding the various risk factors – genetic, cultural, psychological and affective – is essential for developing personalized treatment approaches.

The role of diet In exacerbating or alleviating eating disorder symptoms Is also crucial. Extreme caloric restriction and unmonitored dietary management can worsen symptoms, while a structured and supervised dietary approach can be beneficial. Effective dietary strategies should not only support weight loss but also mitigate the risk of worsening or triggering eating disorders.

Nutritionists play a vital role in this process, providing nutritional education, customized meal plans and ongoing monitoring. Their approach must be evidence-based to avoid exacerbating the patient's condition. A well-designed meal plan should address both physical and psychological needs, promoting healthy behavioral changes and preventing relapses.

Finally, this thesis will detail dietary planning for BED patients, focusing on creating meal plans that promote weight loss while preventing binge episodes. It will examine various dietary approaches, emphasizing those that ensure sensory satisfaction, prevent excessive hunger and manage nutrient intake to stabilize blood sugar levels.

This thesis aims to provide a comprehensive understanding of the complex relationship between dietary practices and eating disorders, ultimately offering practical solutions for managing these conditions effectively.

2 EATING DISORDERS

Eating disorders are not a recent phenomenon; their roots can be traced back to historical periods. In fact, instances of disordered eating behaviors were documented as far back as medieval times. During this period, practices like self-imposed starvation, self-induced vomiting and binge eating were observed, although they might not align with modern diagnostic criteria. These behaviors often stemmed from religious ideals of austerity and purification, or in the case of binge eating, possibly by the fascination with exotic foods from abroad that led to overconsumption.
The 19th and 20th centuries marked significant advancements In medical and psychological knowledge, allowing for clearer identification and classification of eating disorders such as bulimia nervosa and anorexia nervosa. This period also saw increased societal awareness and discourse surrounding eating disorders, culminating in the inclusion of binge eating disorder and other specified and unspecified disorders in the DSM-5 (Diagnostic and Statistical Manual of Mental Disorders) classification in 2013 (Agras et al. 2017).

It's essential to further understand eating disorders by examining their classification.

2.1 Classification of eating disorders

In the latest edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM), eating disorders (Eds) are categorized into five main classifications: Anorexia Nervosa (AN), Bulimia Nervosa (BN), Binge Eating Disorder (BED), Other Specified Feeding or Eating Disorders (OSFED) and Unspecified Feeding or Eating Disorder (UFED). Each of these categories represents a distinct pattern of disordered eating behaviors and associated features.

Anorexia Nervosa is diagnosed when an individual fails to consume sufficient caloric energy to maintain a minimal healthy body weight, coupled with intense fear regarding weight gain or fatness despite being underweight and experiences a profound influence of shape or weight on mood and self-evaluation.

Bulimia Nervosa is identified by regular engagement in the so-called binge eating episodes (see next paragraph) and inappropriate compensatory behaviors. These behaviors include self-induced vomiting, misuses of laxative, diuretics or enemas, fasting or excessive exercise (Mitchel et al. 2012). For a diagnosis of bulimia nervosa, these behaviors must occur at least once a week on average for a duration of three months. Importantly, a diagnosis of bulimia nervosa excludes individuals who meet the criteria for anorexia nervosa.

Despite the distinct classifications, AN and BN have some overlapping diagnostic criteria, particularly regarding the undue influence of body shape and weight on self-evaluation, this criterion is currently absent in the diagnosis of BED.

Binge Eating Disorder is characterized by recurrent episodes of consuming a notably large amount of food, happening at least once a week for three months. These episodes involve specific behavioral and emotional patterns that often result in subsequent feelings of guilt or depression. Differently from bulimia nervosa and other disorders, BED is distinguished by the absence of regular inappropriate compensatory behaviors.

Other Specified Feeding or Eating Disorders (OSFED) encompasses clinically significant eating or feeding disorders that do not fully meet the criteria for AN, BN, or BED, such as atypical AN or night eating syndrome.

Unspecified Feeding or Eating Disorder (UFED) is assigned when the presentation does not align with specific diagnostic criteria or lacks sufficient information for a more precise diagnosis.

Furthermore, the major eating disorder diagnoses often exhibit shared comorbidities, including high rates of mood disorders, substance use disorders, anxiety disorders and personality disorders.

With a solid understanding of the classifications of eating disorders, let’s now delve deeper into one specific disorder: binge eating disorder and its implications, especially concerning obesity.

2.2 Binge Eating Disorder (BED)

Binge Eating Disorder (BED) affects 3% to 5% of adult women and 2% of adult men globally. Although BED is significantly more common in women, the gender gap is less pronounced compared to Anorexia Nervosa (AN) and Bulimia Nervosa (BN), where the prevalence is around 0,4% for AN and 1% to 1.5% for BN in women, approximately ten times higher than in man. It is important to note that the majority of these studies are conducted in Western countries, likely leading to a higher prevalence of BED due to the abundance and easy availability of food. (Agras et al. 2017)

Binge eating disorder (BED) is characterized by recurrent binge eating episodes. A binge eating episode involves two key elements: first, consuming a notably large amount of food within a discrete timeframe, typically less than two hours, surpassing what most people would consume under similar circumstances; second, a sense of loss of control overeating during the episode. These episodes are often triggered by negative emotions, interpersonal stressors, dietary restrictions, body image concerns and boredom. (Diagnostic and Statistical Manual of Mental Disorders)

Indeed, for many individuals with BED, the onset of dieting often follows binge eating episodes, suggesting a cyclical pattern. Additionally, there appears to be a familiar predisposition to BED, indicating possible genetic influences on its development.

To meet DSM-5 criteria, these episodes must exhibit at least three of the following five characteristics: rapid consumption of food, eating until uncomfortably full, eating despite lack of hunger, eating alone due to embarrassment and experiencing negative emotions post-binge.

Individuals with BED often experience shame regarding their eating habits and may engage in binge eating secretively, such as eating late at night or in the parking lots of fast-food restaurants. They may hide evidence of their binges by concealing wrappers or food containers and sometimes stockpile snacks in hidden places like closets or under beds. Others might discard binge foods only to retrieve them from the garbage or make special trips to the supermarket specifically to binge.

Although binge eating may provide short-term relief from these triggers, it often leads to negative self-evaluation and dysphoria afterward. The types of food consumed

during binges vary widely among individuals and are driven more by the volume of food ingested than by specific nutrient cravings.

Some individuals with BED describe their binge eating as "food addiction" (FA), a condition that mimics addictive behaviors. Emerging studies have explored FA, linking it to genetic variants and neurobiological mechanisms similar to those involved in substance addiction. FA and BED share significant overlaps, including a loss of control over consumption, continued overuse despite negative consequences and repeated failed attempts to reduce consumption. Despite these similarities, BED and FA do not completely overlap. The concurrence of these two situations represents a more severe subgroup of BED, characterized by higher levels of psychopathology and emotional dysregulation.

Additionally, both BED and FA are associated with an increased risk of obesity (Di Giacomo et al. 2022, Ivezaj et al. 2011).

Indeed, BED is commonly associated with specific physical and mental health conditions, particularly obesity. Let us now delve into the complexities of this relationship.

2.3 Link between Binge Eating Disorder and Obesity

Understanding the intricate relationship between BED and obesity is crucial for developing effective treatment strategies and addressing the complex challenges posed by both conditions.

Before exploring this topic in greater detail, it is important to elucidate the concept of obesity. According to the World Health Organization (WHO), obesity is defined as a medical condition characterized by an excessive accumulation of body fat that presents a risk to individual's health. It is commonly measured through body mass index (BMI), with a value exceeding 30. Today, approximately 650 million adult people and 340 million children and adolescence suffer from obesity (Sørensen et al. 202).

Researches indicate a strong correlation between BED and obesity, although the exact nature of this relationship remains complex and not entirely clear. While not exclusive to individuals with obesity, BED is more common in this demographic, especially among those seeking weight management treatments. Indeed, community surveys indicate a prevalence of BED ranging from 2% to 5% among people suffering of obesity, but increasing significantly to around 30% among those actively engaged in weight control (Dakanalis et al. 2001, Vamado et al. 1997).

Additionally, studies have shown a positive correlation between the severity of BED and the level of obesity, highlighting the many interconnections between these disorders. Recent data reveals that the prevalence of lifetime obesity in eating disorder cases is 28.8%, ranging from 5% in anorexia nervosa to 87% in binge eating disorders (Sørensen et al. 2022). Over the last 10 years, there has been a threefold increase in lifetime obesity in ED patients, with people with ED and obesity showing higher levels of childhood and family obesity, later onset and longer duration of ED, along with more severe symptomatology (Sørensen et al. 2022). Additionally, studies have shown a positive correlation between the severity of BED and the level of obesity, highlighting the interconnection between these disorders.

A significant aspect of the BED-obesity correlation is the reciprocal influence between the two conditions. People with BED often struggle with weight control due to excessive calorie consumption during binge eating episodes, which can lead to weight gain over time. Similarly, obesity can exacerbate BED symptoms, as weight-related stigma, body dissatisfaction and emotional discomfort associated with obesity can trigger binge eating episodes. This bidirectional relationship creates a challenging cycle in which obesity and BED reinforce each other, making treatment and management more complex.

Addressing this intricate correlation requires a multifaceted approach that includes both psychological and physiological interventions.

Traditional weight loss strategies often overlook the underlying psychological factors contributing to BED, focusing primarily on the physical aspects. For instance, while bariatric surgery can effectively treat obesity and result in short-term reductions in binge eating episodes, it does not provide a long-term solution for BED. This

intervention, although initially beneficial, proves inadequate for sustained management of the disorder (Patterns et al. 2001).

Emphasizing the potential of surgical interventions in selected cases, it is increasingly evident that a psychological solution to the problem must be considered essential. Cognitive-behavioral therapy (CBT) has emerged as a promising treatment modality for BED, focusing on identifying and modifying dysfunctional thoughts and behaviors related to eating (Bruce et al. 1996).

In addition to considering the psychological aspects of the problem, it is necessary to adopt an even broader perspective that includes genetic and environmental factors. Emerging researches suggest that BED may represent a distinctive behavioral phenotype of obesity, influenced by familial factors independent of those contributing to general obesity. This underscores the importance of targeted interventions that address both conditions simultaneously, meeting the unique needs of individuals with comorbid BED and obesity. Indeed, over the last 10 years, the prevalence of obesity associated with disorders characterized by the presence of binge episodes, namely bulimic disorders, is increasing. This is linked with greater clinical severity and a poorer prognosis (Sørensen et al. 2022).

Given that the primary focus of this thesis is the development of dietary interventions considering eating disorders, it is crucial to understand the most common triggers of these disorders. By examining these triggers in detail, we can gain deeper insights into the underlying causes and risk factors, which is essential for developing more effective prevention and treatment strategies.

3. MOST COMMON TRIGGERS OF EATING DISORDERS

In the previous chapter we thoroughly explored the nature of eating disorders, with particular attention to Binge Eating Disorder (BED) and its relationship with obesity. Now, it is essential to examine the key factors that contribute to the development and maintenance of eating disorders. Understanding these factors is fundamental for developing prevention strategies that we will consider in the following chapters, when we will focus on designing an appropriate diet.

Risk factors for eating disorders are primarily identified through prospective studies, which follow participants over time to observe associations between specific variables and the onset of the disorder. A less common method involves identifying factors experimentally by modifying their intensity and observing how these modifications affect the onset of the disorder.

Risk factors are divided into two categories: Non-Modifiable, such as genetic influences, and Modifiable, such as environmental factors. The latter include psychological, emotional factors, cultural influences and dieting.

We will begin by examining non-modifiable risk factors, particularly genetic influences.

3.1 genetic influences

To study the genetic influences on eating disorders, family studies, particularly those involving twins, are used. These studies compare the similarities of traits between identical (monozygotic) and non-identical (dizygotic) twins, in order to study the influence of additive genetic effects, shared environmental effects and non-shared environmental effects. Additive genetic effects refer to the combined influence of many genes on a particular trait or characteristic; shared environmental effects are influences that have a common impact on all family members, while non-shared environmental effects are experiences or influences unique to each individual.

The distinction between these effects is made by comparing monozygotic (MZ) and dizygotic (DZ) twins. MZ twins share 100% of their genetic makeup, while DZ twins

share only 50%. Therefore, an additive genetic effect will be greater in monozygotic twins, while a shared environmental effect will be similar in both MZ and DZ twins.

Twin studies suggest that eating disorders are heritable, with familial and environmental factors interacting with genes to produce such disorders. As mentioned earlier, the increased risk of eating disorders within families could derive from shared environments, genetic influences, or a combination of both.

Two significant studies investigating the genetic contribution to the heritability of Binge Eating Disorder were conducted in 2008 (Javaras et al.) and 2010 (Mitchel et al.). Both utilized an ACE structural model (A – additive genetic effects, C – common or shared environment, E – unique or non-shared environment) (Javaras et al. 2008, Mitchel et al. 2010).

The first study examined 300 twins, while the second involved 1024 twins. The first study estimated the heritability of BED at 57%, whereas the second study reported 45%, indicating a substantial genetic component in the disorder. Both studies indicated that the common environment had minimal influence, while the unique environment significantly contributed but to a lesser extent compared to genetic factors.

When discussing the relationships between genotype and environment, we can refer to correlations or interactions. Correlations describe how an individual's genes influence the likelihood of being exposed to certain environments, while interactions describe how an individual's genes influence susceptibility to a particular environment.

Correlations are divided into passive, evocative and active.

Passive genotype-environment correlation occurs when parents transmit both the genes and an environment conducive to the development of certain traits. For instance, parents concerned about weight may pass to their children both genetic predispositions and restrictive eating behaviors.

Evocative genotype-environment correlation occurs when an individual's genetic traits evoke reactions or responses in the surrounding environment. For example, an adolescent genetically predisposed to weight gain may encounter teasing from peers.

Active genotype-environment correlation occurs when individuals actively select or modify their environment based on their genetic characteristics. For instance, an

individual predisposed to idealize thinness might choose to associate with friends who uphold similar physique ideals.

Genotype-environment interactions occur when the effect an environment has on an individual depends on their genotype. This phenomenon can explain why, for example, the Western sociocultural environment impacts some people more negatively than others, as we will see later in this chapter.

It is important to note that when discussing genetic influences, we are referring to hundreds, if not thousands, of genes influencing the central nervous system (CNS) and metabolism, interacting with complex environmental factors.

However, there are polymorphisms[1] in certain genes that appear to have a significant impact on the onset of binge eating disorder. Specifically, serotonergic and dopaminergic genes, which regulate the expression of serotonin and dopamine neurotransmitters.

The serotonergic system plays a crucial role in mood control, appetite and eating behavior. Certain genetic polymorphisms can affect serotonin availability and efficiency in the brain by increasing serotonin re-uptake, thereby reducing its availability in the synapse and compromising appetite regulation.

The dopaminergic system is essential in reward and motivation mechanisms, which are central to eating behavior. Various genetic polymorphisms can reduce dopamine sensitivity, leading to a hypersensitive reward system. These changes increase susceptibility to binge eating when exposed to highly palatable foods.

Moreover, there is a complex interaction between dopamine and serotonin: reduced serotonin activity can influence the dopaminergic system, increasing its sensitivity. Both neurotransmitters are involved in impulse control and increased impulsivity is a key factor in binge eating disorder (Donato et al. 2022, Bello et al. 2010, Manfredi et al. 2021).

[1]Polymorphism: the occurrence of two or more different alleles of a gene in a population. These genetic variations can affect an individual's phenotype, which includes physical traits, biochemical properties, or behaviors.

Specifically, these neurotransmitters are responsive to sweet foods. Dopamine responds by activating the reward pathway and reinforcing the stimuli to seek out these foods. Serotonin production is directly influenced by the ingestion of carbohydrate-rich foods.

Let us now examine modifiable risk factors, in order: psychological risk factors, emotional risk factors, cultural influences and dieting.

3.2 Psychological risk factors

Psychological risk factors for eating disorders (EDs) are often non-specific, as they are linked to various negative health outcomes. This explains why most risk factors for binge eating disorder overlap with those for bulimia nervosa (Solmi et al. 2021). Key psychological risk factors include parental criticism and neglect, body concerns, low self-esteem and experiences of abuse.

Family influence plays a crucial role in the development of eating disorders. Dysfunctional family dynamics, criticism about body shape or weight and a lack of supportive social relationships can contribute to these disorders (Jacobi et al. 2011, Neumark-Sztainer et al. 2007, Allen et al. 2014). Studies have also shown that parental encouragement to lose weight can lead to weight gain and increased body dissatisfaction (Allen et al. 2014, Allen et al. 2015).

Body dissatisfaction is a significant risk factor. Individuals unhappy with their body image are at a higher risk of developing eating disorders, as they often engage in behaviors aimed at changing their body shape or weight. These behaviors can lead to restrictive eating or binge eating episodes. In fact, although concerns about weight are not included in the diagnostic criteria for this disorder, there is new evidence indicating that this can be an important factor even in BED (Neumark-Sztainer et al. 2007, Wilfley et al. 2009, Hilbert et al. 2002). Such concerns typically arise during adolescence and mediate the influence of parental factors in the development of eating disorders (Allen et al. 2015). Body image, especially among adolescents and women, is often a key aspect of self-evaluation.

A positive self-perception and self-esteem generally indicate good physical and mental health (Frieiro et al. 2022). Individuals with low self-esteem may resort to disordered eating behaviors as a coping, that is a set of psychological mechanism that an individual adopts to deal with negative emotions or stress.

Traumatic experiences and stress, including physical or sexual abuse, significantly increase the risk of developing eating disorders. Trauma is closely associated with emotional dysregulation, which is strongly linked to the onset of eating disorders. Traumatic experiences are significantly more prevalent in individuals with EDs compared to people without. The likelihood of developing an eating disorder is three times higher for those who have experienced childhood abuse, with BED and BN showing stronger associations with childhood trauma than other EDs (Brustenghi et al. 2019).

Psychological risk factors also include perfectionism and impulsivity.

Perfectionism can manifest in rigid eating habits, obsessive thoughts about food and an intense fear of gaining weight, often linked to the development of restrictive eating disorders. Individuals with BED exhibit associations with perfectionism, particularly socially prescribed perfectionism (SPP) and self-oriented perfectionism (SOP). SPP focuses on perceived external expectations and standards, while SOP involves high personal standards set by the individual (Pratt et al. 2001).

Numerous studies show that individuals with BED display increased impulsiveness compared to healthy individuals. Impulsive behaviors can exacerbate the cycle of binge eating and subsequent feelings of guilt or shame, as increased impulsiveness can make it difficult to resist the temptation to seek immediate rewards (Walenda et al. 2021).

3.3 Affective risk factors

Eating disorders are associated with difficulties in affect regulation and mood dysregulation, as food-related regulation strategies are used to manage mood and emotions. Specifically, anorexia nervosa is closely linked with anxiety disorders, while

bulimia nervosa and binge eating disorder show a higher prevalence of mood disorders (Touchette et al. 2011).

Mood disorders such as depression and bipolar disorder and anxiety disorders including obsessive-compulsive disorder, are also closely linked to negative emotionality, that is the tendency to feel negative emotions rather than positive ones. These three factors are often observed in individuals with eating disorders. There is no definitive cause-and-effect relationship among these factors; they may precede, co-occur, or follow the onset of the eating disorder. However, to be considered risk factors, these disorders must necessarily precede the eating disorder.

Regarding binge eating disorder, there is evidence that individuals with comorbidities exhibit higher levels of eating disorder psychopathology and negative emotionality (Grilo et al. 2009). Moreover, the difficulty in identifying, managing and regulating negative emotions lead individuals to employ maladaptive emotional regulation strategies. This appears to be more relevant than negative emotionality per se (Whiteside et al. 2007, Czaja et al. 2008).

Negative emotions are also influenced by feelings of hunger and satiety. Colloquially, a new word 'hangry' has been coined to illustrate how hunger can increase irritability and alertness, generally promoting negative emotional states (Swami et al. 2022). Conversely, satiety is associated with positive emotions and tranquility. For children with binge eating disorder and difficulties in regulating negative emotions, it is common to confuse anxiety and anger, emotions that often precede episodes of overeating (Czaja et al. 2008).

Negative emotions are closely associated with rumination, the perseverative thinking about past or present events. By dwelling on negative emotions, these are amplified, triggering increased food intake as a coping strategy.

Emotional eating represents a significant risk factor for binge eating disorder. Individuals with BED tend to suppress or ruminate on unwanted emotions and less frequently use adaptive strategies such as cognitive restructuring, which involves replacing negative and distorted thoughts with more rational ones (Dingemans et al. 2017).

3.4 Cultural risk factors

When discussing environmental risk factors, it is essential to also consider cultural aspects, as they constitute a fundamental part of the environmental context. Cultural factors include broader contexts that influence entire populations, such as religious practices and political-economic situations, as well as more specific contexts that vary from individual to individual, such as school and sports environments. Together, these factors influence individual type of exposure and susceptibility to eating disorders.

Let’s analyze the broader contexts first.

Religious practices, particularly fasting, have been observed as possible triggers for eating disorders. Islamic communities, which observe Ramadan, a month-long period of fasting from dawn to dusk, have shown high prevalence rates of disordered eating behaviors. Fasting practices are also common in other religions, such as Catholicism and Judaism; however, these religions tend to show lower rates of eating disorders. This difference may be attributed to the fact that fasting in these religions is often limited to certain foods or specific days and is generally not observed as rigidly as in Islam.

Countries that, due to poverty, wars, or natural disasters, cannot guarantee food security present a different situation regarding eating disorders compared to more stable countries. In countries with food insecurity, eating disorders related to restriction, such as anorexia nervosa, and compensatory behaviors, such as bulimia nervosa, are rare. However, regarding binge eating disorder, a meta-analysis based on 20 studies revealed that binge episodes are 1.66 times more frequent in individuals experiencing food insecurity compared to those with food security and the likelihood of developing this disorder is even 2.70 times higher (Abene et al. 2023). The causes of this phenomenon are not yet fully understood, but a possible explanation could be that people who do not have enough food are less likely to limit their intake and if the opportunity to have food arises, they are more likely to lose control.

In developing countries, most eating disorders are observed in individuals who aspire to higher social status or wish to conform to Western culture. Given the extensive research in Western contexts, we can now move on to more specific contexts.

School and university environments have a significant impact on eating disorders. At school, one of the main causes of the onset of eating disorders, in addition to those already mentioned for adolescence, is bullying. It is interesting to note that both bullies and victims are at risk (Copeland et al. 2015). Additionally, when bullying is related to racial reasons, a higher presence of binge eating disorder has been observed (Raney et al. 2023). This correlation is not limited to the school environment but extends to all occasions of racial discrimination (Assari et al. 2018, Beccia et al. 2020).

During college life, changes in eating habits and physical activity often lead to weight gain, a phenomenon referred to as the "freshman 15," where 15 represents the weight gain of 15 pounds in the first year of study. This change, along with peer influence, puts many university students at risk of eating disorders. A study indicates that 10% of university students are at risk of developing eating disorders and 4.5% present both eating disorders and food addiction (Yu et al. 2016).

Finally, the sports environment can also influence eating disorders. Sports can be divided into "refereed sports," where success depends on an objective result, such as soccer, and "judged sports," where success depends on the evaluation of one or more judges, such as artistic gymnastics. The results indicate that while "refereed sports" can have a protective effect against eating disorders, "judged sports" can represent risk factors (Zucker et al. 1999).

In general, white people, particularly women, in Western countries report higher levels of eating disorders and body dissatisfaction. Unlike some other cultures, where roundness is considered attractive and desirable, symbolizing fertility, success and economic security, the Western model idealizes thinness (Nasser M. 1988).

The thin ideal emerged in the last century, starting with actresses and models and was disseminated through cinema, television and fashion magazines. Today, due to the internet, we are daily exposed to these images. These unrealistic beauty ideals, popularized by social media, can lead to disordered eating behaviors (Aparicio-Marttinez et al. 2019).

Online, there are also forums that explicitly promote eating disorders, such as pro-ana (anorexia) and pro-mia (bulimia) websites. These sites provide advice on how to achieve extremely thin bodies and explicitly encourage anorexic and bulimic behaviors, especially among teenage girls. Some of these tips include eating naked in front of a

mirror or punishing oneself after eating, for example by using a rubber band on the wrist. This last tip is also part of the “10 ana commandments”, specifically the fifth: you cannot eat fattening food without punishing yourself afterward (Mento et al. 2021)

On other sites, seemingly harmless trends are popular, but they risk triggering harmful behaviors. An example is the "10,000 calorie challenge" on YouTube. The rules are simple: you have to ingest ten thousand calories within 24 hours, liquid calories don’t count and all meals and eating must be shown. These unhealthy and unbalanced behaviors are often normalized and taken as examples.

In recent years, in contrast to the thin ideal, the curvy ideal has emerged. This promotes a body with more curves. Initially, promoting this ideal had a value of inclusivity and countered the negative effects of the thin ideal. Over time, however, curvy has become synonymous with “hourglass”. This body type is characterized by a voluptuous bust and buttocks, but also a very slim waist. This has been promoted by influencers who resort to cosmetic surgery to achieve it, since, except for certain physical constitutions, it is almost impossible to achieve this type of body with just exercise and diet. A study found that women who aspire to this ideal are more likely to develop clinical symptoms of eating disorders, as adherence to this ideal can negatively affect self-esteem and trigger disordered eating behaviors (Hernández et al. 2021).

Having thoroughly examined these risk factors, we shall now address the final factor: dieting.

3.5 Dieting

The term "diet" can refer either to a lifestyle, as suggested by the Greek "way of life," meaning what one habitually eats, or to a special course of food to which a person restricts itself. In this context, we refer to the latter meaning.

The role of dieting in eating disorders remains a topic of debate. Although there is a known correlation between dieting and some eating disorders, the etiology of this relationship has not been clearly defined yet. Retrospective studies have shown that individuals with eating disorders often report a history of extreme or repeated restrictive dieting. It has been demonstrated that caloric restriction is a causal risk factor for

episodes of binge eating and bulimia nervosa, but there is insufficient evidence to make the same claim for anorexia nervosa and binge eating disorder (BED) (Yu et al. 2016).

Episodes of overeating and binge eating can be explained from various perspectives. From a psychological perspective, dietary restriction can increase both concern about food and desire to eat. From a biological perspective, dieting can alter the mechanisms of hunger and satiety regulation, contributing to the development of disordered eating behaviors.

Another aspect to consider is the so-called set-point theory. This theory suggests that body weight is regulated at a predetermined level by a feedback control mechanism located in the hypothalamus. This system integrates the information received from this organ and modulates food intake or energy expenditure to maintain stable body weight. The regulation of body weight is influenced by multiple factors, including nutrients, dietary composition, hormones, neural pathways and neurotransmitters. Additionally, the body is more efficient at protecting against weight loss during caloric restriction compared to weight gain under overfeeding conditions, due to an adaptive role in protecting during periods of low food availability (Weinsiner et al 2000).

The majority of evidence concerns the role of self-directed diets, which pose a significant risk for the development of eating disorders. The lack of professional supervision and inadequate understanding of nutritional needs can lead to extreme caloric restrictions, meal skipping, and nutritional imbalance. This increases concern about food and weight, contributing to a rigid dieting mentality, which can lead to disordered eating behaviors, including binge eating episodes.

However, other researches suggest that dieting can have beneficial effects when supervised by health professionals. Supervised weight loss programs have been shown to be effective in reducing weight and improving overall health, without increasing, and often reducing, the risk of developing eating disorders.

Therefore, it is crucial to analyze how a nutritionist can intervene to prevent and treat eating disorders by promoting a balanced and sustainable approach to diet and nutrition.

In the next chapter, we will explore the role of nutritionists in managing weight loss and eating disorders.

4. HOW A NUTRITIONIST CAN INFLUENCE EATING DISORDERS

Nutritionists are often the first professionals consulted by patients with eating disorders. This is because, although such disorders are predominantly mental illnesses, they have tangible repercussions on the relationship with food, making the role of the nutritionist essential in identifying signs and symptoms.

4.2 Positive influence

A well-trained nutritionist can provide crucial nutritional support for patients with eating disorders. This support includes three elements: nutritional education, personalized diet and a continuous monitoring.

Basic nutritional education aims at providing accurate information on the principles of balanced and healthy nutrition. This helps counteract the myths and false beliefs that often fuel eating disorders, allowing patients to normalize their eating habits and make healthier choices (Reiter et al. 2010, Howard et al. 1999).

The development of personalized meal plans tailored to the specific needs of each patient is the second essential role. These plans must be sustainable over time and, with possible modifications, adoptable as a general future lifestyle. To create the right meal plan, it is essential to assess the patient's nutritional status, considering any deficiencies or excesses that may affect overall health or the symptoms of the eating disorder.

The last fundamental element in the nutritionist support is continuous monitoring, that can lead to adjustments to the meal plan and can give motivational support to help the patient maintain positive behavioral changes and manage potential relapses.

A nutritionist can provide further help not only giving dietary advice to patients but also working to create a more informed and aware environment around them.

Awareness and education are fundamental both for preventing eating disorders and for improving the management of those affected. Nutritionists can play a key role by educating the community and involving parents, who are crucial in the treatment of eating disorders in children and adolescents. Parental involvement is often associated with a reduction in the severity of symptoms (Brown et al. 2020). Additionally, awareness programs in schools and the community can promote healthy eating habits and increase awareness of eating disorders.

Finally, nutritionists can collaborate with other health professionals, such as psychologists, mental health professionals and physicians, for an integrated approach to treating eating disorders. As we have seen, these disorders are complex psychological conditions linked to deep-rooted causes that go beyond a simple relationship with food. It is essential to investigate and address the underlying factors to improve the patient's mental health. Collaboration among professionals allows for addressing both the physical and psychological aspects of the disorder, thereby increasing the chances of complete recovery. Patients treated by a multidisciplinary team often show significant improvements in both eating behavior and mental health (Brown et al. 2020).

When a nutritionist lacks the necessary knowledge or competence to identify and properly treat a potential eating disorder, he not only fails to help but may also risk worsening the situation due to a lack of individualized care.

4.3 Negative influence

As discussed, nutritionists can play a crucial role in managing eating disorders. However, it is essential that they are properly trained in the complexities of these conditions to avoid approaches that might worsen the patient's condition. Without specific training, some nutritionists may adopt inadequate strategies that risk exacerbating the symptoms of the disorder.

One of the main risks is the imposition of excessively restrictive or unbalanced diets. Such diets can contribute to the perpetuation of disordered eating habits, intensifying

concerns about food and body weight. This excessive focus on caloric restriction not only fosters an unhealthy relationship with food but can also increase anxiety and obsessive-compulsive behaviors related to diet and body image (Howard et al. 1999).

Another significant issue in managing eating disorders is the excessive focus on weight control. Concentrating primarily on body weight can exacerbate the symptoms of the eating disorder, as this focus can fuel concerns and anxieties related to body image and obsessive behaviors regarding diet and physical appearance, making it more challenging to achieve balanced management of the disorder.

Furthermore, it is important to note that body weight is not always a reliable indicator of weight loss or health improvement. The Body Mass Index (BMI), calculated only on the basis of weight and height, does not accurately reflect body composition. A person might lose weight while maintaining the same amount of body fat and losing only muscle mass and water, while another person might have stable body weight despite a reduction in body fat and an increase in muscle mass. In the latter case, although body weight remains unchanged, the improvement in body composition suggests a more favorable state of health.

Lastly, a superficial understanding of the psychological aspects of eating disorders can make the nutritionist's work ineffective or even harmful. Managing such disorders requires a thorough knowledge of the psychological dynamics involved. Without this understanding, a nutritionist might fail to identify and address the psychological causes contributing to the eating disorder and to provide the necessary support to promote positive behavioral change and a healthy relationship with food and the body.

In summary, nutritionists have the potential to significantly influence eating disorders, both positively and negatively. To ensure a positive impact, it is crucial to invest in continuous education, collaborate with other health professionals, and adopt evidence-based approaches. Through personalized nutritional interventions, proper education and ongoing support, nutritionists can help patients overcome eating disorders and establish a balanced and healthy relationship with food and their bodies.

5. HOW TO BUILD A DIET FOR PATIENTS SUFFERING FROM BINGE EATING

In this chapter, taking into account the previously discussed topics, we propose an analysis on how to structure a weight loss diet for individuals suffering from binge eating, examining both the structural and nutritional aspects of the diet.

5.1 Designing a Diet

Diets can be structured in various ways to address the specific needs of patients. The most common types of diets include the weekly menu diet, the single menu diet and the macronutrient-based diet.

The weekly menu diet is frequently used in the early stages of a dietary program. It involves providing a detailed menu for each day of the week, ensuring precise management of micronutrient and macronutrient intake.

For the patient, the benefits include reduced stress associated with meal choices due to the predefined planning and ease in purchasing weekly groceries, limited to what is necessary. This approach is particularly suitable for those with limited nutritional knowledge or little creativity in the kitchen. However, it requires a high degree of organization and offers limited flexibility. Those with a hectic lifestyle might find it challenging to organize and prepare portioned meals, especially if they need to eat away from home.

This diet can be implemented in two variations: a more rigid version that specifies exactly which foods to use with no substitutions allowed and a more flexible version that permits substitutions within predetermined food groups, while still maintaining control within specific nutritional ranges. The first version is highly precise, allowing for exact knowledge of the micronutrients being consumed. However, the second version is less stressful, making it easier for doctors to prescribe and patients to follow.

The single menu diet involves defining a "standard" breakfast, lunch and dinner based on fundamental foods chosen according to the patient’s preferences or specific nutritional needs. Once these foods are selected, possible substitutions and appropriate proportions are established. This scheme, while less precise in terms of micronutrients, offers greater flexibility and adaptability, making it easier to follow on particularly busy days. However, it requires that the patient has some familiarity with quantities and nutritional principles. If the patient needs to eat out, he can choose dishes that adhere to the substitutions outlined in the plan, but an inadequate understanding of portion sizes could make it difficult to adhere to the diet. Moreover, for patients prone to losing control, excessive freedom may result in a complete lack of adherence to the diet.

The macronutrient-based diet is suitable for those with a good understanding of nutrition, whether they are concluding a nutritional program or already possess prior knowledge. This diet specifies the daily amount of macronutrients (carbohydrates, proteins, fats) to be consumed, which can be fixed or vary from day to day. The patient has the freedom to choose preferred foods, provided they stay within the macronutrient limits.

Typically, allowances are made to facilitate adherence to the diet, such as the possibility of including "cheat" meals or following the 80/20 rule.

Cheat meals, defined as meals that temporarily break the rules of a diet and are usually permitted on a predetermined day of the week, are often more easily incorporated into a weekly menu but can also be adapted to other dietary approaches. These meals can serve as motivation to stick to the dietary plan throughout the week; however, they carry the risk of losing control and turning into full-blown binges. Additionally, they can lead to the categorization of foods as "good" or "bad," creating a distorted perception that increases cravings for "forbidden" foods (Ganson et al. 2022, Murray et al. 2018).

To mitigate the negative effects of cheat meals, it may be helpful to provide a complete weekly menu, from Monday to Sunday, with predetermined meals, explaining the patient he can follow this plan in the absence of special events or specific desires. If special occasions occur during the week, it is not necessary to wait for the cheat meal and multiple events in the same week should not be a problem. It is essential for the

patient to manage these situations carefully, avoiding restrictive regimes or excessive fear of certain foods, to prevent cravings that could lead to binges.

Coming to the 80/20 rule, this suggests consuming 80% of foods with low caloric density, rich in water, protein and fiber and 20% of foods with higher caloric density and less "nutritive" value, on a weekly or daily basis. Although this rule introduces a distinction between categories of foods, it helps build a balance that can be maintained even in a non-diet regimen. Additionally, it allows the patient to manage his meals independently, avoiding excessive restrictions that could lead to binge episodes, as they can enjoy more satisfying foods daily. The 80/20 rule is particularly suitable for a more flexible dietary pattern, such as the macronutrient-based diet, and can be useful for patients already knowledgeable about nutritional principles, preparing them to maintain a healthy and balanced diet in the long term.

Another crucial aspect of diet structuring is the decision whether or not to include daily calorie counts. This choice can have both positive and negative effects. On one hand, it may increase dietary awareness, helping patients make healthier choices. On the other hand, for many patients with eating disorders, particularly binge eating, knowing the calorie content may heighten food obsession, worsening the disorder's symptoms. Additionally, awareness of calorie numbers may lead to restrictive behaviors that could trigger binge episodes. For example, if a patient perceives that results are not being achieved quickly enough, they might attempt to further reduce daily calories, risking an inability to maintain such a regime and falling back into binge cycles.

Although a patient might independently determine the calorie content of his diet, it should not be the focus of the nutritionist. If a foundation for future self-management is desired, it is preferable to emphasize nutrient ranges or food groups, as these elements contribute to a balanced, healthy and sustainable diet in the long term.

Beyond choosing the most suitable type of diet, it is essential to plan how it can evolve into a long-term sustainable regime, particularly for patients with binge eating disorder. Once weight loss goals are achieved, it is crucial that the patient has developed the knowledge and skills to maintain healthy and balanced eating habits.

An effective method for facilitating the transition to a self-administered balanced diet might be gradually moving from a weekly menu diet to a macronutrient-based diet or single menu diet, adopting the principles of the 80/20 rule. This approach emphasizes listening to the body's hunger and satiety signals, minimizing the risk of reverting to dysfunctional eating habits.

Incorporating greater flexibility into the diet can help patients maintain the results achieved, preventing the risk of binge eating episodes, often triggered by overly rigid dietary regimes. Furthermore, ongoing monitoring, even if less frequent than during the weight loss phase, can be useful to ensure that patient continues to make mindful food choices and maintain a healthy relationship with food.

5.2 Diet from a Nutritional Perspective

Managing the diet of an overweight or obese patient requires a careful and balanced approach, with particular attention to caloric needs and sensory satisfaction. A low-calorie diet is essential to promote weight loss, but it's crucial that this caloric reduction isn't excessive and that the diet remains balanced and satisfying from a sensory standpoint.

A crucial point to consider is the role of food in binge eating. As discussed earlier, this disorder is characterized by episodes of uncontrolled overeating, often triggered by negative emotions rather than actual hunger. In such cases, a diet that doesn't satisfy the palate can exacerbate the desire to seek comfort in highly palatable and calorie-dense foods. Therefore, it is important that the diet provides not only an adequate caloric intake but also sufficient gustatory pleasure to reduce the risk of dysfunctional eating behaviors.

A fundamental strategy is the adoption of low-calorie-density foods, which provide fewer calories per unit of weight. This approach allows for an increased sense of fullness without adding excessive caloric load, thereby helping to prevent physiological hunger that could compound emotional hunger and worsen the patient's condition.

Fruits and vegetables are excellent examples of low-calorie-density foods. These foods are rich in water and fibers, contributing to a high volume with a low-calorie

intake. Fiber, in particular, is a nutrient that promotes prolonged satiety and slows down the digestion process, helping to stabilize blood sugar levels. This can prevent the blood sugar spikes that often trigger hunger and, consequently, binge eating. This may also explain why individuals with BED consume less protein and fiber on binge days than on non-binge days (Raymond et al. 2003).

Proteins are another crucial component of a weight-loss diet. Foods rich in lean protein, such as white meats, fish, eggs and legumes, not only help maintain muscle mass during weight loss but also have a high thermic effect, meaning the body burns more calories to metabolize them. This increases overall energy expenditure and helps keep metabolism active.

Furthermore, proteins help regulate appetite. High-protein diets can reduce feelings of hunger and improve control over food intake; indeed, proteins positively influence satiety signals and can help prevent binge eating by reducing the desire to consume high-calorie foods (Veldhorst et al. 2008).

Taking into account fats, it is important to distinguish between saturated and unsaturated fats. Saturated fats[2] are considered "bad fats" and are primarily of animal origin. Conversely, unsaturated fats[3] , including monounsaturated and polyunsaturated fatty acids, are considered "good fats" and are essential for a balanced diet. Omega-3 (n-3) and omega-6 (n-6) fatty acids, two types of polyunsaturated fats, play a particularly significant role in health.

Omega-3s, found mainly in fatty fish, nuts and flaxseeds, are known for their positive effects on cardiovascular health and appetite control. These essential fatty acids are involved in mood regulation and can help reduce systemic inflammation. They are crucial for brain health and maintaining cognitive function in areas involved in mood and behavior regulation. For this reason, studies suggest that omega-3

[2] Saturated fats: Fats composed of fatty acids with straight carbon chains, lacking any double bonds between carbon atoms.

[3] Unsaturated fats: Unsaturated fats: Fats containing at least one double bond within the carbon chain, creating a bend or "kink" in the molecular structure where the double bond occurs. Depending on the number of double bonds present, they can be classified as monounsaturated (one double bond) or polyunsaturated (two or more double bonds).

supplementation may improve symptoms of depression and anxiety, which are frequently associated with binge eating (Khoury et al. 2021, Parker et al. 2006).

On the other hand, omega-6s, found in vegetable oils and seeds, are important for cellular health, but an excess of these fats relative to omega-3s can promote inflammatory processes in the body. Additionally, a high omega-6/omega-3 ratio has been associated with an increased incidence of mood disorders. Therefore, maintaining an appropriate balance between these fatty acids is crucial for optimizing mental and physical health.

Moving on to the last macronutrient, managing the intake of sugars and refined carbohydrates is essential. Simple sugars and refined carbohydrates, found in foods like white bread and pasta, can cause rapid spikes and drops in blood sugar levels. These glycemic fluctuations can increase feelings of hunger and lead to a higher incidence of binge eating. Diets high in refined carbohydrates have been associated with a greater likelihood of developing dysfunctional eating behaviors. Limiting the consumption of these foods and opting for complex carbohydrates with a low glycemic index can help maintain stable blood sugar levels and prevent sudden hunger crises.

Finally, some micronutrients can have a significant impact on managing binge eating. Magnesium, for example, is a mineral that has shown positive effects on mood and anxiety control. Foods rich in magnesium, such as spinach, almond and pumpkin seeds, can contribute to better emotional regulation and reduce the inclination toward binge eating. Studies suggest that magnesium can modulate the activity of neurotransmitters involved in mood and appetite regulation (Phelan et. Al 2008).

Additionally, fermented foods, such as yogurt, kefir, sauerkraut and kimchi, are beneficial for maintaining a healthy gut microbiota[4]. The gut microbiota is increasingly recognized as a crucial factor in regulating eating behavior and mood. Alterations in the composition of the gut microbiota have been linked to eating disorders and mental health issues, such as anxiety and depression. Some studies suggest that probiotic supplementation can have a positive impact on anxiety symptoms, which in turn can influence the frequency and intensity of binge eating episodes. While specific evidence

[4] Gut microbiota: Gut microbiota: ecosystem residing in a person's gastrointestinal tract, that includes various bacteria, fungi, viruses and other organisms that coexist symbiotically within the human digestive system.

on probiotics relation with binge eating is still limited, recent studies suggest a direct link between probiotic supplementation and BED (Carlos et al. 2022, Navarro-Tapia et al. 2021).

The last aspect of diet management is hydration. Often, thirst can be mistaken for hunger, leading to excessive food intake when the body actually only needs fluids. Adequate hydration is therefore crucial to avoid confusing hunger with thirst and to maintain proper fluid balance in the body.

Despite all nutritional guidelines, it is essential that the diet does not feel sad or punitive. Finding strategies to integrate more "indulgent" and palatable foods into the meal plan is crucial for long-term success. An effective strategy could be to consume low-calorie, nutrient-rich foods before indulging in a desired food, such as a sweet snack or a piece of chocolate. For example, consuming yogurt with fruit before eating a sweet snack can help the feeling of fullness, allowing the treat enjoyment.

Moreover, it is possible to use "substitute" foods, such as sugar-free sweetened beverages or desserts. However, these should be consumed in moderation. Artificial sweeteners can interact with sweet receptors on the tongue, causing the body to prepare for glucose intake that doesn't occur, thus increasing the craving for simple sugars (Klein et. Al 2006). Additionally, artificial sweeteners can disrupt the gut microbiota, with potential negative effects on health (Nyd et al. 2022). Finally, some of these sweeteners have been classified as potentially carcinogenic, although the scientific debate on this point is still ongoing (Weihrauch et al. 2004).

The management of the diet for overweight or obese patients, particularly those with tendencies toward binge eating, requires a holistic and personalized approach. It is crucial that the diet promotes sustainable weight loss and reduces the risk of dysfunctional eating behaviors. For this reason, both the structure of the diet and the choice of foods must be functional to weight loss while also considering the psychological aspect of eating disorder, promoting a healthy and lasting relationship with food.

6 CONCLUSIONS

This thesis has examined the complex relationship between dietary strategies and eating disorders, with a particular focus on binge eating disorder (BED) in patients with overweight and obesity.

We highlighted how BED is an extremely complex disorder, arising from the interaction of multiple risk factors. In particular, genetic, cultural, emotional, psychological and dietary factors intertwine in its onset and development. While genetic factors may predispose an individual to binge eating disorder, cultural and social pressures can further increase the risk. Emotional and psychological aspects, such as anxiety and depression, play a crucial role not only in the development of BED but also in significantly complicating its treatment.

Lastly, the management of caloric restriction must be approached with great caution, as it can have both harmful and beneficial effects. Those suffering from BED are often accustomed to feeling an urge to eat, regardless of physiological hunger. Caloric restriction can exacerbate this urge, making the disorder even more insidious, especially for those struggling with overweight and obesity. The loss of control during food consumption not only compromises the patient's physical condition but also further deteriorates their psychological state.

It is essential for the patient to regain a healthy relationship with food, avoiding its use as a coping mechanism for personal issues. A balanced relationship with food must be the foundation of any treatment, as improving psychological well-being and breaking the cycle of uncontrolled eating are crucial for achieving sustainable weight loss.

In this context, it is vital that nutritionists are fully aware of the complexity of eating disorders. A professional in this field cannot limit themselves to considering only the caloric aspect or the macronutrient balance. It is essential to deeply understand the difficulties and needs of the patient, considering the body not as a machine, but as a complex organism where physiological and psychological factors are interconnected. Even the most "perfect" diet from a nutritional standpoint will not be adequate if it does not also take into account the patient's psychological well-being. Therefore, the role of

the nutritionist must go beyond merely achieving physical goals: it must include promoting psychological balance to promote a lasting and sustainable change.

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