OBESITY – DEPRESSION INTERRELATION IN CHILDREN AND ADOLESCENT

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ABSTRACT

Obesity and depression represent two fundamental problems of public health at a global level; paediatric obesity is alarming both per se and through the risk of maintaining the obese status in adulthood and of continuing to be exposed to comorbidity, implicitly. On the other hand, depressionin childrenis a genuine diagnostic problem (considering its masked clinical symptomatology) and a diagnostic necessity (considering its severe consequences and mostly the pathological alterations of food-related behaviour). This paper seeks to elaborate a synthesis of the current scientific literature regarding the causes of obesity – depression comorbidities in children,with a focus on the interrelation and common etiopathogenic origin.

Keywords: obesity, depression, child/adolescent, interrelation, multifactorial

INTRODUCTION

Both obesity and depression are two health issues of global, interest, because their rates are soaring. Both contribute to a significant deterioration of life quality and global functioning. Furthermore, obesity in children and adolescents has become a stringent, world-level issue, mostly in the western civilization; it entails a series of comorbidities, such as diabetes, hypertension, sleep apnoea, dyslipidemia, intracranial hypertension, depression, elements of pathological skeletal development and orthopaedic disorders. These comorbidities emerge especially in children and adolescents, who are in the middle of the growth process. Classically, medicine catalogues obesity as a metabolic disease, while depression pertains to psychiatric pathology. Despite the abundant evidence attesting the relation between the two nosological entities, the nature of this interrelation has not been fully elucidated. It is worth mentioning the existence of complex underlying mechanisms, consisting in the interaction between numerous environmental and genetic factors, including the signalling pathways in charge with balancing energy and with ensuring euthymia, which comprise anorexigenic and orexigenic neuropeptides, metabolic factors, and stress hormones (1-3).

EPIDEMIOLOGICAL DATA

Obesity is a pathological condition characterized by excessive accumulation of fat in the body, following a misbalance between calorie input and consumption. World Health Organization monitors regularly the prevalence of obesity and overweight; a recent estimate shows that 11% of the global adult population suffers from obesity, while 35% are overweight. Moreover, 10% of children in the world

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suffer from obesity or they are overweight. The global prevalence of obesity in children ranges between 30% in the USA and 2% in Sub-Saharan Africa. World Health Organization estimates that, after 2015, approximately 2-3 billion adults and more than 700 million children and adolescents will be obese. Child obesity foreshadows premature death and adult disability, considering that 50-80% of obese children become obese adults. Presently, obesity in children is considered a genuine global epidemic (2,4).

Depression is the most common psychiatric pathology, characterized by negative hyperthymia, anhedonia, asthenia, hypobulia, sleep disturbances, and appetite disorders. The most recent data show that 350 million people in the entire world suffer from depression. Depression is a heterogeneous, atypical condition, characterized by psychomotor slowness, hyperphagia, and weight gain; the last is one of the most common manifestations. This subtype is frequently associated with excessive fat on the organs, which entails metabolic, endocrine, and behavioural alterations. Studies found that the degree of abdominal obesity is a significant predictor of the obesity – depression comorbidity (1,2,4).

PARTICULARITIES OF OBESITY – DEPRESSION INTERRELATION IN CHILDREN/ADOLESCENTS

Like in the case of obesity, the biological substrate of depression has not been fully elucidated yet, but genetic predisposition is relevant in approximately 40% of the cases. Genetic approach demonstrates that depression is apolygenic pathology, influenced by a series of environmental factors and by individual genetic predisposition. At the same time, numerous longitudinal studies suggest that depression is a significant predictor of the metabolic syndrome, as it has been associated with cardiovascular pathology, diabetes, obesity, and chronic inflammatory status; this phenomenon is explained only partially by the fact that patients with depression have an unhealthy lifestyle (4,5,6).

The initial idea was that certain socio-demographic, psychological, and genetic factors can determine predisposition to depression for certain obese individuals and vice versa. In the same sense, studies confirmed the existence of a connection between the patho-physiology of the two nosological entities and the amendment that only certain forms of obesity and certain forms of depression are interrelated. Therefore, obesity was found to associate with negative hyperthymic states and with disorders of the anxious spectrum, which suggests the existence of a series of social and cultural factors that mediate the obesity – depression relationship. Recent studies found that each of the two diseases influences the other, concerning both the onset and the evolution. Therefore, the bio-psychosocial variables involved in this interrelation are as follows: health state, poor social activity, family history of depression, child abuse, distortions of body image, and food disorders such as binge eating. A series of studies conducted on samples comprising adolescents confirmed that depression is a significant risk factor for obesity, while obesity is a risk factor for the onset of depression only if it associates binge eating and a predisposition to abdominal fat.

On the other hand, numerous scientists have pinpointed the relationship between child obesity and interiorization of difficulties, low quality of life, and behavioural disorders. At the same time, children with obesity are more exposed to depression, lack of hope, suicidal tendencies, and low self-esteem (4,5,6,7).

A possible explanation of obesity following depressive disorders is precisely the fact that the latter involves excess fat accumulation, considering the reduction of physical activity, caused byhypobulia, anhedonia, hypodynamia, and apathy, which leads to decreasing calorie consumption. From a cognitive-behavioural perspective, the accentuated symptoms of depression develop and maintain because of low self-esteem (6,7).

Over time, obesity has been perceived as a reason for stigma, leading to social exclusionand discrimination, in adults and mostly in children and adolescents.

Biological substrate of depression in relation to the one of obesity

Lack of balance at the level of hypothalamic-pituitary-adrenal axis is involved in the pathogeny of both depression and obesity. Furthermore, the cortisol levels of children with obesity are in a linear correlation with the level of perceived emotional stress. The hyperactivation of this axis following a permanent state of stress leads to depression. The adjustment response provided as a reply to stressor elements increases the energy available at the level of the organs directly involved in combating stressful situations; hence, cardiac rhythm and breathing are accelerated, and catabolism increases. Emotional stimuli are processed by the amygdala, they activate the paraventricular nucleus of the hypothalamus, and they determine an adaptive fall, through the release of CRH (corticotropin releasing

hormone). Its target-neurons are located at the anterior level of the pituitary gland that releases ACTH in the bloodstream. In its turn, this hormone stimulates the secretion of cortisol from the adrenal gland cortex. Cortisol contributes to increasing glycaemia and to antagonizing the effect of insulin, growth hormones, and thyroid hormones. In the last three decades, a series of studies found that the body's response to prolonged stress – materialized by sustained CRF and cortisol release – is a trigger mechanism for both depressionand obesity with predominantly visceral adiposity predisposition. Hence, stress alters the homeostasis of hypothalamic-pituitary-adrenal axis, thus determining both the onset and the aggravation of depression. At the same time, hypothalamus is the main regulator of energetic balance and of food behaviour; naturally, the alterations of hypothalamic-pituitary-adrenal axislead tohyperphagia and obesity (4,8,9,10).

Neurotrophins represent an important class of signalling molecules and they play a fundamental role in brain development, in maintaining neuronal integrity, and in synaptic plasticity. The BDNF (brain derived neurotrophic factor) has been granted special attention, because of its certification asa biomarker of depression and of suicidal behaviour. Neurogenesis of the hippocampus is an important process involved in subsequent maintenance of euthymia. BNDF and its receptors are key-elements in the modulation of various neurogenesis phases, such as proliferation, migration, differentiation, and cell death. The involvement of BNDF in the pathogeny of depression is a consequence of stress-acting as a down-regulator of the expression of cerebral neurotrophic factors, with a role in maintaining euthymia. Depressionis considered to induce, in time, morphological alterations at the level of the hippocampus, which is connected intimately with the hypothalamic-pituitary-adrenal axis. On the other hand, the BDNF has proven its direct role in the regulation of homeostatic and hedonic food contribution, but most studies have beenpreclinical, which means that the hypothesis is not fully confirmed for human subjects (10,11,12).

Psychosocial aspects in the obesity – depression relationship in children/adolescents

An increasing number of studies show that early food habits of obese children are substantially different from those of other children. Children with obesity often eat large amounts of food, and their caloric input is significant. This inadequate diet is accompanied by low level of physical activity, because their daily schedule is based on sedentary activities. Furthermore, many children with obesity have obese or overweight parents, who have unhealthy food habits and a generally unhealthy lifestyle (1,5,7).

Negative self-image is an almost unanimous element detected in children with obesity; most of them are not satisfied with their appearance. The onset of this phenomenon is early, and it usually coincides with them being mocked by their peers, who ridicule precisely their excessive fat, materialised in a non-aesthetic appearance. Hence, generally, obese children have a low self-esteem. Paradoxically, obese or overweight parents prefer normoponderal children, and they diminish their own children with obesity, thus causing them an insurmountable disservice. Obese children also find it difficult to integrate in their group of peers and, sometimes, in the relationship with their teachers. Beyond their status of persecuted children, obese children can become persecutors in their turn, precisely because they are larger than the other children, which makes them feel strong and superior (5,7,14).

It is well known that a child/adolescent with obesity has to deal with accentuated psychological stress. In numerous situations, his/her family of origin overprotects him/her, reason for which the child develops a significant anxiety of separation. The depressive symptomatology of the child/adolescent with obesity is most of the times less apparent, but is associates somatic symptoms that often lead to a wrong diagnostic. At the same time, in some cases, paediatric depression can include heteroaggressive behaviour, fury, and behavioural disorders. The depression of children with obesity is closely connected to the feelings of guilt caused by weight gain and abuse of hypercaloric foods, to low self-esteem and to self-deprecation. Depression consecutive to child obesity frequently includes fatigability and low academic performance (8,14,15).

Early childhood psycho-traumatising experiences were found to play a fundamental role in mood modulation and in food behaviour, because it represents an element of vulnerability for the subsequent development of depression and/or of obesity. At the same time, stress induces a preference for unhealthy, hypercaloric foods, which decrease the individual's perceived discomfort. Therefore, when such unhealthy diet becomes a habit, it creates a vicious circle where the very absence of preferred foods determines reduced tolerance to frustration and symptoms within the sphere of depression. Beyond this aspect, the processed foods that have increasingly replaced fresh and cooked

meals do not contain sufficient polyunsaturated fatty acids, while the excessive intake of saturated fatty acids promotes visceral fat depositions, thus leading to negative mood hyperthymia (3,14,15).

CONCLUSIONS

Obesity is a multifactorial disease; in the recent years, attempts have been made to identify the nature of the connection between mental status, obesity, development ,and relationship with the parents of the child/adolescent who suffers from obesity.

Despite the numerous scientific outcomes concerning the role of genetic and metabolic factors in the etiopathogenesis of obesity, the role of psychological factors in the development of obesity in children has not been fully explored. This is caused by the fact that clinicians find it extremely difficult and challenging to acknowledge psychiatric symptoms in the paediatric sphere.

On one hand, this paper aims at sending a warning concerning the need to assess depressive symptoms in children who suffer from obesity, as an integrant part of their clinical and therapeutic process. On the other hand, this paper proposes an early identification of depressive symptoms in children/adolescents, in order to prevent the emergence of food disorders and of obesity, implicitly. Hence, the solution is to interveneat the social level, within families and schools, to promote healthy food habits and exercising, as well asto approach the children/adolescents with obesity from a biopsychosocial perspective. At the same time, more exact and targeted studies should be conducted on the nature of factors that mediate the relationship between depression and obesity in the paediatric sphere.

This field of study is overwhelmingly important both per se and because paediatric obesity is the precursor of adult obesity, while depression is a pathology that entails significant therapeutic challenges, mostly concerning its connection with obesity.

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