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AN INTEGRATIVE REVIEW ABOUT BODY COMPOSITION OF WOMEN WITH ANXIETY AND DEPRESSION

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ABSTRACT

In this integrative review, were identified studies in the literature that point to the relationship between obesity and the signs and symptoms of anxiety and depression in women. Three databases were searched, the descriptors were used in the search strategies and met articles that discuss anthropometrics measures, body composition and anxiety/depression. Studies included samples that ranged from 35 to 222,029 participants, with a predominance of the adult age. There is a positive relationship between obesity and anxiety and/or depression scores in women, given that a positive and direct association was found between obesity markers and signs and symptoms of anxiety and depression. However, there is no consensus in the literature on the causality between the presence of obesity and the signs and symptoms of anxiety and depression. This can be explained by the absence of mechanisms, causes, and treatments, which are still poorly established and clarified in the literature.

Key words: Anthropometry. Body composition. Obesity. Anxiety. Depression. Women.

RESUMO

Uma revisão integrativa sobre a composição corporal de mulheres com ansiedade e depressão

Nesta revisão integrativa, foram identificados na literatura estudos que apontam a relação entre a obesidade e os sinais e sintomas de ansiedade e depressão em mulheres. Foram pesquisadas três bases de dados, os descritores foram utilizados nas estratégias de busca e encontrados artigos que abordam medidas antropométricas, composição corporal e ansiedade/depressão. Os estudos incluíram amostras que variaram de 35 a 222.029 participantes, com predominância da idade adulta. Existe relação positiva entre obesidade e escores de ansiedade e/ou depressão em mulheres, visto que foi encontrada associação positiva e direta entre marcadores de obesidade e sinais e sintomas de ansiedade e depressão. No entanto, não há consenso na literatura sobre a causalidade entre a presença de obesidade e os sinais e sintomas de ansiedade e depressão. Isso pode ser explicado pela ausência de mecanismos, causas e tratamentos, ainda pouco estabelecidos e esclarecidos na literatura.

Palavras-chave: Antropometria. Composição corporal. Obesidade. Ansiedade. Depressão. Mulheres.

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INTRODUCTION

Obesity is a multifactorial chronic disease characterized by excess body fat. Due to its high prevalence and mortality over time, it is considered a public health problem, directly influencing the onset of diseases and, consequently, affecting aspects of people's quality of life (QoL) and self-perception of health (Busutil et al., 2017; Hruby et al., 2016).

It should be noted that the effects of obesity go beyond the physical consequences, as they also negatively affect mental health, with the emergence of depression, anxiety, low self-esteem, eating disorders, dissatisfaction with body image, and stress (Barghandan et al., 2021; Chu et al., 2019).

There is evidence that 50% pf the Brazilian population is already overweight and, as consequence, there are a large number of people with cardiovascular diseases, type 2 diabetes mellitus, some types of cancer, osteodegenerative diseases, and mental disorders such as anxiety and depression.

The literature points to the negative influence of obesity on anxiety and depression. Even though the causal relationship between these pathologies is still being studied, the bidirectional association between them is already evidenced, as obese individuals presented a 55% increased risk of developing depression over time, while people with depression presented a 58% increased risk of developing obesity (Delai et al., 2020).

Anxiety and depression are the mental disorders that most affect the general population, leading to costly public health expenses, and affecting people's lives, health, and work (Stubbs et al., 2017), especially in women.

Studies point out that women present the highest incidence rates of anxiety disorders, as well as depression. The incidence is twice as high in women with more symptoms, affecting the prognosis and making treatment more difficult. All these events are affected by genetic, biological, environmental, and psychological influences (Costa et al., 2018; Parreira et al., 2021; Salk et al., 2017; Veras e Nardi, 2008).

Considered comorbidities, depression and anxiety can be related to weight gain and work as a risk factor for obesity, as they have a bidirectional relationship (Blasco et al., 2020; Van Dammen et al., 2018).

The literature demonstrates a relationship between obesity and the presence of signs and symptoms of anxiety and/or depression, which can be understood by the series of neurotransmitters involved in this underlying biological mechanism, activated in the hypothalamic-pituitary-adrenal axis, that influence the symptoms and regulation of cortisol secretion, causing adiposity (Jin et al., 2017; Koksal et al., 2017; Zhu et al., 2017).

There is consensus regarding the incidence and sex, in which depression, anxiety, and obesity occur in greater proportions in the obese female population. As obesity is a multifactorial health problem, it causes major complications in both therapeutic and evolutionary aspects, as the consumption of caloric foods can alter the dietary pattern and metabolic profile.

However, recent research lines show that the occurrence of anxiety and/or depression leads to a higher incidence of obesity (Casselli et al., 2021).

Therefore, the present study is justified by the need for a current integrative review on the interaction between the variables obesity, anxiety, and depression, as there is evidence of the importance of physical activity, not only due to the hormonal release through serotonin, which causes a feeling of well-being, but mainly as physical activity can control body mass, since obesity is considered an influencing factor acting on body image and the body schema.

Even though most of the studies consulted evidence the relationship that exists between obesity and the signs and symptoms of anxiety and depression, the mechanisms by which this relationship occurs are not clear.

Therefore, the aim of the current study is to review the literature on the relationship between obesity and signs and symptoms of anxiety and depression in women.

MATERIALS AND METHODS

This integrative review was carried out in the PubMed, Scopus and Scielo database, from April to December 2021, and the following descriptors were used in the search strategies: (obesity) AND (anxiety AND/OR depression); English language, sex, age greater than or equal to 19 years.

Articles containing the subject in the title/abstract were detected, but only articles in English, original articles, and studies conducted with humans were selected for full reading. To

be included in the review, the inclusion criteria were: 1) have at least one marker of anthropometric measurements (body mass index - BMI, waist circumference - WC, hip circumference - HC, and waist-hip ratio - WHR) and/or body composition (fat percentage - %F, skinfolds - SFs, bioelectrical impedance, and dual energy X-ray absorptiometry - DEXA); 2) having evaluated, through a validated questionnaire/inventory, the presence of anxiety and/or depression; 3) articles from the last 8 years. Articles that did not relate obesity to anxiety and/or depression were excluded from the study (Figure 1).

After observing the criteria, the data were extracted and entered in a table containing information on: author, year of publication, origin and type of study, sample, instrument for assessing body composition, presence of obesity, presence of anxiety and/or depression, and instrument used to assess the presence of signs and symptoms of anxiety and depression.

RESULTS

Considering the 11 initially selected articles, a total of 08 studies were analyzed, of which 87.5% were about depression, 12.5% about anxiety and depression, and no studies were found that evaluated only anxiety.

The main characteristics of the studies are described in table 1 below. The studies originated from different regions of the world, with 10% corresponding to Brazil. There were several types of studies, but the cross-sectional design stood out with 62.5%. The evaluated studies included samples ranging from 35 to 222,029 participants. These were made up of adults (18 to 59 years of age) with a predominance of 53.8%, adolescents (11 to 17 years old) with 15.4%, who participated in the longitudinal study and systematic review, and older adults (60 to 75 years of age), who represented 30.8% of the participants.

The most used measures to assess obesity in the studies were: anthropometric (BMI, WC, HC, and WHR) with 56.5%; and body composition (%F, SFs, electrical bioimpedance, and DEXA) with 43.5%. Of the results of the studies, 90% showed that anthropometric and body composition measures are related to depression and/or anxiety, highlighting depression as a risk factor for obesity and vice versa.

The instruments applied to assess the presence of depression and anxiety in the studies were the Beck Depression Inventory (BDI) I and II, Spielberger State Trait Anxiety Inventory (STAI), Hamilton Depression Scale (HAM-D), manual diagnosis and statistics of mental disorders (DSM-IV), depression, anxiety, and stress scale-21 (DASS-21), and symptoms of depression (WHO).

The instruments used were generally applied in 10% of the studies, except for the Beck Depression Inventory (BDI) which was used in 50% of the studies examined. It is worth noting that a single study investigated both the signs and symptoms of anxiety and depression and, thus, two instruments were used, the STAI and BDI-II. Another study used two instruments, one to identify the presence of DSM-IV disorder and the other to determine the severity of HAM-D symptoms. Finally, one study that investigated depression also used two different instruments, the BDI for adolescents (14 to 17 years old) and the DASS-21 for adults (20 years old).

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Table 1 - Characteristics of the studies included in the integrative review.

Author (year)	Country	Type of study	n	Body composition assessment instrument	Obesity	Anxiety and/or depression	Anxiety and/or depression assessment instrument
Blasco et al., (2020)	Spain	Systematic review	CT=851 L=47,177 C=174,011	BMI, WC, HWR, %F, Body image, Weight	Yes	Depression	DSM-IV
Barghandan et al., (2021)	Iran	Cross-sectional	245	BMI Bioelectrical impedance	Yes	Anxiety and Depression	BDI-II STAI
Jin et al., (2017)	South Korea	Cross-sectional	514	BMI, WC %F-Bioelectrical impedance	Yes	Depression	BDI
Koksal et al., (2017)	Turkey	Cross-sectional	154	BMI, WC, HC, WHR %F-Bioelectrical impedance	Yes	Depression	BDI
Li et al., (2017)	USA	Cross-sectional	67	DEXA	Yes	Depression	DSM-IV HAM-D
Tonello et al., (2019)	Brazil	Experimental	35	BMI, %F, SF	Yes	Depression	BDI
Webb et al., (2017)	United Kingdom	Cross-sectional	639	BMI, WC	Yes	Depression	WHO well-being index
Zhu et al., (2017)	Austria	Longitudinal	1161	BMI, DEXA	Yes	Depression	BDI DASS-21

Legenda: CT: clinical trial; L: longitudinal; C: cross-sectional; BMI: body mass index, WC: waist circumference, HC: hip circumference, WHR: waist-hip ratio, %F: fat percentage, SF: skinfold, DEXA: dual energy X-ray absorptiometry, DSM IV: diagnostic and statistical manual of mental disorders, BDI: Beck Depression Inventory, BDI-II: Beck Depression Inventory II, STAI: Spielberger State Trait Anxiety Inventory, MDD: Major Depressive Disorder, HAM-D: Hamilton Scale for Depression, WHO: World Health Organization, DASS-21: depression, anxiety and stress scale-21.

DISCUSSION

The studies analyzed used, for the most part, relatively simple and cost-effective markers, validated and highly correlated with various disease and health parameters, and those considered the gold standard, such as densitometry. Among the parameters, anthropometric and body composition were the most commonly used to assess the presence of obesity.

Anthropometric Measurements

Regarding anthropometric measurements, some studies emphasized the presence of obesity as a factor associated with anxiety and/or depression. It was noted that although BMI is present in all studies, it was not always the measure used to determine obesity in women (Barghandan et al., 2021; Blasco et al., 2020; Jin et al., 2017; Koksal et al., 2017; Li et al., 2017; Tonello et al., 2019; Webb et al., 2017; Zhu et al., 2017).

In the analysis of the studies, it was identified that 40% used BMI to verify the presence of obesity, and its relationship with anxiety and depression was observed (Barghandan et al., 2021; Koksal et al., 2017; Li et al., 2017; Zhu et al., 2017).

Still with regard to BMI, women with higher values presented higher anxiety scores and, consequently, more severe anxiety (Barghandan et al., 2021), moreover, they were classified as depressed (Koksal et al., 2017; Li et al., 2017; Zhu et al., 2017).

Therefore, the existence of a positive correlation between the highest BMI and the severity of depression was suggested.

In addition to BMI, other obesity markers were used in the studies, highlighting the relationship between higher WC and depressive symptoms in women, even with the absence of reference values used for the WC parameter in the study (Webb et al., 2017).

There is also evidence of a positive correlation between depression severity and various measures of obesity such as BMI, WC, and HC (Koksal et al., 2017; Webb et al., 2017).

Thus, it is clear that obesity can be an independent risk factor for depression, even though there is no consensus in the conclusions of the studies.

One contradictory study found no association between BMI, WC, and %F measurements (discussed in the next topic) with depressive symptoms in women, in other words, there was no relationship between anthropometric and body composition measures with depressive signs in women (Jin et al., 2017).

This conclusion is justified by the heterogeneous results, the diversity of instruments used to measure the signs and symptoms of depression, and the different life environments of the participants (Jin et al., 2017).

The great difficulty found is that most publications are cross-sectional studies and to date, few longitudinal studies have been published that enable identification of the cause-effect relationship.

It should be mentioned that the relationship can be bidirectional in the sense that obesity induces anxiety/depression and the same can occur the other way around.

Body Composition

In studies that relate obesity to anxiety and/or depression in women, obesity is identified through body composition and its main measures, which are: %F, SF, bioimpedance, and DEXA. Three studies using bioimpedance stood out, but only two showed that women with a higher proportion of adipose tissue had a higher anxiety score, including those classified as more severe (Barghandan et al., 2021), as well as a lower concentration of muscle tissue (Koksal et al., 2017).

The DEXA method was also used as a measure of obesity in some studies and the findings showed that depressed women had a higher proportion of visceral adipose tissue/body fat (Li et al., 2017; Tonello et al., 2019; Zhu et al., 2017).

Another marker used to assess body composition was the SF, applied in only one study. The authors identified a relationship of SFs with the depression score as this is a measure that calculates the %F, and does not use estimates, as is the case with BMI (Tonello et al., 2019).

Despite the use of different measures to identify the presence of obesity and different instruments to detect the presence of signs and symptoms of anxiety and/or depression, the studies affirm the existence of a relationship between obesity and anxiety and/or depression in women, regardless of the measures or instruments used.

However, the plurality in the use of instruments affects the computation of the scores to assess signs and symptoms of anxiety and depression. This condition can have repercussions when calculating the score, depending on the point scale used for each classification category, which is commonly used in the Likert-type format and classified as mild, moderate, and severe.

Thus, it is clear that a signal considered as moderate on one scale, may receive another classification on another scale and, thus, when scaling the degree of anxiety and/or depression, divergences can occur, especially regarding the use of scores and/or values to identify the category. This scenario, consequently, makes it difficult to distinguish and better analyze the results.

There is still no consensus in the literature on the mechanisms by which the bidirectional relationship between obesity and depression/anxiety are explained. The

mechanisms established to date include the genetic aspects, the neuroendocrine system, and the chronic inflammatory response that can occur in both conditions.

The association between the studied pathologies, obesity, anxiety, and depression can be justified by the action of some genes involved among them, such as those responsible for encoding glucocorticoid, leptin, and dopamine receptors (Blasco et al., 2020).

Regarding the neurological mechanisms involved in the relationship between obesity and anxiety/depression, some works offer evidence and perceptions of what occurs physiologically, which can be explained through the set of neurotransmitters that are part of the activation of the hypothalamic-pituitary-adrenal axis.

The impairment of this axis directly interferes with depressive symptoms through the regulation of cortisol, as this is one of the factors responsible for adiposity in the body, including central adiposity, in addition to causing deficits in the serotonergic system, as stated by several authors (Jin et al., 2017; Koksal et al., 2017; Zhu et al., 2017).

The incidence of obesity and depression in women is justified by the presence of sex hormones, which may be linked to a depressed mood and high levels of leptin, present in the pro-inflammatory process in obesity and in metabolic syndrome as it is a protein derived from adipocytes (Li et al., 2017).

The relationship between obesity and anxiety causes an immune-inflammatory response and an increase in inflammatory biomarkers, such as C-reactive protein (CRP), interleukin-6 (IL-6), tumor necrosis factor-alpha (TNF-α), and leptin (Barghandan et al., 2021).

Furthermore, the action of chronic stress on the hypothalamic-pituitary-adrenal axis generates a pro-inflammatory state through peripheral resistance to the action of glucocorticoids, intestinal bacterial translocation, increase in catecholamines, and secretion of cytokines (TNF-α and IL-6).

This pro-inflammatory process affects fat adipocytes and, therefore, causes an increase in leptin and a decrease in adiponectin, resulting in the accumulation of adipose tissue and inflammatory cytokines that act on the nervous system, as in depression (Blasco et al., 2020).

CONCLUSION

In conclusion, the majority of studies indicate a positive relationship between obesity and anxiety and/or depression.

To identify the presence of obesity, markers of anthropometric measurements and body composition were used, as well as validated instruments to identify the presence of signs and symptoms of anxiety and depression.

The studies showed a direct and positive association between anxiety and/or depression scores and obesity, identified with all the markers analyzed in the present literature review.

Therefore, despite the lack of consensus and clarification of the mechanisms by which this relationship occurs, the control of obesity is suggested.

As a matter of priority, the stimulation of preventive health promotion activities, among them, the practice of physical activity in a guided, systematic, planned way with specific and individual objectives, together with nutritional monitoring.

CONFLICT OF INTERESTS

The authors declare no conflict of interest.

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