REVIEW

The effect of neurological diseases on overweight in obese patients: A Systematic Review

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ABSTRACT

Aim: In the present study, the effect of neurological diseases, especially depression on overweight in obese patients, was investigated.

Methods: In the current study, 46 published research between 2014 and 2024 were reviewed with keywords including "Overweight", "Neurological Disease", "Depression" and "Obesity" in PubMed, Web of Science, Scopus and Embase.

Results: The results showed that obesity may be one of the side effects of drugs used to manage mental health issues. Therefore, the relationship of overweight is very affected on the psyche of a person. Increased appetite or severe lethargy can contribute to undesirable weight gain and associated long-term consequences. Obesity and metabolic dysfunction brought on by nutrition have lately been recognized as risk factors for the emergence of several neurological conditions affecting the central and peripheral nervous systems.

Conclusion: Accordingly, the relationship of being overweight is very affected on the psyche of a person, and people who were obese were more at risk of developing depression over time. Also, it was found that people with depression were more at risk of becoming obese than others.

Keywords: Overweight, Neurological Disease, Depression, Obesity.

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INTRODUCTION

Despite a number of demographic variables that could influence the direction or strength of socioeconomic status, education level, age, gender, and ethnicity, bidirectional association between depression and obesity was highlighted [1]. The relationship of overweight is very affected on the psyche of a person [2]. It is estimated that the NHS spent £6.1 billion on overweight and obesity-related diseases from 2014 to 2015 [3]. Failure to address the challenge posed by the obesity epidemic will further strain NHS resources [4] This emphasizes the

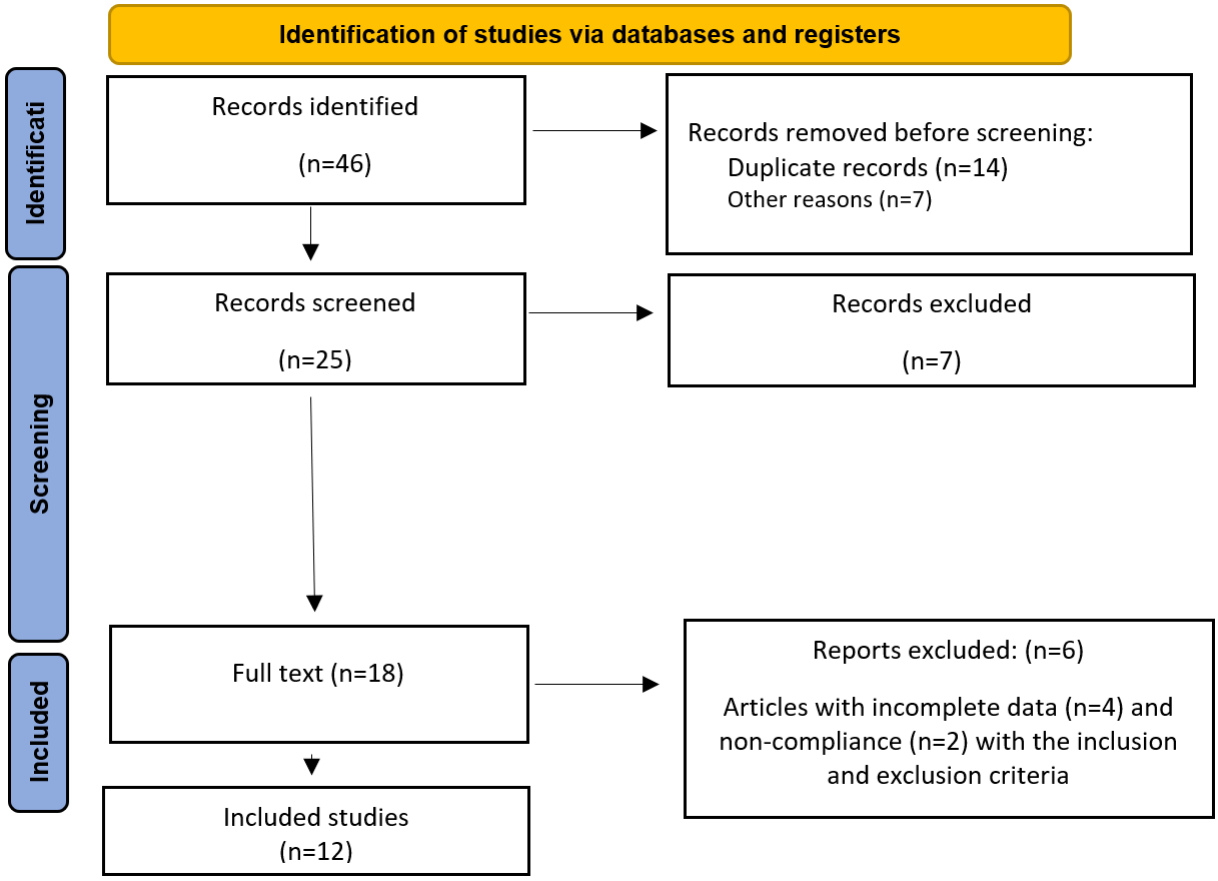

Figure 1. PRISMA 2020 flow diagram.

importance of early detection of eating disorder symptoms as well as careful consideration of the impact of mental health on obesity [5].

Managing anxiety involves finding effective ways to reduce stress levels [6]. Engaging in activities such as meditation, deep breathing exercises, yoga, or mindfulness can help calm the mind and reduce anxiety. Creating a balanced and nutritious meal plan is essential for managing anxiety and weight gain. Managing anxiety and obesity requires a holistic approach that addresses both mental health and physical well-being [7]. The link between anxiety and obesity is a complex relationship that is influenced by emotional eating, hormonal imbalances, sedentary lifestyles, and the effects of stress hormones. Understanding this relationship is critical to effective weight and anxiety management [8]. By seeking professional help from medical and psychological professionals, practicing stress management techniques, developing healthy eating habits and incorporating regular physical activity, people can break the existing cycle and achieve optimal mental and physical well-being [9- 10].

Some medications commonly prescribed for anxiety (such as certain types of antidepressants) are associated with weight gain as a side effect. While the exact mechanisms are not fully understood, it is believed that these drugs can affect appetite, metabolism, and energy balance and contribute to weight gain in some

people [11]. It is increasingly recognized that obesity may be a side effect of medications used to manage mental health issues [12]. Increased appetite or severe lethargy can contribute to undesirable weight gain and associated long-term consequences [13-14]. In addition, co-morbidities such as diabetes or joint pain can significantly reduce the quality of life. Because medication is often an essential component of treatment, diet and lifestyle changes should be the first-line interventions for weight management. Based on this the current study aimed to investigate the effect of neurological diseases especially depression on overweight in obese patients.

MATERIALS AND METHODS:

Despite a number of demographic variables that could influence the direction or strength of this link, including socioeconomic status, education level, age, gender, and ethnicity, a systematic review highlighted a bidirectional association between depression and obesity. For this, 46 published research between 2014 and 2024 were reviewed with keywords such as "Overweight", "Neurological Disease", "Depression" and "Obesity" in PubMed, Web of Science, Scopus, Science Direct, EBSCO, Wiley, Elsevier, Embase databases and Google Scholar (Figure 1).

RESULTS

The initial search identified 46 articles. In the first phase, 21 articles were eliminated due to duplicate records based on article titles. Studies that did not meet the inclusion criteria were excluded by reviewing the abstracts of 25 articles in the second step (n=7). In the third step, 6 articles with incomplete data or non-compliance with the inclusion and exclusion criteria were eliminated after examining the full texts of 18 articles. Ultimately, 12 articles were included in the present study (Table 1).

Some nerve drugs may indirectly cause weight gain. Some neuroleptics can have side effects such as increased appetite, changes in metabolism, and increased water retention in the body, which may lead to weight gain [15-16]. However, not all neuroleptics because weight gain in the same way, and their effect depends on the type of drug, the dose taken, and the individual reaction of the drug taker. Some neuroleptics may accelerate weight gain while others do not have much effect on weight [17].

The effect of stress on obesity

Stress can be one of the causes of obesity and eating addiction. When you are under stress, you are likely to overeat high-calorie and unhealthy foods. This may cause you to gain weight. Therefore, managing stress and learning ways to deal with it can be used as a way to control and prevent obesity problems and eating addiction. In addition, one of the reasons that stress can cause digestive problems is that over time, the body's digestive activities decrease in response to stress [18]. Things like bloating, abdominal pain, constipation, diarrhea, belching and irritable bowel syndrome are symptoms that warn you of stress [19]. Some people in this situation look for different diets and nutrition. While its root is tied to psychological factors, and as a result, it is necessary to seek help from a psychologist. Stress can even have a negative effect on the fuel

	Study	Year		Proportion Wight 98%		Weight %
1	Lin et al. [9]	2021		0.64	[0.11 – 1.72]	3.02
2	Haase et al.[3]	2021		0.52	[0.42 – 2.11]	4.00
3	Kundi et al. [2]	2025		0.96	[0.44 – 1.02]	6.32
4	Friedman et al. [1]	2025		0.65	[0.25 – 0.98]	5.12
Heterogeneity t^2=0.00, I^2= 0.00, H^2=0.9				0.55	[0.34 – 0.58]	1.23
Test of θ= θ, Q (4) =3.45, P= 0.77						
1	Svensson et al. [10]	2014		0.56	[0.11 – 0.66]	1.55
2	Dayabandara et al.[17]	2017		0.66	[0.15 – 0.48]	4.33
3	Ghusn et al. [15]	2022		0.48	[0.19 – 0.55]	6.77
4	Thorkelson et al. [16]	2016		0.64	[0.17 – 0.29]	3.03
Heterogeneity t^2=0.05, I^2= 0.07, H^2=0.78				0.82	[0.03 – 0.32]	
Test of θ= θ, Q (4) =3.01, P= 0.11						
1	Vesga-Jiménez et al. [23]	2022		0.97	[0.39 – 1.06]	3.11
2	Teleanu et al.[24]	2022		0.95	[0.54 – 1.02]	6.05
3	Yin et al.[21]	2023		0.43	[0.63 – 1.01]	4.06
4	Zeng et al.[26]	2015		0.51	[0.25 – 1.08]	7.03
Heterogeneity t^2=0.12, I^2= 0.01, H^2=0.99				0.68	[0.22 – 1.07]	6.03
Test of θ= θ, Q (4) =1.45, P= 0.14						

Table 1. Included subjects.

system. Those who lead a healthy lifestyle will gradually reduce these physical symptoms [20].

The connection between neurological disorders and free fatty acids

According to epidemiological studies, diets heavy in saturated fats are associated with memory and cognitive impairments, and metabolic diseases like obesity and type 2 diabetes are connected to a higher risk of Alzheimer's disease (AD) [21]. For example, low HDL cholesterol, high blood cholesterol, and familial hypercholesterolemia are known risk factors for AD, even though the CNS's cholesterol pool differs from the systemic pool. Moreover, increased levels of free fatty acids (FFAs), along with the metabolic intermediates acyl-carnitines and acyl-CoA, can cause neurotoxicity and disrupt mitochondrial function [22]. Fatty acid metabolism

disturbances in the brain are indicated by changes in FFA levels in AD. Furthermore, new research indicates that increased FFA levels can be a factor in neuroinflammation, which is a prevalent aspect of many neurological disorders [23]. FFAs may be linked to the underlying processes of multiple sclerosis (MS) and amyotrophic lateral sclerosis (ALS) since excessive FFAs may also cause oxidative stress, which has been linked to the pathophysiology of various neurological disorders [24].

Obesity's Effects on the Peripheral Nervous System

The PNS is separated into the somatic nervous system, which is made up of the sensory and motor peripheral nerves, and the autonomic nervous system (ANS), which includes the sympathetic and parasympathetic divisions. Because they are not shielded by the blood-brain (nerve) barrier, autonomic and sensory ganglia, unmyelinated fibers, and synaptic terminals of the peripheral nervous systems (PNS) are vulnerable to the pathophysiological effects of obesity.

Through its regulation of anabolic and catabolic processes and its intimate connection to the hypothalamus, the ANS plays a vital role in maintaining energy balance. The ANS is especially vulnerable to disruptions brought on by obesity, and young people who are overweight frequently exhibit ANS dysfunction [25]. An imbalance between the sympathetic and parasympathetic branches of the ANS is linked to obesity. By means of stimulatory G-protein coupled β-adrenoceptors, increased sympathetic outflow to neuro-adipose junctions promotes lipolysis. Triglyceride hydrolysis results from the activation of adipose triglyceride lipase, which sets off a downstream signaling cascade. Therefore, obesity-related sympathetic hyperactivation can encourage a feed-forward process that increases the amount of circulating long chain fatty acids (LCFA) [26]. Increased sympathetic outflow to the cardiovascular system also results in increases in heart rate, blood pressure, and microvasculature tone.

DISCUSSION

Binge eating disorder is a disorder in which a person has no control on eating and has episodes of binge eating. These people worry about the consequences of eating, such as the fear of choking. In these people, the cause of anorexia is not the fear of gaining weight [27]. Most of the time, this disorder is seen in children. But it can last until adulthood. Anorexia is equally common among men and women. These people usually lose weight, and problems arise in their health due to nutritional deficiencies [7]. A separate study confirmed that there is indeed a link between depression and obesity, although there are doubts as to the significance of this relationship. Depression is a risk factor for obesity, especially atypical depression and in African-American adolescent males. Obesity is a risk factor for depression, especially in women and for recurrent depressive disorder [28].

Understanding the associations and interactions between stress, neurobiological adaptations, and obesity is important in the development of effective prevention and treatment strategies for obesity and related metabolic diseases. Findings from large-scale

populational studies and responsiveness analyses to investigational therapies in the past two decades emphasize the necessity to incorporate individual risk profile, especially genetic- and non-genetic factors that affect metabolic and vascular functions, when intervening lipid metabolism against AD. Further, successful lipid-targeting therapeutics should consider the dynamic changes and adaptations of lipid metabolism throughout the prodromal, early, and late phases of the disease [21].

It has been suggested that the association between depression and obesity is probably due to the action of certain genes involved in both pathologies. For example, the genes that encode glucocorticoids, leptin and dopamine receptors. The role of environmental factors should also be noted, especially all those situations that contribute to maintaining a situation of chronic stress [26]. As previously explained, the wide methodological variety of the studies included in this review hampered the conclusion of unequivocal results. This is seen in the heterogeneity of the sample size, the design of the studies or the different instruments used to measure obesity and depression, all which could significantly influence the results. However, it can be stated that a high percentage of the analyzed bibliography demonstrates that obesity and depression are associated, although in some cases it is difficult to determine the significance of this association.

CONCLUSION

Obesity and depression are disorders with a high incidence and a significant impact on worldwide morbidity and death. The link between the two disorders has been studied in scholarly literature, with strong correlations but also contradicting findings. According to the result of the current study, the relationship of overweight is very affected on the psyche of a person, and people who were obese were more at risk of developing depression over time. In addition, it was found that people with depression were at more risk of becoming obese than other.

ΒΙΒΛΙΟΓΡΑΦΙΑ

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