

## Association of Binge-Eating Disorders and Cardiovascular Diseases: A Literature Review

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### ABSTRACT

**Objective:** To investigate the correlation between binge-eating disorders (BED) and cardiovascular diseases (CVD), synthesizing existing literature to identify risk factors and assess the extent of association.

**Methodology:** This review was conducted using PubMed, Cochrane Library, and Google Scholar, the primary database from January to October 2023. The search strategy included keywords related to BED, obesity, CVD, and eating habits. Only articles published within the past 12 years were considered. Inclusion criteria focused on studies assessing BED as a risk factor for CVD. Data extraction & synthesis were performed and the quality of included studies was assessed.

**Results:** The studies demonstrated a positive association between BED and various CVD outcomes, including hypertension, hyperlipidemia, and bradycardia. However, our results lacked numerical or categorical data representation.

**Conclusion:** This review provides compelling evidence supporting a direct link between BED and CVD, highlighting the increased risk of cardiovascular conditions independent of obesity. Lifestyle modifications and patient education are recommended interventions.

**Keywords:** Cardiovascular diseases. Binge-eating disorder. Ischemic heart disease.

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### INTRODUCTION

Binge-eating disorder is known for its multifactorial etiology and it is the most common eating disorder which can occur with obesity, psychological, physical, and mental comorbidities such as anxiety and depression.<sup>1,2</sup> Binge-eating disorder is defined as continuous episodes of eating without preventing weight gain through compensatory behaviors.<sup>1</sup> In the United States (US), the lifetime prevalence of BED is 2.6%.<sup>2</sup> The female-to-male ratio in BED is balanced, in contrast to other eating disorders. It is seen to be the most prevalent among older individuals, especially males.<sup>3</sup> There are many treatments for BED but the patient population seeking treatment is low. Currently, cognitive behavioral therapy (CBT) is a treatment of choice. It not only helps with the remission of binge-eating disorder but also improves associated general and specific psychopathologies.<sup>4</sup> Research has shown that BED is also associated with other medical comorbidities.<sup>5,6</sup>

According to a study conducted in 2015, about 1 in 3 people die globally due to cardiovascular diseases, and it is widely known that disease symptoms have a chronic onset starting in middle age. Obesity has

been shown to be the most independent factor of all other risk factors which affect CVD.<sup>7</sup> In a cross-sectional study on Latinos to assess the high risk of CVD, it was concluded that there was an association between dysfunctional eating patterns and CVD metabolic risk factors.<sup>8</sup> The best way to manage CVD is to identify the risk factors, closely monitor them, introduce lifestyle changes, and involve a multidisciplinary team.<sup>9</sup>

The aim of the current study was to conduct a literature review to examine the association between binge-eating disorders and cardiovascular diseases. In addition, it would help synthesize existing literature for identifying risk factors, assessing the extent of the association, and contributing insights for informing future research and potential interventions in this context.

### METHODOLOGY

In this literature review, electronic databases including PubMed, Cochrane Library, and Google Scholar, were systematically searched in January 2023. We thoroughly went through the articles and narrated the ones which showed a linkage between BED and CVD. Medical Subject Heading (MeSH) words and keywords used for search include binge-eating disorder, obesity, cardiovascular diseases, ischemic heart disease (IHD), coronary artery disease, eating habits, CVD and eating disorders, and cardiovascular disease risk factors. The number of articles found with each keyword are shown in Table 1. It is noteworthy that to guarantee the inclusion of thorough and robust findings, unpublished work and solitary abstracts were

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purposefully excluded from the study. To include current research and insights from the modern era, only complete publications published in the last 12 years were considered, in keeping with the study's scope.

The search was done on PubMed, Cochrane Library, and Google Scholar using the keywords: cardiovascular diseases, which showed 2842428 results, ischemic heart disease, which generated 551197 results, binge-eating disorders, which generated 5463 results, obesity, which generated 430082, eating habits which generated 213465, coronary artery disease which generated 189875, cardiovascular diseases and binge-eating disorders which generated 49 results.

Out of the 49 articles, 34 were excluded based on selection criteria (full-text and human). Out of 15 studies reviewed, 5 were irrelevant studies. In the end, 10 articles were included in the final analysis, all of which show a positive linkage between BED and CVD (Figure 1).

The study evaluated the relationship between binge-eating disorder and cardiovascular diseases, including hypertension, metabolic syndrome, and dyslipidemias. The analysis delved into the results obtained from the studies, providing insights into the association between BED and these cardiovascular conditions. Additionally, the manuscript discussed the potential implications of these findings for clinical practice and public health interventions aimed at managing both BED and cardiovascular diseases.

## RESULTS

One of the included studies was a cross-sectional, correlational study with a sample of 111 patients with cardiovascular diseases, out of which binge-eating disorder was present in 18% of patients. So, this study showed a positive association between CVD and BED.<sup>10</sup> One of the review articles showed a strong association between BED and CVD.<sup>11</sup> Two studies suggested that mental illnesses including eating disorders are associated with hypertension and hypertriglyceridemia.<sup>12,13</sup> A cohort study in the USA with 350 participants of BED and 1875 controls scheduled for bariatric surgery analyzed that BED contributes to specific medical comorbidities in severely obese patients.<sup>14</sup> A study conducted in Spain in 2019 showed a positive link between bradycardia and all eating disorders including BED.<sup>15</sup> Moreover, a study done in Japan showed that eating disorders are associated with raised serum lipid levels.<sup>16</sup> Lastly, a study done in Sweden in

2016 showed a positive linkage between CVD and BED.<sup>17</sup>

According to an epidemiological data, patients with night eating syndrome were more likely to gain weight, become obese, and develop cardiometabolic diseases due to the consumption of large, mixed meals along with irregular sleep patterns.<sup>18</sup>

An analysis of a nationwide epidemiological database of around two million individuals without prior cardiovascular disease revealed that 51% of the general population had suboptimal eating habits. These habits were independently linked to a higher risk of CVD, including myocardial infarction, angina pectoris, stroke, and heart failure (Table 2).<sup>19</sup>

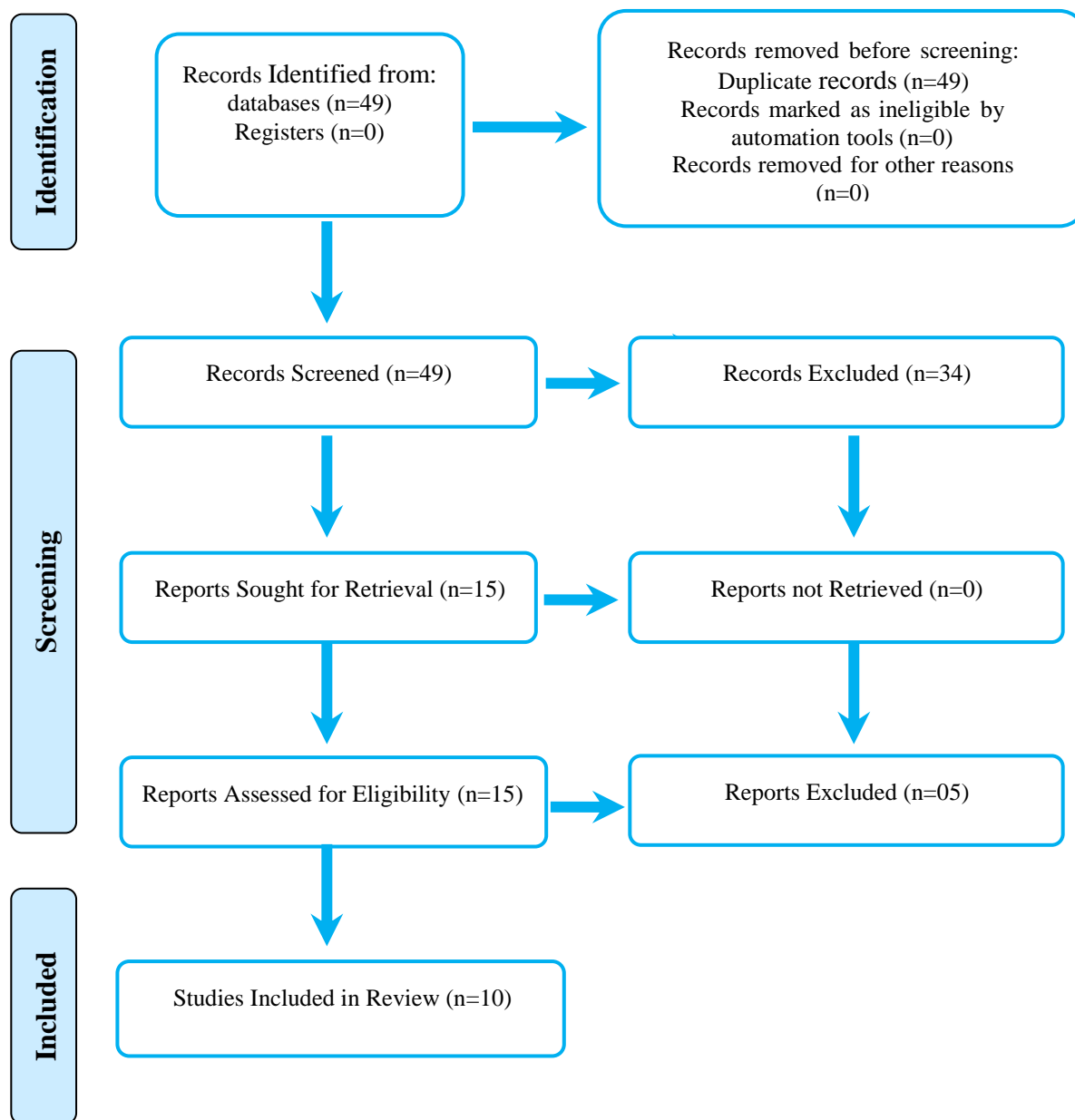
## DISCUSSION

The current study investigated the association between BED and CVD using literature data. A study conducted by Garcia et al. in Spain revealed that compulsive overeating disorder was prevalent among cardiovascular disease patients, affecting 18% of them. It underscored the association between BED, body mass index, and anxiety, emphasizing the importance of a comprehensive evaluation of patients with cardiovascular conditions. The findings highlighted the importance of addressing both mental and physical health aspects in the care of these patients.<sup>10</sup> Another study reinforced that binge-eating disorder was linked with significant medical comorbidity beyond obesity alone. It emphasized the necessity for further investigation into the broader medical comorbidities associated with BED and how they intersected with obesity and concurrent psychiatric disorders.<sup>11</sup> A study done in the USA revealed independent associations between binge-eating disorder and comorbidities such as impaired glucose levels, high triglycerides, and urinary incontinence. Even after adjusting for demographic and health factors, BED remained linked to these conditions.<sup>14</sup>

Similarly, another study found that binge-eating disorder was associated with a wide range of diseases, with the strongest links observed for diabetes and circulatory system disorders, likely indicative of components of metabolic syndrome. Interestingly, individuals with BED who also had comorbid obesity were more likely to have a history of respiratory and gastrointestinal diseases compared to those without obesity. Importantly, the increased risk of certain somatic diseases in individuals with BED could not solely be attributed to obesity or other psychiatric comorbidities.<sup>17</sup>

**Table 1: Search Results with Simple Keywords & MeSH Words**

Keywords	Database	Number of Results
Binge-eating Disorder	PubMed/Google Scholar/Cochrane Library	5463
Obesity	PubMed /Google Scholar/Cochrane Library	430082
Cardiovascular Disease	PubMed/Google Scholar	2842428
Cardiovascular Risk Factors	PubMed/Google Scholar/Cochrane Library	275744
CVD and Eating Disorders	PubMed/Google Scholar/Cochrane Library	148
Cardiovascular Diseases and Binge-eating Disorder	PubMed/Google Scholar/Cochrane Library	49
Ischemic Heart Disease	PubMed/Google Scholar	551197
Coronary Artery Disease	PubMed/Google Scholar/Cochrane Library	189875
Eating Habits	PubMed/Google Scholar/Cochrane Library	213465



**Figure 1: Flow Chart of Empirical Studies and Reviews**

**Table 2: Research Studies Correlating BED and CVD**

Sr. No.	Author	Journal	Year	Country	Sample Population	Conclusion	Study Design
1	Kinsey et al. [18]	Nutrients	2015	USA	-	Consuming large meals at night time leads to obesity and cardiometabolic diseases	Review
2	Stein et al. [12]	Gen Hosp Psychiatry	2014	19 countries	52,095 adults from 19 countries	Most mental illnesses, including eating disorders, are associated with hypertension	Cross-sectional
3	Solmi et al. [13]	Acta Psychiatr Scand	2021	Brazil	13,388 participants	Researcher shows an increased risk of hypertriglyceridemia and hypertension in binge-eating individuals	Cohort
4	Garcia et al. [10]	Rev Lat Am Enfermagem	2018	Spain	111 patients with cardiovascular diseases	There is a positive linkage between BED and CVD	Cross-sectional, correlational
5	Kaneko et al. [19]	Atherosclerosis	2021	Japan	1941125	The findings underscore the importance of optimal eating behaviors for the primary prevention of CVD	Cross-sectional
6	Thornton et al. [17]	Int J Eat Disord	2016	Sweden	850 cases with BED	BED is associated with a risk of circulatory system diseases	Case-control
7	Mitchell et al. [14]	Int J Eat Disord	2015	USA	2225 Bariatric surgery candidates	BED contributes to specific medical comorbidities in severely obese patients	Prospective Case-control
8	Olguin et al. [11]	Eat Weight Disord	2016	NA	Patients with BED	There is an association between BED and CVD	Narrative review
9	Marin et al. [15]	Rev Med Chil	2019	Spain	53 women	There's a link between bradycardia and all eating disorders, including BED	Cross-sectional descriptive
10	Nakai et al. [16]	Intern Med	2016	Japan	732 Japanese women with eating disorders	Eating disorders are associated with raised serum lipid levels	Cohort

A cross-sectional study conducted in 19 countries revealed significant associations between various psychiatric disorders and the subsequent diagnosis of hypertension, even after adjusting for psychiatric comorbidity. Specifically, depression, panic disorder, social phobia, specific phobia, binge-eating disorder, bulimia nervosa, alcohol abuse, and drug abuse were all linked to hypertension.<sup>12</sup>

A study showed that individuals who engaged in binge-eating had a higher likelihood of developing metabolic syndrome due to elevated body mass index (BMI). Furthermore, they faced increased risks of hypertriglyceridemia and hypertension, even when considering factors other than BMI. These findings suggested potential causal relationships

between binge-eating behavior and metabolic health issues.<sup>13</sup> Another study by Nakai et al. aimed to evaluate risk factors for cardiovascular diseases in different groups of feeding and eating disorders by investigating lipid abnormalities in a large Japanese cohort. Participants included 732 women with anorexia nervosa, bulimia nervosa, and BED. The study highlighted the presence of elevated low-density lipoproteins cholesterol and non-high-density lipoprotein cholesterol levels across all eating disorder groups, suggesting an increased risk of cardiovascular diseases, particularly considering the chronic nature of these conditions.<sup>16</sup>

A study carried out in Spain demonstrated a positive correlation between bradycardia and all eating

disorders, including BED.<sup>15</sup> Large, mixed meals and inconsistent sleep patterns were associated with increased risk of weight gain, obesity, and cardiometabolic diseases in individuals with night eating syndrome, according to a study done in the United States.<sup>18</sup>

A countrywide epidemiological database containing almost two million people who had never had cardiovascular illness was used in another Japanese study, which found that 51% of the general population had unhealthy eating habits. An increased risk of CVD, which includes myocardial infarction, angina pectoris, stroke, and heart failure, has been independently associated to these practices.<sup>19</sup>

Genetic links between BED and CVD exist. Shared deoxyribonucleic acid (DNA) methylation suggests BED as a risk factor for CVD.<sup>20,21</sup> Following an eating routine and losing weight are key predictive factors for dietary issues which have been displayed to influence DNA methylation designs across different body tissues.<sup>22</sup> Understanding epigenetics gives an open door with respect to therapeutic and diagnostic platforms; this makes it easier to come up with ways to treat the disease and properly screen for people at high risk.<sup>23,24</sup>

Many changes in diet, medicines, alcohol use, and smoking can act as a stressor in triggering CVD.<sup>25</sup> However, minority status, deprivation, violence, trauma, and major mental health illnesses are possible risk factors for binge-eating disorder. An unhealthy diet is a risk factor for both BED and CVD as it influences binge-eating and eventually is a cause of cardiovascular disorders.<sup>26</sup> Another particular risk factor identified in eating disorders is the cultural pressure for a thinner appearance.<sup>27</sup> Smoking cessation, diet therapy, and exercise therapy are all lifestyle modifications enlisted in Japan's Atherosclerotic Cardiovascular Disease guidelines for disease prevention.<sup>28</sup> Progression and development of peripheral arterial disease (PAD) and complications, including major adverse cardiovascular events and major adverse limb events, are shown to be affected by dietary patterns and eating disorders. Obesity is an important risk factor of PAD. It results from BED response to distress and discomfort that leads to recurrent episodes of overeating with resultant weight gain.<sup>29</sup>

Aging is a significant risk factor and a leading cause of death in CVD.<sup>22</sup> Binge-eating disorder and CVD are both prevalent in children and adolescents, causing physical and mental health problems. The peak age of BED onset is late adolescence, and childhood obesity is a significant factor in the development of CVD during adolescence. To further

cement such a claim, childhood obesity according to the above-given literature has a significant role to play in the development of adolescent CVD and BED. Although evidence suggests that BED is more common in females, it is, in reality, highest in males.<sup>30,31</sup> On the other hand, cardiovascular diseases have a chronic onset starting in middle age, it is pertinent to shed light on the fact that BED, according to the published literature is most prevalent in older individuals. Aging leads to uniform and generalized structural degeneration and functional decline, even if different cardiovascular system components may be affected quite heterogeneously. Furthermore, as discussed above, obesity is the most independent risk factor affecting cardiovascular diseases, thus serving as a pathological bridge between CVD and BED. Enough evidence shows that overweight/obese people and sexual minorities are more likely to meet the diagnostic criteria of disordered eating than heterosexuals and people having normal BMI/smaller bodies.<sup>32</sup> Binge-eating disorder and night eating syndrome are associated with obesity, increased risk of metabolic dysfunction, psychopathology, and various treatment options including CBT and selective serotonin reuptake inhibitors.<sup>33</sup>

## CONCLUSION

Following a thorough examination of prior studies, we established a direct link between cardiovascular diseases and binge-eating disorders. Studies also revealed a higher incidence of hypertension, hyperlipidemia, and hypertriglyceridemia, irrespective of obesity, in individuals with eating disorders. Consequently, BED should be recognized as a risk factor for cardiovascular diseases. Physicians should advise lifestyle modification to their patients and educate them about this association.

## STRENGTHS & LIMITATIONS

A main limitation to this review is the small number of available studies. That's why we incorporated studies of all qualities which affect the robustness of our findings. The manuscript "Binge-eating Disorder and Cardiovascular Diseases" underwent a risk of bias assessment to ensure the reliability of its findings. Selection bias was scrutinized to ascertain if the sample adequately represented individuals with binge-eating disorder and cardiovascular diseases. Measurement bias was evaluated concerning the methods used to measure BED, CVD, and associated risk factors, ensuring their

validity. Confounding bias was addressed by assessing the control of potential confounding variables, such as age, sex, and comorbidities, in the analysis. Reporting bias was considered to ensure transparent reporting of all relevant data, including negative findings. Publication bias was also scrutinized to determine if only significant results were included, potentially skewing the overall conclusion. These assessments aimed to enhance the integrity and reliability of the manuscript's conclusion regarding the relationship between BED and CVD. Heterogeneity among included studies, such as differences in populations, interventions, and outcomes, may limit the ability to draw definitive conclusions.

### RECOMMENDATIONS

Based on our findings in this review, we recommend awareness programs on binge-eating disorders. Physicians should advise lifestyle modifications, especially regarding a healthy diet to their patients and educate them while offering CBT as the treatment of choice for binge-eating disorders. Further research addressing identified deficiencies is warranted to enhance understanding and inform clinical practice.

#### Authors' Contributions:

**F.T:** Results, methodology, and discussion

**U.B.Z:** Results, Prisma, and abstract

**F.I:** Critical revision and final approval of the draft

**I.M:** Supervision

**M.S.H:** Introduction and conclusion

**M.A.L:** Formatting and abstract

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