

Anorexia Nervosa and its Effects on the Cardiovascular System

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ABSTRACT

The overarching purpose of this research paper is to identify and investigate the relationship between the human's cardiovascular system and the eating disorder often known as Anorexia Nervosa. We provide a thorough and intricate evaluation of both the heart system as well as eating disorders. Aside from the psychological components of anorexia, internal aspects often go unnoticed; the paper introduces this subject in a much deeper context. The heart is an organ at the center of the human's circulatory system that pumps blood through a network of arteries and veins. Quite simply, the heart is one of the main systems that ensure the human's viability. We discovered, however, that rapid weight loss as caused by anorexia displays significant, if not fatal, effects on the heart. A few subsequent illnesses worth mentioning include Mitral Valve Prolapse and Arrhythmia. We also further suggest possible approaches to both mitigate and preempt the deterrents of the affairs discussed in the paper. By and large, we executed this research in hope of spreading greater acknowledgement towards the menace that comes accompanied by anorexia, which is all the more necessary in the ever-growing world of technology and the exposure that it offers for young adolescents.

Keywords: Anorexia, Anorexia nervosa, Heart, Cardiovascular system, Biological, Psychological, Symptoms

1. INTRODUCTION

Manifold platforms of media and broadcast networks have established a seemingly riveted depiction of anorexia. Based on diagnostic interview data from the National Comorbidity Survey

Replication (NCS-R), median age of onset was 18 years-old for anorexia nervosa. As the quintessential teenage girl myself, I've come across social media posts of beautiful models and influencers who starved themselves or suffered from anorexia to acquire the archetypal body of the 'consummate' female or male body that our society weighs down through duplicitous propaganda.

It is also imperative to recognize the different varieties of eating disorders. Common types of eating disorders include, but are not limited to, Binge-eating, Bulimia nervosa, and Anorexia nervosa. Binge-eating refers to "out-of-control eating". This often leads to obesity and weight gain and people who suffer from this disorder experience feelings of guilt and shame. Similarly, people with Bulimia nervosa also experience periods of binge-eating, but afterwards, they force themselves to throw up with the use of laxatives. Lastly, Anorexia nervosa is when people avoid and restrict food consumption and may consider themselves overweight even when they are dangerously underweight. While it is the least common, it has the highest fatality rate.

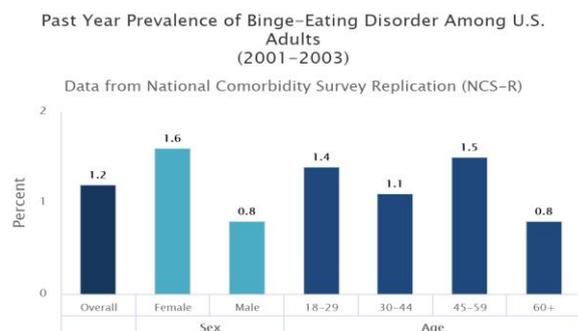


Figure 1. Past year prevalence of binge-eating disorder among U.S. adults (2001-2003)

Patients of Anorexia Nervosa are most commonly observed to intentionally restrict the amount of calories, food, and energy consumed, in order to obtain a body mass index of less than 18.5. This is also associated with intense fear of weight gain, persistent behaviors of excessive exercise, as well as a distorted personal perception of the body. Subsequently, this has a negative influence on an individual's self worth. One highly dangerous symptom is the denial of being underweight.

Anorexia can be categorized into 2 different general forms, which are determined by patterns or behaviors over a 3-month period. When exhibiting symptoms of restricting the intake of food as through dieting, fasting, and excessive exercise, this can be categorized as one particular form. This rapid weight loss leads to the loss of both skeletal and cardiac types of muscle mass. The loss of cardiac muscle mass causes patients to develop mitral valve prolapse. Another form is determined when an individual has episodes of binge eating or purging including vomiting, using diuretics, enemas, and/or other laxatives. Binging and purging can become severe or even fatal when it affects the digestive system, increasing risk of gastric rupture, as well as increasing the likelihood of imbalance of electrolytes, causing irregular heartbeat.

Anorexia Nervosa is most often associated with bodily symptoms such as weight loss, fatigue, emaciation, and more. What much of the media fails to shed light on are the lethal repercussions of this disease. Our heart is one of the most fundamental systems in our body that keeps us alive. When affected by anorexia, one's body begins to experience paramount changes, including direct and indirect effects to the heart. When the heart is weakened, a victim becomes subjected to greater risks that threaten their mortality. This paper aims to focus on the specific effect that Anorexia nervosa has on a patient's heart and, ultimately, fatality.

2. Structure of Heart

In order to discuss the effects that Anorexia has on the heart, it is imperative to understand the rudimentary functions and mechanisms of the heart. Simply, the heart consists of arteries, veins, and muscles. The flux of blood through the heart is also quite straightforward. In essence, blood must enter the heart in order to be pumped out through the body. Because of this, two different veins called the

Superior Vena Cava and the Inferior Vena Cava provide an entrance into the heart for blood to enter. Through these veins, deoxygenated blood enters into the Right Atrium, which is one of four main "rooms" within the heart. From this chamber, blood is pumped down through the Tricuspid Valve, a membranous structure consisting of three flaps, which ensures that blood flows in the correct direction. Blood then enters the Right Ventricle, from where the blood is then pumped out through the Pulmonary Valve towards the Pulmonary Artery. Whereas veins lead blood towards the heart, arteries send blood away from the heart. Accordingly, the Pulmonary Artery sends blood away from the heart to the lungs. A vital process termed Pulmonary circulation occurs at this stage, when the deoxygenated blood becomes oxygenated as the lungs supply it with oxygen and drain the carbon dioxide. The oxygenated blood then re-enters the heart through the Pulmonary Veins, and into the Left Atrium. The Mitral Valve then pumps the oxygenated blood down into the last chamber called the Left Ventricle. From the Left Ventricle, the Aortic Valve leads the blood towards the Aorta, which is an essential organ which supplies our entire body with oxygenated blood from the heart.

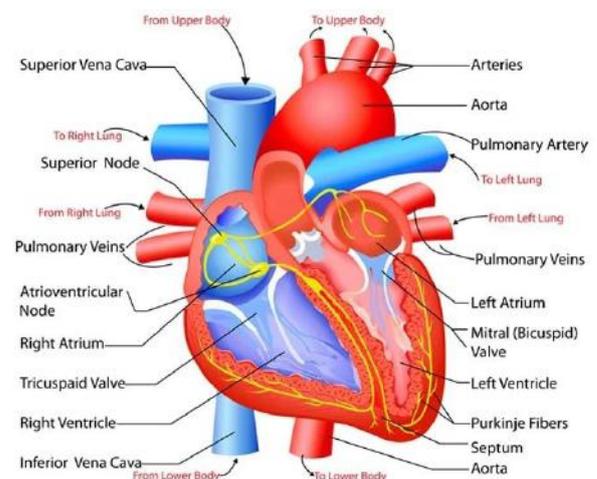


Figure 2. Structure of the Heart

3. About Anorexia Nervosa

3.1 Pathophysiology

The exact pathophysiology of Anorexia Nervosa is unknown. Many researchers, however, believe that a complex interaction of genetic, biological, behavioral, psychological, and social factors can cause eating disorders.

3.2 Diagnosis

Proper diagnosis requires professional medical attention. Healthcare providers will often take the patient’s medical history and ask about symptoms. Physical exams including blood and urine tests are required to rule out other possible causes for symptoms. Many other tests are also required to look for other health problems possibly caused by the eating disorder.

3.3 Symptoms

Symptoms may vary depending on the disorder. Specifically, however, these are the symptoms associated with patients suffering from Anorexia Nervosa:

General Symptoms

Starving or eating very little

Excessive exercise

Severe thinness

Fear of gaining weight

Distorted image of body: seeing oneself as overweight when, in fact, one is severely underweight

Long-term Symptoms

Bone thinning (osteopenia or osteoporosis)

Anemia

Weak and wasting muscles

Dry, blotchy, yellow skin

Drop in internal body temperature (feeling cold all the time)

Slow breathing and pulse

Low blood pressure

Feeling faint, dizzy, or weak

Frequent tiredness

Infertility

Damage to structure and function of heart

Brain damage

Multiorgan failure

4. Treatment

Treatments are mostly tailored to the patient’s preference and needs. A team of providers including doctors, nutritionists, nurses, and therapists most often aid the treatments. Common forms of treatments are individual, group, and family psychotherapy, medical care and monitoring, nutrition counseling, and medication. Serious cases sometimes require hospitalization and residential treatment programs.

Recovering from Anorexia is not an easy or simple process. It requires addressing the social and emotional components, often achieved through meeting with a specialist as well as the support of a nutritionist, in order to meet both emotional and physical needs.

Lifetime Co-morbidity of Eating Disorders with Other Core Disorders Among U.S. Adults Data from National Comorbidity Survey - Replication (NCS-R)			
	Anorexia Nervosa (%)	Bulimia Nervosa (%)	Binge-Eating Disorder (%)
Any Anxiety Disorder	47.9	80.6	65.1
Any Mood Disorder	42.1	70.7	46.4
Any Impulse Control Disorder	30.8	63.8	43.3
Any Substance Use Disorder	27.0	36.8	23.3
Any Disorder	56.2	94.5	78.9

Table 1. Lifetime comorbidity of eating disorders with other core disorders among U.S. adult

Anorexia plays a significant impact on an individual’s heart and is often the driving force behind several heart diseases. Slow heart rate commonly leads to low blood pressure and deteriorating muscles of the heart as a result of rapid weight loss creates larger chambers and weaker walls. Subsequently, pumping blood becomes more difficult for an individual. Another complication induced by Anorexia is the loss of reflexes to constrict blood vessels and the increased risk of heart failure. A few other side effects worth noting include osteoporosis, muscle loss, fatigue and weakness, etc

Mitral Valve Prolapse

Mitral valve prolapse is one of the various heart diseases commonly induced by Anorexia Nervosa. Its list of symptoms is comparatively short, but when an individual is experiencing sharp pain beneath the sternum, Mitral valve prolapse must be suspected. As for hospitalization for this disease, it is not necessarily required as it is a benign condition which can improve with weight gain. However, the disease may continue to persist even after weight gain. Over 20 percent of people with anorexia suffer from Mitral valve prolapse.

Heart Failure

Heart failure is a more serious disease which requires proper treatment. There are several ways to identify heart failure and this list of symptoms include chest pain, shortness of breath, fatigue, tachycardia, relative tachycardia, and edema. While the disease must be properly treated, patients do have the potential to improve.

Cardiac Arrhythmia

Cardiac arrhythmia is an extremely severe and sometimes even fatal disease caused by anorexia. The disease results in the patient to experience prolonged QT or QT dispersion which are problems concerned with the heart rate. It is most often the result of electrolyte disturbances (low potassium and magnesium). If not treated properly or in extreme cases, cardiac arrhythmia may lead to sudden cardiac death.

Cardiomyopathy

5. Conclusion

Anorexia Nervosa is not simply a disease that “dries up the body”; the disease is profoundly complex and its effects on the body surpasses well over what scientists and researchers confidently know of. Foremost is the pathophysiology of Anorexia. While it is ambiguously known, an intricate interaction of various factors is most likely the leading agent behind this eating disorder. Another important point to establish is the many forms of eating disorders. The diagnosis includes close observation of the patient including behavioral and physical symptoms. In this paper, I specifically located my focus on the cardio impacts of Anorexia Nervosa. The impression that this seemingly physical and weight-related disease could induce fatalities or

Cardiomyopathy is a heart disease accompanied by heart failure and heart arrhythmia. Most often, patients who excessively starve or chronically use emetics end up with cardiomyopathy. Other underlying causes include chronic alcohol abuse and nutritional deficiencies

Bradycardia

A common disease found in patients with anorexia is bradycardia. When patients have heart rates less than 60bpm, hypotension, and blood pressures less than 90/50, they are considered to have bradycardia. Hospitalization is required if patients develop “a rhythm other than sinus rhythm on the ECG”. However, this disease can be alleviated with good nutrition and weight gain. Moreover, some patients diagnosed with this disease have also been found to have overactive parasympathetic nervous systems.

Loss of autonomic regulation

Last but not least, loss of autonomic regulation is also one of the many diseases resulted by anorexia. In order to be diagnosed with this disease, patients must have reflexes such as constricting of the blood vessels to raise blood pressure, and the loss of a subtle elevation of the heart rate and contractility of the heart. Further, the disease may result in profound drops in blood pressure.

chronic sickness through its repercussions on the cardiovascular system was extremely compelling. With details of the diagnosis and varieties thus far established in the paper, I feel it is necessary to reinstate a few cardio symptoms often prompted by anorexia. To briefly summarize, rapid weight loss subsequently results in larger chambers and weaker walls of the heart. In other words, individuals with Anorexia Nervosa find it difficult to pump blood normally throughout the body. Slow heart rate, weak constriction of blood vessels, osteoporosis, and muscle loss are a few of many complications accompanied with anorexia. Anorexia is commonly distorted in the media through misleading depictions. As we move into the tech-savvy generations, younger children become increasingly exposed to such distortions. With the threatening

consequences on the cardiovascular system in mind, researchers and experts must be significantly more attentive with what is put out into the media. The medical field must also consider expanding the media coverage of symptoms associated with anorexia in order to impel earlier and prompt hospital visits. Moreover, to alleviate mental symptoms of patients, it is crucial for deeply trust-dependent relationships to be established between patients and doctors. Ultimately, we must carefully construct an environment in which patients can easily recognize their symptoms and reach medical care.

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