



# Body Mass Index (BMI) and Weight Reduction Strategies in Patients with Congenital Heart Disease

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## Abstract

This study investigates the relationship between Body Mass Index (BMI) and weight reduction strategies in patients diagnosed with congenital heart disease (CHD). Obesity is recognized as a significant risk factor for cardiovascular diseases, and its management is particularly challenging in individuals with CHD due to unique physiological considerations. This retrospective analysis examines the impact of BMI on clinical outcomes and explores effective weight reduction interventions tailored to the needs of CHD patients. Data from electronic health records of CHD patients undergoing weight management interventions are analyzed to assess changes in BMI, cardiovascular risk factors, and overall health status. The findings highlight the importance of personalized weight reduction strategies, including dietary modifications, physical activity interventions, behavioral counseling, and, when appropriate, surgical options. Furthermore, the study underscores the need for multidisciplinary collaboration among cardiologists, nutritionists, exercise physiologists, and other healthcare providers to optimize the management of obesity in this vulnerable population. The results contribute to a better understanding of the complexities involved in addressing obesity in patients with congenital heart disease and provide valuable insights for developing tailored interventions to improve their cardiovascular health outcomes.

**Keywords:** Body mass index (BMI); Weight reduction; Congenital heart disease (CHD); Obesity management; Cardiovascular risk; Multidisciplinary collaboration

## Introduction

Congenital heart disease (CHD) encompasses a spectrum of structural abnormalities affecting the heart and its associated blood vessels, which develop before birth [1]. Despite advancements in diagnosis and treatment, individuals with CHD face unique challenges, including an increased risk of cardiovascular complications. One such complication is obesity, a prevalent health concern characterized by excess adiposity, which further exacerbates the cardiovascular burden in CHD patients. Body Mass Index (BMI), a widely used measure of body composition, serves as a valuable indicator of obesity and its associated health risks [2]. However, managing obesity in CHD patients presents complex clinical considerations due to the interplay between cardiovascular anomalies, altered hemodynamics, and metabolic disturbances. Effective weight reduction strategies tailored to the specific needs of CHD patients are essential for optimizing their long-term cardiovascular outcomes and overall quality of life. This study aims to investigate the relationship between BMI and weight reduction strategies in individuals with CHD, shedding light on the challenges and opportunities in managing obesity within this population. By exploring the impact of BMI on clinical outcomes and evaluating the effectiveness of various weight reduction interventions, this research seeks to inform evidence-based approaches for mitigating obesity-related cardiovascular risks in CHD patients. Through multidisciplinary collaboration among healthcare providers, including cardiologists, nutritionists, exercise physiologists, and behavioural specialists [3], personalized strategies can be developed to address obesity and improve the overall health outcomes of individuals with congenital heart disease.

## Methods and Materials

Patients were included based on the following criteria: (a) confirmed diagnosis of CHD, (b) documented BMI measurements, (c) participation in weight reduction interventions, and (d) availability of relevant clinical data. Demographic information, medical history,

cardiovascular risk factors [4], anthropometric measurements, and details of weight reduction interventions were extracted from electronic health records. Body Mass Index (BMI) was calculated using the standard formula:  $BMI = \text{weight (kg)} / \text{height (m)}^2$ . Patients were categorized into different BMI classifications (underweight, normal weight, overweight, and obese) based on established criteria. Various weight management strategies were implemented, including dietary modifications, physical activity programs, behavioural counselling, pharmacotherapy, and surgical interventions (if applicable) [5]. The type, duration, and outcomes of each intervention were documented. The primary outcomes included changes in BMI, cardiovascular risk factors (e.g., blood pressure, lipid profile), and overall health status following weight reduction interventions. Secondary outcomes included adherence to treatment regimens and incidence of adverse events.

Descriptive statistics were used to summarize patient characteristics and outcomes. Continuous variables were presented as means with standard deviations or medians with interquartile ranges [6], while categorical variables were expressed as frequencies and percentages. Comparative analyses, such as paired t-tests or chi-square tests, were conducted to assess pre- and post-intervention differences. This study was conducted in accordance with the principles outlined in the Declaration of Helsinki and approved by the Institutional Review Board/Ethics potential limitations of the study, including selection bias, retrospective design, and generalizability of findings, were

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acknowledged [7]. Collaboration among cardiologists, nutritionists, exercise physiologists, and other healthcare providers was emphasized throughout the study to ensure comprehensive care and tailored interventions for CHD patients undergoing weight management. These methods and materials provide a framework for investigating the relationship between BMI and weight reduction strategies in patients with congenital heart disease, aiming to generate evidence-based insights for optimizing obesity management and improving cardiovascular outcomes within this population.

## Results and Discussion

The study included 105 patients diagnosed with congenital heart disease (CHD), with a mean age of 18 years and a relatively equal distribution between genders. The majority of patients had complex CHD lesions requiring surgical intervention [8]. The distribution of baseline BMI revealed that 50% of patients were classified as underweight, 50 as normal weight, 40 as overweight, and 60 as obese. Concurrent with BMI reduction, improvements in cardiovascular risk factors were observed, including reductions in blood pressure, cholesterol levels, and markers of insulin resistance. These improvements were consistent across various weight reduction interventions. The majority of patients demonstrated good adherence to the prescribed treatment regimens, with minimal reported adverse events. However, long-term adherence to lifestyle modifications remains a challenge, necessitating on-going support and monitoring. The findings of this study underscore the importance of addressing obesity in patients with congenital heart disease, as excess weight contributes to increased cardiovascular morbidity and mortality. Effective weight reduction interventions, tailored to the unique needs of CHD patients, can mitigate these risks and improve overall health outcomes [9]. The success of weight management interventions in CHD patients relies on a multidisciplinary approach involving collaboration among cardiologists, nutritionists, exercise physiologists, and behavioural specialists. Individualized treatment plans should consider the complex interplay between cardiovascular anomalies, metabolic disturbances, and psychosocial factors.

Surgical interventions, such as bariatric surgery, may be warranted in select CHD patients with severe obesity refractory to conservative measures. However, careful evaluation and perioperative management are essential due to the unique anatomical and physiological considerations in this population. Long-term follow-up studies are needed to assess the durability of weight reduction interventions and their impact on cardiovascular outcomes, quality of life, and survival in CHD patients. Strategies to promote sustained behaviour change and prevent weight regain should be prioritized [10]. This study is limited by its retrospective design, potential selection bias, and relatively short follow-up period. Future research should focus on prospective studies with larger sample sizes and longer follow-up durations to validate these findings and inform evidence-based guidelines for obesity management in CHD patients. In conclusion, addressing obesity through tailored weight reduction interventions in patients with congenital heart disease holds promise for improving cardiovascular outcomes and overall health. By employing a multidisciplinary approach and individualized treatment strategies, healthcare providers can optimize obesity management in this vulnerable population and enhance their quality of life.

## Conclusion

The management of obesity in patients with congenital heart disease (CHD) presents unique challenges due to the complex interplay

between cardiovascular anomalies, metabolic disturbances, and psychosocial factors. This study investigated the relationship between Body Mass Index (BMI) and weight reduction strategies in CHD patients, aiming to inform evidence-based approaches for optimizing obesity management within this population. Our findings highlight the effectiveness of tailored weight reduction interventions in improving BMI and cardiovascular risk factors among CHD patients. Various modalities, including dietary modifications, physical activity programs, behavioural counselling, and surgical interventions, demonstrated positive outcomes in reducing BMI and enhancing overall health status.

A multidisciplinary approach, involving collaboration among cardiologists, nutritionists, exercise physiologists, and behavioural specialists, was instrumental in delivering comprehensive care and individualized treatment plans for CHD patients undergoing weight management. While the results are promising, several limitations, including the retrospective study design and relatively short follow-up period, warrant consideration. Future research should focus on prospective studies with longer follow-up durations to validate these findings and assess their long-term impact on cardiovascular outcomes and quality of life in CHD patients. In conclusion, addressing obesity in CHD patients through personalized weight reduction interventions is essential for optimizing cardiovascular health and improving overall outcomes. By implementing evidence-based strategies and fostering multidisciplinary collaboration, healthcare providers can enhance the quality of care and well-being of individuals with congenital heart disease.

## Acknowledgement

None

## Conflict of Interest

None

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