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Review Article

**ASSOCIATION OF OBESITY WITH CARDIOVASCULAR
DISEASES; A SYSTEMATIC REVIEW****Dr Abdullah Khan, Dr Bishart Hussain Wattoo, Dr Ghulam Jillani**University Institute of Radiological Sciences and Medical Imaging Technology, University of
Lahore**Abstract:**

Background: Excess body weight, a growing problem worldwide, Obesity increases the risk of cardiovascular disease and premature death. **Objective:** To evaluate the association between obesity and cardiovascular diseases by reviewing the available literature. **Study Selection:** Multiple articles were reviewed. Prospective studies, case reports and retrospective studies were included in the study. **Methods and Materials:** A review of the scientific literature concerning the association between Obesity and Cardiovascular diseases. In this study, digital databases including PubMed, EMBASE and Google scholar were searched. The survey was carried out using keywords such as abdominal obesity; CVD; arterial hypertension; BMI; Heart failure; CAD; low High-Density Lipoprotein-cholesterol (HDL) and Low-Density Lipoprotein (LDL) variously associated together. **Conclusion:** The results of this study suggest that central obesity is associated with a higher incidence of CVD. it effects cardiac performance, cardiac hemodynamics, cardiac structure and function. More study can be done so that the mortality and mobility could be reduced in the society.

Keywords: Obesity; Cardiovascular Diseases; Risk Factors; HDL; LDL; Abdominal Circumference; BMI

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INTRODUCTION:

The prevalence of diabetes and obesity has reached epidemic proportions in Western countries¹ it is the second leading cause of preventable death following tobacco use.² Although the etiology of the obesity epidemic has been intensely debated, it is widely accepted that increased body weight and overall adiposity are the result of a chronic positive energy balance, with energy intake exceeding energy expenditure.³ Obesity is a major independent risk factor for cardiovascular disease (CVD), such as hypertension (HTN), coronary heart disease (CHD), atrial fibrillation (AF) and heart failure (HF).^{3,4} The World Health Organization (WHO) indicates obesity as one of the most important public worldwide health problems. In 2014, more than 1.9 billion adults were overweight. Out of these, 600 million were already obese. From 1980 to 2013, obesity increased 27.5% among adults and 47.1% among children⁵. Each year, 28 million individuals die from the consequences of overweight or obesity worldwide.⁶ High BMI is associated with the development of cardiovascular (CV) risk factors such as hypertension (HTN), dyslipidemia, insulin resistance, and diabetes mellitus (DM) leading to CV diseases (CVD), such as coronary heart disease (CHD) and ischemic stroke⁷⁻⁸ The development of these comorbidities is proportionate to the BMI and obesity is considered as an independent risk factor for CVD⁹⁻¹⁰. A data published by WHO revealed that 21% of world's mortality is caused due to CVD. This study is conducted to emphasize the association between obesity and Cardiovascular diseases as Coronary artery disease, heart failure and arterial fibrillation.

STUDY SELECTION:

Multiple articles were reviewed. Prospective studies, case reports and retrospective studies were included in the study.

RESULTS:

Using the search criteria, 28 researches were examined based on the title and abstract. All the 28 studies were considered in their full versions. Excluding all meta analysis and literature reviews. A study conducted by Mathieu P¹¹ et al states that obesity have multiple effects on cardiovascular system. Accumulation of excessive fat leads to metabolic changes and increases the risk of CVD and inflammation. Some studies proposed that in order to maintain the whole-body homeostasis Increased cardiac output and a decrease in peripheral resistance are important. Expanded blood volume increases heart preload shifting the Frank-Starling curves to the left. With passage of time an

increase in cardiac burden induces ventricular remodelling with enlargement of the cardiac cavities and increased wall tension eventually leading to Left Ventricle Hypertrophy¹²⁻¹³⁻¹⁴⁻¹⁵. The association between obesity and risk of developing CVD is strongly supported with large prospective studies as the Framingham Heart Study, the Manitoba Study, and the Harvard School of Public Health Nurses Study and many other researchers have documented obesity as an independent predictor of CVD.¹⁶⁻¹⁷⁻¹⁸

DISCUSSION:

Overweight and obese patients consistently have a higher prevalence of CHD, and the Framingham study showed that 23% of CHD in men and 15% of CHD in women was attributable to excess adiposity.¹⁸ In a large study including more than 100,000 patients who presented with non-ST elevation myocardial infarction (NSTEMI), obesity was found to be the strongest factor linked to NSTEMI events in younger patients, followed by tobacco use. The higher the BMI, the lower the mean age at which the patients presented with NSTEMI¹⁹. Khan et al.²⁰ performed a study with 3.2 million person-years follow-up from 1964-2015, and confirmed that obesity is associated with a significantly increased risk of CVD morbidity and mortality compared with normal BMI. Incident CVD events were significantly higher in the overweight or obese compared to normal weight individuals. Atherosclerotic disease and obesity share several common pathophysiological features²¹

Kenchaiah et al. reported the first large epidemiological study showing obesity to be an independent risk factor for development of HF, analyzing 5881 individuals from the Framingham Heart Study. It was concluded that for each increment of 1 kg/ m² in BMI, there was an increase in the risk of HF of 7 % for women and 5 % for men²². Loehr et al. examined the Atherosclerosis Risk in Communities cohort of over 14,000 individuals and showed obesity to be an independent risk factor for development of HF, after adjusting the covariates²³ Similarly, another large study of over 59,000 individuals from Finland showed a graded association between BMI and HF risk, with adjusted hazard ratios of HF for overweight and obese patients as compared to normal weight of 1.25 (95 % CI = 1.12–1.39) and 1.99 (95 % CI = 1.74–2.27) in males, and 1.33 (95 % CI = 1.16–1.51) and 2.06 (95 % CI = 1.80–2.37) in females²⁴.

CONCLUSION:

Obesity, generally assessed by BMI, adversely impacts CV risk factors and CV structure and function

and is associated with increased risk of most CVD²⁵⁻²⁶. Through this review numerous basic, clinical and population studies provided robust evidence supporting the statement that obesity is associated with numerous structural deformations and increases the risk of CVD. Although better long-term intervention studies are needed improving nutritional quality, reducing sedentary lifestyle, increasing physical activities seems to be beneficial

REFERENCES:

1. NCD Risk Factor Collaboration. Worldwide trends in body-mass index, underweight, overweight, and obesity from 1975 to 2016: a pooled analysis of 2416 population-based measurement studies in 128.9 million children, adolescents, and adults. *Lancet*. 2017;390(10113):2627-2642. doi:10.1016/S0140-6736(17)32129-3.
2. Lavie C, Arena R, Alpert M, Milani R, Ventura H. Management of cardiovascular diseases in patients with obesity. *Nat rev, Cardiol*. 2018;15(1):45-56. doi:10.1038/nrcardio.2017.108.
3. Lavie CJ, De Schutter A, Parto P, et al. Obesity and Prevalence of Cardiovascular Diseases and Prognosis-The Obesity Paradox Updated. *Prog Cardiovasc Dis*. 2016;58(5):537-47. doi:10.1016/j.pcad.2016.01.008.
4. Lavie CJ, Sharma A, Alpert MA, et al. Update on Obesity and Obesity Paradox in Heart Failure. *Prog Cardiovasc Dis*. 2016;58(4):393-400. doi:10.1016/j.pcad.2015.12.003.
5. Ng M, Fleming T, Robinson M, Thomson B, Graetz N, Margono C, et al. Global, regional, and national prevalence of overweight and obesity in children and adults during 1980–2013: a systematic analysis for the Global Burden of Disease Study 2013. *Lancet*. 2014;384(9945):766-81. doi: 10.1016/S0140-6736(14)60460-8. Erratum in: *Lancet*. 2014;384(9945):746.
6. Global Health Observatory (GHO): Obesity 2008. World Health Organisation 2013. http://www.who.int/gho/ncd/risk_factors/obesity_text/en/index.html.
7. Wilkins K, Campbell NR, Joffres MR, et al. Blood pressure in Canadian adults. *Health Rep*. 2010;21(1):37-46
8. Wormser D, Kaptoge S, Di AE, et al. Separate and combined associations of body-mass index and abdominal adiposity with cardiovascular disease: collaborative analysis of 58 prospective studies. *Lancet*. 2011;377(9771):1085-1095.
9. Poirier P, Giles TD, Bray GA, et al. Obesity and cardiovascular disease: pathophysiology, evaluation, and effect of weight loss. *Arterioscler Thromb Vasc Biol*. 2006;26(5):968-976.
10. Poirier P, Eckel RH. Obesity and cardiovascular disease. *Curr Atheroscler Rep*. 2002;4(6):448-453.
11. Mathieu P, Poirier P, Pibarot P, Lemieux I, Despres JP. Visceral obesity: the link among inflammation, hypertension, and cardiovascular disease. *Hypertension*. 2009;53(4): 577-584
12. Kaltman AJ, Goldring RM. Role of circulatory congestion in the cardiorespiratory failure of obesity. *Am J Med*. 1976;60(5): 645-653.
13. Messerli FH, Nunez BD, Ventura HO, Snyder DW. Overweight and sudden death. Increased ventricular ectopy in cardiopathy of obesity. *Arch Intern Med*. 1987;147(10):1725-1728.
14. Messerli FH. Cardiopathy of obesity—a not-so-Victorian disease. *N Engl J Med*. 1986;314(6):378-380.
15. Ku CS, Lin SL, Wang DJ, Chang SK, Lee WJ. Left ventricular filling in young normotensive obese adults. *Am J Cardiol*. 1994;73(8):613-615.
16. Rabkin SW, Mathewson FA, Hsu PH. Relation of body weight to development of ischemic heart disease in a cohort of young North American men after a 26 year observation period: the Manitoba Study. *Am J Cardiol*. 1977;39(3):452-458.
17. Hubert HB, Feinleib M, McNamara PM, Castelli WP. Obesity as an independent risk factor for cardiovascular disease: a 26- year follow-up of participants in the Framingham Heart Study. *Circulation*. 1983;67(5):968-977.
18. Wilson PWF, D'Agostino RB, Sullivan L, Parise H, Kannel WB. Overweight and Obesity as Determinants of Cardiovascular Risk: The Framingham Experience. *Arch Intern Med*. 2002;162(16):1867-72. doi:10.1001/archinte.162.16.1867.
19. Madala M, Franklin B, Chen A, et al. Obesity and age of first nonST-segment elevation myocardial infarction. *J Am Coll Cardiol*. 2008;52:979–85.
20. Khan SS, Ning H, Wilkins JT, et al. Association of Body Mass Index With Lifetime Risk of Cardiovascular Disease and Compression of Morbidity. *JAMA Cardiol*. 2018;3(4):280-287. doi:10.1001/jamacardio.2018.0022
21. Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults: The Evidence Report: National Institutes of Health. *Obes Res*. 1998;2:51S– 209S

22. Kenchaiah S, Evans J, Levy D, et al. Obesity and the risk of heart failure. *N Engl J Med*. 2002;347:305–13.
23. Loehr L, Rosamond W, Poole C, et al. Association of multiple anthropometrics of overweight and obesity with incident heart failure: the Atherosclerosis Risk in Communities study. *Circ Heart Fail*. 2009;2(1):18–24.
24. Hu G, Jousilahti P, Antikainen R, Katzmarzyk PT, Tuomilehto J. Joint effects of physical activity, body mass index, waist circumference, and waist-to-hip ratio on the risk of heart failure. *Circulation*. 2010;121(2):237–44.
25. Ortega FB, Sui X, Lavie CJ, Blair SN. Body mass index, the most widely used but also widely criticized index: would a gold-standard measure of total body fat be a better predictor of cardiovascular disease mortality? *Mayo Clin Proc*. 2016. [in press].
26. Ortega FB, Lavie CJ, Blair SN. Obesity and cardiovascular disease. *Circ Res*. 2016. [in press].