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ASSOCIATION OF OBESITY WITH CARDIOVASCULAR DISEASES; A SYSTEMATIC REVIEW

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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 countries[1] 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 children[5]. 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 stroke[7-8] The development of these comorbidities is proportionate to the BMI and obesity is considered as an independent risk factor for CVD[9-10]. 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 Cardio vascular 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 P[11] 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 Franck-Starling curves to the left. With passage of time an increase in cardiac burden induces ventricular re-modelling with enlargement of the cardiac cavities and increased wall tension eventually leading to Left Ventricle Hypertrophy[12-13-14-15]. 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 NSTEMI[19].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 features[21]

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 men[22]. 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 covariates [23] 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 females [24].

CONCLUSION:

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

and is associated with increased risk of most CVD[25-26]. 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

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