The Influence of Obesity on Quality of Life: A Systematic Review

Abstract

Background: The relationship between obesity and the quality of life (QoL) or health-related quality of life (HRQoL) has been confounded by several factors, including multi-morbidity. The objective of this study is to review and explore the relationship between obesity and quality of life, controlling for the long-term conditions alongside various demographic, health, and lifestyle factors within the general population.

Methodology: To achieve the objective, we have conducted a systematic review of 21 studies published between 2020 and 2024, focusing on the influence of obesity on individuals' quality of life. This systematic review employed a robust methodology that follows the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. It included studies published between 2010 and 2024, drawn from various databases, including SCOPUS, PubMed, Embase, and Google Scholar.

Results: The findings indicate that obesity is directly associated with reductions in the quality of life, including mental and physical health, activities of daily living, and psychological functioning. Obese persons have higher functional limitations levels than normal and overweight individuals, even as obesity has been linked to the development of various sleep disorders, including obesity hypoventilation syndrome (OHS) and obstructive sleep apnea (OSA).

Conclusions: The systematic review has disclosed the existence of a clear inverse relationship between increased weight status and decrease in the quality of life. Obesity significantly influences the quality of life of persons with obesity as it adversely affects individual's health

and affects different aspects of the person's quality of life, including physical and psychological functioning, mental health and well-being, and body image, among others.

Keywords: Obesity, Quality of Life, Body Mass Index, Weight Loss, and Overweight

Introduction

According to the World Health Organization (WHO), obesity's global prevalence rates have dramatically increased in the last forty years, from approximately 3.2% in 1975 to nearly 11% by the year 2016 for the adult males, as well as from 6.4% in 1975 to approximately 13% in adult females [1]. The observed prevalence patterns and trends have not been restricted to adult persons, given that the number of obese children and adolescents have equally risen from approximately 4% in the year 1975 to approximately 18% as at 2016. In comparison, as at the end of 2016, the WHO noted that the total number of obese and overweight individuals surpassed the overall number of people who were undernourished, as nearly 1.9 billion adult persons were obese and overweight in comparison to only 462 million adults who were underweight [2].

The increasing prevalence rate of obesity has resulted in not only public health concerns but also adverse socio-economic outcomes, including increments in cost of care, increase in the number of preventable deaths, reduction in the quality of life, decreases in labor productivity, and reduction in life expectancies. In concurrence with the rising incidence and prevalence rates of various chronic and non-communicable disease, the upsurge in obesity cases has turned out as amongst the most significant population health risks that continue to contribute to mortality, morbidity, and disability-adjusted life years (DALYS) across the globe [3]. In this regard, the

WHO has maintained that obesity and overweightness kills more individuals compared to undernutrition kills for a larger proportion of the globe's population [1].

Though initially linked to developed high-income nations, obesity rates have drastically risen in developing low and middle-income nations [1]. For instance, as at 2016, the prevalence rates of obesity were 5.8% in low-income nations, 7.3% in lower-middle-income nations, 14.3% in upper-middle-income nations, and 25.9% in high-income nations [4, 5]. Consequently, low-income nations have, in recent times, experienced drastic increase in obesity rates, rising from below 1% of their populations in 1975 to approximately 5.8% as at the end of the year 2016 [4]. The observed movement from undernutrition to over-nutrition has rapidly happened in the low-income nations and middle-income nations, even as obesity has become an increasingly significant public health concern compared to hunger [5].

Materials and Methods

To collect the relevant literature and data regarding the influence of obesity on quality of life, we conducted an in-depth and extensive literature search on different databases, including PubMed, SCOPUS, Web of Science, and Google Scholar. Thus, for this systematic review, only English language published studies, published between 2015 and 2024 were selected. Additionally, of the articles and reports chosen, epidemiological studies and guidelines with de-identified participant data in addition to different multi-center studies and review articles that have been published in high-impact journals. This was subsequently followed by the comparison of studies in order to identify the various duplicate studies from the same publication years, even as studies with increasingly logical details were included. Additionally, a number of MeSH keywords were utilized in the literature search, including Obesity, Quality of Life, Body Mass Index, Weight

Loss, and Overweight. The in-depth literature search conducted yielded a total of 1052 studies.

Inclusion and Exclusion Criteria

Following the removal of identified duplicates, pertinent literature was additionally subjected to a selection process comprising three distinct phases. The initial phase entailed the screening of the selected studies' titles and abstracts. The second phase entailed the exclusion of studies found to be irrelevant to this study. The final phase entailed the comprehensive assessment of the full-text of the chosen studies with the objective of ensuring that only apt and pertinent studies are included in the systematic review. A team of three independent reviewers was tasked with carrying out the three phases of literature screening. All potential discrepancies were aptly resolved through the use of consensus and consultations.

Still, the study's inclusion and exclusion criteria entailed original studies, including crossover design studies, prospective cohort design studies, and randomized controlled trials, which met all the set inclusion criteria as follows: articles that focus on effects of obesity on health-related quality of life; articles on the outcomes of obesity management interventions in children and adults; and articles published between 2015 and 2024 in |English language. Consequently, narrative reviews, opinion pieces, editorials, and funded clinical studies were excluded. The initial assessment of the abstracts and titles resulted in the exclusion of 356 articles. Additionally, important data derived from the literature that met the inclusion criteria were extracted as follows: (a) the general attributes of the study, such as the authors' names, year of study and publishing, and the method of sampling used; (b) the study population attributes, including age, gender, sample size, and race, as well as follow-up; (c) the intervention type utilized and duration of the intervention, as the proposed interventions; and (d) the studies' main findings.

Lastly, this study has utilized the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines in the process of selecting pertinent literature. The database search resulted in the retrieval of 1052 articles. The subsequent screening of the literature resulted in the removal of 356 duplicates and another 280 articles found to be ineligible through automation. A total of 416 articles were subjected to further screening leading to the removal of an additional 105 articles were also removed for a number of notable reasons, such as failure to align with the study objectives, non-peer-reviewed journal articles, dissertations, and original studies published in non-English languages. Therefore, 311 articles were sought for retrieval resulting in the removal of 96 studies for being irretrievable. The remaining 215 articles were assessed for eligibility leading to the exclusion of 194 studies for various reasons, including preprints (48 studies); failure to asses targeted interventions (51 studies); irretrievable full-text (85 studies); and protocol (12 studies). Of the studies, 21 met the inclusion criteria and were included in this systematic review.

Quality assessment

The quality of the included studies was assessed using the Appraisal Tool for Cross-Sectional Studies, which refers to the 20-item critical appraisal tool developed for cross-sectional studies. Three authors were selected and tasked with independent assessment of every study, even as another two authors were tasked with confirming the assessments. Any potential disagreement or discrepancy was solved using group discussions.

Data extraction

The researchers developed a form for data extraction with the objective of extracting relevant data from the studies included. This was followed by the collection of data regarding the

attributes of the reviewed studies, including the sample size, authors' names, year of publication, location, findings, research design, stigma prevalence, correlates, and impacts on the health outcomes. The authors independently extracted the data, and potential discrepancies were solved through group discussions. The PRISMA flow diagram has been presented in Figure *1* and indicated the process of article selection.

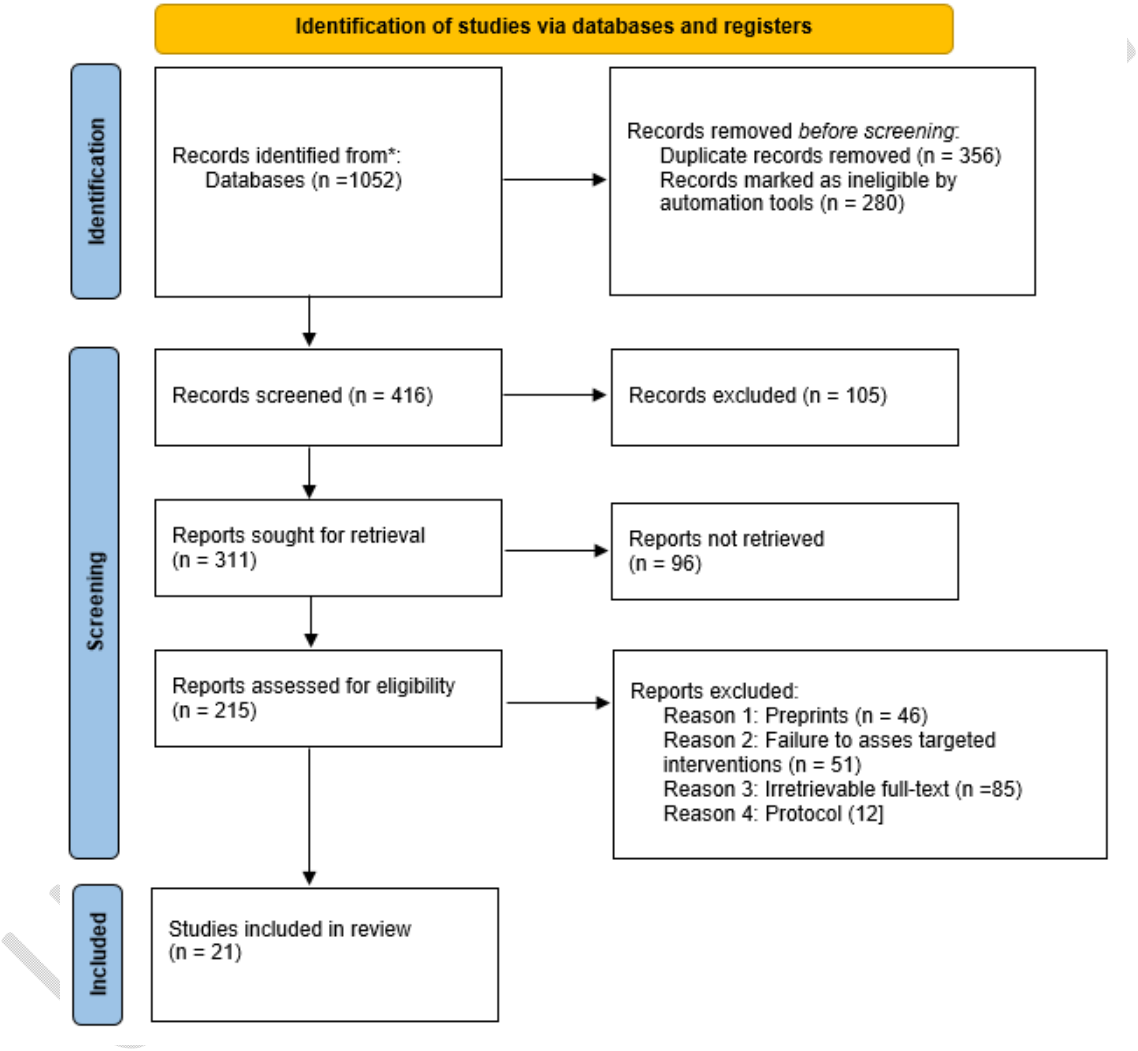

Figure 1: PRISMA flow diagram indicating the article selection process for this systematic review.

Discussion

Obesity prevalence has significantly increased in the last two decades globally [6]. A number of studies have reported several impacts of obesity on the quality of life of the obese persons. Thus,

obesity, which is typified by excessive adiposity, while not benign, predisposes the affected persons to an array of interconnected diseases, resulting increased risk of complex (above four v) and simple (two comorbid diseases) multi-morbidity in obese persons, in instances where they are compared against normal weight persons [6]. For instance, a Finnish large cohort study comprising 114,657 persons aged between 16 and 78 years and with a 12.1 years mean follow-up period, disclosed that obese individuals were five times highly prone to develop simple multimorbidity and over 12 times highly prone to develop intricate multimorbidity, with a sturdy correlation disclosed in individuals with severe obesity [7]. The dose-response correlations existing between obesity and multimorbidity has additionally been noted in various populations, including Asian and American populaces [8, 9]. According to Wanjau et al., the proportion of the disability-adjusted life years, which refers to the composite measurement of every health loss in a given population, that is contributed by obesity has significantly increased from the initial 3.9% reported in 1990 to approximately 6.4% as reported 2017, making it one of the major risk factors affecting health and quality of life, globally [10]. As such, obesity has a significant influence on the quality of life as it adversely affects individual's health and remains a global public health challenge, and affects different aspects of the person's health and quality of life as discussed below.

Still, regarding the influence of obesity on physical function as an aspect of quality of life, it is noteworthy that obesity places a number of physiological demands on the functioning of multiple organs, including the vascular system and heart, respiratory system, skin, and musculoskeletal system. However, obesity's effects on the skin is mostly marked by an increase in sweating, lower extremities swelling and discoloration, and cutaneous infections [11]. Other key symptoms, including gastroesophageal reflux/heartburn alongside urinary incontinence have

been attributed to an increase in the intra-abdominal pressure [11]. The physical effects of obesity in relation to the quality of life of obese persons is mainly evaluated using the generic health-related quality of life instruments under a number of domains, including bodily pain, role limitations resulting from physical challenges, and physical functioning [12]. This systematic review has disclosed significant positive correlations between obesity and physical functioning in obese individuals, with palpable patterns in high prevalence odds of functional limitations and activities of daily living (ADL/IADL) impairments, particularly in obese females [12]. Further, the findings of the study conducted by Kotanidou et al. has additionally disclosed that free of the physical activity level, obese persons have higher functional limitations levels that normal and overweight individuals [13]. The sturdy correlation between obesity and functional limitations/disability, especially in females, has been reported in several studies, with the overall disability risk in obese females being four times higher than in normal weight females. On the other hand, in obese males, the correlations between functional limitations and activities of daily living impairments was found to be less strong compared to in women [13]. A number of earlier studies have disclosed that self-reported functional restrictions increased with obesity or higher BMI [14]. Additionally, obesity has been found to have independent influence with regard to onset of impairments with regard to lower body mobility, strength, and ADL [12]. Nevertheless, contradictory to the findings of this systematic review, a study conducted by Stenholm et al. disclosed that physical activity was a key protective factor with regard to reduction of impairment of physical functioning regardless of the weight category, thereby contributing to the extant evidence that physical activity is beneficial to obese persons [15].

Still, the other notable influences of obesity on quality of life regards its effects on an individual's psychological functioning. In this regard, a number of comprehensive studies have

disclosed that approximately 20% to 60% of obese persons, particularly those with severe obesity, tend to suffer from mental illness [16]. The percentages are characteristically higher in comparison to those of the general population. Similarly, a number of previous studies have disclosed the extant relationship between obesity and depression [16]. For instance, individuals with severe obesity have been found to be nearly five times more prone to have experienced episodes of major depression in the last 12 months in comparison to normal weight individuals [17]. Moreover, the correlation between severe obesity and depression has been acknowledged to be stronger in women compared to men, and this has been attributed to the increased emphasis of the society on thinness as a key attribute of female beauty [18]. It is approximated that a third of bariatric surgery candidates have reported having clinically significant depression symptoms during the surgery time, while approximately 50% have reported having a depression history [19]. The underlying rationale for such higher prevalence rates have not been well comprehended; however, it might be attributed to the experience of stigma and discrimination due to being overweight, occurrence of eating disorders, and physical pain presence and additional impairments in the quality of life [16]. In concurrence, Puhl maintains that severe obesity may contribute to an individual's experience of discrimination, even as obese persons have a lesser likelihood of completing high school, are less prone to marry, and characteristically earn lesser compared to normal weight persons [20]. Further, obese persons are regularly subjected to discrimination in a number of contexts, including employment, healthcare, and educational settings [21]. Such experiences are likely to be widespread among individuals with severe obesity.

Further, obesity influences quality of life through its impact on mental health treatment. Many individuals with obesity tend to seek assistance from mental health services with their eating

disorders and to cope with the psychological aspects of the eating disorder [22]. Studies have disclosed that approximately 50% of patients seeking bariatric surgery have a history of mental health treatment: up to 40% of obese persons seeking bariatric surgery are treated with psychoactive substances at the time of the surgery [23, 24]. The use of most psychotropic medications, including antipsychotics and certain antidepressants, result in adverse effects that include weight gain and impaired weight loss. Currently, fewer studies have focused on the pharmacokinetics of psychiatric medications and their subsequent interactions with different bariatric operations in relation to the quality of life of obese persons seeking treatment [23]. Nevertheless, it has been acknowledged that the absorption of psychiatric medications is altered after the surgical procedure and onset of weight loss, in addition to causing significant fluctuations in body weight, even as the fat mass might influence the effectiveness of treatment and medications tolerability. Moreover, a number of comorbid conditions have been linked to obesity, including dementia and Alzheimer's Disease, cellular stress in the brain regions involved in disease advancement [22, 24]. A recent Australian study conducted on diabetes, obesity and lifestyle has also disclosed the existence of correlations between obesity and depression, with depression being twice higher in obese individuals compared to the normal weight persons [23].

Still, obesity influences the quality of life through its adverse effects on the general health of individuals with obesity. Thus, the adipose tissue hypertrophy has been linked to increased release of pro-inflammatory adipokines and the subsequent infiltration of macrophage cells [25]. Moreover, the inability of adipose tissue to expand indefinitely causes lipotoxicity and obligatory fat deposition in healthy non-adipose tissues, such as the heart, liver, pancreas and kidneys[26, 27] This further leaders to the development of a pro-inflammatory and insulin-resistant

environment even as an increase in mechanical hypertrophy occurs due to increment in the adipose tissue mass[26,28], which are mostly pathophysiological factors responsible for development of various diseases, including cardiovascular diseases, musculoskeletal disorders such as osteoarthritis, type 2 diabetes mellitus (T2DM), and certain cancers, including colon, breast, and endometrial cancers. The different musculoskeletal disorders that include low back pain and osteoarthritis are directly related to higher BMI, as a result of the excessive strain on body joints and inflammation [29]. excessive weight has also been linked to greater risk of future functional limitations in old age, and a graded correlation between obesity and disability measures, such as difficulties in performing activities of daily living has been established [29]. Therefore, there are several logical pathways correlating the outcomes with the exposure, including plausibility, which is amongst the most significant principles in the determination of causal relationships [29]. Still, existing evidence has additionally indicated the role that obesity plays in the development of type 1 diabetes mellitus (T1DM), as several surveys conducted in the UK and North America have disclosed increased prevalence rates of obesity in individuals with T1DM [30]. Further, studies have hypothesized that insulin resistance attributable to obesity might be responsible for increased loss of β pancreatic cells as a result of the severe proinflammatory state and excessive stimulations [31, 32]. The observed causal role has been aptly supported by a number of Mendelian randomization (MR) studies, despite the observation that the extant evidence remains inconsistent, in comparison to the evidence on the relationship between obesity and T2DM, even as a higher heterogeneity has been observed between different studies [33].

Additionally, regarding the influence of obesity on general health as an aspect of quality of life, it has been noted that, obese persons have twice more prevalence rates of hypertension (HTN)

compared to normal weight individuals [34]. Even as the obesity-induced hypertension mechanisms tend to differ, as they involve insulin, adipokines, free fatty acids, cytokines, and renin–angiotensin–aldosterone system, they are often interrelated, even as their eventual common pathways include extracellular fluid overload alongside activation of the sympathetic nervous system [34, 35]. As such, obesity remains amongst the notable established risk factor for development of HTN, and the causal role has been proven by various MR surveys [33, 36], especially the role of increased adiposity that has increasingly high ectopic and visceral fats, which is unfavorable metabolic profile [36]. Studies have also disclosed consistency between increased HTN prevalence and obesity, particularly in males [37].

Obesity has also been acknowledged to increase the risk of cardiovascular disease and events, mostly through mechanisms that include secretion of hypofibrinolytic factors, adipokines, and proinflammatory cytokines, which joint results in increased levels of oxidative stress alongside endothelial dysfunction, which, in turn, leads to the development of atherosclerosis [38]. Moreover, the increased adiposity often leads to haemodynamic alterations through different metabolic and neurohormonal abnormalities, resulting in the left ventricular (LV) hypertrophy and the consequent dysfunction, which results in the failure of LV. The failure of LV, which is attributable to pulmonary arterial hypertension from hypoxia as a result of obesity hypoventilation syndrome (OHS) and obstructive sleep apnea (OSA), might consequently result in the failure of the right ventricular [39]. The obesity's causal role has been disclosed and proven by a number of MR surveys [33, 36, 40], even as sturdy correlations have been noted between obesity and heart failure, then obesity and coronary artery disease, and lastly, obesity and stroke [33, 36]. Additionally, atrial fibrillation (AF) is another cardiovascular disease that has been linked to obesity, with obesity being considered an independent risk factor in AF

development, even following the accounting for OSA [39]. To this end, various studies have further indicated the existence of sturdy graded correlations between obesity and the risk of developing persistent AF, and heightened risk of post-ablation AF [39]. The mechanism that links obesity to the development of AF is increasingly intricate and has not been fully understood, with higher left ventricular and atrial abnormalities, alterations in hemodynamics, inflammation, neurohormonal and metabolic abnormalities, as well as increased pericardial and epicardial fat, being regarded as possible causal mechanisms [39]. A number of MR surveys have equally supported such causal relationships and have consistently indicated that genetically predicted obesity is linked to persistent AF [33, 36, 41].

Lastly, obesity has been linked to the development of obstructive sleep apnoea and hypoventilation syndrome, which affect the quality of life of obese persons. Thus, the increment in the intrathoracic and intra-abdominal pressures due to disproportionate adiposity obstructs the lung's inflation, which has a significant effect on the functioning of the lungs, resulting in ventilation perfusion imbalances and hypoventilation [42]. The obesity constellation, daytime hypoventilation, mainly marked by hypoxaemia and hypercapnia, as well as sleep-disordered breathing, devoid of an alternative hypoventilation cause, is referred to as OHS, and with an approximated prevalence rate of 20% in obese persons seeking treatment for sleep-disordered breathing [43]. Nevertheless, OSA is the most widespread sleep-disordered breathing in obese persons, given that the accumulation of fats around the upper respiratory system predisposes one to a potential airway collapse [42]. Studies have also disclosed that approximately 50% of individuals suffering from OSA are obese, even as nearly 40% to 90% of overweight individuals have OSA [42, 43]. In concurrence with the epidemiological observations and the existing genetic correlation between obesity and OSA, a recent study has disclosed that obesity that is

genetically predicted has a stronger association with OSA, which supports the causal effects of obesity on OSA [44]. An additional study with 587 participants has also disclosed that persons with OSA had obesity or considerably higher BMI, in addition to obesity being a significant OSA predictor following adjustments for HTN and smoking, in line with the extant overall evidence [45].

Study strengths and limitations

This systematic review has a number of strengths, including the observation that it has utilized studies with larger samples, which has enabled the effective studying of different impacts of obesity on quality of life for younger and elderly persons. This makes the findings of the study increasingly generalizable to different populations across the globe. Moreover, through the systematic review of the various studies, the present study has effectively incorporated studies comprising varied population subgroups, including ethnic and racial groups and genders, which enables the expansion of the possibility for developing a comprehensive and broader public health impact in the dissemination of this study's findings. Moreover, the other key strength of this study entails the observation that the systematic review has utilized an effectual methodology, which enabled the identification of various apt and high-quality studies for inclusion. Nonetheless, among the notable limitations include the observation that the correlations between obesity and quality of life are prone to influences by various confounding and interacting variables that have not been assessed in this study, including the effect of medications for obese persons with comorbid conditions in relation to the quality of life.

Conclusions

In conclusion, this systematic review has found a correlation between obesity and the quality of life of obese and overweight persons, disclosing that there is an inverse correlation between

obesity status and decrement in the quality of life. For instance, the study has disclosed the existence of a direct correlation between obesity and the development of obstructive sleep apnoea and hypoventilation syndrome, which affect the quality of life of obese persons. However, the study has also disclosed that obesity is inversely linked to increased risk of cardiovascular disease and events. With these findings, it is our hope that targeted interventions will be developed to enable development of treatment and therapeutic procedures that will enable persons with obesity to have better quality of life. Moreover, it is recommended that prospective studies should be conducted with the focus on the bidirectional correlations between obesity, gender, and quality of life. This will enable better understanding of how obesity affects the quality of life in males and females, as well as enable development of suitable targeted interventions for males and females with obesity.

Disclaimers: This article has not been submitted to other publications and/or presented at conferences or meetings.

Regulatory Approval or Research Subject Protection Requirements: This manuscript does not require regulatory approval.

Ethical approval: This Paper does not require ethical approval

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