Linkage between Diabetes and Obesity

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ABSTRACT

Every year, the growing obesity epidemic adds millions to the ranks of those at risk for diabetes, highlighting a critical public health challenge that demands immediate action, relative to a global health crisis. In the United States, an individual's average Body Mass Index (adult) is simply overweight. This paper explores the link between diabetes and obesity within the U.S.A. According to W.H.O., this condition has drastically increased over the past decade. Likewise, a worldwide crisis, particularly affecting individuals with a BMI OF 30 or higher, also known as obesity, is deemed a worldwide epidemic with a noticeably increasing rate over the past decade. An essential contributor to the increasing rate of "diabesity" is obesity, with various physiological, socioeconomic, and behavioral factors playing a role in this linkage. The current study thus emphasizes the need for effective public-health policies and comprehensive lifestyle interventions that address obesity to mitigate diabetes. Via our understanding of the connections between these two conditions, we can develop targeted strategies to improve health outcomes and reduce the mortality rate and costs of both conditions. Addressing obesity via an inclusive lifestyle intervention, we can establish public-health policy essential for effective mitigation.

Keywords: Obesity Epidemic, Diabetes, Public health challenge, body mass index (BMI), Lifestyle interventions, Health Outcomes, and Public Health Policy.

DIABETES MELLITUS

Diabetes is a persistent condition characterized by disruptions in carbohydrate, protein, and fat metabolism. This disruption occurs from either the absence or insufficient secretion of insulin due to the lack of the pancreas' β-Langerhans islet cells to generate adequate amounts of

insulin. This condition affects a huge portion of the population. (Algoblan et al., 2014) Diabetes manifests itself as a form of low blood sugar in cells. Diabetes is composed of three types, Type 1, Type II, and prediabetes, which is also known as metabolic syndrome. These conditions result when the cells do not produce enough insulin or do not respond to the insulin's being produced. In the United States, 37% of the population, which equates to eighty-six million adults, are diagnosed as pre-diabetics. Of those, only 11% are aware of their condition. Approximately 415 million people have been diagnosed with diabetes globally, according to the International Disease Foundation (Boles et al., 2017). The World Health Organization considers diabetes as an epidemic due to its numbers' increasing at a tremendous rate. Factors known to contribute to exposure to diabetes include genetics, environmental factors, weight, and, in some cases, non-genetic factors. It is commonly assumed that Diabetes does not lead to death. Still, according to the statistical data presented by WHO, in 2012, 1.5 million deaths were caused by diabetes, ranked sixth overall in Texas and worldwide deaths (Boles et al., 2017).

OBESITY

Obesity is the accumulation of excess adipose tissue, impairing physical and psychosocial health (Algoblan et al., 2014). According to the World Health Organization, obesity is recognized as an epidemic that is also increasing at a tremendous pace, surpassing undernutrition, and contagious diseases as the most substantial factors when it comes to health concerns (Kopelman, 2000). More than one billion adults worldwide are overweight, with at least 300 million being obese (Smith et al., 2006). The global epidemic of obesity is said to be a result of a combination of genetic susceptibility, increased availability of high-energy foods, and decreased physical activity. The livelihood of many individuals does not require extraneous activities (Kopelman, 2000). Data provided by Kopelman suggest that the United States has shown a prevalence of obesity, with the percentage of individuals having a BMI greater than 30 being over 50%. As stated above, many factors contribute to this condition, with the main one being genetics. According to Kopelman, most of the contributing facts stem from non-genetic factors. Obesity, despite its factors, plays a significant role in causing prediabetes and diabetes in society (Boles et

al., 2017).

LINKAGE OF OBESITY AND DIABETES

Many Chronic conditions evolve as an underlying cause of other disorders. Obesity is one of those diseases that is an underlying factor in various medical, psychological, and social conditions, with type 2 diabetes being one of the most significant. The rising incidence of type 2 diabetes among children and adults is parallel to the epidemic of obesity (Algoblan et al, 2014). The most prevalent commonality between type 2 diabetes and obesity is associated with insulin resistance. Implicated in that phenomenon is the fact that obesity is the accumulation of excess adipose tissue; an excess amount of this tissue causes metabolic dysregulation by secreting hormones, glycerol, and other substances, including leptin, cytokines, adiponectin, and proinflammatory substances as well as releasing non-esterified fatty acids (NEFA's) at an increasing rate. The increase in these fatty acids contributes to insulin resistance in diabetes and obesity (Algoblan et al., 2014).

Despite the molecular factors linking diabetes and obesity, research has explored how socioeconomic factors and depression contribute to these conditions. A study by the Centers for Disease Control and Prevention and the Behavioral Risk Factor Surveillance System explored the correlation and other significant health risk factors. This cross-sectional study utilized questionnaires covering ranging from overall health status and access to healthcare to such lifestyle factors as exercise, awareness of hypertension, cholesterol levels, and management of chronic conditions like asthma, diabetes, and arthritis. Interventions include immunization, reduction of tobacco and alcohol consumption, and strategies for firearm safety (Mokdad et al., 2003). They also used their individuals' weight and height data to calculate a body-mass index (BMI). The participants from the study were categorized as overweight and obese if their BMI was above the range of 25 to 30 or higher. Individuals with health conditions were analyzed and grouped into categories as well. The results of the data showed a prevalence and increase in

obesity. Both overweight participants and obese individuals were significantly associated with diabetes, as well as high blood pressure and high cholesterol levels, asthma, arthritis, and fair or poor health status (Mokdad et al., 2003).

SOCIOECONOMIC FACTOR.

Socioeconomic variables contribute to the diagnoses and prevalence of diabetes and obesity in America. Poverty income ratio (PIR), education, and occupational status are key indicators of socioeconomic status (Robins et al., 2005). Individuals' body size, physical activity, diet, and alcohol consumption are certain lifestyle-related factors recognized as potential risk factors (Robins et al., 2005). According to the National Center for Biotechnology Information, the availability of food is still a crucial factor that relates to obesity; regarding variances in prevalence observed among different geographies, increased rates of obesity surface in communities with lower socioeconomic status (Lee,2019). Not only are foods contributing to the increased risk of obesity, but the environment is as well. According to Lee, living in areas characterized by deprivation, disorder, or high crime rates is linked to increased chances of obesity, particularly among individuals with lower social status. Infrastructure is also associated with weight status. The less transport-related physical activity, the more risk there is of obesity (Lee, 2019). Some socioeconomic factors are known to be associated with diabetes. These include the levels of education, sex, region, marriage status, occupation, debt, and liability. Most individuals with low socioeconomic status and education level have been associated with the prevalence of Diabetes. (Suwannaphant et al, 2010) Studies are still being conducted to determine if SES does contribute to the diagnosis of obesity and diabetes.

METHODOLOGY

Using a qualitative research approach, one can gain deeper insights into individual experiences and perceptions by conducting semi-structured interviews with healthcare

professionals and individuals diagnosed with obesity and diabetes. Quantitative data was referenced from the National Health and Nutrition Examination Survey (NHANES). In the study "Relationship Between Obesity and Diabetes in a U.S Adult Population: Findings from the National Health and Nutrition Examination Survey, 1999-2000," the prevalence of diabetes was conducted across various weight classes (normal, overweight, and obese). The results from the study of 21,205 surveyed participants, approximately 2894 adults with diabetes (13.6%), 80.3% of diabetics were considered overweight with Body Mass Index (BMI) greater than or equal to 25, while 49.1% of diabetics were considered obese with BMI greater than or equal to 30. This indicated that the prevalence of diabetes did increase as weight increased. The significance of these findings demonstrates the link between diabetes and obesity. It illustrated that most individuals with diabetes are susceptible to having a higher BMI, which is either being obese or overweight. A recent study conducted in 2022 by researchers at the Johns Hopkins Bloomberg School of Public Health found that 62% of adults with type 1 diabetes are overweight or obese, which is like the 64% of people without diabetes who have the same condition.

For adults with type 2 diabetes, the rate is even higher at 86%. ("Overweight and Obesity in People with Type 1 Diabetes Nearly Same as General Population," 2023). According to the Centers for Disease Control and Prevention, in 2022, all U.S. states and territories had an obesity prevalence higher than 20% (more than 1 in 5 adults), with the prevalence for diabetes being higher than 20%. For instance, the overall percentage for the territories is as follows: the Midwest has a percentage of 35.8%, the South 35.6%, the Northeast 30.5%, and the West 29.5%, with the highest rates being in the South and the Midwest (*Adult et al., 2024)*. As the connection between obesity and diabetes increases, adoption of such interdisciplinary innovations as the involvement of psychologists would help better manage this condition. Community-based programs in high- prevalence areas like the South and Midwest would help promote a healthy lifestyle and reduce prevalence. As awareness of these correlated issues grows, there are possibilities for societal shifts in how the community and individual are

affected by these challenges. These results underline a profound connection between obesity and diabetes that calls for coherent public-health strategies and policies. The links between obesity and diabetes have become more pronounced in the U.S, adopting an interdisciplinary approach in the U.S healthcare system. Community-based interventions as well as innovative solutions and policy shifts will be beneficial in addressing these public-health challenges.

MITIGATION

Managing diabetes and obesity typically requires a multifaceted approach, including lifestyle changes, dietary modifications, physical activity, and sometimes medical interventions. Both obesity and type 2 diabetes are said to be preventable. Research conducted before has demonstrated that lifestyle adjustments are successful in preventing both diabetes and obesity among adults at elevated risk due to impaired glucose intolerance. (Mokdad et al, 2003). As for solutions, individuals should adopt a clean, nutritious, balanced diet while eliminating highly processed food, sugars, and unhealthy fats. In addition, individuals should avoid being sedentary and participate in activities that aid with weight loss. For instance, Walking, Swimming, and riding bikes at the park could enhance activity levels.

Some systems to combat diabetes at a community level include the National DPP and DMSES. The National Diabetes Prevention Program (National DPP) is a proven lifestyle intervention designed to prevent or delay the onset of type 2 diabetes, while Diabetes Self-Management Education and Support (DSMES), offered by the American Diabetes Association, aims to empower individuals with diabetes effectively to manage their condition and lead healthy lives through education and support services (CBO, 2023). To fully combat these two epidemics, we also need to take a person's mental health into consideration. One significant mental-health issue often linked with diabetes is major depressive disorder. This condition affects approximately 6.7% of adults aged 18 and older in the United States and tends to be more

prevalent among adults with diabetes (Ducat et al., 2014). Diabetes distress arises because all aspects of diabetes care involve self-management behaviors. This requires individuals and their families to navigate a complex array of behavioral tasks to maintain balance in managing the condition (Ducat et al. 2014). Assessing treatment based on public health perspectives is ideal for prioritizing the identification and treatment of mental health among individuals with diabetes.

Another approach in combating the epidemic of both obesity and diabetes is that of altering and adjusting the dietary options of most fast-food chains. Those should put the wellbeing of their consumers first by offering healthier alternatives on their menus. These would include salads, grilled options, fruit cups, fresh juices, and non-processed syrups, and alternatives for sugary sodas. Decreasing portions and introducing half-size meals can effectively assist in controlling calorie consumption. In addition to that, offering options that adhere to diabetic dietary guidelines, such as fewer carbs, sugars, and saturated fats, would help decrease the risk of both diabetes and obesity. Educating staff and customers through awareness of the impact of food choices and selections, as well as the impact of those on blood sugar levels and overall health, can enable individuals to make healthier lifestyle decisions.

Lastly, a viable health policy to help combat the correlation between obesity and diabetes includes the implementation of comprehensive public-health programs focused on promoting healthy eating habits, regular physical activities, and preventive obesity initiatives. In addition, taxes on sugary and highly processed food and beverages can be included in subsidies for healthier food options and improved access to community-based interventions to create healthy living for individuals. Implementing this policy will help individuals battling diabetes and obesity as they are interconnected. This will reduce the onset of battles related to these conditions in the healthcare system and society.

CONCLUSION

In summary, this thesis explored the relationship between obesity and diabetes, with emphasis on the significant impact of obesity along with the rise in the incidence of type 2 diabetes. The faceted nature of the two linkages has been highlighted by examining physiological, socioeconomic, and behavioral factors. Several factors highly heighten the prevalence of these conditions. Including genetic susceptibility, lifestyle choices, and socioeconomic disparities. The data analysis emphasizes the urgent need for comprehensive intervention to address both obesity and diabetes. Effective strategies include promoting a healthy lifestyle, including balanced diets and regular physical activities, alongside community-based programs and public-health policies aimed at reducing the availability of high-calorie processed foods. Implementing sugary and highly processed food substitution for healthier alternatives can support healthier eating habits at the community level. To combat these two interconnected epidemics effectively, a multifaceted approach combining lifestyle changes, policy modifications, and community support is essential. Future research should continue to explore these linkages and evaluate the effectiveness of various interventions to revise strategies and improve public health outcomes.

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