BRIEF COMMUNICATION

Obesity in South Africa: Biopsychosocial Determinants and Evolving Perspectives

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Abstract

Obesity is a critical public health issue in South Africa, exacerbated by unique cultural, socioeconomic, and environmental factors. This article delves into the determinants of obesity within the South African context, examining biological, psychological, and social influences. With obesity rates particularly high among urban populations and women of childbearing age, there is a significant burden of associated noncommunicable diseases. The evolving understanding of obesity as a complex, chronic disease has shifted perspectives away from patient-blaming paradigms. Effective management and prevention strategies require culturally sensitive, context-specific approaches that address socioeconomic disparities, promote public awareness, and integrate comprehensive health care interventions.

Keywords: Obesity, South Africa, social determinants

Introduction

Obesity is a growing global health challenge with significant implications for public health, economies, and individual well-being. South Africa, like many other nations, faces a burgeoning obesity epidemic, influenced by unique cultural, socioeconomic, and environmental factors. The concern of excess body weight is particularly pronounced in urban areas, leading to a surge in associated noncommunicable diseases (NCDs) such as prediabetes, type 2 diabetes (T2D), hypertension (HT), and atherogenic dyslipidemia[1,2]. These NCDs contribute significantly to the cardiovascular disease (CVD) burden, making South Africa one of the unhealthiest countries worldwide. The surge in obesity and NCDs is driven by nutrition transitions, urbanization, the consumption of high-fat foods, and sedentary lifestyles[3-5]. Notably, the prevalence of obesity and overweight disproportionately affects women of childbearing age in South Africa, with reports indicating an upward trend from 51.3% to 60.0% for overweight and from 24.7% to 35.2% for obesity between 1998 and 2017[2].

This article explores the determinants of overweight and obesity in the South African context, underscoring the evolving perspectives on obesity management and the shift away from patient-blaming paradigms.

The Prevalence of Obesity in South Africa

South Africa has one of the highest obesity rates in sub-Saharan Africa. According to the South African Demographic and Health Survey (SADHS), the prevalence of obesity among adults has been increasing steadily over the past few decades[2]. Data from the World Health Organization (WHO) indicate that nearly 28% of men and 43% of women in South Africa are classified as obese, with a body mass index (BMI) of 30 or higher[6]. Even health care workers are at risk, based on a recent study at Tygerberg Hospital, Cape Town, South Africa, where 59% were found to be overweight or obese[7]. These figures are alarming, particularly given the associated risks of comorbid conditions such as T2D CVDs, and certain cancers.

In addition to the obesity epidemic, South Africa is also grappling with a high prevalence of human immunodeficiency virus (HIV). The collision of these two pandemics creates a complex public health challenge. HIV and obesity are interconnected in several ways[8]. Antiretroviral therapy (ART), which is essential for managing HIV, has been associated with changes in body fat distribution and increased risk of metabolic complications, including obesity. Furthermore, individuals

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living with HIV may experience increased stigma and psychological stress, contributing to unhealthy eating behaviors and reduced physical activity.

Addressing both obesity and HIV in South Africa requires integrated health care strategies that consider the overlapping and unique needs of individuals affected.

The Evolving Understanding of Obesity

The traditional view of obesity as a consequence of individual lifestyle choices and lack of willpower has been challenged by contemporary research. The recognition of obesity as a complex, chronic disease has profound implications for its management and treatment[9].

From Blame to Understanding

Historically, weight management strategies focused on diet and exercise, with an underlying assumption that individuals could control their weight through willpower and discipline. This approach often led to stigmatization and blaming of individuals with obesity. Recent advancements in obesity research emphasize the role of genetic, metabolic, and environmental factors, shifting the focus from blame to understanding[10].

Biopsychosocial Determinants of Obesity

The multifactorial nature of obesity necessitates an examination of the biopsychosocial model, which integrates biological, psychological, and social determinants to provide a comprehensive understanding of the condition.

Biological Determinants

Genetics and epigenetics

Genetic predisposition plays a significant role in obesity, with studies identifying multiple genes associated with increased susceptibility to weight gain, such as the fat mass and obesity-associated gene (FTO gene)[11]. Epigenetic modifications, influenced by environmental factors, also contribute to the heritability of obesity. Disruption of the hypothalamic-pituitary-adrenal (HPA) axis, associated with the stress response, is hypothesized to contribute to obesity via epigenetic modulation of HPA axis-regulatory genes[12]. A South African study highlights this factor in the local context too. The authors investigated adipose tissue depot-specific DNA methylation differences in the glucocorticoid receptor (GR) and its co-chaperone, FK506-binding protein 51 kDa (FKBP5), in obese and normal weight urban-dwelling South African women. They found that FKBP5 DNA methylation was higher in obese women compared to normal weight women, correlating with adiposity, insulin resistance, and systemic inflammation, while GR methylation showed no differences[13]. FKBP5 mRNA levels were also lower in the gluteal subcutaneous adipose tissue of obese women, suggesting a link between FKBP5 dysregulation and obesity. Further studies are needed to explore this association and other epigenetic factors in South Africa over time.

Metabolic factors

Variations in metabolism, including basal metabolic rate (BMR) and energy expenditure, can influence body weight. Individuals with a lower BMR may be more prone to weight gain. In line with this, a recent study suggests the resting energy expenditure in Black South African adults is lower than in White adults, contributing to the disproportionate obesity burden in the country[14].

Hormonal influences

Adipose tissue is now widely recognized as an endocrine organ that secretes numerous inflammatory mediators and adipocytokines, such as leptin. The primary role of leptin is to induce satiety after a meal and suppress appetite. In recent years, the role of leptin in the development of obesity-related CVD has gained increasing attention[9]. Leptin levels vary not only by gender but also by ethnicity. In South Africa, Black Africans exhibit higher leptin levels than Caucasians, attributed to a greater subcutaneous fat component[15]. The prevalence of hypertension and stroke is also higher in the African population. Elevated leptin in this population has been shown to be associated with sympathetic overactivity, vascular damage, and delayed post-stress recovery, potentially contributing to increased CVD risk. The physiological role of glucagon-like peptide-1 receptor agonists, such as semaglutide, and coagonists in promoting satiety and regulating food intake underscores the significance of hormonal contributors to obesity. These medications enhance the feeling of fullness and reduce appetite, highlighting the crucial role that biological factors, particularly hormones, play in the development and management of obesity[16].

Psychological Determinants

Behavioral factors

Eating behaviors, such as the consumption of high-calorie, low-nutrient foods and sedentary lifestyles, are major contributors to obesity. Emotional eating, stress, and coping mechanisms also play a role in overeating and weight gain. There is a paucity of data in South Africa on behavioral factors contributing to overweight and obesity, and research in this area is urgently needed to improve our local understanding.

Mental health

Globally, there is a bidirectional relationship between obesity and mental health conditions[17]. Depression, anxiety, and other psychological disorders can lead to weight gain, while obesity can exacerbate these conditions, creating a vicious cycle. It is estimated that the lifetime risk of an obese patient developing depression is 55%, and the risk of a depressed patient becoming

obese is increased by 58%[17]. Van der Merwe et al reported that 25.5% of males and 53.2% of females had depression prior to metabolic surgery in their South African center sample of 820 candidates[18].

Social Determinants

Societal pressures and cultural perceptions of body image can impact an individual's self-esteem and mental health, influencing their eating behaviors and overall relationship with food. There is also a strong correlation between socioeconomic status (SES) and obesity. Lower SES is often associated with limited access to healthy foods, safe recreational spaces, and health care services, increasing the risk of obesity, globally and in South Africa[19,20].

Cultural norms and practices also significantly influence dietary habits and perceptions of body weight. In some South African communities, higher body weight is associated with affluence and health[21]. Rapid urbanization has led to lifestyle changes, including increased consumption of processed foods and reduced physical activity[19]. The local urban environment often lacks infrastructure to support active living, further contributing to the obesity epidemic.

The Role of the Environment

The concept of an "obesogenic environment" highlights how external factors contribute to the development of obesity. This includes the availability and marketing of unhealthy foods, urban design that discourages physical activity, and socioeconomic factors that limit access to health-promoting resources[22].

Addressing these environmental influences is crucial for effective obesity prevention and management. In April 2018, the South African government, in response to a recommendation of the WHO, introduced a tax on sugar-sweetened beverages known as the Health Promotion Levy (HPL) in an attempt to reduce citizens' sugar intake and curb obesity in the country.

Although it is too soon to quantify the reduction of obesity as a direct result of the sugar tax implementation, mathematical modeling predicts that a 20% sugar tax rate would decrease obesity by approximately 2,50,000 people per year[23]. However, the jury is still out on whether this sugar tax alone will be enough to combat obesity, which is regarded as one of the risk factors for NCDs such as heart disease, stroke, cancer, and diabetes.

Addressing Obesity in the South African Context

Addressing obesity in South Africa requires a context-specific approach, considering the unique cultural, social, and economic factors at play.

1. **Cultural sensitivity in interventions:** Health promotion strategies must be culturally sensitive and relevant to the diverse populations in South Africa. Community-based programs that engage local leaders and incorporate traditional practices can enhance the acceptance and effectiveness of interventions.
2. **Addressing socioeconomic disparities:** Efforts to reduce obesity must address the underlying socioeconomic disparities that contribute to the condition. This includes improving access to affordable, nutritious foods, creating safe spaces for physical activity, and ensuring equitable health care services.
3. **Promoting awareness and education:** Public awareness campaigns are crucial for changing perceptions of obesity and promoting healthy behaviors. Education programs that target schools, workplaces, and communities can empower individuals with the knowledge and skills to make healthier choices. Additionally, with 59% of health care workers found to be overweight or obese, there is a pressing need to prioritize initiatives that promote healthier lifestyles and environments, also within health care settings.

Conclusion

The obesity epidemic in South Africa presents a multifaceted challenge that necessitates a holistic and nuanced approach. Understanding the biopsychosocial determinants of obesity highlights the interplay between genetic, metabolic, psychological, and socioeconomic factors.

As perspectives on obesity continue to evolve, shifting from blame to understanding, it becomes clear that effective interventions must be culturally sensitive and tailored to the unique needs of South African communities. By addressing socioeconomic disparities, enhancing public awareness, and promoting integrated health care strategies, South Africa can make significant strides in combating obesity and its associated health burdens.

References

1. Roomaney RA, van Wyk B, Cois A, Pillay-van Wyk V. One in five South Africans are multimorbid: an analysis of the 2016 demographic and health survey. PLoS One. 2022;17(5):e0269081.
2. Nglazi MD, Ataguba JE. Overweight and obesity in non-pregnant women of childbearing age in South Africa: subgroup regression analyses of survey data from 1998 to 2017. BMC Public Health. 2022;22(1):395.
3. Blüher M, Stumvoll M. Diabetes and Obesity. In: Bonora E, DeFronzo RA (Eds.). Diabetes Complications, Comorbidities and Related Disorders. Cham: Springer International Publishing; 2020. p. 1-49. (Endocrinology). Available from: http://link.springer.com/10.1007/978-3-030-36694-0_1
4. Shariq OA, McKenzie TJ. Obesity-related hypertension: a review of pathophysiology, management, and the role of metabolic surgery. Gland Surg. 2020;9(1):80-93.
5. Rendell MS. Obesity and diabetes: the final frontier. Expert Rev Endocrinol Metab. 2023;18(1):81-94.
6. Obesity. WHO. Available from: https://www.afro.who.int/health-topics/obesity
7. Coetzee A, Beukes A, Dreyer R, Solomon S, van Wyk L, Mistry R, et al. The prevalence and risk factors for diabetes mellitus in healthcare workers at Tygerberg hospital, Cape Town, South Africa: a retrospective study. J Endocrinol Metab Diabetes South Afr. 2019;24(3):77-82.
8. Gizamba JM, Davies J, Africa C, Choo-Kang C, Goedecke JH, Madlala H, et al. Prevalence of obesity, hypertension and diabetes among people living with HIV in South Africa: a systematic review and meta-analysis. BMC Infect Dis. 2023;23(1):861.
9. Kalra S, Kapoor N, Bhattacharya S, Aydin H, Coetzee A. Barocrinology: The endocrinology of obesity from bench to bedside. Med Sci (Basel). 2020;8(4):51.
10. Westbury S, Oyebode O, van Rens T, Barber TM. Obesity Stigma: Causes, Consequences, and Potential Solutions. Curr Obes Rep. 2023;12(1):10-23.
11. Huang C, Chen W, Wang X. Studies on the fat mass and obesity-associated (FTO) gene and its impact on obesity-associated diseases. Genes Dis. 2023;10(6):2351-65.
12. Gianotti L, Belcastro S, D'Agnano S, Tassone F. The stress axis in obesity and diabetes mellitus: an update. Endocrines. 2021;2(3):334-47.
13. Willmer T, Goedecke JH, Dias S, Louw J, Pheiffer C. DNA methylation of FKBP5 in South African women: associations with obesity and insulin resistance. Clin Epigenetics. 2020;12(1):141.
14. Pretorius A, Piderit M, Becker P, Wenhold F. Resting energy expenditure of a diverse group of South African men and women. J Hum Nutr Diet. 2022;35(6):1164-77.
15. Van Zyl S, van Der Merwe LJ, van Rooyen FC, Joubert G, Walsh CM. The relationship between obesity, leptin, adiponectin and the components of metabolic syndrome in urban African women, Free State, South Africa. South Afr J Clin Nutr. 2017;30(3):68-73.
16. Drucker DJ. GLP-1 physiology informs the pharmacotherapy of obesity. Mol Metab. 2022;57:101351.
17. Luppino FS, de Wit LM, Bouvy PF, Stijnen T, Cuijpers P, Penninx BW, et al. Overweight, obesity, and depression: a systematic review and meta-analysis of longitudinal studies. Arch Gen Psychiatry. 2010;67(3):220-9.
18. Van Der Merwe MT, Fetter G, Naidoo S, Wilson R, Drabble N, Gonçalves D, et al. Baseline patient profiling and three-year outcome data after metabolic surgery at a South African centre of excellence. J Endocrinol Metab Diabetes South Afr. 2015;20(3):115-26.
19. Stellenbosch University, Giljam-Enright M, Statham S, Stellenbosch University, Inglis-Jassiem G, Stellenbosch University, et al. The social determinants of health in rural and urban South Africa: A collective case study of Xhosa women with stroke. In: Stellenbosch University, Louw (Eds.). Human Functioning, Technology and Health. AOSIS; 2021. pp. 307-50. Available from: https://books.aosis.co.za/index.php/ob/catalog/book/85
20. Achoki T, Sartorius B, Watkins D, Glenn SD, Kengne AP, Oni T, et al. Health trends, inequalities and opportunities in South Africa's provinces, 1990–2019: findings from the Global Burden of Disease 2019 Study. J Epidemiol Community Health. 2022;76(5):471-81.
21. Manafe M, Chelule PK, Madiba S. The perception of overweight and obesity among South African adults: implications for intervention Strategies. Int J Environ Res Public Health. 2022;19(19):12335.
22. Fruh SM. Obesity: Risk factors, complications, and strategies for sustainable long-term weight management. J Am Assoc Nurse Pract. 2017;29(S1):S3-14.
23. Wrottesley SV, Stacey N, Mukoma G, Hofman KJ, Norris SA. Assessing sugar-sweetened beverage intakes, added sugar intakes and BMI before and after the implementation of a sugar-sweetened beverage tax in South Africa. Public Health Nutr. 2021;24(10):2900-10.

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