



RESEARCH ARTICLE

REGARDING EPIDEMIOLOGY OF OBESITY AND ASSOCIATED RISK FACTORS IN SAUDI ARABIA

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ARTICLE INFO

Article History:

Received 20th September, 2023
Received in revised form
27th October, 2023
Accepted 15th November, 2023
Published online 30th December, 2023

Key words:

Prevalence, Symptoms, Causes and Risk factors, Prevention and Control.

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Citation: Esmail Alrajhi, Yahya A. Asseri, Khadijah A. Hummadi, Amwaj A. Hijri, Amal A. Hakami, Reda M. Ashwi, Abrar M. Almutahhir et al. 2023. "Regarding epidemiology of obesity and associated risk factors in Saudi Arabia." *International Journal of Current Research*, 15, (12), 26669-26672.

ABSTRACT

Obesity is a major public health crisis both globally and within Saudi Arabia. The increasing prevalence across nations carries severe consequences for population health and healthcare systems. Obesity elevates the risks for numerous chronic diseases like heart disease, stroke, type 2 diabetes, cancer and osteoarthritis, resulting in reduced quality of life and expectancy. The economic costs are equally staggering, estimated over \$2 trillion annually including both direct medical costs and indirect productivity losses. Within Saudi Arabia, rapid urbanization, economic growth and associated lifestyle changes have catalyzed the obesity epidemic. The public health implications are just as severe as the global situation. Saudi Arabia faces one of the highest obesity rates worldwide, with around 30% of adults classified as overweight or obese. This has contributed to soaring rates of related chronic illnesses and risks within the Saudi population (Althumiri *et al.*, 2021).

INTRODUCTION

Obesity is a major public health crisis both globally and within Saudi Arabia. The increasing prevalence across nations carries severe consequences for population health and healthcare systems. Obesity elevates the risks for numerous chronic diseases like heart disease, stroke, type 2 diabetes, cancer and osteoarthritis, resulting in reduced quality of life and expectancy. The economic costs are equally staggering, estimated over \$2 trillion annually including both direct medical costs and indirect productivity losses. Within Saudi Arabia, rapid urbanization, economic growth and associated lifestyle changes have catalyzed the obesity epidemic. The public health implications are just as severe as the global situation. Saudi Arabia faces one of the highest obesity rates worldwide, with around 30% of adults classified as overweight or obese. This has contributed to soaring rates of related chronic illnesses and risks within the Saudi population (Althumiri *et al.*, 2021). Tackling obesity will protect population health and the sustainability of the healthcare system. Thorough epidemiological analysis of the Saudi-specific causes, trends and solutions can address this crisis. A close examination of the underlying causes and correlations will help the health departments to directly target the lifestyle, behavioral, and environmental sources most linked to rising obesity rates.

For instance, Al-Hazaa and Albawardi (2021) demonstrate particularly strong associations between sedentary lifestyles, unhealthy diets high in processed and calorie-dense foods, and the escalating obesity levels among the Saudi population. The overarching goals are to quantify the current and future impacts of the epidemic, elucidate the drivers its increase, and ultimately provide targeted, evidence-based recommendations to mitigate associated health burdens and costs. This epidemiological review hopes to contribute vital insights toward curbing obesity and protecting population health of the Saudi-specific factors

Prevalence of Obesity in Saudi Arabia: Obesity rates in Saudi Arabia have increased dramatically over the past 5 years. As Althumiri *et al.* (2021) reported in a nationally representative study, the prevalence of obesity rose from 28.7% in 2016 to 33.7% in 2020. This reflects a relative increase of 17.4% in just a few years. Additionally, severe obesity leapt from 9.7% to 11.1% during the same period. The upward trajectory aligns with global patterns, as Saudi Arabia faces rapid urbanization and nutritional transitions. However, the pace of increase is particularly steep for Saudi adults ages 45-69, with obesity prevalence soaring from 42% to 55% among this high-risk group. If current rates continue without any measures set in place, models predict more than 50% of the adult population will be obese by 2030. A 2021-2022 survey in the Makkah area found over 30% of people were overweight and nearly 25% were obese.

World Health Organization statistics cite around 35% obesity countrywide, approaching 40% among women and 30% for men. Additional studies point to up to 70% of Saudis being overweight or obese, with increasing prevalence in older age groups. A recent large national study saw 25% obesity, while a Jeddah investigation found 39%. Though exact percentages differ slightly across regions and surveys, Saudi Arabia consistently demonstrates high obesity, ranking among the top five problem areas (Alsulami *et al.*, 2023). Rates range from 25-70%, averaging around 33%. The condition pervades the country and requires urgent public health action. Saudi Arabia exemplifies the unhealthy nutrition shifts occurring in developing nations leading to ballooning obesity. Comprehensive interventions targeting diet, activity levels, and awareness are needed to combat this epidemic.

Table 1. Obesity prevalence (%) in KSA (Alshehri & Alorfi, 2023)

Year	Men	Women	Overall
1992	12	20.7	16.4
1997	26.6	43.1	34.9
2002	29.3	46.3	37.8
2007	32	51.1	41.6
2012	35.1	58.7	46.9
2017	38.2	67.5	52.9
2022	41.4	77.6	59.5

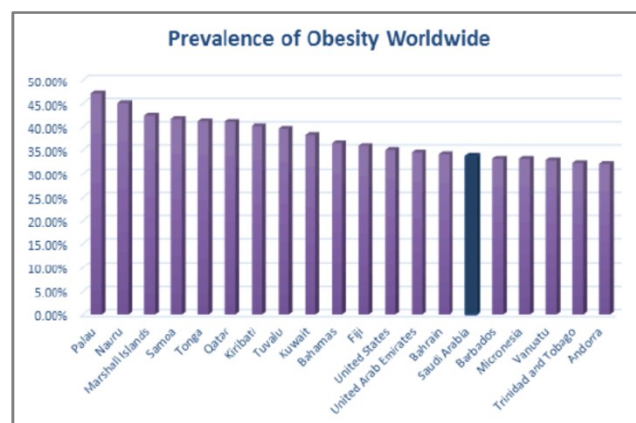


Figure 1. World Obesity Rates. The figure shows that Saudi Arabia is the world 15th most obese country, with an overall obesity rate of 33.7% (Alshehri & Alorfi, 2023)

Symptoms: Obesity brings with it a multitude of concerning symptoms that significantly impact one's health and quality of life. Excessive weight gain is the most overt sign, but obesity also dramatically increases Saudi Arabians' risk for chronic diseases like type 2 diabetes, heart disease, and some cancers. For example, studies show that obese adults in the Kingdom have 2-3 times higher rates of diabetes compared to those with normal BMI, with over 20% of the adult population affected. Heart disease risk also rises, with obesity implicated in 44% of ischemic heart disease cases (Salem *et al.*, 2022). Breathlessness and fatigue are common obesity symptoms as well, making even basic physical exertion more difficult. The obese Saudi adults reported fatigue interfering with day-to-day activities. Psychologically, obesity takes a major toll through lowered self-esteem, higher rates of depression, and social isolation. Saudi children 10-18 years old equally scored significantly higher on depression scales than normal weight youth. Stigmatization and weight bias remain pressing issues in the culture as well (Balhareth *et al.*, 2019). Obese Saudi women seeking marriage, for instance, may find fewer marital prospects compared to thinner women due to cultural beauty standards. Bullying of overweight children is also a problem. Indeed, Saudi Arabia's high obesity prevalence has made its population extremely vulnerable to an array of detrimental health and psychological consequences.

Causes and Risk factors: Dietary and lifestyle factors play a major role in the high rates of obesity seen in Saudi Arabia. The traditional Saudi diet is very high in calories, fat, and refined carbohydrates through dishes like kabsa, which features rice, oils, nuts, and meat. Intake of fruits, vegetables, and whole grains is low, with limited consumption of fresh produce. Sedentary lifestyles are also common, with activities like watching television and online gaming taking precedence over physical activity and exercise (Al-Kadi *et al.*, 2018). High consumption of sugary beverages like soda and unhealthy fast food like pizza contribute to excessive calorie intake. The hot desert climate limits outdoor activities for much of the year. Lack of walkable neighborhoods and reliance on automobiles promote inactivity, evident in low walking rates. These dietary and lifestyle factors interact to promote positive energy balance and weight gain over time. Genetic and biological factors also increase obesity risk. Studies show Arabs may have a higher genetic predisposition to obesity and diabetes, potentially linked to consanguineous marriage patterns (Younes *et al.*, 2021). Saudi Arabia has high rates of consanguineous marriages between cousins, which raises genetic susceptibility. There are high birth rates and familial clustering of obesity, pointing to heritable factors. Medical conditions like hypothyroidism and Cushing's syndrome can predispose to weight gain. Use of medications that cause weight gain as side effects is common, like antidepressants and steroids. Gestational diabetes and excessive pregnancy weight gain raise obesity risk in women. Genetics and biology interact with dietary and lifestyle factors to exacerbate obesity at the population level. Several socioeconomic, cultural, and environmental factors contribute to the obesity epidemic in Saudi Arabia. Rising affluence from oil wealth and nutrition transition have increased access to high-calorie imported foods. Cultural attitudes promote overeating and consider obesity a sign of prosperity and fertility. The hot desert climate necessitates indoor lifestyles, with lack of pedestrian infrastructure and reliance on cars discouraging physical activity (Aljassim & Jradi, 2021). Rapid urbanization and technology reduce energy expenditure through inactive transport and sedentary jobs. There are limited public spaces and exercise facilities, especially for women due to gender norms. Health education and public health efforts have been inadequate to address the multifactorial causes of obesity.

Economic and Social Impact: Obesity exerts a heavy economic toll on Saudi society through escalating healthcare costs, lost productivity, and strain on the workforce. Obese individuals require more medical care for conditions like diabetes, heart disease, and joint problems, draining healthcare resources. One study estimated obesity accounts for 14% of Saudi Arabia's total health expenditures (Alqahtani *et al.*, 2023). Obesity also reduces productivity, as obese workers take more sick days and early retirement. With over 30% obesity prevalence, Saudi Arabia loses billions in GDP annually from obesity-related absenteeism and lack of workforce participation (Malkin *et al.*, 2022). The social implications are equally concerning. Obese individuals face stigma and discrimination in employment, healthcare, and social settings. Studies show obese Saudis have higher rates of depression and lower quality of life scores. With strong social emphasis on hospitality and food, obesity carries a heavy psychosocial burden (Ayoub Ali Alshaikh *et al.*, 2023). Still, positive initiatives like public education campaigns, promoting active lifestyles, and nutrition programs in schools can alleviate obesity's economic and social toll.

Prevention and Control of Obesity: Lifestyle modification programs are needed to promote healthy behaviors in Saudi Arabia. Culturally-tailored education programs delivered through schools, worksites, and healthcare facilities can provide skills for adopting healthier diets, increasing physical activity, and achieving long-term weight management (Aldubikhi, 2023). For example, schools can integrate interactive nutrition and fitness classes into the core curriculum, while workplaces can provide subsidized on-site gyms and healthy cafeteria food options labeled with calorie information. Healthcare facilities should establish dedicated weight management clinics that provide intensive lifestyle counseling, self-monitoring tools like pedometers and food diaries, and consistent follow-up to high-risk patients (Wahabi *et al.*, 2023).

Adaptations like women-only exercise facilities and home workout programs with cultural accommodations can help overcome barriers to physical activity among females in the conservative Saudi culture (Alshaikh *et al.*, 2022). Changing social norms about generational overconsumption of calorie-dense foods and widespread sedentary leisure activities will be key according to studies on the cultural factors driving obesity in Saudi Arabia. Sustained public education through mass media and community channels will be essential.

Several public health policies and initiatives can address obesity at the population level. Policies like excise taxes on sugar-sweetened beverages, mandatory front-of-package nutrition labeling requirements, and restrictions on advertising of calorie-dense foods to children can lower consumption, as evidenced by research in other countries. Urban planning and transport policies to promote mixed-use zoning, sidewalks, parks, dedicated bike lanes, and accessible public facilities can encourage daily active living (Emhj, 2023). Agricultural policies and awareness campaigns can increase production of and access to fruits, vegetables and other healthy foods, which are lacking in modern Saudi diets. Reimbursement of obesity screening, intensive behavioral counseling, weight loss medications and bariatric surgery by insurers and employers can expand reach of weight management programs. Strict nutritional standards for cafeterias in schools, hospitals, and government agency offices are impactful interventions as demonstrated by studies globally. Multi-sectoral coordination involving health, transport, agriculture, trade, and education agencies is essential for effective policy implementation. Community-based interventions utilize existing social structures to promote healthy changes. Engaging religious leaders to emphasize Islamic tenets that endorse active lifestyles and balanced diets can leverage faith-based values that support health (Aldubikhi, 2023). Utilizing extensive family and tribal networks can spread knowledge and new social norms around optimal diet and regular physical activity. Partnering with the food industry and restaurants to reformulate and provide healthier alternatives that are lower in fat, salt and sugar can increase accessibility to better choices given the nutrition transition (Almughamisi *et al.*, 2022). Media campaigns via influential television shows, websites, social media influencers and local celebrities that model healthy lifestyles can shape cultural attitudes and behaviors. Grassroots physical activity and healthy eating initiatives through schools, worksites and neighborhood organizations can catalyze local environmental and behavioral changes. Comprehensive policy, system and environmental changes are required alongside individual-level programs to impact population health. A national taskforce with government, private sector and civil society representation should develop evidence-based strategies tailored for the cultural context in Saudi Arabia, as recommended by public health experts. More research on obesity prevention approaches specific to Arabs is critically needed to guide future efforts. Sustained political commitment and coordinated efforts across healthcare, education, media, agriculture, transport, industry, and environment sectors are essential to promote broad lifestyle changes. Saudi Arabia should prioritize long-term investments into multisectoral obesity prevention initiatives to avert the huge projected costs and adverse health impacts in coming decades.

Measures implemented by Saudi Arabia Government: In response to rising obesity rates, the Saudi government has implemented various policies and programs to promote healthier lifestyles and curb obesity. Initial efforts focused on assessing the scope of the problem through national surveys and research studies, increasing public awareness through education campaigns, and establishing physical activity and dietary guidelines (AlFlayyeh, S. and Fayzu, 2023). More recent strategies have involved comprehensive reforms targeting the food environment, physical activity infrastructure, and healthcare services. For example, in 2016, a tax on soft drinks and energy drinks was passed, which led to price increases and decreased consumption (Jalloun & Qurban, 2022). The government has also partnered with the private sector to increase access to exercise facilities and develop pedestrian walkways and cycling trails in urban areas (AlMarzooqi *et al.*, 2023).

Healthcare policies have expanded obesity screening and management, with specialized clinics and bariatric surgery options covered by insurance (Bowen *et al.*, 2018). Regulations have also been introduced by the Saudi Food and Drug Authority regarding food labeling, advertising, and nutrition standards (Arfaoui *et al.*, 2021). While these policies represent progress, additional efforts are needed to promote healthier lifestyles from an early age, reduce sedentary lifestyles, and improve dietary habits over the long-term. Sustained commitment involving multiple sectors of society is critical to reverse the obesity epidemic in Saudi Arabia.

Recommendations For Future Research And Interventions: More research is needed to better understand the complex interplay of factors contributing to the high prevalence of obesity in Saudi Arabia. Large-scale longitudinal studies tracking diet, physical activity, and weight status over time would help delineate how these factors interact across the lifespan. Researchers should examine how factors like food marketing, food environments, walkability of neighborhoods, and social norms around diet and activity influence obesity risk. Special attention should be paid to high-risk subgroups like children and those of low socioeconomic status. Culturally-tailored interventions are needed to promote healthy lifestyles (Farhat, 2023). Campaigns using social media, text messages, and community health workers could provide nutrition education, encourage home cooking, and model active lifestyles. Worksite wellness programs involving healthy catering policies, access to exercise facilities, and weight management resources can promote healthy behaviors among adults. Schools are ideal settings for teaching children lifelong healthy habits through nutrition standards, physical education, and health education.

To address the obesogenic environment, policies are needed to improve nutrition labeling, limit junk food marketing to kids, provide access to affordable healthy foods, and promote physical activity through improved walkability and recreational facilities. Sustained, multi-level efforts are required to curb the obesity epidemic and ameliorate its health and economic burdens (Salem *et al.*, 2022). Success will necessitate coordinated initiatives across healthcare, schools, worksites, and communities that transform social norms, structures, and policies to make healthy choices easy and fulfilling for all. Further research using qualitative and mixed methods approaches would provide richer insight into personal, interpersonal, and environmental drivers of obesity in Saudi Arabia (Almutairi *et al.*, 2021). Interview and focus group data could probe attitudes, beliefs, and perceived barriers and facilitators regarding healthy lifestyles. Community-based participatory research engaging local stakeholders is important to ensure cultural relevance. Studies should examine the feasibility and effectiveness of programs and policies in real-world settings. For instance, researchers could work with schools to evaluate wellness initiatives and with food suppliers to assess product reformulation. Built environment changes like new bike lanes or parks could also be rigorously evaluated. Translational studies are critical to build an evidence base for scaled-up interventions. Partnerships between policymakers, communities, and academia can support a coordinated, sustained, and data-driven approach to promoting healthy weights nationwide.

CONCLUSION

In conclusion, Saudi Arabia faces an urgent public health crisis of obesity and overweight that demands immediate, multifaceted action. While rates of obesity have rapidly escalated in recent decades parallel to global trends, the prevalence in Saudi Arabia remains among the highest worldwide. Contributing factors span dietary patterns high in fat, sugar, and refined carbohydrates, widespread sedentary lifestyles enabled by technology advances and car reliance, and built environments lacking in opportunities and facilities for physical activity. Sociocultural attitudes celebrating overconsumption and hospitality have inadvertently fueled obesity's rise. Tackling this complex, multifactorial issue necessitates coordinated efforts across healthcare, education, transportation, urban planning, agriculture, media, and other sectors.

Comprehensive policies, programs, and environmental changes are required alongside supporting individuals to modify behaviors. Promising strategies evidenced in Saudi Arabia and globally include built environment enhancements to encourage active transport, healthcare system incentives for obesity screening and management, taxation and marketing limitations on unhealthy foods and beverages, nutrition standards in public institutions, and community-based initiatives leveraging social networks and faith values.

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