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RESEARCHARTICLE

REGARDING EPIDEMIOLOGY OF DIABETES MELLITUS AND ASSOCIATED RISK FACTORS IN SAUDI ARABIA

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ABSTRACT

Diabetes Mellitus poses a substantial public health challenge in Saudi Arabia due to escalating prevalence. This paper delves into the epidemiological landscape of diabetes mellitus and its linked risk factors within the country. Comprehensive in scope, the study traverses the historical aspects of diabetes in Saudi Arabia, current prevalence rates, prevalent symptoms, underlying causes, risk determinants, and preventive strategies and concludes with a discussion encompassing the present state and forthcoming implications. In a country grappling with the mounting burden of this disease, this research contributes vital insights for health policymakers and practitioners. The historical context elucidates the evolving nature of diabetes in Saudi Arabia. At the same time, examining risk factors, symptoms, and prevention measures sheds light on the multifaceted aspects of this health challenge. Understanding the complexities surrounding diabetes in the Saudi Arabian context is pivotal for developing effective interventions, health education, and healthcare infrastructure improvements. The findings underscore the urgency of sustainable strategies to curb the diabetes epidemic and pave the way for a healthier future.

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INTRODUCTION

Saudi Arabia is burdened with diabetes mellitus, placing a strain on the healthcare system and population. This study examines Saudi diabetes epidemiology in detail to inform healthcare providers, policymakers, and the public by analyzing its history, prevalence, risk factors, and prevention. To understand how diabetes became common in Saudi Arabia, we must consider its historical context (Mokdad *et al.*, 2015). This historical narrative sheds light on the social, environmental, and behavioral changes that shape diabetes today. The prevalence of diabetes in Saudi Arabia is of significant concern, prompting healthcare officials to pursue strategies to mitigate its impact actively (Mokdad *et al.*, 2015). Typical manifestations of diabetes encompass heightened thirst, frequent urination, inexplicable weight reduction, exhaustion, and impaired visual acuity. The rising prevalence of diabetes across the nation may be attributed to many reasons, including genetics, obesity, inadequate dietary patterns, sedentary behaviors, and other environmental influences (Al-Hanawi, Chirwa, & Pulok, 2020). This project will also examine diabetic crisis prevention and control measures, such as public awareness campaigns, healthcare infrastructure improvements, and lifestyle changes. Developing an effective public health policy to mitigate diabetes requires understanding these metrics.

In earlier decades, scarce epidemiological data made it challenging to estimate the prevalence of diabetes. The Saudi government employed epidemiological surveys, research endeavors, and public health initiatives to investigate the phenomenon of diabetes comprehensively. These activities have contributed to a novel comprehension of diabetes in the nation. Based on a study published by the Saudi government about diabetes, it is evident that Saudi Arabia had significant underdevelopment throughout the early 1950s, characterized by a comparatively lower median income compared to the United States (El Bcheraoui *et al.*, 2014). As a result, people ate less manufactured food and more, fresh, locally produced vegetables, lowering diabetes rates. After the country's median income climbed and became more accessible to the outside world, fast food firms joined the market, and Saudis adopted a Western diet. Additionally, soft drinks became increasingly popular. Late 20th-century epidemiological studies showed a dramatic rise in diabetes incidence, undermining the idea that it was rare and putting it at the forefront of public health concerns. This viewpoint change reevaluated healthcare goals, policies, and budgets, enabling more extensive treatments. As diabetes spread, healthcare in Saudi Arabia evolved to meet the challenge. Increased healthcare infrastructure, access and diagnostic tools made it possible to diagnose and intervene early. Diabetes awareness campaigns also promoted early identification by educating

people about symptoms and risk factors (Famuyiwa *et al.*, 1992). In recent decades, public attitudes towards diabetes in Saudi Arabia have changed dramatically. It is now increasingly recognized as a widespread indigenous health condition and not just a Western abnormality.

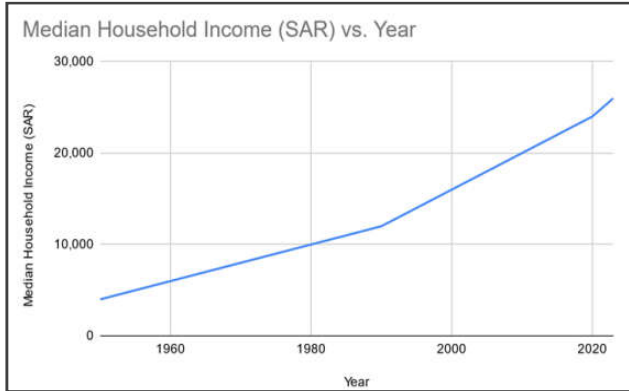


Fig. 1. Showing a Line graph of the median income in Saudi Arabia from 1950 to 2023

This shift in attitude has compelled policymakers, healthcare professionals, and the public to address the growing diabetes burden. The rise of diabetes from obscurity to commonness is a testament to its dynamic growth. A once-rare disease has become a major public health issue requiring comprehensive solutions to manage its consequences (Mokdad *et al.*, 2015). Early detection, awareness programs, and prevention have transformed the Saudi Arabia’s diabetes landscape. This timeline highlights the need for a proactive and informed diabetes response and the factors contributing to its spread in Saudi Arabia over time.

Prevalence: The prevalence of diabetes in Saudi Arabia has exhibited a consistent rising trend, presenting a significant public health concern. Chart 1 thoroughly depicts current prevalence rates, emphasizing the substantial and escalating burden of the disease, particularly across various age cohorts.

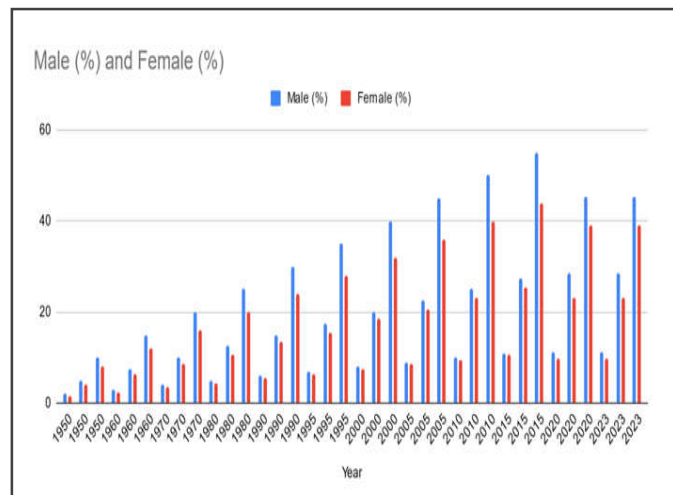


Chart 1. Shows the prevalence of diabetes in Saudi Arabia

Chart 1 thoroughly depicts the varying incidence of diabetes in Saudi Arabia during the past decade. The prevalence rates have exhibited an ascending trend, underscoring the urgent requirement for comprehensive approaches to tackle this escalating issue in public health. Saudi Arabia had 10% diabetes among 20-39-year-olds in the year 2010. The 40–59 age group showed a 25% prevalence. Of particular concern was the considerable prevalence of diabetes among individuals aged 60 and beyond, reaching a rate of 50% (Robert *et al.*, 2018).

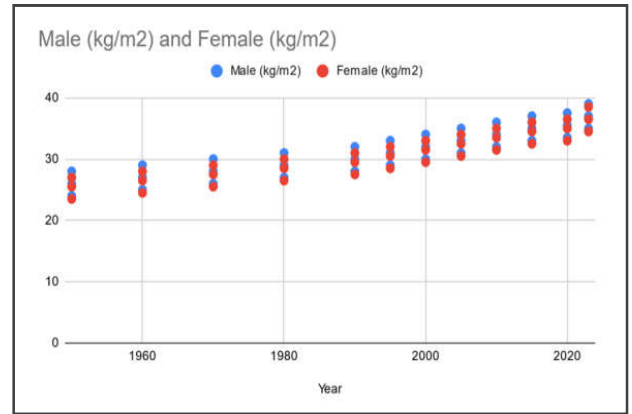


Chart 2. Showing BMI rates in Saudi Arabia

This demographic stratification highlights the progressive nature of diabetes and its association with advancing age, establishing it as a key determinant in the country's epidemiological landscape. As the country progressed to the year 2015, prevalence rates showed a noticeable upward trend. The 20–39-year-old prevalence rate has risen to 11%. At 27.5%, the 40–59 age group had a higher prevalence rate (Sami *et al.*, 2020). A prevalence rate of 55% showed that people 60 and older had the greatest influence. The research shows a global rise in diabetes, especially among seniors. Diabetes prevalence increased in the year 2020, with 11.2% among 20-39-year-olds and 28.6% among 40-59-year-olds. The prevalence percentage among persons 60 and older remained at 45.2%. Statistics show a rising prevalence of diabetes, emphasizing the need for early intervention and prevention, especially in middle-aged people (Al-Hanawi, Chirwa, & Pulok, 2020). The latest data from the year 2023 confirms the concerning trend of increasing diabetes prevalence. The prevalence percentage among those aged 20 to 39 years has remained constant at 11.2%, indicating a sustained burden over some time (Al-Nozha *et al.*, 2004). The prevalence rate of 28.6% seen among individuals between the ages of 40 and 59 underscores the persistent nature of the issue within this particular demographic. Seniors 60 and above had the greatest occurrence rate at 45.2% (Al-Hanawi, Chirwa, & Pulok, 2020). The above results emphasize the need to continue addressing the diabetes epidemic, particularly in older adults. Diabetes incidence has been increasing in Saudi Arabia, especially, among middle-aged and elderly adults. The patterns above demonstrate the intricate interaction between genetics, lifestyle, and demographics. To better understand and manage diabetes's complicated issues, public health measures, awareness campaigns, and research projects must be prioritized, given the nation's growing burden (Al-Hanawi, Chirwa, & Pulok, 2020). Chart 1 shows that Saudi Arabia needs comprehensive diabetes mitigation programs and regulations.

Symptoms: The identification and interpretation of typical indicators of diabetes mellitus might be essential in the process of diagnosing and managing this metabolic ailment. Diabetes mellitus presents a range of unique symptoms. Polydipsia, often known as excessive thirst, is a characteristic symptom that compels individuals to consume substantial quantities of water to alleviate their thirst. This increased fluid intake often leads to another common symptom, polyuria or frequent urination, particularly at night. Diabetes can also trigger extreme hunger or polyphagia, causing people to experience an insatiable appetite and consume excess food. Paradoxically, unexplained weight loss is another feature, especially, in people with type 1 diabetes, despite increased hunger and food intake. Fatigue is also a common symptom that causes people with diabetes to feel generally tired. Vision problems are common, with blurred vision and difficulty focusing being frequently experienced. Diabetes raises blood sugar levels, which slows wounds from healing (Sami *et al.*, 2020). Cuts, wounds, and infections may heal slowly or not at all. The presence of diabetes has been associated with an elevated likelihood of developing infections in the skin, urinary system and vaginal regions. People with diabetes may develop neuropathy, which causes numbness and tingling. Degeneration frequently begins in the feet and legs.

Blood glucose fluctuations can cause mood swings, irritability, and emotional control issues (Mokdad *et al.*, 2015). Patients may also exhibit ketoacidosis, which is more common among people with type 1 diabetes which is characterized by a patient's breath smelling fruity or alcoholic. The observation of these symptoms can assist medical practitioners in the early diagnosis and effective diabetes management.

Causes and Risk Factors: Metabolic diseases are conditions where the body's metabolic processes fail to operate right. Causes of diabetes can include genetics, changes in behavior, and things outside of the person's control. A person's genes and family history greatly affect their diabetes risk. Family history, genetics, and race or culture increase type 2 diabetes risk (Mokdad *et al.*, 2015). Type 2 diabetes is linked to poor diet, sedentary lifestyle, obesity, and smoking. Overweight people are more likely to develop type 2 diabetes. Researchers argue those who eat poorly—eating at irregular times, eating too many calories, or not enough fiber—are more likely to develop diabetes. External factors can also affect the growth of diabetes. Adopting unhealthy habits has been linked to living in cities, and being around pollution, including natural toxins, has been linked to a higher risk of getting diabetes (Mokdad *et al.*, 2015). The effects of long-term stress on hormone balance and the growth of unhealthy ways of coping can increase people's likelihood of developing diabetes. The considerations above underscore the necessity of employing a comprehensive strategy in mitigating the risk of diabetes, encompassing hereditary factors, lifestyle adjustments, and environmental stressors.

Distribution of Risk Factors: A pie chart can show population risk variable distribution. Based on statistical data, the pie chart shows Saudi Arabia's diabetes risk factors.

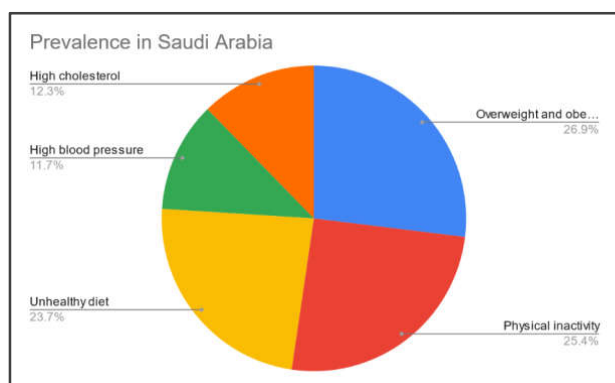


Figure 3. Shows the data as a pie chart

The Saudi Arabian diabetes risk factor pie chart shows a diverse distribution of risk factors. While genes play a significant role, lifestyle and environment also increase the risk. These risk factors must be addressed in individualized treatment plans to reduce the diabetes epidemic (Mokdad *et al.*, 2015). Additionally, early identification of genetic risk through family history and genetic testing can help individuals implement preventive measures.

DISCUSSION

This study examines the incidence of diabetes in Saudi Arabia, its consequences, how well preventative and control approaches work as well as the challenges and solutions to this rising health issue. The incidence of Diabetes has increased from 12.4% in 1995 to 28.6% in 2023 in Saudi Arabia. Notably the increase in the prevalence rate of the disease has been highest among the senior population whose incidence currently stands at 45.2% (Mokdad *et al.*, 2015). The ramifications of the increased incidence of diabetes extend beyond these figures. For instance, the rising incidence of the disease places a considerable strain on the healthcare system, and diminishes the overall well-being of affected individuals. Additionally, the rising incidence presents budgetary challenges for effective treatment and

management strategies. The increased incidence of diabetes burdens healthcare resources and requires significant investment in diabetes treatment and educational initiatives.

The Efficacy of Prevention and Control Measures: The Saudi government has implemented a range of interventions to prevent and manage diabetes, including promoting healthy lifestyles, increasing healthcare access and funding research. Public education campaigns have encouraged healthy eating and exercise to reduce lifestyle-related risk factors (Al-Hanawi, Chirwa, & Pulok, 2020). Improved healthcare access has enabled diabetes patients to receive timely and adequate care, which helps manage this chronic condition. Despite increased efforts of managing the disease, rising diabetes rates necessitate further action. The issue at hand is influenced by a multitude of intricate aspects, including but not limited to the aging population, escalating rates of overweight and obesity, and shifts in lifestyle patterns (Al-Hanawi, Chirwa, & Pulok, 2020). An all-encompassing approach that incorporates timely identification, extensive public awareness initiatives, and policy interventions aimed at addressing the fundamental factors contributing to the illness, such as unhealthy eating habits and a lack of physical activity, has the potential to enhance preventive and control endeavors. One of the fundamental obstacles encountered in managing diabetes within Saudi Arabia pertains to the imperative of implementing comprehensive and sustainable plans that encompass not just the treatment but also primary and secondary preventive measures (El Bcheraoui *et al.*, 2014). An integrated system is essential due to the significant influence of genetic factors and lifestyle choices. Implementing a comprehensive approach requires addressing dietary patterns, encouraging regular physical activity, and improving early detection and effective treatment. Another pressing issue that needs attention is the need to alleviate disparities in healthcare accessibility and the varying socio-economic conditions within the community. To proficiently address diabetes management, it is necessary to establish a system that guarantees fair and unbiased availability of healthcare services of superior quality to individuals across all demographic categories, irrespective of their socio-economic standing or geographical placement (Sami *et al.*, 2020). Saudi Arabia's future success in managing diabetes depends on its ability to implement these programs (Sami *et al.*, 2020). Medical research and technological advances, such as cheaper and more accessible medications, can improve the outlook for diabetes patients.

CONCLUSION

This paper demonstrates the severe epidemiological impact of diabetes in Saudi Arabia, with its rising prevalence. The aforementioned notable discoveries emphasize the necessity of addressing this escalating matter of public health. The prevalence of diabetes has experienced a substantial rise, escalating from 12.4% in 1995 to 28.6% in 2023. Notably, the incidence rate among older adults is at 45.2%. The statistics above underscore the swift advancement of diabetes and its substantial ramifications on the healthcare system, quality of life, and economic resources. Addressing diabetes in Saudi Arabia is critical. Awareness campaigns, promotion of healthy lifestyles, and equitable healthcare access should be part of the nation's primary prevention plan. The Saudi government must also fund research into the complex genetic, behavioral, and environmental factors contributing to this common disease. Future research should investigate genetic predisposition to diabetes, lifestyle modifications, and innovative diabetes management strategies. Improved policies should increase healthcare access for all demographic groups, promote preventive measures, and raise public awareness of health issues. Diabetes and its many effects must be addressed holistically to ensure population health.

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