

A Review of Prevalence of Obesity in Saudi Arabia

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Received date: September 13, 2016; Accepted date: October 20, 2016; Published date: October 25, 2016

Citation: M Alqarni SS (2016) A Review of Prevalence of Obesity in Saudi Arabia. J Obes Eat Disord 2:2. doi: 10.21767/2471-8203.100025

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Abstract

Over the past 3 decades, the prevalence of overweight and obesity has increased dramatically worldwide. The rising trend of obesity indicates that this increase is not only confined to the developed world, but also extending towards the developing world. In the context, Saudi Arabia is now among the nations with the highest obesity and overweight prevalence rates due to a number of factors. This research explores and evaluates the prevalence of obesity in Saudi Arabia on the basis of the findings of previous literature. The research reveals that the rate of obesity is significantly high in the country among different age groups and occupations; at different locations in the country; and among both males and females. The main factors causing obesity include family history, diet pattern and eating habits, genetic factors, marital status, hypertension and lack of physical activities; while, the major consequences are cardiovascular diseases, diabetes, cancers, and Ischemic heart disease. The research stresses on the need to raise awareness regarding obesity and design efforts and strategies to combat it in the country.

Keywords: Obesity, Heart disease, Cardiovascular, Overweight, Sedentary lifestyles, Osteoarthritis, Body mass index, Anthropometric

Introduction

The prevalence of obesity, over the past 3 decades, has increased in many countries around the world. It is defined by a 30 or higher body mass index (BMI) [1]. The problem of obesity extends globally as estimated by the WHO. In 2008, worldwide 1.5 billion adults were overweight, where nearly 300 million women and over 200 million men were obese. However, across different nations, the prevalence of obesity varies, ranging from below 5% in Japan, China, Indonesia, India, and certain African countries to over 75% in Nauru and Samoa. In addition, childhood obesity is also on the rise globally, and an epidemic in some countries. Worldwide, 22 million children approximately, under age 5, are estimated to be overweight. Obesity prevalence has also increased dramatically among children aged 6-17 years, which is extending into the developing world from the

developed nations. The rising trend, as indicated by international data, is not confined to the developed world, and it is predicted that by 2030, a majority of adult population of the world would be either obese or overweight [2].

In the rise of obesity and overweight, the interaction of a number of factors is contributing, which include metabolic, genetic, environmental, and behavioural influences. According to Mahmood and Arulkumar, the rapid growth in the rate of obesity is directly contributed by environmental and behavioural factors, rather than the biological factors. Moreover, racial or ethnic differences, consumption pattern, and lifestyle also influence the rate of obesity. For instance, as compared to rural areas, people in urban areas have higher obesity rate, possibly due to consumption of high-fat diets and more sedentary lifestyles. For daily living, the amount of energy spent has also reduced over the years, which also promotes obesity. Obesity is also often associated with high socio-economic status; as populations in the developed world are mostly affected by obesity.

Over the past few decades, Saudi Arabia has become increasingly westernized, and now it has one of the highest obesity and overweight prevalence rates [3]. Obesity in the country is a major cause of concern, where 7 out of 10 people are experiencing the problem [4]. Previous studies related to prevalence of obesity in the Kingdom of Saudi Arabia (KSA) indicate an increasing trend in obesity and overweight, which are major sources of a number of other diseases, including hypertension, diabetes, obstructive sleep apnea, hyperlipidemia, and osteoarthritis [5].

The current research study aims to explore and evaluate the prevalence of obesity in Saudi Arabia. Based on findings of previous literature, the study examines the prevalence rate in the country, and explains its causes and consequences.

Methodology

The study adopts a qualitative approach and follows a review-design to explore the research problem. It performs a literature review to evaluate the prevalence of obesity in the KSA, and explain its causes and consequences in the country. It focuses on recent Saudi-specific literature and studies on obesity and

analyses the key findings. The research also evaluates and analyses secondary quantitative data specific to obesity in the KSA.

Literature Review

Obesity is regarded as a significant public health issue, which has raised a concern globally. The WHO claims that, obesity has more than doubled worldwide, since 1980. More than 1.9 adults were overweight, in the year 2014, including over 600 million obese individuals. 39% of the adults were overweight and 14% were obese. Moreover, it is found that 41 million children (under age 5) around the world in 2014 were either overweight or obese [6]. Previous studies have revealed that obesity is among the major cause of co-morbidities, including cardiovascular diseases, diabetes, cancers, and the related issues that may lead to morbidity and mortality. In most of the countries, the high total obesity and overweight cost represents a relative economic burden on the GDP. Over the last decade, the prevalence of obesity has increased significantly in several developed and developing countries [7]. The current research paper focuses on obesity in Saudi Arabia, which has now one of the highest obesity and overweight prevalence rates [3].

Sabra examine obesity among female nursing students in Dammam, Saudi Arabia using waist to hip ratio (WHR) and body mass index (BMI). The study collected data with the help of an interviewer-administered questionnaire, from a sample of 260 female nursing students. The results of the study indicate the dietary pattern and life style, according to which 71.5% of the respondents do not share family members in their meals, 46.9% watch television while eating, and 35.7% take snacks as their main eating pattern. In addition, 82.7% of the students consume fast/junk food 1 to 6 times/week and 73.1% consume soft drinks more than 7 times/week. According to the BMI results, almost half of the students (51.5%) have normal weight; and 23.1% and 3.8% are overweight and obese respectively. It is also found that 19.2% of the respondents are underweight. 33% have abnormally unacceptable WHR, which is more prevalent among those who are found overweight by BMI. It is also observed that family history is significantly associated with prevalence of obesity in female nursing students.

It is argued that data on obesity related to Kingdom of Saudi Arabia (KSA) is non-existent, which restrained evaluation of government efforts in controlling obesity trends in the country [8]. In this regard, Memish et al. conducted a national survey to examine obesity and its associated factors in KSA; and in the process, interviewed 10,735 individuals aged 15 years and older. The research collected data regarding physical activities, diet, health-related behaviours and habits, socio-demographics characteristics, anthropometric measurements, use and access to healthcare, and chronic diseases of the respondents using computer assisted personal interviews. The results reveal that 28.7% of the total respondents are obese, with a BMI greater than 30 kg/m², which is more prevalent among women (33.5%) than men (24.1%). Obesity, among men is associated with diet, marital status, hypertension, hypercholesterolemia, diagnoses of diabetes, and physical activity. Among women, it is related with

education, marital status, hypertension, and chronic diseases' history.

In many developing societies, high caloric intake, decreased physical activity, and adoption of western lifestyle are contributing toward the prevalence of obesity [8]. In addition, genetic factors also influence obesity and are related to BMI [9]. Obesity has become an epidemic at global level, and widely regarded as a public health problem. Due to its related diseases, it is considered as major concern in KSA and other gulf states. [9], in the context of KSA, examine association between obesity (BMI), fat mass and obesity-associated gene (FTO), glucose, and other metabolic-related traits. The study uses data of 186 female preparatory students of a university, and finds that one third of the students have a high glucose level (HGL), and one tenth are non-obese. Moreover, 50% of the students with T-allele have heterozygous FTO.

According to Horaib et al., obesity is a heritage of modernization of society. It involves faulty dietary habits, unhealthy food, less physical activity, and increased stress. In the Middle Eastern countries, these changes are drastic in the last four decades. The daily per capita consumption, during this period, has increased by 143.3% in the KSA. Moreover, the consequences are evident with the significant increase in prevalence and incidence of lifestyle-related diseases, which include ischemic heart diseases, diabetes, and hypertension [10], in the context of obesity, conducted a nationwide study and covered all five KSA military regions. Using a random (multistage stratified) sample of 10,229 military personnel, the research finds that 40.9% of the respondents are overweight; 42% have central obesity and 29% are obese. On the basis of multivariate analysis, results reveal that education years, age, and family history of hypertension and diabetes significantly influence the increase in BMI. On the other hand, smoking, higher rank, heavy physical activities, and fruits intake are negatively associated with BMI. The result reveal that, among military personnel in Saudi Arabia, obesity is a major health problem, especially among soldiers, which associates with physical activity and unhealthy dietary habits.

Overweight and obesity are increasing in KSA, especially in females, and they are among the well-known causes of coronary artery disease (CAD) performed a national epidemiological health survey by collecting data from 17,232 Saudi households aging between 30-70 years [11]. The research study finds prevalence of overweight and obesity equaling 36.9% and 35.5% respectively in KSA. Male are found to be significantly more overweight; while female have more prevalence of obesity than the opposite gender. Similarly, Ahmed et al. [12] provide epidemiological data on obesity prevalence in Hail, KSA. Using data of 5000 Saudis, extracted from 30 primary healthcare centers, the study finds overall obesity prevalence of 63.6% in Hail region. Furthermore, 71% females and 56.2% males are obese in the region.

For effective obesity prevention and management in youth, a better understanding of the association between lifestyle factors and obesity is necessary. To measure obesity among Saudi adolescents collected data from 2906 male and 1400 female secondary school participants, residing in Riyadh, Jeddah, and

Al-Khobar, KSA [13]. Based on a variety of measurements (BMI, WHR, physical activity, screen time, and dietary habits), the research finds that obese individuals (both male and female) are significantly less active than non-obese adolescents. The prevalence of overweight and obesity is equal to 43.6% and 34.8% in males and females respectively. Using logistic regression, it finds that obesity has a significant inverse relation with vigorous physical activity levels, frequency of breakfast, vegetable intake, and consumption of sugar-sweetened beverages [14] conduct another study on prevalence of obesity, overweight, and abdominal obesity among Saudi adolescents residing in urban areas (Riyadh, Jeddah, and Al-Khobar). Using a sample size of 2908 students (1507 females and 1401 males), and based on sex- and age-specific BMI and WHR, the research finds that prevalence of obesity equals 14% and 24.1%; prevalence of overweight equals 20.8% and 19.5%; and prevalence of abdominal obesity is equal to 30.3% and 38.7% in females and males respectively. Overall, a high prevalence of obesity and overweight among Saudi adolescents is observed, especially in students of private schools.

Al-Mohaimeed et al. [15] address school children obesity in Saudi Arabia, as childhood obesity is regarded as a major issue of public health in the region. For the past 20 years, childhood obesity in KSA is increasing consistently. The sample of the research consists of 874 primary school children (6-10 years). According to the research findings, the mean BMI is high and mean percent body fat is low in girls as compared to boys. The prevalence of obesity in girls is equal to 34.3%, which is higher than that of boys (17.3%). In a similar study [16], evaluate obesity in children in Saudi Arabia, which is becoming a public health problem in the country, and has emerged as a global epidemic. For this purpose, the researchers examine data of 283 male primary students from Tabuk, KSA, and report obesity prevalence of 18.1% (using BMI). The research study also finds significant relationships between childhood obesity and fast food intake, sleeping interruptions/disturbances, physical activities, and hours of watching TV per day. Shehri et al. [17] also investigate obesity among Saudi children. Based on the findings of previous studies (2000-2012) regarding childhood obesity in KSA, the study demonstrated that there is high prevalence of obesity in the country. The recent data reveals that 23% and 9.3% of school-age children are overweight and obese respectively. Among preschool children, the rates of overweight and obese children are 15% and 6% respectively.

Al-Quwaidhi et al. [18] discuss current trends and future projections of adult obesity prevalence. The research forecasts that the overall obesity will increase to 41% in men and 78% in women by 2022 in Saudi Arabia. Baig et al. [19] examine prevalence of obesity in Jeddah, KSA, among university students, and measures their attitude towards Cardiovascular Disease

(CVD) risk factors (Table 2). The researchers, using data of 610 students, find that 7.9% of the students are severely obese, 10.7% are moderately obese, 29.8% are overweight, and 7.5% are hypertensive. Moreover, the respondents consider obesity, high blood pressure, increased cholesterol level, and smoking as the main causes of CVD. According to Alzahrani et al. [20], Saudi Arabia is experiencing a growing obesity crisis, and requires a focus on healthy eating habits, which can be promoted and facilitated by physicians. It is likely that physicians taking healthy diet themselves would effectively counsel the significance of proper nutrition. In the context [20], evaluate prevalence of obesity among physicians from Saudi board, in Aseer region. According to the results, based on the data of 211 physicians, 23.2% and 36% of the residents are obese and overweight respectively. Moreover, in male resident physicians, obesity is significantly higher than females (31.9% vs. 7.1%). Eating habits, including pizza, sweets, potato chips, and no consumption of skimmed or semi-skimmed milk is among the factors significantly affecting obesity among resident physicians.

Data Analysis and Discussion

Saudi Arabia has a relatively high rates of overall obesity and overweight, which are significantly increasing over the years [11,21,22].

According to World Atlas data, Saudi Arabia is in list of most obese counties in the world (Figure 1), which has resulted from less regular exercise or physical activities, increased consumption of western fast food, and the use of large community platters [23].

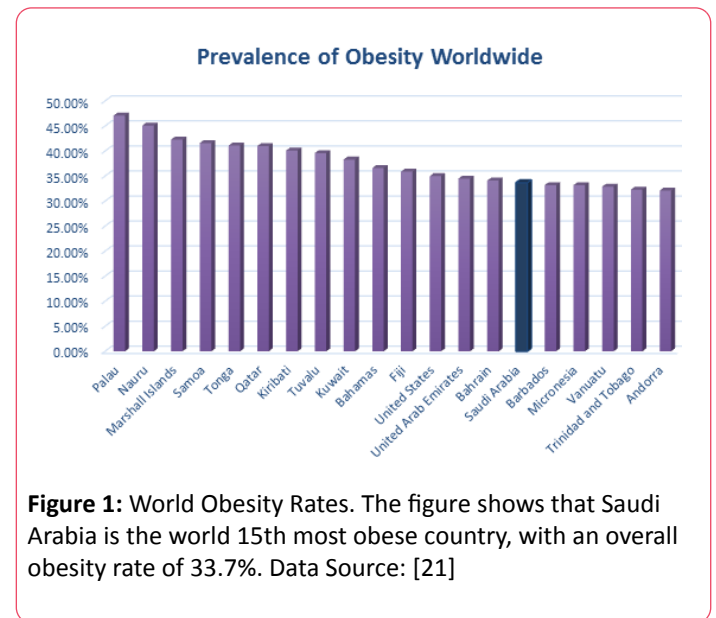


Figure 1: World Obesity Rates. The figure shows that Saudi Arabia is the world 15th most obese country, with an overall obesity rate of 33.7%. Data Source: [21]

Table 1: Obesity prevalence (%) in KSA. The above table shows existing trends and future projections of gender-specific and overall obesity prevalence in KSA. According to the statistics, rate of obesity is continuously increasing (as shown in the Figure 2); Saudi women have a higher obesity rate than men; and the overall rate is projected to reach 59.5% by 2022. Data Source [23].

Year	Men	Women	Overall
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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

Table 2: Review Summary.

Research Study	Location	Sample Size	Gender	Obesity and Overweight %	Other Findings
Sabra	Dammam	260	Female	Obesity: 3.8%; Overweight: 23.1%	Family history is significantly associated with prevalence of obesity in female nursing students; and overall high prevalence of obesity is estimated. It is the major cause of co-morbidities, including cardiovascular diseases, diabetes, and cancers.
Memish et al.	National	10,735	Male and Female	Obesity: 28.7% (Men=24.1% and Women=33.5%)	Obesity, among men is associated with diet, marital status, hypertension, hypercholesterolemia, diagnoses of diabetes, and physical activity. Among women, it is related with education, marital status, hypertension, and chronic diseases' history.
El Nashar et al.	Taibah University, Medina	186	Female	1/10th respondents are non-obese	1/3rd of the students have a high glucose level (HGL) and 50% of the students with T-allele have heterozygous FTO. Genetic factors also influence obesity.
Horaib et al.	5 Military Regions	10,229	Male	Overweight: 40.9%, Obesity: 29%, Central Obesity: 42%	Education years, age, and family history of hypertension & diabetes significantly influence the increase in BMI. On the other hand, smoking, higher rank, heavy physical activities, and fruits intake are negatively associated with BMI. Ischemic heart diseases, diabetes, and hypertension are its major consequences.
Al- Nozha et al.	National	17,232	Male and Female	Overweight: 36.9%, Obesity: 35.5%	Male are found to be significantly more overweight; while female have more prevalence of obesity than the opposite gender.
Ahmed et al.	Hail	5,000	Male and Female	Obesity: 63.6%	71% females and 56.2% males are obese in the region.
Al-Hazzaa et al.	Riyadh, Jeddah, and Al-Khobar	4,306	Male and Female	Overweight & Obesity: Males=43.6% ; Females=34.8%	Obesity has a significant inverse relation with vigorous physical activity levels, frequency of breakfast, vegetable intake, and consumption of sugar-sweetened beverages
Al-Hazzaa et al.	Riyadh, Jeddah, and Al-Khobar	2,908	Male and Female	Obesity: Male=24.1%; Females=14%	Prevalence of overweight equals 20.8% and 19.5%; and prevalence of abdominal obesity equals to 30.3% and 38.7% in females and males respectively.
Al-Mohaimed et al.	Buraydah and Unaiza	874	Male and Female	Obesity: Girls=34.3% and Boys=17.3%	The mean BMI is high and mean percentage body fat is low in girls as compared to boys.
Elbadawi et al.	Tabuk	283	Male	Obesity: 18.1%	There are significant relationships between childhood obesity and fast food intake, sleeping interruptions/disturbances, physical activities, and hours of watching TV per day.

Shehri et al.	National	-	Male and Female	Overweight: 23%, Obesity: 9.3%	Among preschool children the rates of overweight and obesity are 15% and 6% respectively.
Al-Quwaidhi et al.	National	-	Male and Female	-	The overall obesity will increase to 41% in men and 78% in women by 2022.
Baig et al.	Jeddah	610	Male and Female	Overweight: 29.8%, Moderately Obese: 10.7%, Severely Obese: 7.9%	The respondents consider obesity, high blood pressure, increased cholesterol level, and smoking as the main causes of Cardiovascular Disease.
Alzahrani et al.	Aseer	211	Male and Female	Overweight: 36%, Obesity: 23.2%.	Eating habits, including pizza, sweets, potato chips, and no consumption of skimmed or semi-skimmed milk are among the factors significantly affecting obesity.

From the above summary of the literature specifically related to obesity prevalence in Saudi Arabia (Table 2), it is observed that the country is experiencing the obesity crisis, which has become a public health issue. High prevalence of overweight and obesity is observed at regional and national level; in different age groups (adults, adolescents and children); and among both males and females. Obesity is found greater in males in urban areas; however, overall it is more prevalent among females. The determinants of obesity include, family history of obesity, diet, marital status, diagnoses of diabetes, physical activity, education, age, hypertension, high glucose level, eating habits, sleeping interruptions and genetic factors. The consequences of obesity in the country include cardiovascular diseases, diabetes, cancers; hypertension, hypercholesterolemia, and Ischemic heart disease.

hypertension, diabetes, obstructive sleep apnea, CVD etc. The research paper evaluates prevalence of obesity in Saudi Arabia by reviewing previous literature. According to the findings, the rate of obesity is significantly high in the country, and expected to increase in future. There is a dire need to raise the issue at the national level, and design efforts and strategies to combat obesity in the country, through involvement of all stakeholders, including policy makers, educators, healthcare providers, and individual citizens.

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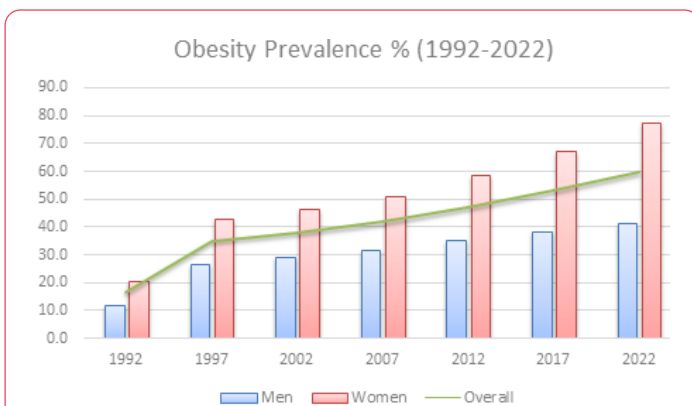


Figure 2: Obesity Prevalence % (1992-2022). As indicated earlier, the current research paper adopts a qualitative approach and follows a review-design to explore the research problem; i.e. to examine the prevalence of obesity in KSA, and explain its causes and consequences, the study performed a detailed literature review. The following table presents a summary of the reviewed studies in order to highlight and discuss the key statistics and findings. Data Source: [18].

Conclusion

Obesity is regarded as one of the most common health issue in different parts of the world. In Saudi Arabia, there is an increasing trend in the prevalence of obesity and overweight, which are also the sources of various diseases including

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