



Comparative Study of Obesity Prevalence, Dietary Pattern and Physical Activity among Male Adult Saudi Citizens and Foreign Workers: The Case of Al-Qassim, Saudi Arabia

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Abstract

Background: Overweight and obesity become a worldwide epidemic health problem. Unhealthy eating habits, fast food intake, and physical inactivity are factors that lead. Accelerating the economy makes Saudi Arabia the leading destination for foreign workers from neighboring countries in the Middle East. Saudi Arabia's population stood at 30.8 million at the end of 2014, there were 20.7 million Saudis, making up 67 per-cent of the people, while the number of foreigners stood at 10.1 million or 33 percent. For foreign workers, scientific research on the incidence of overweight/obesity and related factors is nearly non-existent.

Objective: The current research examined the disparities among male adult Saudi citizens and foreign workers residing in Qassim concerning obesity prevalence, eating habits, fast food intake, and physical activity.

Methods: A cross-sectional study was employed among the 1200 male adults aged 20-49 years (600 Saudi citizens and 600 foreign workers). This research was drawn randomly from public centers in Qassim. Bodyweight and height were measured using standardized methods.

Results: The results showed that overweight was highly prevalent among male adult Saudi citizens and foreign workers living in the Qassim region as a result of the altered lifestyle patterns, reduced physical activity, and unhealthy dietary habits.

Conclusion: Saudi men have a significantly higher rate of obesity and a lower rate of physical activity levels. While healthy dietary patterns such as eating whole grains, fruits, and vegetables dimensioned among Saudi and foreign workers men, fast food consumption is widespread and will undoubtedly continue and increasing.

Keywords

Dietary pattern; Overweight; Obesity; Physical activity; Food; Nutritional disorders; Fruits and vegetables

Introduction

Obesity is a complex disorder involving an excessive amount of body fatness which adversely affects health. Worldwide obesity has nearly doubled since 1980. There are more than 1.4 billion overweight adults globally, of them about 300 million women and 200 million men were obese [1]. It increases the risk of many diseases, such as diabetes, heart, and hypertension. The fifth leading cause of global mortality is overweight and obesity. Statistics showed that at least 2.8 million adults die each year caused by obesity [2]. From the data, 44% of persons are diabetic, 23% have heart diseases, 7% have cancer and 41% of these diseases are caused by obesity [3].

Obesity is primarily defined by a BMI, determined by measuring the weight of the body in kilograms by meters of height. Despite that BMI does not directly measure body fat, BMI is a reasonable estimate of body fat. When an individual's BMI equals 30 or higher, he/she considered obese [4]. Obesity occurs as a result of positive energy imbalance when individuals take in more food energy than his burn through normal daily activities and exercise. Therefore, the body stores these excess calories primarily as fat in adipose tissue [5]. Obese people are more likely to develop several potentially dangerous health problems examples of these are type 2 diabetes, high blood pressure, metabolic syndrome, heart disease, stroke, cancer, breathing disorders, gallbladder disease, nonalcoholic fatty liver disease, and osteoarthritis [6]. This may explain how obesity increased the risk of many chronic diseases [7,8].

Dietary pattern

A healthy diet is essential to maintain overall health. It provides the human body with essential nutrients. On the other hand, an unhealthy diet is a significant risk factor for many chronic diseases [9]. A healthy diet means eating the right quantities from different foods groups to achieve a healthy life. Some people defined diet as a dietary regimen to lose weight. However, diet referred to all foods eaten every day. Therefore, a healthy diet is a nutritional lifestyle that promotes good health and must include several food groups (cereals, vegetables, fruits, dairy products and meats) [10].

The healthy dietary pattern helps to manage body weight includes consuming a variety of food groups, eating breakfast, and smaller meals throughout the day, avoid eating at night, taking time to chew your food, eating with others whenever possible and enjoy mealtimes [11]. A previous study found that eating a big breakfast of 700 calories with reduced intake at dinner promotes weight loss and reduces risks for metabolic syndrome [12]. Saudi dietary guidelines published in 2012 promote eating a nutritionally adequate diet includes a variety of food groups especially whole grains, fruits and vegetables, limit consumption of foods with a high content of fat, saturated fat, cholesterol, salt and sugar, achieve and maintain healthy body weight and increase physical activity [13].

Fast food

During these last decades, dramatic changes have occurred in dietary patterns, particularly an increase in fast food consumption defined as any meal with low preparation time, typically referred to as food sold in restaurants with pre-heated or pre-cooked ingredients [14].

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Fast food can cause significant health harm and obesity, diabetes and cardiovascular disease [15,16]. Fast foods have poor nutritional value as they have high fat, saturated fat, calories, and sodium content. It provides a few vitamins and minerals. Furthermore, unsaturated fats are seldom contained in fast foods. Instead, saturated fats are high in most quick foods [17].

Physical activity

Physical activity is described as body movement which results from skeletal muscle contraction and increases energy costs in the body. Physical inactivity is the fourth major risk factor for non-communicable diseases and millions of deaths each year worldwide. Moreover, physical activity is a crucial factor to achieve energy balance and weight control. Adults are recommended to have at least 30 minutes of physical activity each day [18].

Research context and objective

Saudi Arabia's culture has evolved in the last few decades with harmful eating habits such as high fast food intake, low fruit and vegetable intake, and physical inactivity. Accelerating the economy makes Saudi Arabia the leading destination for foreign workers from neighboring countries in the Middle East. Saudi Arabia's population stood at 30.8 million at the end of 2014, there were 20.7 million Saudis, making up 67 percent of the people, while the number of foreigners stood at 10.1 million or 33 percent. For foreign workers, scientific research on the incidence of overweight/obesity and related factors is nearly non-existent. The current study aimed to determine whether lifestyle, dietary patterns were potential risk factors for morbid obesity in Saudi citizens and Foreign workers in the Qassim region.

Materials and Methods

Design and respondents

This latest work is a cross-sectional multicenter analysis. The sample was drawn randomly from public centers in the three main cities in the Qassim region: Buraydah, Unaizah and Arras. Participants were Saudi citizens or foreign workers, male adults aged 20-49 years, and free of any physical health problems. The total sample size included in the present study consisted of 1200 participants (600 Saudi citizens and 600 foreign workers).

Anthropometric measurements

Bodyweight with calibrated portable scales was measured to the nearest 100 g. Minimum clothes and without shoes is weighed. The body mass index (BMI) was calculated by meter-square height as a kilogram weight scale. Bodyweight has been classified in accordance with WHO classifications according to underweight BMI (BMI<18.5), standard BMI (BMI: 18.5-24.9), overweight (BMI: 25-29.9), and obese (BMI<30).

Dietary pattern

There were 14 elements in the questionnaire to gather dietary patterns. Data was completed from participants through face-to-face interviews. Nutritional trends included the number of times an average week of food consumed by participants. The quality and reliability of the questionnaire are collected.

Fast food consumption

The questionnaire for fast food consumption selection consisted of 16 objects. Data from participants is done via a face-to-face interview.

Fast food consumption details included the volume of fast food (in general) eaten by participants every average week. The quality and reliability of the questionnaire are collected.

Physical activity level

The Physical activity of the respondents was collected with the use of a global physical activity questionnaire developed by the World Health Organization [19]. The questionnaire consisted of 16 items. Data was completed from participants through face-to-face interviews. Physical activity was classified to three levels: low, moderate, and high physical activity level.

Data statistical analysis

To analyze the data, SPSS version 21 was used. Numbers and percentages of the findings have been given. For categorical variables, Chi-square analyzes were used. All P values reported were produced based on two-tailed tests. Differences at p-value<0.05 were considered statistically significant.

Results

Our findings indicated that 39.3% of Saudi participants were overweight, and another 27% were obese (Table 1). On the other hand, 30.5% of foreign workers participants were overweight, and only 19% were obese. The difference between the two groups was significant (<0.001) in Table 1.

As shown in Table 2, only 17.2% of Saudi subjects and 40.7% of foreign workers subjects eat breakfast daily and the difference was significant (p-value<0.001). Regarding fresh fruits and vegetables, only 10% of participants or less eat them on a daily basis. About two-thirds of Saudi and Foreign workers participants consume fresh fruits, and vegetables 1-3 times per week. Despite that daily consumption of dairy products was low in both groups (<19%), a significantly higher rate of foreign workers participants consumed milk, yogurt, and cheese than Saudi participants. In addition, our results showed that 32.6% of Saudi and 47.2% of foreign workers subjects never eat whole grains. However, 22.8% of Saudi and 38.7% of foreign workers subjects eat refined grains daily. About half of the participants consume fresh fish 1-3 times weekly (Table 2).

As shown in Table 3, only 15.4% of Saudi and 20.1% of foreign workers' subjects never eat fast food. Contrariwise 4.2% of Saudi subjects and 7.6% of foreign workers subjects eat fast food daily. However, 64.4% of Saudi and 58.7% of foreign workers eat fast food 1-3 times weekly. Interestingly, more than half of Saudi participants eat burgers, French fries, pizza, fried chicken, shawarma, falafel, pastries, croissant, chocolate, cake, biscuits, donuts, and sweetened fruit juices 1-3 times per week. Similarly, more than half of foreign workers participants eat mentioned fast-food meals 1-3 times per week with exception to burgers (41%), pizza (41.2%) and chocolate (46.1%) (Table 3).

Table 1: Body weight status among the study subject.

	Saudi workers	Foreign workers
Body weight status	Frequency (%)	Frequency (%)
Under weight	4 (0.7)	6 (1)''
Normal weight	198 (33)	297 (49.5)'''
Overweight	236 (39.3)	183 (30.5)'''
Obesity	162 (27)	114 (19)'''
Total	600 (100)	600 (100)

Saudi citizens vs foreign workers : ''p<0.05; '''p-value<0.001

Table 2: Dietary pattern among Saudi and Foreign workers participants.

Dietary pattern	Saudis (per week)				Foreign workers (per week)				p-value
	Never	1-3	4-6	Daily	Never	1-3	4-6	Daily	
Breakfast	6.10%	33.60%	43.10%	17.20%	15%	16.30%	28%	40.70%	<0.001
Vegetables	5.70%	65.40%	22.60%	6.30%	6.60%	58.80%	25.70%	9%	0.193
Fresh Fruits	11.70%	67.70%	16.30%	4.30%	13%	63.40%	17.80%	5.80%	0.605
Milk	23.40%	53.40%	17.40%	5.60%	12.80%	39.80%	28.60%	18.80%	<0.001
Yogurt	19.90%	57.20%	19.20%	3.70%	26.30%	44.30%	19.60%	9.80%	<0.001
Cheeses	10.10%	54.30%	26.60%	9%	8.30%	45%	32.10%	14.60%	0.006
Egg	21.90%	55.20%	18.60%	4.30%	17.40%	48.60%	25.60%	8.40%	0.003
Whole grains	32.60%	46.60%	14.60%	6.30%	47.20%	24.60%	16.50%	11.70%	<0.001
Refined grains	7.90%	36.10%	33.20%	22.80%	11.40%	23.20%	26.70%	38.70%	<0.001
Fresh fish	44.10%	53.20%	2%	0.70%	45%	51.90%	1.20%	1.90%	0.958
Canned fish	57.40%	35.40%	5.80%	1.40%	43.80%	48.80%	6.70%	0.70%	<0.001
Nuts	39.40%	47.70%	11%	1.90%	49.40%	38.20%	11.40%	1%	0.03

Table 3: Fast food types consumed by Saudi and Foreign workers participants.

Fast food types	Saudis (per week)				Foreign workers (per week)				p-value
	Never	1-3	4-6	Daily	Never	1-3	4-6	Daily	
Fast food	15.4%	64.4%	15%	4.2%	20.1%	58.7%	13.6%	7.6%	0.089
Burgers	36.5%	55.9%	5.7%	1.9%	55.4%	41%	3.6%	0%	<0.001
French fries	27.2%	62.1%	8.1%	2.6%	30.6%	53.7%	13.1%	2.6%	0.098
Pizza	36.4%	59.2%	3.2%	1.2%	52.8%	41.2%	5.3%	0.7%	<0.001
Fried Chicken	37.4%	58.1%	3.5%	1%	26.8%	58.3%	14.2%	0.7%	<0.001
Shawerma	23%	63.8%	10.6%	2.6%	29.2%	49.2%	19%	2.6%	<0.001
Falafel	35.9%	57.2%	4.8%	2.1%	30.6%	50.1%	17.2%	2.1%	<0.001
Hotdog	79.2%	17.4%	2.4%	1%	78.6%	19.6%	1.6%	0.2%	0.207
Pastries and Croissant	30.8%	60.8%	7%	1.4%	37.4%	52.3%	8.9%	1.4%	0.151
Chocolate	17%	66.1%	12.6%	4.3%	34.8%	46.1%	15%	4.1%	<0.001
Chips	45.9%	43.4%	8.1%	2.6%	53.7%	37.4%	7.3%	1.6%	0.133
Soft drinks	13.9%	46.5%	21.9%	17.7%	13%	28.8%	29.6%	28.6%	<0.001
Energy drinks	65%	30.8%	1.6%	2.6%	51%	35.4%	9.3%	4.3%	<0.001
Sweetened fruit juices	22.6%	59.6%	13.7%	4.1%	15.9%	51%	21.2%	11.9%	<0.001
Ice cream	51.4%	44.6%	3.6%	0.4%	57.8%	36.2%	4.7%	1.3%	0.076

Table 4: Physical activity among Saudi and foreign workers participants.

Physical Activity Level	Saudi	Foreign workers	p-value
Low	48.3	20.1	<0.001
Moderate	25.4	33.2	<0.001
High	26.3	46.7	<0.001

Regard physical activity levels, the results indicated that about half of Saudi participants (48.3%) were found with low physical activity, and only (26.3%) were found with high physical activity. By opposition, about half of Foreign workers participants (46.7%) were found with high physical activity. The differences between Saudi and foreign workers participants in physical activity levels were significant (p -value<0.001) (Table 4).

Control of overweight and obesity prevalence is an important public health issue for people live in Saudi Arabia either citizens or residents. Therefore, a national obesity prevention program at the community level is recommended to promote healthier dietary and lifestyle patterns. These programs can encourage and awareness community to adopt a healthier dietary pattern, limit fast food eating, and increase

physical activity levels for them. At the individual level, every person should have at least 30 minutes of moderate-intensity physical activity on five days each week. In addition, unhealthy dietary pattern and fast food consumption might be a factor behind adult body weight gain. Adults who wish to restrict their energy intake should eat a nutritionally adequate diet consisting of a variety of foods and reduce consumption of fat, saturated fat, cholesterol, and added sugar and salt. Adults who eat frequently at fast-food restaurants need to limit the number of fast-food meals eaten.

Discussion

This study compared and described the prevalence of obesity, dietary pattern, fast food consumption and physical activity among a sample of men belonging to different Middle Eastern nationalities (Saudi citizens and foreign workers) living in Qassim region, Saudi Arabia. The results indicate the strong incidence of overweight among both groups (>30.5%) while obesity rate was significantly higher among Saudi men (27% versus 14%). A previous community-based national survey conducted in Saudi Arabia found that the prevalence of overweight and obesity among Saudi men was 42.4% and 26.4% respectively [20]. In Yemen, a previous study indicated that 18% of

foreign workers men were overweight while only 2.5% were obese [21]. We can observe elevation in overweight and obesity rates among foreign workers men living in Saudi Arabia compared with those living in their country. This may be related to changes in their dietary pattern.

Our results clarified that the dietary pattern for both groups moves toward an unhealthy diet with different degrees. Most of Saudi and Foreign workers men did not eat breakfast daily. Breakfast eating is important to weight loss because breakfast eaters tend to eat fewer calories, saturated fat, and cholesterol and have better overall nutritional status than breakfast-skippers [22]. Saudi dietary guidelines recommended to consumed daily 3-5 servings of vegetables and 2-4 servings of fruits [13]. The low rate of Saudi and foreign workers men achieved this recommendation and consumed fruits and vegetables on a daily basis. Eating fruits and vegetables daily is an important part of a healthy diet and reduced the risk of many chronic diseases [23]. Fruits and vegetables are important sources for many nutrients including potassium, fiber, folic acid, and vitamins A, E, and C [24]. Potassium is important to maintain healthy blood pressure, dietary fiber plays role in reducing blood cholesterol and lowering the risk of heart disease, while, folic acid is essential to form healthy red blood cells [25].

Saudi dietary guidelines recommended eating 2-4 servings of dairy products each day [13]. Similarly, the low rate of Saudi and foreign workers men achieved this recommendation and eat dairy products daily. Milk is a nutrient-rich food considered an important source of calcium, vitamin D, and protein. In addition, milk provides phosphorus, potassium, magnesium, and vitamins A, B12, and riboflavin. Therefore, dairy products protect children from rickets and adults from osteoporosis [26]. Both Saudi and foreign workers men consumed more refined grains and less whole grains.

Eating whole grains as part of a daily diet helps to reduce the risk of some chronic diseases [27]. Whole grains are important sources of several nutrients including fiber, B vitamins such as thiamin, riboflavin, niacin and folate, and minerals such as iron, magnesium, and selenium. Fiber helps to provide a feeling of satiety with fewer calories and is important for healthy bowel function [28].

The current report showed that fast food meals becoming epidemic and consumed frequently by Saudi and Foreign workers men. A study found that eating fast food once weekly increases the risk of mortality from coronary heart disease by 20% while the risk increases by 50% for people eating fast food 2-3 times weekly and increases by 80% for people who consume fast food four or more times weekly. Moreover, consuming fast food two or more times per week increases the risk of modality for type 2 diabetes by 27% [29]. Finally, our results confirmed that foreign workers have significantly higher levels of physical activity than Saudi citizens. A previous study found that the prevalence of physical inactivity among Saudis adults is relatively high; 43.7% of Saudi men were physically inactive, 36.5% were moderately active and only 19.8% were active regularly [30].

Conclusion

In summary, Overweight was highly prevalent among male adult Saudi citizens and foreign workers living in the Qassim region as a result of the altered lifestyle patterns, reduced physical activity, and unhealthy dietary habits. Saudi men have a significantly higher rate of obesity and a lower rate of physical activity levels. While healthy dietaries are popular among Saudi and foreign staff, such as consuming whole

grains, fruit, and vegetables, quick food consumption is prevalent and is likely to continue and grow.

Health Promotion and Clinical Implications

Obesity is a disproportionately spread worldwide disease, like all other sources of diseases within the populace. The main processes involve shifts in the intensity between physical and nutritional exercise. The result of this present study provides necessary clinical and organizational implications to Saudi and foreign workers. Obesity is found prevalent in the case of Al-Qassim, Saudi Arabia. Hence, the general finding implies that there is a need for behavioral modification interventions by strengthening the health awareness of the employees. The results of this study should be used as the basis for a company-based health intervention program.

Conflict of Interest

All the authors declared that they have no conflict of interest.

Contributors

Soussia L contributed to the study conception and design, analysis and interpretation of data, and drafting of the manuscript. Al-Ahdal A contributed to the study design, acquisition of data, and critical revision. Ab Elshikh B contributed to the acquisition of data, helped select the questionnaires that were used in the present study. All authors approved the final manuscript as submitted.

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