

Prevalence of Type 2 Diabetes Mellitus and Hypertension in Overweight and Obese People in Riyadh City, KSA 2017

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ABSTRACT

Background: overweight and obesity are well known risk factors for high morbidity and mortality rates and are associated with chronic diseases including hypertension and diabetes.

Objectives: evaluating the prevalence of hypertension (HTN) and diabetes mellitus type II (DMT2) in overweight and obese adult Saudi population. **Methods:** a cross sectional community based study was undertaken among 549 of overweight and obese Saudi subjects in Riyadh region, Kingdom of Saudi Arabia (KSA). All enrolled volunteers were subjected to the following clinical history taking, calculating BMI, diagnosis of HTN and measurement blood pressure.

Results: the age of the subjects was 20-35 years old in 23.9%, 48.2% were 36-50 years old and 27.9% were older than 50 years old. About 55% of respondents were females and 45% were males. 60.8% of subjects were overweight and 39.2% were obese. The HTN and DM prevalence were found to be significantly higher among obese subjects than overweight group.

Conclusion: the results indicated that obese subjects were at increased risk of hypertension and diabetes. Also, obese females were more susceptible to DM and HTN than men.

Keywords: Hypertension, Diabetes mellitus, Obesity, Overweight, Riyadh.

INTRODUCTION

Obesity is defined as the imbalance between the intake of energy and the energy expenditure^(1, 2). Obesity is a global disease and a complex condition that impacts the physical and psychological health of humans⁽³⁾. Also, the WHO defines obesity as major accumulation of excessive fat in the body. A body mass index (BMI) of ≥ 25 kg/m² is defined as overweight⁽⁴⁾.

The negative health impacts of the obesity includes encountering the economic growth and representing a burden on the society and health facilities^(5, 6). Obesity may also result in enhancing chronic non-communicable diseases including diabetes, hypertension (HTN), breathing disorders, osteoporosis and certain types of cancers^(7, 8).

In Saudi Arabia, obesity is related to various chronic diseases thus many studies are focusing on this issue for controlling the high prevalence in our society. The nature of diet, activity, cultural behaviors and education are linked to high incidence of obesity among Saudi population⁽⁹⁾ with a frequency of 285 among males and 44% among females⁽¹⁰⁾.

Complex disorders could induce obesity including endocrine diseases, genetic factors,

metabolic disorders, female gender, old age, economic status and drug abuse⁽¹¹⁾.

Aim of the study

The study aimed at evaluating the prevalence of hypertension (HTN) and diabetes mellitus type II (DMT2) in overweight and obese adult Saudi population.

SUBJECTS AND METHODS

Study design

A cross sectional community based study was undertaken on a random sample of overweight and obese Saudi subjects from February to June 2017 in Riyadh region, Kingdom of Saudi Arabia (KSA).

Sample size and population:

Out of a random sample of 870 adult Saudi population, only 549 were enrolled in the present study, they were diagnosed to be overweight and obese according to their body mass index (BMI) in Saudi population⁽¹²⁾. The inclusion criteria were being older than 20 years old, BMI more than 23 Kg/m² for overweight and more than 25 for obese

subjects. Subjects were interviewed in Malls and community pharmacists.

Study tools

All enrolled volunteers were subjected to the following:

- Clinical history taking including, name, age, gender, history of previous chronic diseases as diabetes mellitus (DM) and hypertension (HTN).
- Calculating the BMI was done using the anthropometric measurements including height and weight according to the following formula: weight divided by the squared height ($BMI = \text{Kg}/\text{m}^2$).
- Diagnosis of HTN: the blood pressure diagnosis was based on the criteria Joint National Committee VII (JNC VII)⁽¹³⁾ as the blood pressure $\geq 140/90$ mm of Hg was considered hypertension which was measured and recorded in two sittings after an interval of 2 min.
- Diagnosis of DM: the diagnosis of diabetes includes fasting plasma glucose level (FPG) after eight hours of fasting, post prandial glucose (PPG) after two hours of eating and random plasma glucose (RPG). Subjects who have a FPG ≥ 126 mg/dL, PPG ≥ 200 mg/dL or RPG ≥ 200 mg/dL were diagnosed as diabetics⁽¹⁴⁾. The test was repeated twice for confirmation of the results.
- **Ethical considerations**
An oral or a written consent were given by the volunteers enrolled in the study. The study was also approved from the Faculty of Medicine.
- **Statistical analysis**
The data were possessed using the Statistical Package for Social Science (SPSS) program version 22. The descriptive statistical data were shown as frequency and percentage. The Chi-square was used for assessing the significance between groups of more variables. P values < 0.05 is statistically significant.

Table (3): prevalence of hypertension among included subjects (549)

Hypertension	Overweight (334)	Obese (215)	p-value
Absent	179 (53.6%)	99 (46%)	0.001
Present	155 (46.4%)	116 (54%)	
Male (247)			
Absent	78 (23.4%)	53 (24.7%)	0.02
Present	75 (22.4%)	40 (18.6%)	
Female (302)			
Absent	101 (30.2%)	46 (21.4%)	
Present	80 (24%)	76 (35.3%)	

RESULTS

Socio-Demographic Characteristics:

A total of 549 subjects were included in the study out of which 23.95 aged from 20-35 years, 48.25 were 36-50 years old and 27.9% were older than 50 years old. More than half of the respondents (55%) were females and 45% were males (Table 1).

Table (1): Socio-Demographic Characteristics (n=549)

Age (year)	Frequency	Percentage (%)
20-35	131	23.9
36-50	265	48.2
>50	153	27.9
Gender		
Female	302	55
Male	247	45

BMI classification

Table. 2 represents the classification of obese and overweight in which 60.8% of subjects were overweight and 39.2% were obese.

Table (2): Anthropometric measures of the study population (549)

BMI classification	Frequency	(%)
Overweight (≥ 23)	334	60.8
Obese ≥ 25.00	215	39.2

Prevalence of hypertension

Table. 3 shows the prevalence of hypertension among overweight and overweight subjects. The hypertension prevalence was found to be significantly higher among obese subjects than overweight group. Also, hypertension was more prevalent among obese female subjects when compared with obese and overweight males.

Prevalence of diabetes mellitus type 2

Table 4 indicates the prevalence of diabetes mellitus among overweight and overweight subjects. Diabetes mellitus was significantly higher

among obese subjects than overweight subjects with a significant higher prevalence among females in the obese group.

Table (4): prevalence of diabetes mellitus among respondents (549)

Diabetes mellitus	Overweight (334)	Obese (215)	p-value
Absent	283 (84.7%)	166 (77.2%)	0.001
Present	51 (15.3%)	49 (22.8%)	
Male (247)			0.001
Absent	164 (49.1%)	87 (24.7%)	
Present	28 (8.3%)	13 (18.6%)	
Female (302)			
Absent	119 (35.7%)	79 (21.4%)	
Present	23 (6.9%)	36 (35.3%)	

DISCUSSION

The present study is a community cross sectional study conducted among 549 adult Saudi subjects who were diagnosed as obese and overweight. The prevalence of hypertension was significantly higher among obese subjects (54%) when compared with 46.4% of overweight population with a higher incidence in males than females. Also, diabetes mellitus was significantly associated with obesity in 22.8% of subjects when compared with 15.3% in overweight subjects and there was a higher prevalence among females than males.

In Aseer region, hypertension and diabetes were significantly correlated with the prevalence of obesity⁽¹⁵⁾. Other studies were carried out in KSA showed that the most common morbidities among obese and overweight subjects in Aseer^(16, 17) and Qassim region⁽¹⁸⁾ were diabetes and hypertension.

A high morbidity rate of diabetes was associated with obesity and would result in impaired glucose tolerance thus increasing the risk of developing diabetes^(19, 20). Among adult Saudi population, the prevalence of diabetes was 8.52% among adult males and 19.48% among females⁽²¹⁾. Also, the body weight gain would result in elevated blood sugar in about 58.3% of obese subjects and 25% of overweight males⁽²²⁾. The blood sugar was reported to be highly prevalent among 4.85 of overweight subjects and 5.85 of obese individuals when compared with 2.95 of normal weight subjects^(23, 24).

The process of glucose intolerance could be attributed to that overweight and obesity are risk

factors of poor insulin sensitivity which would increase the intake of carbohydrates and decrease the physical activity^(25, 26).

CONCLUSION

A high prevalence of hypertension and diabetes mellitus was found among overweight and obese subjects with a higher incidence among females. The health authorities should carry out an educational campaigns for improving the life style among Saudi population for prevention of metabolic risk factors.

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