



## Obesity Prevalence and its Associated Risk Factors in Women of Ha'il Region in Saudi Arabia

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### ABSTRACT

*Obesity is a condition of excessive fat accumulation in the body leading to health hazards and reduced life expectancy. Obesity is rising in Saudi Arabia at an alarming rate, especially women. There is a need to assess the extent of obesity in women and also the various disorders associated with it such as Hypertension, Diabetes and Cardio Vascular Diseases in the Ha'il province of Saudi Arabia. A cross-sectional study was done in 501 random patients and the association between obesity and presence of chronic diseases was examined using the Statistical software program (SPSS, version 20). In this study, it is found that obesity is highly correlated with Diabetes (OR=0.495, 95% CI= 0.26-0.91, P<0.05). A high Body Mass Index (BMI) indicated high risk for Diabetes. But, Cardio Vascular Diseases and hypertension did not show any significant association with BMI and seem to be age related rather than obesity, as they increased with age irrespective of BMI. 90% of the women in Hail region were found to be obese. There is a need for immediate action to be taken to educate the women about the obesity related risks and to prevent obesity by a adopting healthy lifestyle.*

**Keywords-** Body Mass Index (BMI), Cardio Vascular Diseases (CVD), Systolic Blood Pressure (SBP), Diastolic Blood Pressure (DBP), Hypertension.

### INTRODUCTION

Obesity is defined as a condition of abnormal or excessive fat accumulation in the fat tissues of the body leading to health hazards and reduced life expectancy. Obesity is a leading preventable cause of death worldwide. It is one of the most serious problems of the 21st century. The worldwide prevalence of obesity has been doubled between

1980 and 2014. In 2014, 39% of adults aged 18 years and above are overweight, and 13% obese.<sup>[1]</sup> The fundamental cause of obesity is an energy imbalance between calories consumed and calories expended. Weight gain occurs when the calories consumed exceed the calories expended. Globally, there has been an increased intake of energy-dense foods that are high in fat and an

increase in physical inactivity due to the increasingly sedentary nature of many forms of work, changing modes of transportation, and increasing urbanization.

Saudi Arabia has one of the fastest-growing obesity rates in the world, about 70% of the total population above 18 years are obese, males(68%), females 72% <sup>[1]</sup>. Globalization and economic prosperity has been a double-edged sword in this country and the problem needs immediate attention to slow this “age of obesity”. Women in Saudi do little physical activity as they are discouraged from exercising due to conservative traditions. Hence Obesity is increasing at an alarming rate especially in Saudi women, as compared to other countries.

Therefore, this study aims to determine the proportion of obesity among female population of Ha'il region and analyse the effects of obesity on the health of obese women. A statistical analysis has been done to assess the correlation between Obesity and Hypertension, Diabetes and Cardio Vascular Diseases.

## MATERIALS AND METHODS

A cross-sectional study was conducted at Maternity and Children's Hospital and Ha'il General hospital in Ha'il Province of Saudi Arabia. The sample size is 501 random woman patients visiting this Hospital in a time span of 5-6 months. The purpose of the study was explained to the patients and a questionnaire was given to them to be filled only after their consent.

The data collection included the basic anthropometric details of the patients such as weight, height and age. Blood pressure was checked using the mercury sphygmomanometer. The information about risk factors associated with obesity, i.e., chronic diseases such as Hypertension, Diabetes Mellitus, Cardio Vascular Diseases or if any other diseases was known from the case history of the patient and also from the questionnaire. The time period that a patient had been diagnosed with such diseases and the treatment period and if they had any surgeries

particularly related to heart condition was also obtained through questionnaire. The association between presence of chronic diseases and obesity was examined using the Statistical software program (SPSS, version 20). The Demographic information is presented as frequencies and percentages. Logistic regression was used to generate the odds ratios (ORs) and their 95% CIs for the association of BMI and risks factors. Chi-square and t-test was used to assess the relationship between obesity and other categorical variables. A simple measure of the relationship between weight and height called the Body Mass Index (BMI). It is defined as the weight in kilograms divided by the square of the height in meters ( $\text{kg}/\text{m}^2$ ). In this study participants with BMI of  $\geq 30$  were categorized as Obese and below 30 as Non obese.

## RESULTS

The participants were grouped as Obese and Non-obese based on their BMI. In this study, about 90.8% of the women were found to be obese and only 9.2 as Non Obese. The mean age and standard deviation of the sample is 45 years ( $\pm 19$  years). The mean BMI is 32.5 ( $\pm 5$  years) (Table 1) The demographic features of the participants in this study are presented in Table-2. About 60% of the women belonged to age group between 30-50yrs and 40% were above 50 yrs, 75% of the women had hypertension, 67% had Diabetes and 47% suffered from Cardio Vascular Diseases.

Diabetes and Cardio Vascular Diseases (CVD) increased with age with high significance level, whereas, Hypertension did not show any significant correlation with age (Table-3). However, when SBP and DBP were analyzed, a significant correlation was seen between increase in SBP with age but not with DBP (Table-4).

Obesity was observed to be highly correlated with Diabetes (Table-5), indicating that a high BMI is a greater risk for Diabetes. Whereas, CVD and Hypertension did not show any significant correlation with BMI (Table-5), they seem to be age related and increase with age rather than BMI.

**Table-1 : Mean age and BMI of the group**

VARIABLES	N	Minimum	Maximum	Mean	S.D
Age	501	16	92	45.20	19.188
Height	501	1.48	1.98	1.6211	.09846
Weight	501	56	132	84.57	10.778
BMI	501	18.37	49.68	32.49	5.367
Valid N (list wise)	501				

**Table-2 Demographic characteristics of the group**

VARIABLE	FREQUENCY (%)
Age	
< 30 Years	28.5
30-50 Years	31.7
>50 Years	39.7
BMI	
Non Obese	9.2
Obese	90.8
Hypertension	
Yes	75
No	24.8
Diabetes	
Yes	67.3
No	32.7
Cardio Vascular Diseases	
Yes	47.7
No	52.3

**Table-3: Prevalence of risk factors with increase in age**

	Age	Yes	No	df	P value
Hypertension	<30yrs	74.1	25.9	2	0.524
	30-50yrs	73	27		
	>50yrs	77.9	22.1		
Diabetes	<30yrs	59.4	40.6	2	0.018*
	30-50yrs	66.0	34.0		
	>50yrs	73.9	26.1		
Cardio Vascular Diseases	<30yrs	37.1	62.9	2	0.004*
	30-50yrs	47.8	52.2		
	>50yrs	55.3	52.3		

\* Significant, P < 0.05

**Table-4: Correlation of SBP and DBP with age**

	Age	Mean	SD	df	P value
SBP	<30yrs	148.2	20.66	2	0.001*
	30-50yrs	153.49	23.72		
	>50yrs	158.45	24.86		
DBP	<30yrs	84.32	10.5	2	0.689
	30-50yrs	83.97	9.78		
	>50yrs	83.33	11.77		

\* Significant, P < 0.05

**Table-5:** Association between Obesity and Other Risk factors

VARIABLE	YES (%)	NO (%)	ODDS RATIO Non obese/obese	CI (95%)	P VALUE
HYPERTENSION					
Non Obese	76.1	23.9	0.951	0.468 - 1.935	0.526
Obese	75.2	24.8			
DIABETES					
Non Obese	52.2	47.8	0.495	0.268 - 0.912	0.019*
Obese	68.8	31.2			
CARDIOVASCULAR DISEASES (CVD)					
Non Obese	54.3	45.7	1.341	0.729 – 2.464	0.214
Obese	47.0	53.0			

\*Significant, P &lt; 0.05

## DISCUSSION

Based on the National Nutrition Survey of 2007, the prevalence of obesity in Saudi was 23.6% in women and in a survey conducted in 2013, about 61% of women were obese or overweight<sup>[2]</sup>. The WHO Obesity data for 2015<sup>[1]</sup> shows 72% of females are obese in Saudi Arabia. Obesity is predicted to increase to 78% in Saudi women by the year 2022, but in Hail region 91% of women are found to be obese with mean age being 45 years, which is very high. And, high prevalence of obesity is in the age group of 35-65 yrs. On an average, obesity reduces life expectancy by six to seven years, a BMI of 30–35 kg/m<sup>2</sup> reduces life expectancy by two to four years, while severe obesity (BMI > 40 kg/m<sup>2</sup>) reduces life expectancy by ten years<sup>[3]</sup>.

Prevalence of Type 2 Diabetes has increased over the two decades in Arab world, one of the major causes of this being Obesity. The number of people with diabetes is projected to increase to 96.2% by 2035<sup>[5]</sup>. In this study too, higher BMI was observed to be significantly correlated with high risk for Diabetes and it increased with age. Excess body fat underlies 64% of cases of diabetes in men and 77% of cases in women<sup>[4]</sup>. In a National survey conducted for women in Saudi Arabia<sup>[2]</sup>, its reported that Diabetes was more prevalent in older women. Warsy *et.al.*,<sup>[6]</sup> reported a significant increase in the prevalence of Diabetes, hypertension, and obesity with age in both males and females. Many earlier studies too confirm the fact that a higher BMI is high risk for Diabetes.<sup>[7]</sup>

Hypertension leads to many serious health conditions like stroke, heart disease, coronary artery disease, kidney disease and also a major contributor for morbidity and mortality<sup>[8]</sup><sup>[9]</sup>. According to World Health Statistics 2012, 29% of females were found to be Hypertensive in KSA. In a national women survey in the kingdom (2013), about 15.2% were hypertensive and 40.6% were borderline Hypertensive, 58% of Hypertensive were undiagnosed and hypertension increased with age, Obesity, Diabetes and Hypercholesterolemia<sup>[10]</sup>. In this study, 75% of the women in Hail region were Hypertensive and SBP increased with age but was not found to be correlated with obesity. However, several studies report that obesity is the strongest predictor of pre-hypertension.<sup>[10]</sup><sup>[11]</sup> A linear correlation has been observed with Hypertension and increasing weight<sup>[12]</sup>. It could be that increase in Hypertension is due to a number of other factors and not just only on obesity. Hypertension was observed to be more in single women, separated or divorced<sup>[2]</sup>. Hypertension also increased with diabetes and physical inactivity<sup>[13]</sup>. The increase in SBP often leads to several other complications. Though obesity can be one of the risk factors for Hypertension, it depends on several other social and psychological factors such as stress<sup>[14]</sup>. It has been reported that<sup>[8]</sup><sup>[9]</sup> increased SBP was associated not only with increased mortality but also cardiovascular morbidity as risk of non-fatal stroke and myocardial infarction was increased three and two-times respectively. Diabetes and Hypertension were more strongly associated with

higher BMI in both men and women, which also increased the risk for CVD<sup>[15]</sup>.

Increased body weight has been associated with an increased risk of morbidity and mortality from Cardio Vascular Diseases (CVD) in several populations<sup>[15] [16]</sup>. In the present study, BMI was not significantly related to risk of CVD. However, it increased with age. The inconsistent association of BMI and CVD has been previously reported. High BMI was found to be weak risk factor for mortality from cardiovascular disease in south Asians<sup>[17]</sup>. Fluctuating body weight rather than obesity has been associated with risk of stroke and increased mortality<sup>[18]</sup>. Stability in weight and obesity avoidance is the best prevention strategy for CVD. Long-term control of BMI from childhood may be important to reduce the risk of CVD<sup>[19]</sup>. The risk for CVD is seen to be higher in Diabetic patients than non diabetic irrespective of BP<sup>[20]</sup>.

## CONCLUSION

The results of this study indicate that obesity has increased to alarming proportions in women population of Hail region in Saudi Arabia. Saudi women seem to be potentially at a greater risk to develop Diabetes, hypertension and Cardio Vascular Diseases with an increase in Obesity. Without lifestyle changes to increase the amount of physical activity and reduce the amount of calories consumed, obesity cannot be prevented. Social stigmatization of obese persons can be cause of stress and psychological disorders. Therefore, health education of women is required to prevent obesity and its subsequent complications.

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**CONFLICT OF INTEREST:** None

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