

## Original Research Article

# The nutritional, hormonal and vitamin status in overweight and obesity

Snaa A. Kamel, Mohammed K. Alelwan, Ahmed S. Alqahtani\*

Department of Medicine, College of Medicine, Sattam University, AL-kharj, KSA

**Received:** 26 October 2016

**Revised:** 03 January 2017

**Accepted:** 07 January 2017

**\*Correspondence:**

Dr. Ahmed S. Alqahtani,

E-mail: [dr.alqahtani.ahmed@gmail.com](mailto:dr.alqahtani.ahmed@gmail.com)

**Copyright:** © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

### ABSTRACT

**Background:** Obesity is a global epidemic which is increasing dramatically in overwhelming rates among males and females of all age categories in developing and developed countries.

**Methods:** The first phase of the project involves the questionnaires which apply to all the Participants in research. We also use the lab investigation to determine the abnormality in overweight and obese people. Then we will analysis and combine the results to others research and give output and recommendation that we hope helping us to limiting of increase incidence of obesity.

**Results:** sample show that high cholesterol above normal average approximately in 31.05% of the participants while the triglyceride rate increased in 31.67%. A lack of vitamin D, as the rate did not exceed  $18 \pm 6.8$ , in individuals with the BMI 25-29, and to be  $13 \pm 8.82$ , in individuals with the BMI >30. Vitamin B12 rate became borderline in individuals with BMI 25-29, and deficient in individuals with BMI >30.

**Conclusions:** Obese Saudi individuals have several nutritional deficiencies specifically in vitamins D and B12 despite their overweight. Efforts should be focused to increase awareness of healthy and weight control.

**Keywords:** Hormonal, Obesity, Vitamin status

### INTRODUCTION

Obesity is a global epidemic which is increasing dramatically in overwhelming rates among males and females of all age categories in developing and developed countries.<sup>1</sup> Obesity is defined as an excessive increase in weight that impairs health and activities.<sup>1,2</sup>

Childhood and young adults obesity is a systemic disorder that exposes individuals to serious long term complications and serious health problems such as diabetes mellitus, cardiovascular disease dyslipidemia, fatty liver, musculoskeletal diseases.<sup>3-5</sup> Furthermore, obese individuals may develop psychological problems that compromise their quality of life.<sup>6</sup> According to WHO report in 2010, 63.4 million deaths have been attributed

to overweight and obesity worldwide. In 2015, 2.3 billion individuals are overweight of whom 700 million persons are obese.<sup>6,7</sup>

Obesity is a multi-factorial health disorder resulting from nutritional, genetic, endocrinal and environmental factors. Although, such factors play some role in obesity, the majority of cases of obesity are attributed to imbalance between food intake and energy expenditure. This imbalance results from eating excessive amounts of fat and carbohydrates without losing such calories by doing physical exercise. In Western dietary patterns, there is increased consumption of fatty diets coupled with a sedentary life pattern. In the US, the in the Kingdom of Saudi Arabia, overweight and obesity represent the major non-communicable health disorder.

KSA is one of the world's most rapidly growing economies. This economic growth has been associated with gradual shift in the life style and dietary patterns of Saudis. This change is characterized by the transition from the traditional healthy locally grown natural diets that include dates, vegetables and wheat to a western fatty diet style with significant increased consumption of unhealthy fatty fast-food and sugar-dense beverages. Technological advances minimized physical exercises with complete dependence on cars, elevators, escalators, remote control, long hours spent on TV watching or computer games.

These attitudes have led to a decrease in the level of activity. Saudis rarely practice physical exercise due to environmental and cultural causes. For example, the hot weather all over the year makes it very difficult for individuals to walk in open air or perform any open sports. Women are particularly exposed to obesity since their activities are limited due to traditions. Taken together, Saudis follow a sedentary life style and unhealthy dietary patterns which resulted in escalating rates of overweight and obesity.

KSA is considered a country with highest rates of overweight and obesity. Recent studies showed an overall prevalence of obesity of 28.7%. Obesity rates in women reached 33.5% and in men 24.1%. Another study: Data were obtained by examining 17,232 Saudi subjects from selected households who participated in the study. The prevalence of overweight was 36.9%. Overweight is significantly more prevalent in males compared to 31.8% of females ( $p < 0.0001$ ).

The age-adjusted prevalence of obesity was 35.5% in KSA with an overall prevalence of 35.6% [95% CI: 34.9-36.3]. Morbid obesity rates were 3.2% with more prevalence in women. The peak prevalence of obesity was observed in the age group of 50-59 years. Factors associated with obesity differed between adult men and women. In men, the marital status, type of diet, physical activity, diabetes and dyslipidemia, and hypertension were closely associated with overweight and obesity. Among women, obesity was associated with marital status, education, history of chronic conditions, and hypertension. In KSA, obesity rates showed differences in different geographical regions. In Hail, the prevalence of obesity ranged is 33.9 percent while it is 11.7 percent in Jizan. These differences are related to variation in diet and life style.

Another study exploring overweight and obesity among school children revealed overweight and obesity rates of 7.3% and 17.4%, respectively among boys and rates of 12.4% and 20.9%, respectively among girls. Overweight and obesity were more frequent among student living with both parents, student from families with educated parents, with history of maternal obesity, with working mothers and students coming from smaller family size. Another study on 48,000 children (6-18 years old)

showed that the prevalence of overweight among Saudi boys was 17.6% and obesity 11.3%, while another study of male students revealed the prevalence of overweight and obesity to range between 11.7% and 15.8%, respectively.

Several genetic, metabolic, nutritional, environmental and behavioral factors are linked to obesity.<sup>9,10</sup> Importantly, the perceptions, concepts and opinions about obesity vary largely among individuals according to their cultural background, education and perspectives. Most research has focused on studying the consequences of obesity. However, little research addressed the attitudes and behavior of individuals in the second and third decade of life toward the cause's obesity and how overweight and obesity affected reflected their lifestyle and daily activities.

Thus the current study, aimed to screen the perception and attitude of Saudi men and women toward the causes of obesity and investigate the associated metabolic, nutritional, endocrinal disorders associated with obesity. Specifically, the study assessed the knowledge of Saudi men and women on risk factors and consequences of overweight and obesity and investigated various nutritional, hormonal and vitamin aspects in patients with overweight and obesity.

## METHODS

It was an observational, case-control, cross-sectional retrospective clinical study conducted at prince Sattam university hospital, KSA. Study population was overweight, obese, non-obese Saudi men and women all attending in prince Sattam university hospital. Sample size was estimated using Raosoft sample size calculator available at <http://www.raosoft.com/samplesize.html>. The sample size estimated was 370 individual. We added 30% to guard against invalid responses. Study power was calculated using graph statmate the study is 80% powered.

### *Study methodology*

#### *Questionnaire*

A structured, dichotomous, closed, anonymous 28 items questionnaire (a sample of the questionnaire is attached) was distributed to participants. It included questions on personal data, family data, nutritional attitudes, diet regimen, self and family perceptions about weight and diet. The Arabic and English version of the questionnaire are attached.

#### *Data entry*

The responses were entered into Statistical Package for Social Sciences (SPSS) software version 20 program. Answers (Yes/No) and gender were entered as categorical

variables. Age, BMI, blood picture, vitamins and ferritin levels were entered as continuous variables.

#### Data analysis

Means and standard deviation were calculated for continuous variables. Student unpaired T test was used for continuous variables and Fisher Exact test was used for categorical variables. Correlation was performed using Pearson test. P values equal to or less <0.05 were considered statistically significant.

#### Biological assessment

For biological assessments BMI was calculated, complete blood picture, Vitamin B12 and D, are estimated and biochemical profile including fasting blood sugar, Hb A1C, lipid profile.

## RESULTS

The Table 1 shows average of females for males 2: 1 with an average 26 old years. The average BMI among females- males were 29.21-29.72.

**Table 1: Participants characteristics.**

Variable	Value
Males: Females	205: 117
Age: mean $\pm$ SD	26.51 $\pm$ 8.36
<b>Nationality</b>	
Saudi	189 (58.69%)
<b>BMI</b>	Saudi Men: 29.72 $\pm$ 5.79 Saudi Women: 29.21 $\pm$ 4.31
<b>Cholesterol</b>	
Below 5.2 mmol/L	124 (38.5%)
5.2-6.2 mmol/L	98 (30.43%)
Above 6.2 mmol/L	100 (31.05%)
<b>Triglycerides</b>	
Below 1.7 mmol/L	148 (45.96%)
1.7-2.2 mmol/L	72 (22.36%)
2.3-5.6 mmol/L	54 (16.77%)
> 5.6 mmol/L	48 (14.9%)
<b>Hemoglobin</b>	Range: 10-16.4 Mean $\pm$ SD: 12.87 $\pm$ 1.47
<b>Serum Ferritin</b>	
Range for men: 24 to 336 microgm/ L	Men: 279 $\pm$ 106 microgm/ L
Range for women: 11 to 307 microgm/L	Women: 123.5 $\pm$ 84.23 microgm/ L
Vitamin B12 (normal range: 200-900 pg/mL)	BMI <25: 720 $\pm$ 165.82 BMI 25-29: 216.7 $\pm$ 194.75 BMI>30: 151.84 $\pm$ 85.47
Vitamin D (normal range: 20-60 ng/mL)	BMI <25: 24 $\pm$ 11.7 BMI 25-29: 18 $\pm$ 6.8 BMI>30: 13 $\pm$ 8.82
<b>Correlation between BMI and vitamin D</b>	
Correlation coefficient r	- 0.2684
P value	P<0.0001**
95% CI for r	0.3669 to -0.1639
<b>Correlation between BMI and vitamin B12</b>	
Correlation coefficient r	-0.1534
P value	P=0.0058*
95% CI for r	-0.2584 to -0.04489
<b>Correlation between BMI and Ferritin</b>	
Correlation coefficient r	0.06126
P value	P=0.2854
95% CI for r	-0.05122 to 0.1722

All the participants in the study are Saudi individuals only.

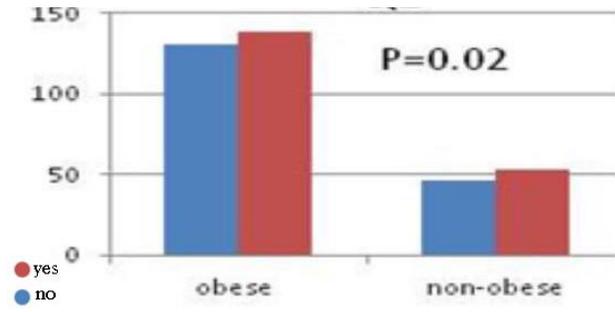


Figure 1: Q1. Do you think your weight is ideal?

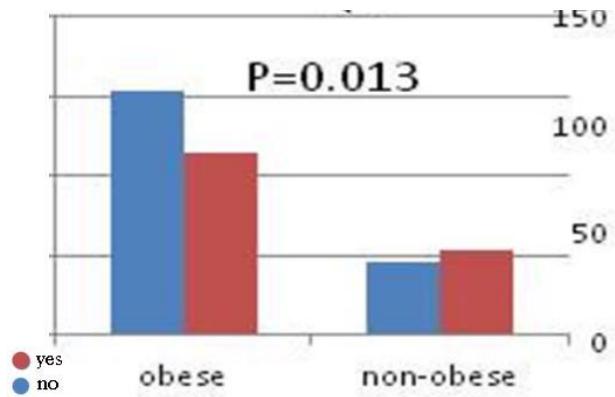


Figure 2: Q2. Do you measure your weight on regular basis?

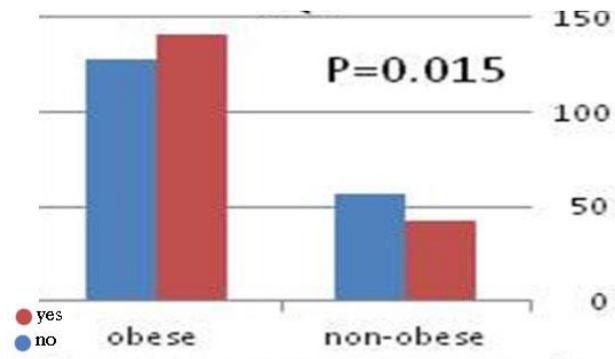


Figure 3: Q3. Is there any one of your family is obese?

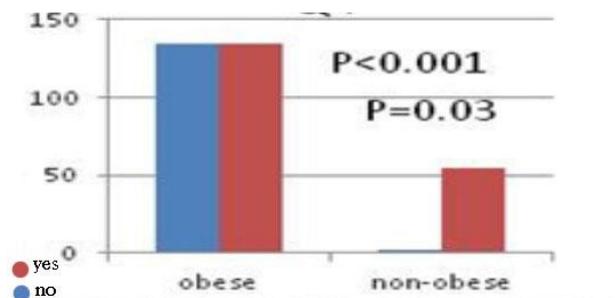


Figure 4: Do you eat more than 3 meals daily?

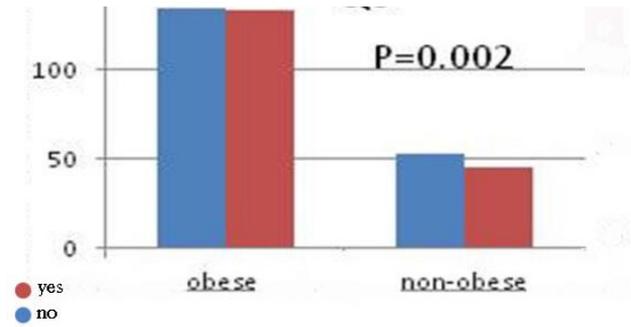


Figure 5: Q5. Do you take your meals at regular times?

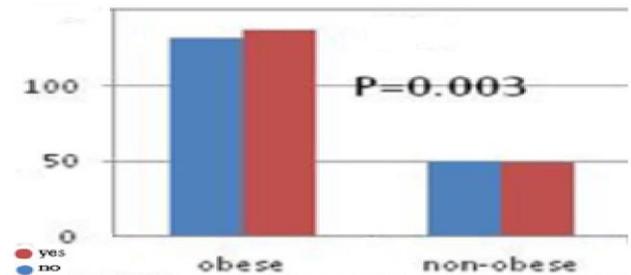


Figure 6: Q6. Do you keep on eating breakfast?

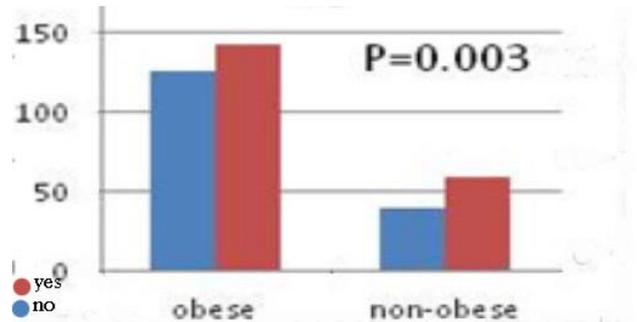


Figure 7: Q7. Do you eat different kinds of food?

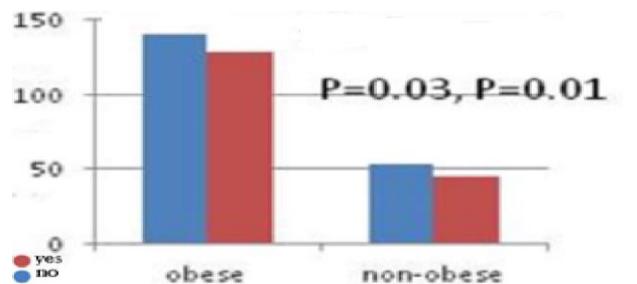


Figure 8: Q8. Do you eat if you don't feel hungry?

The laboratory results of samples show that have been investigate noted that high cholesterol above normal

average approximately in 31.05% of the participants while the triglyceride rate increased in 31.67%. Hemoglobin and serum Ferritin all were in the normal range.

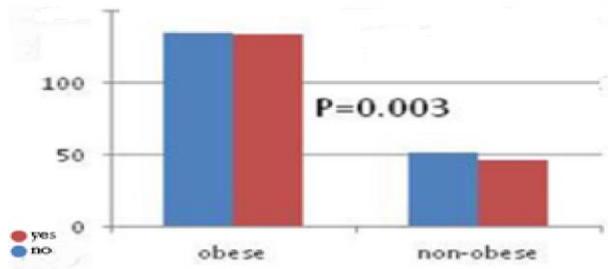


Figure 9: Q9. Do you eat during you watch TV or computer?

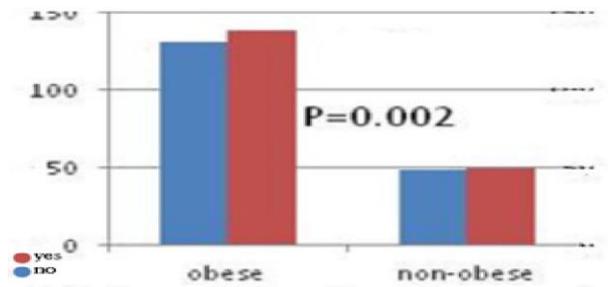


Figure 10: Q10. Do you eat fruits and vegetables on a regular basis?

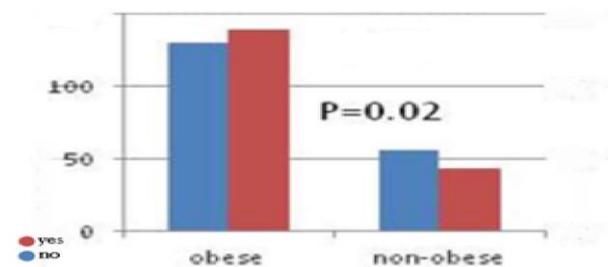


Figure 11: Q11. Do you on specific diet?

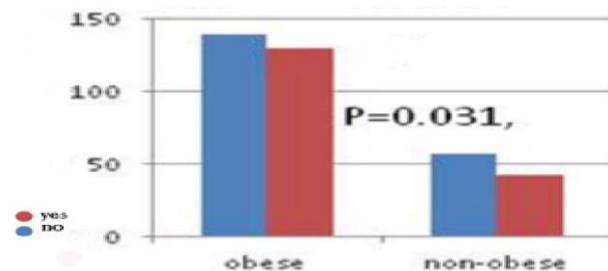


Figure 12: Q12. Are you interested to know how much calories in your meals?

It was also noted that there is a lack of vitamin D, as the rate did not exceed  $18 \pm 6.8$  In individuals with the BMI 25-29, and also the rate found to be  $13 \pm 8.82$  In individuals with the BMI >30. While vitamin B12 rate are in the normal range of people with BMI <25, while it became borderline in individuals with BMI 25-29, and deficient in individuals with BMI > 30.

## DISCUSSION

When we started this research there are many questions we want to answer about them, and compares what we will find of results and other research. There are a lot of people are obese or non-obese satisfied with their weight and this research is not exceptional because we found more people satisfied one way or another about their weight.<sup>1-3</sup> Also, this study proves that the genetic factor plays a very important role in the possibility of increasing incidence of obesity where it was noted that more than half of obese people have family members who are overweight or obese, which is against to these individuals of normal weight where it was noted that obesity few in their families.<sup>9</sup>

Through research, we found Assistant factors on overweight and obesity, including the failure to measure weight in regular periods to note that there has been an increase, where less than half of the individuals involved in the questionnaire measuring their weight on a regular basis; also, helping factors is eating food in irregularly periods.<sup>10</sup>

We improve in this research that eating more than three meals a day does not affect in weight gain or that the eat breakfast helped in an ideal weight. The type and quantity are the main factors in the diet help to gain weight. The study observed that fruits and vegetables are the least share in the diets of individuals of obesity. Also that there is habit as eating food with no feelings of hunger and more than half of obese eating while watching a TV or use a computer. When we asked the individual if they follows a specific diet they answered "yes" while there a litter percentage of them carries about the amount of daily calories in their diet and whether they adequately daily to their needs or not.

This study involving many people the average of females for males 2: 1 with an average 26 old years. The study including Saudi individuals only. The average BMI among females- males 29.21-29.72. The laboratory results of samples show that have been investigate noted that high cholesterol above normal average approximately in 31.01% of the participants while the triglyceride rate increased in 31.67% hemoglobin and serum Ferritin all were in the normal range. It was also noted that there is a lack of vitamin D, as the rate did not exceed  $18 \pm 6.8$  in individuals with the BMI 25-29. While vitamin B12 rate are in the normal range of people with BMI <25, while it became borderline in individuals with BMI 25-29, and deficient in individuals with BMI > 30.

### Recommendations

Based on the observations of our study, the following is recommended:

- Conduction of nationwide surveys to estimate the nutritional habits in different parts of the Kingdom
- Launch more campaigns to increase the orientation of following healthy diet
- Attempt to provide the public with information that overweight may be associated with vitamin and mineral deficiencies.

### CONCLUSION

The concept and opinions about overweight, obesity and nutrition vary among participants based on age, gender and level of education. Obese Saudi individuals have several nutritional deficiencies specifically in vitamins D and B12 despite their overweight. Efforts should be focused to increase awareness of healthy and weight control.

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: The study was approved by the Institutional Ethics Committee*

### REFERENCES

1. WHO (2014), Obesity [Internet] at: <http://www.who.int/topics/obesity/en/> Accessed: 10/12/2014
2. Haslam DW, James WP. Obesity. Lancet. 2005;366(9492):1197-209.
3. Shoelson SE, Herrero L, Naaz A. Obesity, inflammation, and insulin resistance. Gastroenterology. 2007;132(6):2169-80.
4. Grundy SM. Obesity, metabolic syndrome, and cardiovascular disease. J. Clin. Endocrinol. Metab. 2004;89(6):2595-600.
5. Dentali F, Squizzato A, Ageno W. The metabolic syndrome as a risk factor for venous and arterial thrombosis. Semin. Thromb. Hemost. 2009;35(5):451-7
6. WHO. Obesity report 2010. [Internet] at: <http://www.who.int/topics/obesity/en/> Accessed: 10/12/2014.
7. Lozano R, Naghavi M, Foreman K, Lim S, Shibuya K, Aboyans V, et al. Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: a systematic analysis for the Global Burden of Disease Study 2010. Lancet 2012;380(9859):2095-128.
8. Memish ZA, El Bcheraoui C, Tuffaha M, Robinson M, Daoud F, Jaber S, et al. Obesity and Associated Factors-Kingdom of Saudi Arabia. 2013. Prev Chronic Dis. 2014;11:140236.
9. Al-Nozha MM, Al-Mazrou YY, Al-Maatouq MA, Arafah MR, Khalil MZ, Khan NB, et al. Obesity in Saudi Arabia. Saudi Med J. 2005;26(5):824-9.
10. Navarro E, Funtikova AN, Fito M, Schröder H. Can Metabolically Healthy Obesity be explained by diet, genetics and inflammation? MolNutr Food Res. 2014.

**Cite this article as:** Kamel SA, Alelwan MK, Alqahtani AS. The nutritional, hormonal and vitamin status in overweight and obesity. Int J Res Med Sci 2017;5:678-83.