

## Original Research Article

# Prevalence of obesity among adults in Ras Al Khaimah, United Arab Emirates

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## ABSTRACT

**Background:** There is an increasing prevalence of obesity globally which is associated with Non Communicable Diseases. As this trend continues even in UAE we decided to focus on determining the prevalence of obesity among adults in Ras Al Khaimah (RAK), UAE.

**Methods:** This was a retrospective observational study done in adults between the age group of 18 to 77 years using convenience sampling technique in 544 subjects. Anthropometric, bio chemical, clinical and demographic data was collected by direct interview for four consecutive years, i.e. from 2013 to 2016. Body Mass Index (BMI) was analyzed to classify individuals as overweight (BMI 25.0-29.9kg/m<sup>2</sup>), Obese grade I (BMI 30.0-34.9kg/m<sup>2</sup>), Obese grade II (BMI 35.0-39.9kg/m<sup>2</sup>) and obese grade III (BMI ≥ 40.0kg/m<sup>2</sup>).

**Results:** Data was obtained from 544 subjects and considered for analysis. Our results showed that the mean age of the study population was 39.29±13.43 years, the mean weight was 75.35±15.65 kilograms and the mean BMI was 27.62±5.43kg/m<sup>2</sup>. A total of 67.6% of the study population was either overweight or obese. The prevalence of overweight is 36.2% followed by obesity prevalence of 31.4% of which 22.8% were categorized as Grade I obese, 5.5% Grade II obese and 3.1% Grade III obese. We found that higher proportions of males were in overweight and obese category compared to females.

**Conclusions:** The results derived from our study shows that obesity and overweight are widespread among Ras Al khaimah population with the obesity prevalence of 31.4%. Hence, policy makers should focus on preparing national nutritional strategies and implement protocols to overcome this burden by giving practical solutions.

**Keywords:** Body mass index, Obesity, Overweight, Prevalence, Ras Al Khaimah, United Arab Emirates

## INTRODUCTION

There is an increasing prevalence of obesity and overweight globally in developed and developing countries.<sup>1</sup> Over the past two decades the rate of obesity has multiplied by three folds in developing countries due

to urbanization, sedentary life style and excessive intake of calorie dense of foods.<sup>2</sup> Increased risk of chronic diseases like diabetes mellitus, hypertension, stroke and heart disease are also associated with obesity.

The World Health Organization (WHO) states that the possibility of developing non communicable diseases will

increase in many countries depending on their obesity rate. Since 1975 worldwide obesity has increased three folds according to the data published by WHO. Recent data published in 2016 shows that over 650 million adults were obese, of which 39% were overweight and 13% were obese.<sup>3</sup> Developed country like United States of America (USA) is also facing the burden of obesity which is considered as one of the important public health problem due to increasing prevalence and related consequences. The rate of obesity has increased from 13% in 1960 to 1962 to three folds that is 36.5% in 2011 to 2014 which has affected approximately 60 million adults in America.<sup>4</sup> In majority of the Asian countries the magnitude of prevalence of obesity and overweight found to be varied between countries. The burden of obesity associated non communicable diseases such as diabetes mellitus, hyperlipidemia, hypertension and cardiovascular diseases has become an epidemic in Western Pacific and South East Asian countries of which India is ranked as number one in the world with the highest prevalence of diabetes followed by China.<sup>5</sup>

In Gulf countries like Saudi Arabia, Oman, Qatar, UAE, Bahrain and Kuwait the concern related to obesity and the associated risk for non-communicable diseases is increasing and the contributing factors include changes in dietary habits, physical inactivity, cultural changes, socio-economic status and education.<sup>6</sup> The prevalence of obesity was reported as 46% in Kuwait followed by 35% in UAE and 34% in Bahrain.<sup>7</sup> In Gulf countries the obesity prevalent rate showed a drastic increase from 2%-55% in females and 1%-30% in males.<sup>8</sup> Medical cost related to obesity and associated chronic conditions have increased globally which is an added burden to the society. The American Medical Association in 2013 categorized obesity as a disease in order to drive the focus of physicians towards this serious condition. The Body Mass Index (BMI) is a simple reliable index to classify overweight and obesity in adults and a valuable aid for international comparisons and national surveillance (Table 1). It is defined as the weight in kilograms divided by the square of the height in meters ( $\text{kg}/\text{m}^2$ ).<sup>9</sup> According to International Diabetes Association data released in November 2015 the total diabetic population in the UAE was 803,900 which constitutes nearly 19% of the total population. According to a disease study report, obesity is on the rise in UAE which is twice the global average.

“Global Burden of Disease Study 2013” indicates that the average BMI of UAE residents is  $25.6\text{kg}/\text{m}^2$ , which is considered overweight and 47.5% are found to be obese of which 60% are women and 66% are men.<sup>10</sup> Thus, showing that the policy makers, health community and researchers must focus their attention on the problem of overweight and obesity as it is one the global burden which we will encounter in the next few years. Due to such high prevalence rates and its association with several other complications we are interested to assess the prevalence of obesity and explore the variability by

gender, age, nationality and related factors like diabetes mellitus and hypertension in the adult population in RAK, UAE which could pave the way to develop new intervention techniques. We aimed to assess the prevalence of obesity among the adult population in Ras Al Khaimah (RAK), United Arab Emirates (UAE).

**Table 1: BMI classification.**

BMI classification	
Underweight	$<18.5\text{kg}/\text{m}^2$
Normal range	$18.5\text{-}24.9\text{kg}/\text{m}^2$
Overweight	$25.0\text{-}29.9\text{kg}/\text{m}^2$
Obese class I	$30.0\text{-}34.9\text{kg}/\text{m}^2$
Obese class II	$35.0\text{-}39.9\text{kg}/\text{m}^2$
Obese class III	$\geq 40.0\text{kg}/\text{m}^2$

## METHODS

This was a retrospective observational study done to assess the prevalence of obesity among adults in RAK, UAE.

### Study population

All adults between the age group of 18years up to 77 years were included in the study. Adults with serious health complications like cancer and organ transplant were excluded. Convenience sampling technique was used and out of 566 subjects interviewed 22 subjects were excluded and 544 subjects were included in the study based on the inclusion-exclusion criteria.

### Data collection

Anthropometric, biochemical, clinical and demographic data was collected by direct interview method for four consecutive years, i.e. from 2013 to 2016 from various public locations like hospital, malls and public places during public awareness activities organized by Ibrahim Bin Hammad Obaidullah Hospital, RAK. The data collected was documented in the data collection form designed for the study. Demographic data included age, gender and nationality. Clinical and biological data included BMI, values of random blood sugar and blood pressure. All the data collected was weighed according to the sampling scheme and checked for completeness by the study investigators.

### Data analysis

Statistical analysis of the data was performed using Statistical Package for Social Sciences-SPSS version 20. Continuous variables were expressed as mean and standard deviation and categorical variables were expressed as percentages. The study population was stratified as per the BMI where BMI  $18.5\text{-}24.9\text{kg}/\text{m}^2$  was categorized as normal, BMI  $25\text{-}29.9\text{kg}/\text{m}^2$  as overweight and  $\geq 30\text{kg}/\text{m}^2$  as obese. Prevalence was estimated for the

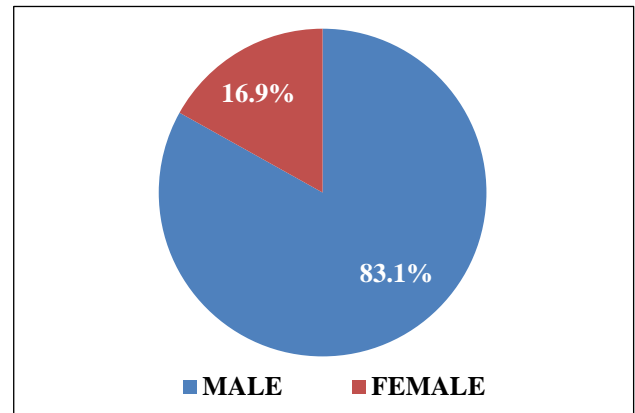
overall population and subpopulations stratified by demographic, clinical and biological variables (age, gender, ethnicity, BMI, blood pressure and blood sugar values). Chi-square test was done to compare the subgroups with BMI status. P-values <0.05 were considered statistically significant.

**RESULTS**

There were 544 subjects considered for data analysis. Among the study population majority of the subjects were males (83.1%) (Figure 1) in the age group of 28-47 years (51.4%) (Table 2). The mean age of the study population was 39.29±13.43years, the mean weight was 75.35±15.65kgs. Among the total population four hundred and sixty one subjects (84.7%) were Emiratis whereas eighty three (15.3%) were expatriates (Table 2) (Figure 2).

The mean blood sugar of the study population was 7.1±1.9mmol/litre. Majority of the study participants (93.2%) were non diabetic with random blood sugar values <11.1mmol/litre. This study population had a

mean systolic blood pressure of 128.03±11.63mmHg and mean diastolic pressure of 79.67±7.69mmHg. Majority of the patients 87.3% had systolic blood pressure within the range of 120-139 mmHg and 91.2% had diastolic blood pressure within the range of 80-89mmHg (Table 2).



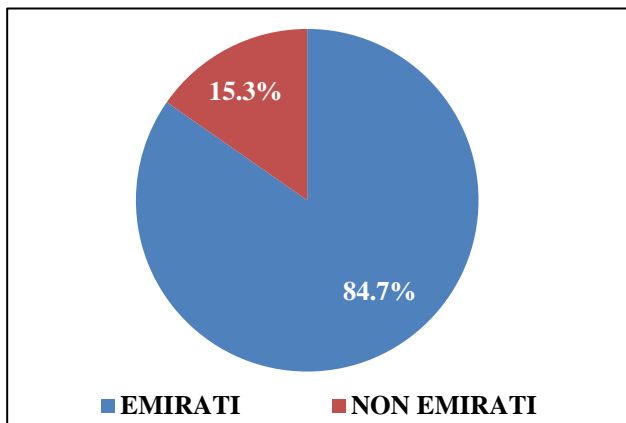
**Figure 1: Percentage of males and females in the study population.**

**Table 2: Patient characteristics.**

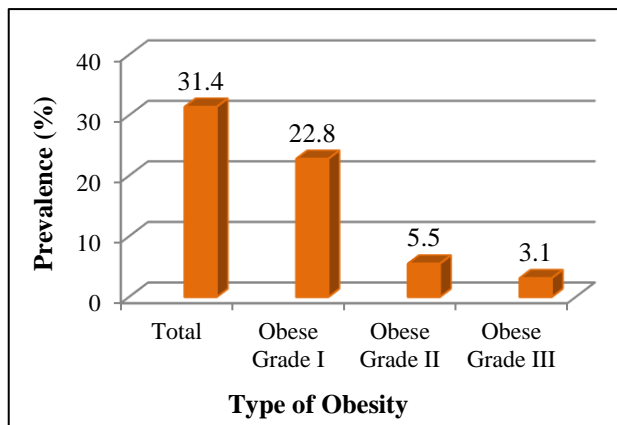
Factors	Frequency N=544	Percentage (%)	95% CI
<b>Age</b>			
18-27	120	22.1	18.6-25.6
28-37	153	28.1	24.4-31.8
38-47	127	23.3	19.9-27.2
48-57	89	16.4	13.2-19.3
58-67	37	6.8	4.8-9.0
68-77	18	3.3	1.8-5.0
<b>Gender</b>			
Male	452	83.1	79.6-86.6
Female	92	16.9	13.4-20.4
<b>Nationality</b>			
Emirati	461	84.7	81.6-87.9
Non-Emirati	83	15.3	12.1-18.4
<b>BMI</b>			
Underweight	13	2.4	1.1-3.9
Normal weight	163	30	26.1-34
Overweight	197	36.2	31.8-40.3
Obese I	124	22.8	19.3-26.1
Obese II	30	5.5	3.9-7.4
Obese III	17	3.1	1.8-4.8
<b>Blood sugar</b>			
<11.1mmol/l	507	93.2	90.8-95.2
>=11.1mmol/l	37	6.8	4.8-9.2
<b>Systolic pressure</b>			
120-139	475	87.3	83.8-89.6
140-180	69	12.7	10.4-16.2
<b>Diastolic pressure</b>			
80-89	496	91.2	87.8-92.9
90-110	48	8.8	7.1-12.2

**Prevalence**

The mean BMI of the study population was 27.62±5.43kg/m<sup>2</sup>. Among the total participants majority of the subjects, 36.2% were overweight and 31.4% were obese where 22.8% were categorized as Grade I obese, 5.5% Grade II obese and 3.1% Grade III obese (Table 2) (Figure 3).



**Figure 2: Percentage of Emiratis and non-Emiratis in the study population.**



**Figure 3: Prevalence of obesity.**

This results revealed that there is a statistically significant correlation between age and BMI categories and gender and BMI categories of the subjects. As age increases the proportion of subjects in obese grade III category also increases. In our study population we observe as the age increases obesity also increases. In the age group of 48-57 years higher proportion of adults are categorized as grade III obese compared to grade II and grade I. Higher proportions of males were obese as compared to females (Table 3).

**Table 3: Association of socio-demographic characteristics as per BMI categories.**

Variable	Under weight %	Normal weight %	Over weight %	Obese grade-I %	Obese grade-II %	Obese grade-III %	P-value
<b>Age</b>							
18-27	76.9	36.2	17.3	9.7	13.3	5.9	<0.001
28-37	15.4	30.1	29.4	25.8	30.0	17.6	
38-47	0.0	18.4	26.4	25.8	26.7	29.4	
48-57	0.0	7.4	17.8	23.4	23.3	35.3	
58-67	0.0	4.9	6.6	10.5	6.7	5.9	
68-77	7.7	3.1	2.5	4.8	0.0	5.9	
<b>Nationality</b>							
Expatriate	15.4	15.9	18.3	11.9	10.0	5.9	0.501
EMIRATI	84.6	84.1	81.7	88.1	90.0	94.1	
<b>Gender</b>							
Male	76.9	90.2	86.3	73.8	76.7	64.7	0.001
Female	23.1	9.8	13.7	26.2	23.3	35.3	
<b>Random blood sugar</b>							
<11.1mmol/L	100.0	93.3	92.4	95.2	90.0	88.2	0.678
>=11.1mmol/L	0.0	6.7	7.6	4.8	10.0	11.8	
<b>Systolic blood pressure</b>							
120-139	92.3	88.4	87.3	86.5	83.3	70.6	0.416
140-180	7.7	11.6	12.7	13.5	16.7	29.4	
<b>Diastolic blood pressure</b>							
80-89	100.0	93.3	88.3	90.5	96.7	76.5	0.098
90-110	0.0	6.7	11.7	9.5	3.3	23.5	

## DISCUSSION

Obesity is a prominent risk factor for non-communicable diseases causing 50% of deaths thereby escalating morbidity and mortality.<sup>11</sup> The increase in body fat percentage is directly proportional to BMI among Asians.<sup>12</sup> Yusuf et al, reported that North Americans have the highest mean body mass index followed by Middle East region and South Americans are reported to have high mean waist: hip ratio followed by Middle East population.<sup>13</sup> Our findings show that the prevalence of obesity is 31.4% in the study population. This finding is in accord with the findings of studies conducted in Kuwait and Bahrain.<sup>7</sup> The data obtained from our study showed that 67.6% of our study population is either overweight or obese. This result is in line with the study conducted in Saudi Arabia where 72.5% were either overweight or obese.<sup>14</sup> In our study population 36.2% of the participants were overweight compared to 37.4% in an American study.<sup>4</sup> This can be attributed to the fact that majority of the study participants had poor dietary habits and sedentary lifestyle. It is important to maintain healthy body weight to prevent health hazards related to overweight and obesity thereby reducing morbidity and mortality. We found that higher proportion of males were in overweight and obese category as compared to females. Contrasting results were reported by a study conducted in Saudi Arabia where higher proportion of females were overweight or obese as compared to males.<sup>14</sup>

As urbanization increases the incidence of overweight and obesity also increases. Prominent risk factors like sedentary lifestyle, unhealthy eating habits, fast food culture and poor physical activity patterns are the hallmark factors of urbanization contributing to increased obesity. We observed a nonlinear trend in the overweight category among different age groups with the highest proportion of participants being overweight in the age group of 28 to 37. Similar trends were observed in the obese category where majority of the study participants (35.3%) were in the age group of 48 to 57. Similar trend was observed in a study conducted in Lebanon.<sup>15</sup> UAE has a multi ethnic population which apart from the Emiratis constitutes of people from India, Pakistan, Philippines, Bangladesh, China and Africa. In our study higher proportion of Emiratis were overweight or obese as compared to expatriates. This can be attributed to Emirati population adopting western life style with rapid changes in dietary habits with over consumption of energy dense foods.

Majority of the study participants were non diabetic with random blood sugar values <11.1mmol/litre. Majority of the patients had systolic blood pressure within the range of 120-139 mmHg and diastolic blood pressure within the range of 80-89mmHg. In our study we did not find any statistically significant correlation between BMI, blood

sugar and blood pressure results. This can be because of the fact that blood sugar and blood pressure values were recorded at one time point. The results derived from our study clearly indicate that obesity and overweight are widespread among RAK population. Hence, we as healthcare workers must actively participate to provide intensive counselling and specialized awareness programs on life style modifications focusing on healthy dietary habits and physical activity for different age groups especially television programs to target families. National nutritional strategies should focus on overweight and obesity protocols to implement practical solutions to overcome this burden. Enhanced efforts have been taken by the UAE government to prevent and control overweight and obesity through the national strategy. It is important to design and implement these strategies in practicably adaptable manner to promote overall wellbeing.

## CONCLUSION

To conclude, our study has one main limitation that it is a single center study with the samples from RAK Emirate only therefore the results cannot be generalized. The validity of the results is strengthened by its large sample size, precise anthropometric measurements and subjects from the same region. Further large scale multi center studies are required to prevent the inevitable epidemic of obesity.

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## REFERENCES

1. Haidar YM, Cosman BC. Obesity epidemiology. *Clin. Colon Rectal Surg.* 2011;24:205-10.
2. Popkin BM, Adair LS, Ng SW. Global nutrition transition and the pandemic of obesity in developing countries. *Nutr Rev.* 2012;70:3-21.
3. WHO. Obesity and Overweight Fact sheet 2016. Available at: [www.who.int/News-room/factsheets/detail/obesity-and-overweight](http://www.who.int/News-room/factsheets/detail/obesity-and-overweight).
4. Pantalone KM, Hobbs TM, Chagin KM, Kong SX, Wells BJ, Kattan MW, et al Prevalence and recognition of obesity and its associated comorbidities: cross-sectional analysis of electronic health record data from a large US integrated health system *BMJ Open.* 2017;7:e017583.
5. Ramachandran A, Snehalatha C. Rising burden of obesity in Asia. *J Obes.* 2010;868573.
6. Musaiger AO. Overweight and obesity in the Eastern Mediterranean Region: can we control it? *Eastern Mediterranean Heal J.* 2004; 10(6):789-93.

7. Carter AO, Saadi HF, Reed RL, Dunn EV. Assessment of obesity, lifestyle, and reproductive health needs of female citizens of Al Ain, United Arab Emirates. *J Health Popul Nutr.* 2004;1:75-83.
8. Sultan AL Nohair, Obesity in Gulf Countries *Int J Health Sci (Qassim).* 2014 Jan;8(1):79-83.
9. Bouchard C. How much progress have we made over the last few decades? *Int J Obes (Lond).* 2008;32(suppl 7):S2-S7.
10. The World Fact book 2009. Central Intelligence Agency; Washington DC, USA, 2009. Available at: <https://www.cia.gov/library/publications/the-world-factbook/index.html>.
11. WHO/EMRO. Regional data on non-communicable diseases risk factors. World Health Organization, Regional Office of East Mediterranean Non-communicable diseases. Available at: <http://www.emr.who.int/ncd>.
12. Gu D, He J, Duan X, Reynolds K, Wu X, Chen J, et al. Body weight and mortality among men and women in China. *JAMA.* 2006 Feb 15;295(7):776-83.
13. Yusuf S, Hawken S, Ounpuu S, Bautista L, Franzosi MG, Commerford P, et al. Interheart study investigators. *Lancet.* 2005 Nov 5;366(9497):1640-9.
14. 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.
15. Sibai AM, Hwalla N, Adra N, Rahal B. Prevalence and covariates of obesity in Lebanon: findings from the first epidemiological study. *Obes Res.* 2003 Nov;11(11):1353-61.

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