# Abdominal Obesity Among Students of  Hawler Medical University

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## ABSTRACT

**Background and Objectives**: Abdominal fat is associated with a greater risk of obesity-related morbidity than overall adiposity. Waist circumference has been shown to be the best simple measure of both intra-abdominal fat mass and total fat. The aim of this study was to measure the waist circumference of the medical college students as an indicator of the prevalence of overweight and obesity and to correlate it with the students' ages and college grades.

**Subject & Methods:** This cross-sectional descriptive study was carried using sample of 500 students of Hawler Medical University in Erbil city during the period from 1st of May through to 31st of July 2008. The WHO stepwise approach had been followed for measuring the waist circumferences of the participants.

**Results:** Five hundred students were studied. The mean (± SD) age of the subjects was 21.39 ± 2.84 years ranging from 17 to 35 years. Regardless of gender, the prevalence of overweight was 16.1% and obesity was 5.1%. Prevalence of overweight (21.8%) and obesity (6.1%) among female students was higher than overweight (10.3%) and obesity (4.1%) among male students. Overweight (50%) and obesity (16.7%) were more common among female students in the age group of ≥ 26 than the other age groups and the other gender as well. There was significant correlation between prevalence of overweight and obesity with the students' grades (P=0.027) and genders (P<0.001).

**Conclusions:** This study concluded that the prevalence of abdominal obesity is higher in female students than male students increasing with the age of the students. Healthy eating behaviors and adequate physical activity for prevention of obesity among college students had been recommended.

**Key words:** obesity, college students.

## INTRODUCTION:

University students form a high proportion of the young population[1]. Obesity is a substantial public-health problem in the developed countries. Its prevalence has been rapidly increasing also in developing nations[2]. Obesity is associated with an increased risk of coronary heart disease, stroke, diabetes mellitus, sleep apnea, gynecological problems as abnormal menses, infertility and many forms of cancer [3,4]. Excess intra-abdominal fat is associated with greater risk of obesity-related morbidity than overall adiposity.

have reported a stronger positive association between cardio vascular risk factors such as hypertension, lipid and glucose concentrations, with abdominal adiposity measured by waist circumference than with overall adiposity as measured by body mass index. Measurements of waist circumference and waist-hip ratio have been viewed as alternatives to body mass index. Waist circumference has been shown to be the best simple measure of both intra-abdominal fat mass and total fat [5]. Body mass index is a crude index that does not take into account the distribution of body fat, resulting in variability in

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individuals and populations [6]. Data about overweight and obesity among college students are not available in Erbil. This study aimed to measure the waist circumference of the medical college students as an indicator of the prevalence of overweight and obesity and to correlate it with the students' ages and college grades.

## SUBJECTS & METHODS:

A cross-sectional descriptive study was conducted examining abdominal obesity of the students of Hawler Medical University (HMU) in Erbil city located in Iraqi Kurdistan Region. The university comprises of Medicine, Dentistry, Pharmacy, and Nursing colleges.  The study was carried out from 1st of May through 31st of July 2008. The total number of the students of HMU was 1959 for the academic year 2007 - 2008. Sample size was determined by using the Epi Info 6. computer program [7]. Population size was 1959 students, expected frequency of obesity was 27%[8], absolute precision was 3.5%, and confidence level (95%) were entered into the program. Accordingly, the required sample size was 470. For convenience, 500 students were randomly selected. Stratification approach was followed for purposive selection of 250 students from the first grades and 250 students from the final grades of each of the 4 colleges. The sample was selected proportional to the total number of the students in each grade. Data were collected by direct interview technique which was recorded in a questionnaire containing demographic data; (age, gender), college, and grade. The WHO stepwise approach had been followed for measuring waist circumference. The waist circumferences were measured to the nearest 0.5 cm. The waist circumference was measured around the narrowest point between the ribs and the hips in the umbilical region when viewed from the front after exhaling. Two consecutive recordings were made for each site on a horizontal plane without

circumference of 94–101.9 cm and female students with a waist circumference of 80–87.9 cm were classified as overweight, whilst male students with a waist circumference of ≥102 cm and female students with a waist circumference of ≥88.0 cm were classified as obese[5]. Data were entered into a computer using the Statistical Package for Social Sciences (SPSS, Version 11.5). Microsoft Excel, Version 2003 had been used for drawing of figures. A P value of ≤ 0.05 was considered as statistically significant.

## RESULT:

According to this study, the mean waist circumference ± SD was 78.27 ± 11.24 cm ranging from 43 – 155 cm. The means (± SD) of the waist circumference were 81.1 ± 10.62 cm in male students and 74.9 ± 8.95 cm in female students. The mean age of the subjects ± SD was 21.39 ± 2.84 years ranging from 17 to 35 years. Table 1 shows that 54% of the participants were males and 46% were females. The male-female ratio was 1.2 : 1. Thirty six percent of the sample was in the age group 17 to 19 years and 23.6% was in the age group 20 to 22 years. About one third (35.4%) of all students were in the age group 23 to 25 years and only 6% were in the age group of ≥26 years.  Figure 1 shows distribution of the sample by college and grade. Number of participants was 102 students from the first grade and 100 students from the final grade of the College of Medicine. There were 53 and 42 students in the first and final grades of the college of Dentistry respectively. This number was 49 against 77 from the College of Pharmacy and 46 against 31 in the College of Nursing. The total number of the participants in each of the colleges of Medicine, Pharmacy, Dentistry, and Nursing was 202, 126, 95, and 77 respectively. Figure 2 shows the proportion of obesity according to the type and grade of college. Abdominal obesity was more common among the final grade students of the Nursing College (6.5%). The lowest proportion of abdominal obesity

within the first grade of college of pharmacy where none of the students was obese. Table 2 shows that the prevalence of overweight but not obesity was 10.3% among males and 21.8% among females. Prevalence of obesity among male students was 4.1% and 6.1% among the female students. Regarding the first and final grades, prevalence of overweight (but not obesity) was 22.4% among the female students of the final grade. Prevalence of obesity was 7.2% among the female students of the final grade which was similar to that of the male students in the same grade. There was significant association between the three categories of waist circumferences of the students and their grade (P=0.027) in one hand and with their gender (P<0.001) in another hand. Table 3 shows prevalence of obesity by waist circumference related to age and gender. The highest proportion (50%) of overweight students was in the female students in the age group ≥ 26 years. The lowest proportion (3.4%) of overweight (but not obese students was) in the male students with the age group of 20 – 22 years. The highest proportion (16.7%) of obese students was in the female students with the age group ≥ 26 and the lowest proportion (1.03%) of obese students was in the male students in the age group 17 – 19 years. It is evident that the prevalence of overweight and obesity increase with age irrespective of gender. Figure 3 shows comparison between the means of waist circumferences of the sample by college. Students of the College of Nursing had the highest mean (81.1 cm) while students of the College of Medicine had the lowest mean (77.03 cm) of waist circumferences. Analysis of data by ANOVA test indicated that there were no significant differences between the means of the waist circumferences of the students in different colleges (P=0.056). A post Hoc Test (Bonferroni Test) showed that although the difference between means in general was not significant. The difference between the mean WC of students of college of

WC of students of the College of Nursing (P<0.05).

**Table 1:** Demographic characteristics of the sample.

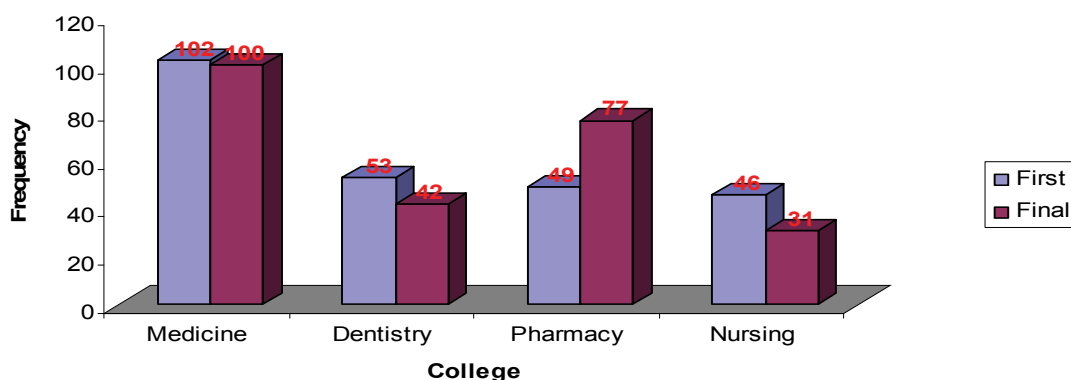| Variables | Frequency n=500 | % |
|---|---|---|
| **Age (years):** | | |
| ١٩ – ١٧ | ١٨٠ | ٣٦ |
| ٢٢ – ٢٠ | ١١٨ | ٢٣.٦ |
| ٢٥ – ٢٣ | ١٧٧ | ٣٥.٤ |
| ٢٦ ≤ | ٢٥ | ٥ |
| **Gender:** | | |
| Male | ٢٧١ | ٥٤ |
| Female | ٢٢٩ | ٤٦ |
| **Grade:** | | |
| First | ٢٥٠ | ٥٠ |
| Final | ٢٥٠ | ٥٠ |

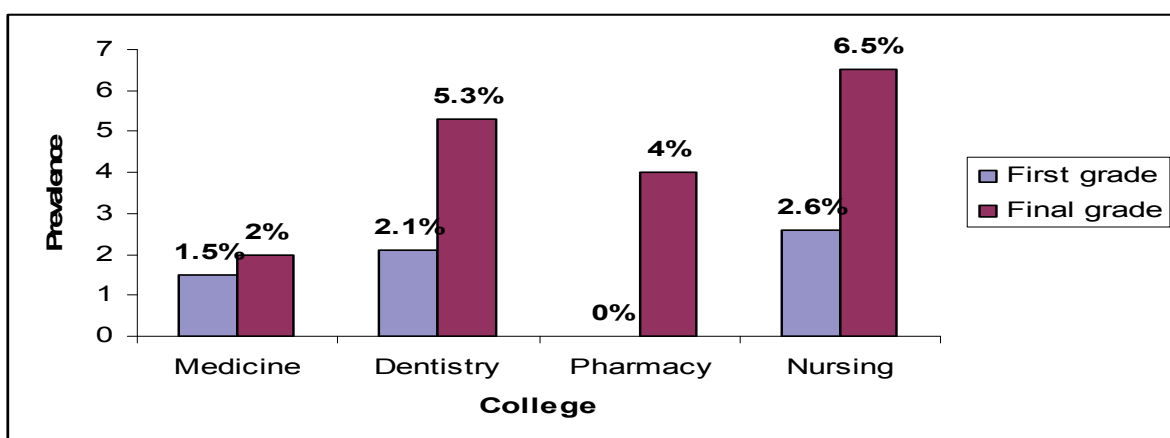**Figure 1:** Distribution of the sample by college and grade.



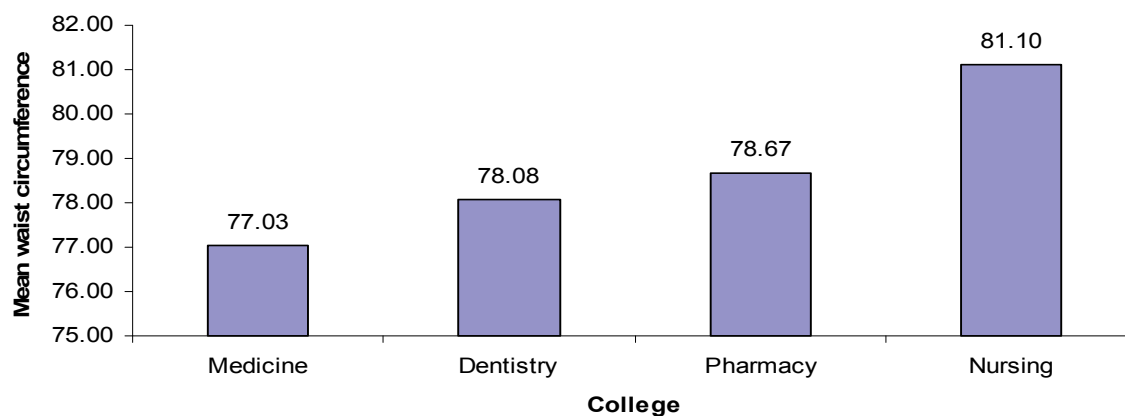**Figure 2:** Prevalence of obesity by waist circumference relative to college type and grade.

**Table 2:** Prevalence of obesity by grade and gender

| Grade and gender / Categories of WC | First grade[*] | | | | Final grade[*] | | | | Total | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Male | | Female | | Male | | Female | | Male[**] | | Female[**] | |
| | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| Normal | ١٣٢ | ٩٠.٤ | ٧٧ | ٧٤ | ١٠٠ | ٨٠ | ٨٨ | ٧٠.٤ | ٢٣٢ | ٨٥.٦ | ١٦٥ | ٧٢.١ |
| Overweight | ١٢ | ٨.٢ | ٢٢ | ٢١.٢ | ١٦ | ١٢.٨ | ٢٨ | ٢٢.٤ | ٢٨ | ١٠.٣ | ٥٠ | ٢١.٨ |
| Obese | ٢ | ١.٤ | ٥ | ٤.٨ | ٩ | ٧.٢ | ٩ | ٧.٢ | ١١ | ٤.١ | ١٤ | ٦.١ |
| **Total** | ١٤٦ | ١٠٠ | ١٠٤ | ١٠٠ | ١٢٥ | ١٠٠ | ١٢٥ | ١٠٠ | ٢٧١ | ١٠٠ | ٢٢٩ | ١٠٠ |

[*]**Comparison ($X^2$ test) between first and final grades: P=0.027**

Table 3: Prevalence of obesity by age and gender

| Age group and gender → Categories of WC | ١٩ – ١٧ Male No. | ١٩ – ١٧ Male % | ١٩ – ١٧ Female No. | ١٩ – ١٧ Female % | ٢٢ – ٢٠ Male No. | ٢٢ – ٢٠ Male % | ٢٢ – ٢٠ Female No. | ٢٢ – ٢٠ Female % | ٢٥ – ٢٣ Male No. | ٢٥ – ٢٣ Male % | ٢٥ – ٢٣ Female No. | ٢٥ – ٢٣ Female % | ٢٦ VI Male No. | ٢٦ VI Male % | ٢٦ VI Female No. | ٢٦ VI Female % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Normal | ٨٥ | ٨٧.٦٢ | ٦٥ | ٧٨.٣ | ٥٢ | ٩٤.٩ | ٤٤ | ٧٤.٦ | ٧٨ | ٨٢.٠ | ٥٤ | ٦٦.٧ | ١٢ | ٦٨.٤ | ٢ | ٣٣.٢ |
| Overweight | ١١ | ١١.٣٤ | ١٥ | ١٨.١ | ٢ | ٣.٤ | ١١ | ١٨.٦ | ١٢ | ١٢.٥ | ٢١ | ٢٥.٩ | ٢ | ١٥.٨ | ٢ | ٥٠ |
| Obese | ١ | ١.٠٣ | ٣ | ٣.٦ | ١ | ١.٧ | ٤ | ٦.٨ | ٣ | ٣.٥ | ٣ | ٧.٤ | ٢ | ١٥.٨ | ١ | ١٦.٧ |
| Total | ٩٧ | ١٠٠ | ٨٣ | ١٠٠ | ٥٩ | ١٠٠ | ٥٩ | ١٠٠ | ٩٣ | ١٠٠ | ٨١ | ١٠٠ | ١٩ | ١٠٠ | ٣ | ١٠٠ |

**Figure 3:** Means of Waist Circumferences in cm by college.
        **P=0.056**

## DISCUSSION:

The findings of this study indicated that the prevalence of abdominal obesity among female students (6.1%) was higher that male students (4.1%). The prevalence of overweight was more common among female students than male students (21.8% vs. 10.3%), respectively. Comparing these results with the neighboring countries, our findings coincide with the first nationwide survey of prevalence of overweight, underweight, and abdominal obesity in Iranian adults which indicated higher prevalence of obesity among females than males[10]. Analysis of results of the current study can be considered as a warning sign for both genders regarding the burden of abdominal obesity as a risk factor for chronic diseases, decreasing the quality of life, and death at an earlier age. Obesity is one of the problems reported by college students. According to the Centers for Disease Control and Prevention in the USA, one in five college students are overweight and nearly half of students perceive themselves as being overweight[11]. Obesity is a substantial public-health problem in the developed countries. Data from the Middle Eastern countries of Bahrain, Saudi Arabia, Egypt, Jordan, Tunisia, and Lebanon, among others, indicate the same disturbing trend, with

40% particuThis study compared the prevalence of overweight and obesity among the first grade students with the final grade students. The findings of this study indicated that the prevalence of both overweight (but not obesity) and obesity were higher among the final grade students than the first grade students. This is probably due to increasing age. The findings of the current study revealed that the students in the age group of ≥ 26 years were more likely to be overweight and obese. This result requires attention and action from the health professionals to develop and implement prevention strategies for this age group. Many studies reported that age is one of the factors that play a significant role in the prevalence of obesity[12]. This is also supported by the Australian Institute of Health and Welfare[13]. Analysis of data with respect to the type of college and grade of the students who participated in this study revealed that abdominal obesity was more common among the final grade students of the nursing college than the other colleges which were medicine, dentistry, and pharmacy colleges. The reason behind this result may be the fact that the college of nursing enrolls some students of higher age groups than the other colleges including in-service nurses who graduated from medical technical institutes. Similar to

grade students of the college of nursing are more obese than the other colleges probably due to the same reason.

## REFERENCES:

1. WHO. A healthy nutrition lifestyle, World Health Organization fact sheet No. 311, September 2006. Available from: http://www.indiana. edu/~engs/quest/uk.html. [Accessed on 2-2-2008].

2. Uwaifo, G. Obesity. emedicine. [online]. May. 21. 2009. Available from: http://emedicine. medscape.com/article/ 123702- overview.

3. Deshmukh P, Maliye C, Gupta S, Bharambe M, Dongre A, Kaur S, *et al*. Does Waist-Hip Ratio Matter? – A Study in Rural India. Regional Health Forum 2005; 9(2).

4. WHO. Reducing risks, promoting healthy life – The World Health Report. Geneva: World Health Organization. 2002. Available from: http://www.who.int/mediacentre/ news/releases/pr84/en/index.html.

5. Dalton M., Cameron A., Zimmet P., Shaw J., Jolley D., Dunstan D. *et al*. On behalf of the AusDiab Steering Committee. Waist circumference, waist–hip ratio and body mass index and their correlation with cardiovascular disease risk factors in Australian adults. JIM 2003; 254: 555–63.

6. Welborn T, Dhaliwal S, and Bennett S. Waist-hip ratio is the dominant risk factor predicting cardiovascular death in Australia. MJA 2003; 179: 580-5

7. Epi Info 6. Version 6.04d. Issued by WHO and CDC. January 2001.

8. Akpinar E, Bashan I, Bozdemir N, Saatci E. Which is the best anthropometric technique to identify obesity: body mass index, waist circumference or waist-hip ratio?. Coll Antropol. 2007 Jun;31 (2):387-93. PMID: 17847914 [PubMed - indexed for MEDLINE]. Available from; http://www.ncbi.nlm.nih.gov/pubmed/1 7 8 4 7 9 1 4? ordinalpos=37&itool=EntrezSystem2.PEntrez.Pubmed.Pubmed_ResultsPanel.Pubmed_RVDocSum.

9. WHO. Guide to Physical Measurements (Step 2). 2003. Available from: http://www.who.int/chp/steps/Part3_Section4.pdf

10. Janghorbani M ,Amini M ,Willett W ,Mehdi M , Delavari A ,Alikhani S *et al*. First nationwide survey of prevalence of overweight, underweight, and abdominal obesity in Iranian adults. Obesity (Silver Spring). PMID: 17629101 [PubMed - indexed for MEDLINE]. 2007 Nov;15(11):2797-808. Available from; http://www.ncbi.nlm.nih.gov/pubmed/17629101ordinalpos=14&itool=EntrezSystem2.PEntrez.Pubmed.Pubmed_ResultsPanel.Pubmed_RVDocSum .

11. Garside J. Spiritual Connection, Spiritual Discontent, and Health. CSJ. (2009). Available from: http://www.webclearinghouse.net/vo-j\L,.lume/9/GARSID E-SpiritualC.php .

12. Payne W, Hahn D, Lucas E. Understanding your Health. (9th ed.). China. McGraw-Hill. 2007.

13. Australian Institute of Health and Welfare. Are all Australians gaining weight? Differentials in overweight and obesity among adults. Bulletin Issue 11. December 2003.