Anthropometric Conditions of Female University Students Registered in Education Year 2011

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ABSTRACT

Assessing anthropometric measure of university student is the subject of many studies. The most common measures used in these types of study are weight, height, waist and hip circumference. The purpose of this study was to examine these anthropometric measures prior to the start of university education. The anthropometric of all the female university students admitted for the first time to the university aged between 18 to 21 years were measured. Seca scale and inflexible measuring tape was employed to weight (kg), height, waist and hip (cm) circumference. Waist to hip ratio (w/h) and body mass index (bmi) was calculated. All the data were analyzed by SPSS:pc software. A total of 265 female students participated in this study.   Overall, 46 percent of the subjects were in normal weight (bmi, 18.5 to 25). One-way analysis of variance indicated that there was a significant difference between the bmi of the different age groups (p=0.03). No such significance was present for the w/h ratio (p>0.05). The association between the bmi and w/h ratio was also significant (p=0.0001). The body composition of female students admitted to university changes as the age increases. This increase occurs as their age increase even before they enter to the university and can lead to the accumulation of fat throughout the body and thus may create health risk factors. The confirmed weight gain during the first year of studying in college can put more students in the over weight and even fat category.

Key words: Anthropometry, Bmi, w/h ratio, Female students.

INTRODUCTION

The assessment of anthropometric characteristics of college students like many other groups of people is an importatant subject. Anthropometric measures such as weight, height, body mass index driven from these two measures waist and hip circumference is a subjecdt of interest not only to the exercise scientists but to also many other academic field such as health , nutrition, anatomomy an so on.   The excess of weight may be associated with the deteriration of physical fitness in one hand and become a risk factor for cardiovascular diseases on the other hand.   The subject of weight gain in college years has been the facus of many research projects. The so called

' freshman 15 ' term is popular in researches focusing on weight gain durin the college years [1]. Results of such reserches have indicated that the first year of college residency is commonly associated with weight gain [2-3-4-5-6]. An assessment of student anthropometric measures is necessary upon the college entrance to determine whether any significant changes occures in subsequent years of study in college or university.   Measures such as weight, height, waist and hip circumference are useful indices upon which ratios such as bmi and waist to hip ratio are calculated. These measures are not only useful for estimating physical condition, but health condition as well.   As was indicated, many researches attemted to evaluate the anthropometric measures such as weight and

body fat percents changes during the freshman or sophomere years of college students. There was a lack of findings in regard to the anthropometric conditions of college or university students upon registeration. Such assessment is necessary to determine whether the anthrpometric measures indeed changes during the years of study in college. This study was designed to determine the anthropometric conditions of female university students who registered in education year 2011.

MATERIALS AND METHODS

In this cross sectional study, female students registered in education year 2011 voluntarily participated. Demographic characteristics of the subjects such as age, weight, waist and hip circumferences were measured and recorded.   All the measurements were made by researcher's assistant who is an experienced nurse a hold a graduate degree in exercise sciences. The data were collected at the gymnasiums where the Seca scale equipped with adjustable height bar made in Germany was set. The circumference sizes were measured according to the criterion set by [7]

using a tape marked to centimeter units. Constant verification of scale accuracy was performed by placing a 5 kg weight at every 10 measurements. All the measurements were performed by the same experienced nurse.   The participants signed a consent form as well as completing the personal information on a prepared form.   Body mass index (BMI) was calculated by applying the conventional method dividing the weight in kg to the squared of height in meter [7]. The exclusion criteria included the students who were pregnant at the start of study, suffering from any metabolic disease that affects body weight, and taking medication or drugs known to impact body weight and distribution.   This information was collected by the physician who checked the general health of students during the registration of the freshwomen students.

RESULTS

A total of 265 girl students participated in this study.   Anthrpometrics measures as well as demographic data including weight, height, weist and hip, bmi and waist to hip ratio were analysed. The results of analysis are presented in Table 1.

Table 1: desriptive statistical values for body mass index, waist to hip ratio, weight, and height of first year girl students

Variables	Age group	Mean	Std. Deviation	Minimum	Maximum
Bmi(kg/sqm)*	18	19.54	3.3	13.74	28.76
	19	20.22	3.8	11.86	29.09
	20	20.60	4.7	11.96	34.34
	21	22.42	4.4	16.83	32.27
whip†	18	.7502	.061	.65	.96
	19	.7539	.051	.54	.91
	20	.7573	.060	.54	1.04
	21	.7570	.058	.62	.86
Wt(kg)††	18	49.70	8.49	32.65	70
	19	51.21	10.004	29.60	72.5
	20	52.61	12.88	31.00	89
	21	57.25	11.04	44.00	86
Ht(cm)‡	18	159.55	5.38	148.00	173
	19	159.15	5.32	149.00	181
	20	159.59	5.36	148.00	174
	21	160	5.45	151.00	168.

*Body Mass Index   † waist to hip ratio   †† weight   ‡ height

Table 2 presents the age categories for the registered students. The highest frequency of age category belonged to the age 19 (38.5 percent) followed by age 20. About 8.7 percent of the newly registered students were above the age 20 and over.

Table 3 presents the bmi categories for the registered students. The highest frequency of bmi category belonged to the normal range (45.7

percent). Approximately 29.1 percent of the girl freshwomen students were under weight and 11.3 percent were very slim (severe under weight). About 2.6 percent of the students were above the age 20 and over.

Further analyse was performed to compare the mean values of bmi, weight and w/h ratio across the age 18 to 21. One-way analysis of variance (ANOVA) was employed to examine

Table 2 : The age categories of the registered students.

Age-group	Frequency	Percent	Cumulative Percent
18	66	24.9	24.9
19	102	38.5	63.4
20	74	27.9	91.3
21	23	8.7	100.0
Total	265	100.0	-

Table 3 : The bmi categories of the registered students

Bmi - categories	Frequency	Percent	Cumulative Percent
Very-slim(under 16)	30	11.3	11.3
Under(16-18.5)	77	29.1	40.4
Normal(18.6-25)	121	45.7	86.0
Over (25 to 30)	30	11.3	97.4
Fat (over 30)	7	2.6	100.0
Total	265	100.0	

Table 4: one-way ANOVA comparing bmi, w/h ratio and weight of the age groups

Variables	Sources	Sum of Squares	df	Mean Square	F	Sig.
bmi	Between Groups	148.623	3	49.541	3.014	.031
	Within Groups	4290.602	261	16.439		
	Total	4439.224	264			
whip	Between Groups	.002	3	.001	.199	.897
	Within Groups	.852	261	.003		
	Total	.854	264			
wt	Between Groups	1056.818	3	352.273	3.106	.027
	Within Groups	29606.110	261	113.433		
	Total	30662.928	264			

whether there was any significant differences in bmi, weight, and w/h ratio among the age groups upon the registration of girl student. The results of analysis indicated that there was a significant differeneces among the age groups in regard to the bmi (p=0.03) and weight (p=0.02) but not in w/h ration. The results of LSD post hoc analysis indicated that the difference in bmi was only between the age group 18 and 21. In addition, the result of similar post hoc test showed that the weight difference was significant between the age group

18 and 21. No other age groups showed significant differences. These results are presented in Table 4.

Further analysis was perfomed to assess the association between the bmi, waist to hip ratio and weight. The results of analysis using Pearson correlation coeficient showed that there was a significant positive correlation between the bmi and w/h ratio (p=0.0001). In addition, there was a significant association between the weight and w/h ratio (p=0.0001) . thesee results are presented in Table 4.

Table 5: Correlation between the weight, bmi and w/h ratio

		bmi	whip	wt
bmi	Pearson Correlation	1	.430[**]	.943[**]
	Sig. (2-tailed)		.000	.000
	N	265	265	265
whip	Pearson Correlation	.430[**]	1	.398[**]
	Sig. (2-tailed)	.000		.000
	N	265	265	265
wt	Pearson Correlation	.943[**]	.398[**]	1
	Sig. (2-tailed)	.000	.000	
	N	265	265	265

[**]. Correlation is significant at the 0.01 level (2-tailed).

DISCUSSION

The difference in anthrpometric measures of weight, height, waist and hip circumferences of female university students enrolling as the freshwomen were assessed in this research. Similar studies in scope have evaluated these measures but at different period of college studies. The results of some studies have indicated that the amount of weight gain across the colloge years increases. Cluskey and associates (2007) conducted a longitudinal research and concluded that t there was a weight gain from October to December 2005 among both male and female college students [8]. Other studies of first year college students have reported similar results and have shown an average weight gain between 2 to 3.5 kg [9-10]. A cross-sectional study conducted by Hingorjo and Qureshi at dental college including 192 freshman students aged 18 to 21 years set the

cutoff point for obesity as a bmi over 25 and concluded that 60.8% of females students were overweight or obese. These studies despite their common goals that all targeted the weight gain phenomenon at the college years did not examine the condition of the anthropometric status of the students prior to enrolling as a college students. The present research was conducted to describe the condition of female students prior to becoming a freshwoman. The results indicated that 13.9 percent of the female students were already in overweight or fat category when they enrolled. The fact that only bmi and not the waist to hip ration did significantly increase may indicate that the general body fat distribution sets in prior to the local fat distribution that appears in the abdominal area. Measures of central obesity, such as waist circumference (WC) and waist-to-hip ratio (WHR), are stronger and more consistent predictors of inflammation than general obesity which is

frequently estimated from the body mass index (BMI) [12-13-14]. It has been indicated that obesity defined by assessing anthropometric measures is associated with negative health consequences such as metabolic syndrome, cardiovascular diseases and some types of cancers [15-19].

The findings of the present research are not comparable with the results of researches conducted during the first year of residency in college. However, the results indicated that as the age of individuals increases, the accumulation of fat distribution throughout the body also increases significantly post the age 20 regardless of being a college student or preparing oneself to enter the college. One possible explanation for these finding

is that the older individuals who were determined to enter the college but failed to do so following the completion of their high school education had plenty of free time to stay inactive physically and instead spent time to study to participate in college entrance examination. The average age of high school education completion is 18. From this age to age 21, there is three years gap. Probably living such life style contributes to the accumulation of extra calorie in the form of fat deposition. The confirmed weight gain demonstrated in many researches during the first year of studying in college can put more students in the over weight and even fat category. Whether these individuals who are already overweight or approaching fat status indeed gain further weight needs to be investigated.

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