PJN
ISSN 1680-5194

PAKISTAN JOURNAL OF NUTRITION

ANSInet
308 Lasani Town, Sargodha Road, Faisalabad - Pakistan
Mob: +92 300 3008585, Fax: +92 41 8815544
E-mail: editorpjn@gmail.com

Pakistan Journal of Nutrition 14 (1): 18-28, 2015
ISSN 1680-5194

Lifestyle and Psychological Factors Associated with Body Weight Status among University Students in Malaysia

Tahereh Mokhtari, Rosita Jamaluddin and Hazizi Abu Saad
Department of Nutrition and Dietetics, Faculty of Medicine and Health Sciences,
Universiti Putra Malaysia, Serdang-43400, Malaysia

Abstract: This study was conducted to determine the factors associated with body weight status among university students. Socio-demographic, lifestyle, dietary and psychological factors are elements that can impact on students' weight status. The main aim of this study is bringing to light the effects of the above-mentioned factors on adult students' weight status. The school of graduate studies of the Universiti Putra Malaysia randomly selected 500 students through iGIMS, however, only 310 Iranian students participated in this study. The data was collected through a 4-section questionnaire and anthropometric measurements such as height and weight were obtained for calculating body mass index (BMI). The results indicated a significant relationship between BMI and energy intake, carbohydrate, protein, fat, physical activity and smoking status, smoking duration, anxiety, age, level of education, gender, marital status and income level of the respondents. Multivariate regression analysis for the prediction of body weight status demonstrated that gender, carbohydrate, age, physical activity, anxiety, income level and smoking status had significant relationships with BMI. In conclusion, the etiology of obesity and overweight is complex and there are a large number of factors it is affected by including energy intake, physical activity, psychological status, environment, culture and economic status. Investigation of the factors associated with body weight status is a necessary consideration in planning obesity interventions.

Key words: Body weight, depression, anxiety, life style, dietary intake

INTRODUCTION

Obesity is a disorder in which excess body fat accumulated in the body, with a serious physical, psychological, health, behavioral, social and economical consequences (WHO, 2013). It may adversely affect individuals' well being, leading to reduced life expectancy and increased health burdens (Haslam *et al*., 2005). Studies have shown that many factors are associated with unhealthy body weight status. Factors such as socio demographic factors (Wang and Beydoun, 2007; Zhao *et al*., 2008) socio economic status (Sanigorski *et al*., 2007), dietary pattern, dietary intake, physical activity level, life style (Mokdad *et al*., 2005) and psychological factors (Pouliou and Elliot, 2010; John *et al*., 2005; Jorm *et al*., 2003) may influence body weight and therefore should be addressed. The great changes in people's lifestyles have caused obesity, which is linked to urbanization, westernization and economic growth, to become prevalent (Zhao *et al*., 2008). The prevalence of obesity is increasing in every country of the world (Lopez *et al*., 2012). There are now more than 100 million individuals with extra body weight solely in the United States (Lopez *et al*., 2012). Obesity and overweight has a multifaceted etiology. Obesity and overweight are wildly known to be a considerable risk factor for chronic disabling diseases namely type II diabetes mellitus, cardiovascular diseases and cancer (WHO, 2010). There are many risk factors such as genetic factors, race, age, excessive energy intake, lack of energy expenditure, medications, sleep deprivation, pregnancy, besides emotional or psychological factors namely depression and stress which significantly contribute to obesity (Pouliou and Elliot, 2010).

It is posited that promotion of healthy lifestyles among university students is of high importance on account of the fact that it might result in reduction of the hazard of lifestyle-related disorders later in life (Gan *et al*., 2011). This study aims to obtain a preliminary understanding of the differences in three crucial factors (socio demographic, life style and psychological factors) contributing to obesity among university students so that future intervention can be planned in order to improve the nutritional status and to assess the need to provide nutrition education for university students. The baseline information gathered in this study may highlight knowledge, attitude or practice gaps which need to be addressed in order to empower students towards their body weight status.

MATERIALS AND METHODS

Samples and survey procedure: This cross sectional study was conducted during the course of four months from March to June 2013 in the campus of the Universiti Putra Malaysia (UPM) among students aged 20 to 40

Corresponding Author: Rosita Binti Jamaluddin, Department of Nutrition and Dietetics, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Serdang-43400, Malaysia

years old. The exclusion criteria of this study were the subjects who were pregnant and suffering from illness such as fever, cough or cold and injury during the data collection. The study population was selected by School of Graduate Studies
SGS randomly selected 500 E-mail addresses out of 1500 Iranian students in UPM through iGIMS. After gathering the information about the students, E-mails were sent with an attached invitation letter and information about the research procedure. In total 311 Iranian students agreed to participate in this study with a response rate of 62.2%.

Instruments
Demographic factors: Age, gender, marital status, living status, education and income are classified as demographic factors. The first section of the questionnaire was a self designed questionnaire used to identify the demographic factors associated with weight status.

Life style factors: WHO (2000) has developed The Global Physical Activity Questionnaire (GPAQ) in order to assess physical activity. The physical activity participation in three settings together with sedentary behavior was collected through GPAQ. The settings are Activity at work, Travel to and from places and Recreational activities. The spent MET-min/week in physical activity was obtained based on the calculation of the following equations:

Vigorous activity: 8.0 x days/week x min/day = MET value

Moderate activity: 4.0 days/week x min/day = MET value

Cycling or walking: 4 x days/week x min/day = MET value

Total physical activity MET-min/week = (the computed sum of total MET-min/week for each domain).
According to the GPAQ analysis framework subjects were classified into three categories including >1500 high, 600-1500 moderate and <600 low activities.
Smoking status was evaluated in which the students were asked if they had ever smoked or if they smoked at present. Smoking status is defined as daily smokers, occasional smokers who smoked at the current time of the survey and never smoked for those who had never smoked.

Dietary factors: Food record is an assessment tool applied in this study by which the nutrient intake of the respondents was determined. This assessment instrument had been done for 3 days, the two weekdays at the beginning and middle of the week and a weekend. The subjects were asked to record all the foods and drinks consumed in the day in detail based on the foods serving sizes. Dietary intakes were entered and analyzed with the Nutritionist IV software developed by N-Squared Computing (2000). Intakes of macronutrients were compared to dietary reference intakes (DRI).

Psychological factors: The Beck Depression Inventory (BDI) is a 21-item self-report instrument applied to assess the existence and severity of symptoms of depression. A total score of 0-13 is considered minimal, 14-19 is mild, 20-28 is moderate and 29-63 is severe range of depression (Beck *et al*., 1961). Beck anxiety scale is a 21-item self-report questionnaire by which anxiety severity is assessed in adults. The symptoms of anxiety were listed in BAI and the respondents were asked to rate how much each symptom has bothered him/her in the past week. The symptoms were rated on a four-point scale, ranging from "not at all" to "severe" (Leyfer *et al*., 2006). The values for each item were summed providing an overall or total score for all 21 symptoms that can range between 0 and 63 points (Beck *et al*., 1988).

Anthropometric measurements: Weighing the subjects was done by means of a TANITA digital weighing Scale HD312 (Japan) on an uncarpeted floor. Weight measurement of each subject was done twice. If the presented weight on the weight scale were different then the third measurement was done to avoid any inaccuracy. The height of the subjects was measured by SECA body meter 206 (Germany) to the nearest 0.1 cm and the measurements were recorded three times in order to get accurate result. Body mass index (BMI) was calculated by taking weight in kilograms divided by height in meters squared (kg/m^2).

Ethical aspects: The Medical Research Ethic committee of the Faculty of Medicine and Health Sciences granted the ethical approval for this study. All the participants were informed about the study procedure and their consent was received prior to the start of the study.

Data analysis: Data analysis was carried out with Statistical Package for the Social Sciences (SPSS version 21). The correlation between two continuous and categorical variables was determined with Pearson product-moment correlation and chi square test respectively. Multiple linear regression analysis was performed to assess the relationship between all the variables and BMI in order to explore how the independent variables can predict and influence dependent variables. The level of statistical significance was considered as α level 0.05.

RESULTS

Socio demographic factors: The distribution of demographic characteristics of the 311 students including age, gender, marital status, living status, level of education, income level are presented in Table 1. The number of male students (52.7%) was quite similar to

Table 1: Demographic characteristic of the students

	Male	Female	Total
DV	---------- (Mean±S.D) n (%) ----------		
Gender	164 (52.7)	147 (47.3)	311 (100)
Age	29.01±3.70	29.07±3.88	29.04±3.78
20-24	9 (5.5)	15 (10.2)	24 (7.7)
25-29	94 (57.3)	73 (49.7)	167 (53.7)
30-34	45 (27.4)	44 (29.9)	89 (28.6)
35-40	16 (9.8)	15 (10.2)	31 (10)
Marital status			
Single	124 (75.6)	108 (73.5)	232 (74.6)
Married	40 (24.4)	39 (26.5)	79 (25.4)
Living status			
Alone	129 (78.7)	86 (58.5)	215 (69.1)
With family	35 (21.3)	61 (41.5)	96 (30.9)
Program of study			
Master	119 (72.6)	102 (69.4)	221 (71.1)
PHD	45 (27.4)	45 (30.6)	90 (28.9)
Income RM	2250.91±881.18	2052.72±855.89	2157.23±873.56
<1500	43 (26.2)	45 (30.6)	88 (28.3)
1500-3500	108 (65.9)	94 (63.9)	202 (65)
>3500	13 (7.9)	8 (5.4)	21 (6.8)

Income status: Low <RM 1500, Moderate: RM 1500-3500, High: >RM3500 (Malaysian Economic Planning Unit Classification)
DV: Demographic variables

Table 2: Anthropometric measurements of the students

	Male	Female	Total
AI	---------- (Mean±S.D) n (%) ----------		
Weight (kg)	76.16±10.67	58.83±8.94	67.96±13.13
Height (cm)	1.76±0.07	1.63±0.05	1.69±0.08
BMI (kg/m^2)	24.61±3.16	22.08±2.94	23.41±3.30
BMI classification			
<18.5 under weight	8 (4.9)	17 (11.6)	25 (8)
18.5-24.9 normal weight	82 (50.6)	113 (76.9)	196 (63)
25-29.9 over weight	66 (39.6)	13 (8.8)	78 (25.1)
≥30 obese	8 (4.9)	4 (2.7)	12 (3.9)

AI: Anthropometric Indicators

the number of female students (47.3%). For females, almost half of the students (49.7%) were in the age group of 25 to 29 followed by the age group of 30 to 34 (29.9%). For males, the majority of the students (57.3%) were in the age group of 25 to 29 followed by the age group of 30 to 34 (27.4 %). The majorities of the female students (73.5%) as well as the majority of male students (75.6%) were single. The results also revealed that more than half of the female students (58.5%) and majority of the male students (78.7%) lived without their families. In addition, the results indicated that a majority of the female students (63.9%) were of moderate income group followed by low-income (30.6%) and almost more than half of the male students (65.9%) were in the moderate income level followed by low level income group (26.2%).

Anthropometric measurements of the students: The anthropometric measurements of the students are shown in Table 2. The prevalence of overweight and obesity for female were (8.8%) and (2.7%), respectively, but for male the prevalence of overweight and obesity were (39.6%) and (4.9%) which was higher than the female students. The prevalence of underweight among females was higher than males.

Life style factors: The lifestyle factors such as smoking status and physical activity level of the students are presented in Table 3b. The results showed that daily smoking was more prevalent among male students (26.8%) than female students (10.2%). On the other hand, occasional smoking was found to be more prevalent among female students (34.7%). The number of never smokers among males and females was practically the same (44.5% for male students and 55.1% for female students).

Most female students were found to do physical activities at a moderate level (40.1%). The findings also indicated that female students do less vigorous (29.9%) and low (29.9%) level physical activities than moderate physical activities. For male students on the other hand, it was found that most of the activities are of the vigorous type (36%). In other words, male respondents were found to be more active than female respondents. In total, most of the activities done by the students were of moderate level type (34.7%) followed by vigorous (33.1%) and low (32.2%).

Dietary factors: The Table 3a indicates mean±SD, range, contribution of macronutrients from energy intake and the dietary reference intake of the macronutrients. The mean value of energy intake for males was higher than females. The carbohydrate and protein intakes of both genders were higher than the amounts recommended by dietary reference intakes. The major contribution of energy intake was carbohydrate 54.78% followed by 27.70% for fat and protein 18.69% for males and for females, 54.75% for carbohydrate, 27.73% for Fat and 18.47% for protein. The consumption of carbohydrate was higher in both genders, followed by fat and protein. The macronutrient percentages for both genders were almost the same.

Psychological factors: Table 5a shows depression and anxiety scores, which are considered as the psychological factors. The mean score of depression for female students (10.88±8.17) was higher than male students (8.82±6.91). The mean score of anxiety for female (12.16±8.31) was higher than the mean score of anxiety for male 9.94±7.30. In general female students were more depressed and anxious than males.

Association between BMI and Socio demographic factors: In order to analyze the association between socio-demographic factors (gender, age, marital status, living status, education level and income level) and between Body Mass Index (BMI) chi-square analysis was employed. As it is presented in Table 4, BMI was significantly associated with gender ($\chi^2 = 43.03$, $p \leq 0.001$) and marital status ($\chi^2 = 8.8$, $p \leq 0.01$) of the students. Living status and education level of the students were found to be insignificantly associated with BMI.

Table 3a: Dietary factors of the students

	Male				Female				Total	
Dietary intake	Mean±S.D	Range	*DRI	DRI (%)	Mean±S.D	Range	*DRI	DRI (%)	Mean±S.D	Range
Energy (kcal)	1863±558	741-3756	-	-	1639±473	676-3196	-	-	1757±530	678-3756
Carbohydrate (g)	254±78	85-513	130	196	224±72	65-452	130	172	240±76	65-513
Protein (g)	86±31	33-212	56	154	74±24	17-156	46	161	80±29	17-212
Fat (g)	58±25	13-151	-	-	51±21	12-126	-	-	54±24	12-151
Macronutrients Percentage of Energy Intake										
Carbohydrate	54.7±6.8	35.6-78.8			54.7±8.7	37.2-81.2			54.7±7.7	35.6-81.2
Protein	18.6±4.2	9.7-36.3			18.4±4.8	9.5-33.8			18.5±4.5	9.5-36.3
Fat	27.7±6.4	13.2-53.8			27.7±6.7	13.8-47.1			27.7±6.5	13.2-53.8

Table 3b: Life style factors of the students

	Male	Female	Total
Life style factors	(Mean±S.D) n (%)		
Smoking status			
Daily	44 (26.8)	15 (10.2)	59 (19)
Occasional	47 (28.7)	51 (34.7)	98 (31.5)
Never	73 (44.5)	81 (55.1)	154 (49.5)
Physical activity level			
Low	44 (29.9%)	55 (33.5%)	100 (32.2)
Moderate	59 (40.1%)	50 (30.5%)	108 (34.7)
Vigorous	44 (29.9%)	59 (36%)	103 (33.1)

Table 5b illustrates the Pearson correlation analysis done in order to determine the association between age and BMI. The results revealed that there was a statistically significant positive relationship between age and BMI ($r = 0.19$, $p = 0.001$). The relationship between BMI and income also revealed that there was significantly positive relationship between income and BMI ($r = 0.22$, $p = 0.001$). In other words, people with higher income levels were found to have significantly higher BMI scores.

Association between BMI and Life style factors: Table 6 Shows the Chi-Square test by which the association between smoking status, smoking duration and BMI was investigated. The smoking status and smoking duration of the students were found to be insignificantly associated with BMI among students. The spearman correlation test was employed in order to investigate the significance of the correlation between the respondents' physical activity and BMI. The results showed that there was a significant negative correlation between BMI and physical activity. It means that when the physical activity of the students increased the BMI decreased.

Association between BMI and dietary factors: According to the results of Pearson's correlation coefficients, there was a significant relationship between BMI and all the dimensions of dietary intake. These relationships were positive and significant. These results also showed a positive relationship between energy and BMI ($r = 0.281$, $p = 0.000$), carbohydrate ($r = 0.310$, $p = 0.000$), protein ($r = 0.208$, $p = 0.000$) and ($r = 0.198$, $p = 0.000$).

Association between BMI and psychological factors: The relationship between BMI and anxiety was examined through Pearson Correlation and the results revealed a significant and negative relationship ($r = -0.152$, $p<0.05$). The findings suggested that the participants with lower levels of anxiety had higher BMI scores. The results demonstrated that there was no statistically significant relationship between BMI and depression ($r = -0.084$, $p>0.05$).

Regression analysis of BMI: Multiple linear regression analysis was performed to assess the relationship between all the variables and BMI to explore the contribution of independent variables which can predict and influence a dependent variable. Regression analysis was applied for gender, carbohydrate, age, physical activity, anxiety, income level and smoking status and a dependent variable which was BMI. Carbohydrate intake has the highest value of positive and significant effect on BMI ($ß = 0.219$, $p<0.05$) with 21% prediction followed by age with 16% of prediction. Income level had 12% of ability of BMI prediction. However, gender, physical activity, anxiety and smoking status were found to have negative and significant effect on BMI with -30, -16, -15 and -9% predictions of BMI, respectively.

DISCUSSION

The widespread presence of obesity is increasing with an accelerating rate all over the world. Nowadays, being overweight is one of the most usual disorders among developed societies and is an indicator of the most important public health burdens. Thirty four percent of US adults at the age of 20 years and above (Shields *et al*., 2011), 16% of men and 18% of women in ten European countries (Shields *et al*., 2011), 19.5% of the Malaysian adults (Mohamud *et al*., 2011) and 13.7% of Iranian adults (Esmaeily *et al*., 2009) are classified as obese.

In this study the prevalence of overweight and obesity was found to be 25.2 and 3.9%, respectively. According to the findings of this study male students were more overweight than female students. These results of the study are consistent with that of the studies conducted by Huda and Ahmad (2010) and Herrera *et al*. (2003). The greater BMI status of male students is attributed to several factors including the males' preference for weight gain and a larger body size as well as females'

Table 4: Associations between socio demographic factors and BMI

	Body weight status						
Socio demographics	Underweight n (%)	Normal n (%)	Overweight n (%)	Obese n (%)	Total n (%)	χ^2	p value
Gender							
Male	8 (4.9)	83 (50.6)	65 (39.6)	8 (4.9)	164 (52.7)	43.03	0.0001*
Female	17 (11.6)	113 (76.9)	13 (8.8)	4 (2.7)	147 (47.3)		
Total	25 (8)	196 (63)	78 (25.1)	12 (3.9)	311 (100)		
Marital status							
Single	19 (8.2)	15 (67.2)	50 (21.6)	7 (3)	232 (74.6)	8.8	0.03*
Married	6 (7.6)	40 (50.6)	28 (35.4)	5 (6.3)	79 (24.4)		
Total	25 (8)	196 (63)	78 (25.1)	12 (3.9)	311 (100)		
Living status							
Without family	15 (7)	140 (65.1)	52 (24.2)	8 (3.7)	215 (69.1)	1.7	0.63
With family	10 (10.4)	56 (58.3)	26 (27.1)	4 (4.2)	96 (30.9)		
Total	25 (8)	196 (63)	78 (25.1)	12 (3.9)	311 (100)		
Program of study							
Master	18 (8.1)	147 (66.5)	49 (22.2)	7 (3.2)	221 (71.1)	5.01	0.17
PHD	7 (7.8)	49 (54.4)	29 (32.2)	5 (5.6)	90 (28.9)		
Total	25 (8)	196 (63)	78 (25.1)	12 (3.9)	311 (100)		

*Chi-Square is significant at p = 0.05 ** Chi-Square is significant at p = 0.01

Table 5a: Psychological factors of the students

	Female	Male	Total
PF	(Mean±S.D) n (%)		
Depression	10.88±8.17	8.82±6.91	9.77±7.46
0-13 Minimal	134 (81.7)	102 (69.4)	236 (76.1)
14-19 Mild	13 (7.9)	21 (14.3)	34 (11)
20-28 Moderate	16 (9.8)	19 (12.9)	35 (11.3)
29-63 Severe	1 (0.6)	4(2.7)	5 (1.6)
Anxiety	12.16±8.31	9.94±7.30	11.11±7.74
0-21 Low	149 (90.9)	124 (84.4)	273 (87.8)
22-35 Moderate	14 (8.5)	20 (13.6)	34 (10.9)
>36 Severe	1 (0.6)	3 (2.00)	4 (1.3)

PF: Psychological factors

greater knowledge about nutrition and weight management, concern about their body shape, body weight and eating, lower energy intake and their higher desire for weight loss, dieting and a smaller body (Khor *et al*., 2009; Huda and Ahmad, 2010; Kuan *et al*., 2011; Zarei *et al*., 2013). The results further indicated that the rate of underweight was higher for female students than males. This finding supports the finding of previous studies conducted in Malaysia and other parts of Asia including studies conducted by Gan *et al*. (2011), Huda and Ahmad (2010), Sakamaki *et al*. (2005) and Sanlier and Unusan (2007). This higher rate of underweight among females is believed to be attributed to their aspiration for a thinner body (Sakamaki *et al*., 2005). Furthermore, the majority of the students in this study were found to have a normal range of BMI. This result is consistent with that of the study conducted by Huda and Ahmad (2010).

In terms of socio demographic factors the results of this study found that married students had significantly higher BMI than single students. This finding is consistent with the result of the study conducted by Sidik and Rampal (2009) and Jeffery and Rick (2002). It is suggested that married individuals are more likely to be fat in view of their spouse's social factor effects (Bakhshi *et al*., 2010). More over married females' higher rate of obesity or overweight is attributed to hormonal alterations caused by pregnancy (Al Qauhiz *et al*., 2010). The impact of marriage on eating habits (e.g. sharing meals) and motivation for weight control are among the other reasons for the higher rate of obesity and overweight among married individuals (Sidik and Rampal, 2009).

Regarding the relation between BMI and gender, the results are consistent with the findings of studies conducted by Wilson *et al*. (2012), Kaphingst *et al*. (2007) and Sneve and Jorde (2008). The results of the research conducted by Wilson *et al*. (2012) revealed higher BMI scores for male respondents than female ones Kaphingst *et al*. (2007) found associations between being female and having a lower BMI through multivariate regression analysis. Furthermore, Sneve and Jorde (2008) found gender to be positively associated with BMI.

The results of this study revealed that age and BMI had positive statistically significant association which is supported by the findings of the study conducted by Wilson *et al*. (2012) which demonstrated that older respondents' BMI scores were significantly higher than those of the younger respondents. Sneve and Jorde (2008) also discovered positive association between age and BMI.

Positive association of age and BMI supports the finding of several studies conducted among adults in Brazil (Peixoto *et al*., 2007; Sousa *et al*., 2011; Gigante *et al*., 2011), Turkey (Sahin *et al*., 2011) and Iran (Nojomi and Najamabadi, 2006; Hajian-tilaki and Heidari, 2007). The positive relationship between age and BMI is ascribed to the accumulation of body fat known as one of the characteristics of the process of aging which occurs due to physical (e.g., reduction of the metabolic rate and increased levels of body adiposity caused by hormonal alterations) and behavioral (adopting sedentary behaviors, inadequate amount of moderate to vigorous physical activity and consumption of high calorie foods) changes of individuals (WHO, 2002).

Table 5b: Correlations between Age, Income and BMI

	Male (BMI)		Female (BMI)		Total (BMI)	
Characteristics	r	p-value	r	p-value	r	p-value
Age	0.20	0.009**	0.23	0.004**	0.19	0.001**
Income	0.1	0.1	0.29	0.001**	0.22	0.001**

*Correlation is significant at p = 0.05 **Correlation is significant at p = 0.01

Table 6: Association between smoking and BMI

	Body weight status						
Smoking	Underweight n (%)	Normal n (%)	Overweight n (%)	Obese n (%)	Total n (%)	χ^2	p-value
Smoking status							
Daily	1 (1.7)	41 (69.5)	16 (27.1)	1 (1.7)	59 (19)	8.4	0.20
Occasional	6 (6.1)	60 (61.2)	28 (28.6)	4 (4.1)	98 (31.5)		
Never	18 (11.7)	95 (61.7)	34 (22.1)	7 (4.5)	154 (49.5)		
Total	25 (8)	196 (63)	78 (25.1)	12 (3.9)	311 (100)		
Smoking duration							
Never	18 (11.7)	95 (61.7)	34 (22.1)	7 (4.5)	154 (49.5)	19.5	0.07
<3 Years	1 (1.6)	33 (54.1)	22 (36.1)	5 (8.2)	61 (19.6)		
3-6 Years	3 (6.2)	34 (70.8)	11 (22.9)	0 (0)	48 (15.4)		
6-9 Years	3 (8.8)	24 (70.6)	7 (20.6)	0 (0)	34 (10.9)		
>9 Years	0 (0)	10 (71.4)	4 (28.6)	0 (0)	14 (4.5)		
Total	25 (8)	196 (63)	78 (25.1)	12 (3.9)	311 (100)		

Table 7: Correlation between physical activity and BMI

	Male (BMI)		Female (BMI)		Total (BMI)	
Life style factor	r	p-value	r	p-value	r	p-value
Physical activity	-0.23	0.003*	-0.10	0.19	-0.14	0.009*

*Correlation is significant at p = 0.01

Table 8: BMI and dietary intake correlation

	Male (BMI)		Female (BMI)		Total (BMI)	
Macronutrients	r	p value	r	p value	r	p value
Energy (kcal)	0.19	0.01*	0.25	0.002**	0.28	0.001**
Carbohydrate (g)	0.25	0.001**	0.26	0.001**	0.31	0.001**
Protein (g)	0.09	0.22	0.21	0.01*	0.20	0.001**
Fat (g)	0.13	0.07	0.17	0.03*	0.19	0.001**

*Correlation is significant at ≤0.05 **Correlation is significant at ≤0.01

Table 9: Association between psychological factors and BMI

	Male (BMI)		Female (BMI)		Total (BMI)	
Psychological factors	r	p	r	p	r	p
Depression	0.01	0.8	-0.08	0.3	-0.08	0.14
Anxiety	-0.06	0.4	-0.14	0.08	-0.15	0.007*

*Correlation is significant at p<0.01

Table 10: Regression analysis of BMI

Variables	UC (B)	SC (Beta)	t	p-value
(Constant)	22.67	13.7	0.000	
Gender	-1.951	-0.295	-5.92	0.000
Carbohydrate	0.009	0.219	4.42	0.000
Age	0.141	0.161	3.23	0.001
Physical activity	-0.647	-0.158	-3.28	0.001
Anxiety	-1.260	-0.144	-2.93	0.004
Income	0.00	0.123	2.48	0.014
Smoking status	-0.424	-0.099	-2.01	0.046

UC: Unstandardized coefficients, SC: Standardized coefficients

People with higher income levels were found to have significantly higher BMI scores in this study. In a study in this area, Chang and Lauderdale (2005) discovered an increase in the obesity rates at all income levels; however, people with higher income had the largest increases in the obesity rates. In another study conducted by Singh *et al.* (2011), the prevalence of obesity was found to be higher for participants with lower incomes; nevertheless, the respondents with higher incomes had a faster rate of increase in obesity. Jolliffe (2011) also found that the rate of obesity among the non-poor (15.5%) was higher than the rate of obesity among the poor (62%).

The high amounts of energy intake and high consumption of carbohydrate, protein and fat result in obesity. These findings were supported with several previous studies in this area including studies conducted by Zarei *et al.* (2013), Lyles *et al.* (2006), Trichopoulou *et al.* (2002), Ko *et al.* (2007) and Herrera *et al.* (2003). Zarei *et al.* (2013) found a significant positive relationship between the intakes of carbohydrates, protein and fats with BMI through 4-day food records. Similarly, in a study conducted by Lyles *et al.* (2006) at the University of Alabama, macronutrient dietary variety was found to be highly correlated with BMI. Trichopoulou *et al.* (2002) indicated protein intake as the

major cause of obesity. More over Ko *et al.* (2007) in a study conducted at a university in Busan, South Korea with 141 participants indicated that high intake of carbohydrate results in obesity. The results further support those of the study conducted by Herrera *et al.* (2003) at the Central University of Venezuela with 1054 participants who revealed a significant positive relationship between energy intake levels and BMI for both males and females. It has been suggested that the high energy density of diets high in fat and carbohydrate weakens their impact on satiety and causes passive consumption of total energy which leads to weight gain and eventually obesity (Swinburn *et al.*, 2004). The significant relationship between carbohydrate and fat intake and obesity is also ascribed to the pleasant taste of foods high in fat and carbohydrate as well as the weak metabolic auto regulation caused by these foods. Some studies on the other hand, have revealed contradictory results. For instance, Kant *et al.* (2008) found that the prevalence of obesity did not augment with an increase in energy intake. Furthermore, results of some other studies in (Chen *et al.*, 1990) and Europe (Lissner and Heitmann, 1995) have demonstrated that there is no correlation between fat intake and obesity. However, the validity of the findings of these studies have been questioned due to the employment of food balance sheet data and lack of control for the impact of cultural attitudes to body fat, physical activity level and smoking (Chen *et al.*, 1990; Mirmiran *et al.*, 2006).

Previous studies have revealed contradictory results with regard to the association between weight status and smoking. The findings of a research conducted by Suleiman *et al.* (2009) among 1219 university students aged between 17 to 28 years in Jordan, demonstrated that the rate of obesity was higher among smokers than non-smokers. Nojomi and Najmabadi (2006) found a significant association between individuals smoking habits and their BMI scores. It has been suggested that higher rate of smoking among individuals suffering from obesity might be due to their belief in the negative effect of smoking on appetite (Nojomi and Najmabadi, 2006). So far, studies have revealed mixed results regarding the association between smoking habits and weight status. It is believed that further studies with a more detailed questionnaire, examining not only the smoking status of a student, but also the actual dose of nicotine (number of cigarettes per day) and smoking history are required to get more reliable results (Pantic *et al.*, 2011). Several other studies have revealed an insignificant relationship between individuals' weight status and smoking including Tamim *et al.* (2004) and Zarei *et al.* (2013). The contradictory results yielded in studies in this area have been attributed to the difference in methods for dietary assessment, analysis and designs. With regard to the association between BMI and smoking status, the results contradict those of the studies conducted by Kaufman *et al.* (2012) and Sneve and Jorde (2009). Kaufman *et al.* (2012) investigated the association between BMI and smoking status of the participants through a logistic regression analysis and the findings indicated a higher probability of obesity among current smokers than never smokers. In addition, the results of multiple linear regression model used in the study conducted by Sneve and Jorde (2009) revealed positive association between smoking and BMI.

Some studies have demonstrated that physical activity and overweight are related to each other (Firdaus *et al.*, 2006; Slattery *et al.*, 2006). In This study the BMI was negatively correlated with physical activity. This is consistent with the result of the study conducted by Dragan and Akhtar Danesh (2007) with 36984 participants in Canada which demonstrated a negative relationship between physical activity and BMI indicating the fact that more physical activity will result in less weight problems. Zarei *et al.* (2013) also found a statistically significant correlation between physical activity and BMI. It has been suggested that this negative relationship between physical activity and BMI is attributed to the fact that exercising prevents and controls excess weight (Guedes *et al.*, 2013). Body weight management, physical fitness and disease prevention have been proposed as the main incentive for exercising (Guedes *et al.*, 2013). Several factors on the other hand, are believed to impede physical activity including the weather, cable network televisions and computers, easily accessible transport and the inactive lifestyle of university students required to attain a higher degree (e.g. writing, studying etc.) (Al-Isa *et al.*, 2011). Several studies have shown that university students have unhealthy eating habits which is known to result in overweight and lack of motivation to exercise (Al-Rethaiaa *et al.*, 2010; Kerkadi, 2003). The low amount of physical activity among university students is further supported by the findings of a study conducted by Oguntibeju *et al.* (2010). It is maintained that dietary treatment by itself is not adequate for treating obesity and intensive exercising (i.e., exercise that requires incessant activity such as jogging, swimming, cycling) ought to be incorporated (Al-Isa *et al.*, 2011).

As for the relationship between BMI and physical activity, the results support those of the research conducted by Mama (2009). In this research the association between physical activity and BMI was examined through Simple linear regression analyses and the findings showed that a decrease in physical activity level results in an increase in BMI. Sneve and Jorde (2009) investigated the association between physical activity and BMI through multiple linear regression model and found negative association between the two.

The relationship between obesity and anxiety has been relatively surveyed through a few recent studies

(Rivenes *et al*., 2009; Van Reedt Dortland *et al*., 2010). The findings suggested that the participants with lower levels of anxiety had higher BMI scores. Previous studies in this area have produced mixed results. While Simon *et al*. (2006) discovered a significant association between obesity and anxiety, Gadalla *et al*. (2009) reported a non-significant association between obesity and anxiety and Cilli *et al*. (2003) and Davis *et al*. (2005) found a moderate positive association between obesity and anxiety. The inconsistency between the findings of these studies is attributed to the difference in methodology and measurement (Lykouras and Michopoulos, 2011).

According to the study conducted by Rivenes *et al*. (2009) the prevalence of depression increased among individuals with higher WHR but no association was found between BMI measured obesity in either men or women. Similarly the results of this study demonstrated that there was no statistically significant relationship between BMI and depression ($r = -0.084$, $p>0.05$). Studies in this area have produced contradictory results. Gavin *et al*. (2010) discovered a positive but insignificant association between BMI and depression. Several studies in this area had shown that the relationship between BMI and depression is stronger among women and girls than men and boys (Erickson *et al*., 2001; De wit *et al*., 2010). A study conducted by Gavin *et al*. (2010) demonstrated a significant association between BMI and obesity solely among women with low education levels. The findings of the studies conducted by Dong *et al*. (2004), Onyike *et al*. (2003) and Stunkard *et al*. (2003) indicated that the association between BMI and depression was significant only for those with severe obesity. Additionally, Simon *et al*. (2006) discovered that the relationship between BMI and depression was significant solely among respondents with higher socioeconomic status.

It is posited that the contradiction in the results of studies in this area is due to the influence of elements such as age, gender, ethnicity, socioeconomic status, physical activity, gene-by-environment interactions, severity of obesity, severity of depression, socio cultural systems, eating, teasing and stress on the association between BMI and depression (Friedman *et al*., 2002; Stunkard *et al*., 2003; Wardle *et al*., 2005; Luppino *et al*., 2010). Wardle *et al*. (2005) suggests that the above-mentioned elements impact upon the way individuals experience obesity.

Consequently, it is maintained that further systematic mechanistic and longitudinal studies limiting intervening variables are required to resolve the uncertainty regarding the association between depression, anxiety and BMI (Luppino and Colleagues, 2010; Faith *et al*., 2011).

Conclusion: Due to the multifaceted etiology of obesity and overweight and the large number of factors they are affected with (e.g., energy intake, physical activity, psychological status, environment, culture, economical status etc.), the findings of the current study are not conclusive and have to be treated with caution. Obesity has become an epidemic in many countries and its increasing rate has been ascribed to diverse factors including age, gender, income, level of education, physical activity, anxiety, depression etc. The majority of studies in this area examine the association between a variety of these factors and obesity simultaneously, which is why the results produced by these studies are typically indefinite and inconclusive. It is suggested that future studies focus on a limited number of these factors so that more in-depth analyses could be carried and more conclusive results could be produced. In sum, further research into the causes of obesity will contribute to development of more accurate design and implementation strategies for reducing obesity.

REFERENCES

Al Qauhiz, N.M., 2010. Obesity among saudi female university students: Dietary habits and health behaviors. J. Egypt. Public Health Assoc., 85: 45-59.

Al-Isa, A.N., J. Campbell, E. Desapriya and N. Wijesinghe, 2011. Social and health factors associated with physical activity among kuwaiti college students. J. Obes., 2011, 512363. doi:10.1155/2011/512363.

Al-Rethaiaa, A.S., A.A. Fahmy and N.M. Al-Shwaiyat, 2010. Obesity and eating habits among college students in saudi arabia: A cross sectional study. Nutr. J., 9: 1-10.

Bakhshi, E., K. Mohammad, M.R. Eshraghian and B. Seifi, 2010. Factors related to obesity among iranian men: Results from the national health survey. Public Health Nutr., 13: 1389-1394.

Beck, A.T., N. Epstein, G. Brown and R.A. Steer, 1988. An inventory for measuring clinical anxiety: Psychometric properties. J. Consulting and Clin. Psychol., 56: 89.

Beck, A.T., C. Ward and M. Mendelson, 1961. Beck depression inventory (BDI). Arch. Gen. Psychiatry, 4: 561-571.

Chang, V.W. and D.S. Lauderdale, 2005. Income disparities in body mass index and obesity in the united states, 1971-2002. Arch. Int. Med., 165: 2122.

Chen, J., T.C. Campbell, L. Tunyao and R. Peto, 1990. Diet, lifestyle and mortality in china: A study of the characteristic of 65 chinese counties. Oxford: Oxford University Press.

Cilli, M., De R. Rosa, C. Pandolfi, K. Vacca, P. Cugini and S. Bella, 2003. Quantification of sub-clinical anxiety and depression in essentially obese patients and normal-weight healthy subjects. Eating and Weight Disorders: EWD, 8: 319-320.

Davis, E.M., S. Rovi and M.S. Johnson, 2005. Mental health, family function and obesity in african-american women. J. Nat. Med. Assoc., 97: 478.

De Wit, L., F. Luppino, van A. Straten, B. Penninx, F. Zitman and P. Cuijpers, 2010. Depression and obesity: A meta-analysis of community-based studies. Psychiatry Res., 178: 230-235.

Dong, C., L. Sanchez and R. Price, 2004. Relationship of obesity to depression: A family-based study. Int. J. Obes., 28: 790-795.

Dragan, A. and N. Akhtar-Danesh, 2007. Relation between body mass index and depression: A structural equation modeling approach. BMC Med. Res. Methodol., 7: 17.

Erickson, S.J., T.N. Robinson, K.F. Haydel and J.D. Killen, 2000. Are overweight children unhappy?: Body mass index, depressive symptoms and overweight concerns in elementary school children. Arch. Pediatrics and Adolescent Med., 154: 931.

Esmaeily, H., M. Azimi-Nezhad, M. Ghayour-Mobarhan, M.R. Parizadeh, M. Safarian, M.J. Parizadeh and H. Javad, 2009. Association between socioeconomic factors and obesity in iran. Pak. J. Nutr., 8: 53-56.

Faith, M., M. Butryn, T. Wadden, A. Fabricatore, A. Nguyen and S. Heymsfield, 2011. Evidence for prospective associations among depression and obesity in population-based studies. Obesity Reviews.

Firdaus, M., M.K. Mathew and J. Wright, 2006. Health promotion in older adults. The role of lifestyle in the metabolic syndrome. Geriatrics, 61: 18-22, 24-5.

Friedman, K.E., S.K. Reichmann, P.R. Costanzo and G.J. Musante, 2002. Body image partially mediates the relationship between obesity and psychological distress. Obes. Res., 10: 33-41.

Gadalla, T., 2009. Association of obesity with mood and anxiety disorders in the adult general population. Chronic Dis., in Canada, 30: 29-36.

Gan, W., N. Mohd, M. Zalilah and A. Hazizi, 2011. Differences in eating behaviours, dietary intake and body weight status between male and female malaysian university students. Mal. J. Nutr., 17: 213-228.

Gavin, A.R., G.E. Simon and E.J. Ludman, 2010. The association between obesity, depression and educational attainment in women: The mediating role of body image dissatisfaction. J. Psychosomatic Res., 69: 573-581.

Gigante, D.P., Franca, Giovanny Vinicius Araujo de, L.M.V. Sardinha, B.P.M. Iser and G.V. Melendez, 2011. Temporal variation in the prevalence of weight and obesity excess in adults: Brazil, 2006 to 2009. Revista Brasileira De Epidemiologia, 14: 157-165.

Guedes, D.P., R.F.S. Legnani and E. Legnani, 2013. Reasons for physical exercise practice in university students according to body mass index. Revista Brasileira De Atividade Fisica and Saude, 17: 270-274.

Hajian-Tilaki, K. and B. Heidari, 2007. Prevalence of obesity, central obesity and the associated factors in urban population aged 20-70 years, in the north of iran: A population-based study and regression approach. Obes. Rev., 8: 3-10.

Haslam, D. and W. James, 2005. Obesity lancet, Cross Ref. Pub. Med. Web of Science® Times Cited 782. 366: 1197-209.

Herrera, H., E. Rebato, G. Arechabaleta, H. Lagrange, I. Salces and C. Susanne, 2003. Body mass index and energy intake in venezuelan university students. Nutr. Res., 23: 389-400.

Huda, N. and R. Ahmad, 2010. Preliminary survey on nutritional status among university students at malaysia. Pak. J. Nutr., 9:125-127.

Jeffery, R.W. and A.M. Rick, 2002. Cross-Sectional and longitudinal associations between body mass index and Marriage-Related factors. Obes. Res., 10: 809-815.

John, U., C. Meyer, H.J. Rumpf and U. Hapke, 2005. Relationships of psychiatric disorders with overweight and obesity in an adult general Population and ast. Obes., 13: 101-109.

Jolliffe, D., 2011. Overweight and poor? On the relationship between income and the body mass index. Econom. and Human Biol., 9: 342-355.

Jorm, A.F., A.E. Korten, H. Christensen, P.A. Jacomb, B. Rodgers and R.A. Parslow, 2003. Association of obesity with anxiety, depression and emotional well-being: A community survey. Aust. and New Zealand J. Public Health, 27: 434-440.

Kant, A.K., M.B. Andon, T.J. Angelopoulos and J.M. Rippe, 2008. Association of breakfast energy density with diet quality and body mass index in american adults: National health and nutrition examination surveys, 1999-2004. Am. J. Clin. Nutr., 88: 1396-1404.

Kaphingst, K.A., G.G. Bennett, G. Sorensen, K.M. Kaphingst, A.E. O'Neil and K. McInnis, 2007. Body mass index, physical activity and dietary behaviors among members of an urban community fitness center: A questionnaire survey. BMC Public Health, 7: 181.

Kaufman, A., E.M. Augustson and H. Patrick, 2012. Unraveling the relationship between smoking and weight: The role of sedentary behavior. J. Obes., 2012, 735465.doi:10.1155/2012/735465; 10.1155/2012/735465.

Kerkadi, A., 2003. Evaluation of nutritional status of united arab emirates university female students. Emirates J. Food and Agric., 15.

Khor, G.L., M.S. Zalilah, Y.Y. Phan, M. Ang, B. Maznah and A.K. Norimah, 2009. Perceptions of body image among Malaysian male and female adolescents. Singapore Med. J., 50: 303-311.

Ko, M., 2007. The comparison in daily intake of nutrients, dietary habits and body composition of female college students by body mass index. Nutr. Res. and Practice, 1: 131-142.

Kuan, P., H. Ho, M. Shuhaili, A. Siti and H. Gudum, 2011. Gender differences in body mass index, body weight perception and weight loss strategies among undergraduates in universiti malaysia sarawak. Malaysian J. Nutr., 17.

Leyfer, O.T., J.L. Ruberg and J. Woodruff-Borden, 2006. Examination of the utility of the beck anxiety inventory and its factors as a screener for anxiety disorders. J. Anxiety Disorders, 20: 444-458.

Lissner, L. and B.L. Heitmann, 1995. Dietary fat and obesity: Evidence from epidemiology. Eur. J. Clin. Nutr., 49: 79-90.

Lopez, K.N. and J.D. Knudson, 2012. Obesity: From the agricultural revolution to the contemporary pediatric epidemic. Congenital Heart Disease.

Luppino, F.S., de L.M. Wit, P.F. Bouvy, T. Stijnen, P. Cuijpers, B.W. Penninx and F.G. Zitman, 2010. Overweight, obesity and depression: A systematic review and meta-analysis of longitudinal studies. Arch. Gen. Psychiatry, 67: 220.

Lykouras, L. and J. Michopoulos, 2011. Anxiety disorders and obesity. Psychiatrike, 22: 307-313.

Lyles, III, T.E., R. Desmond, L.E. Faulk, S. Henson, K. Hubbert, D.C. Heimburger and J.D. Ard, 2006. Diet variety based on macronutrient intake and its relationship with body mass index. Medscape Gen. Med., 8: 39.

Mama, S.K., 2009. The relationship between body image and physical activity in african american women ProQuest.

Mirmiran, P., A. Esmaillzadeh and F. Azizi, 2006. Diet composition and body mass index in tehranian adults. Asia Pacific J. Clin. Nutr., 15: 224.

Mohamud, W., K.I. Musa, A. Khir, A. Ismail, I.S. Ismail, K.A. Kadir and O. Ali, 2011. Prevalence of overweight and obesity among adult malaysians: An update. Asia Pac. J. Clin. Nutr., 20: 35-41.

Mokdad, A.H., J.S. Marks, D.F. Stroup and J.L. Gerberding, 2005. Correction: Actual causes of death in the United States, 2000. JAMA, 293: 293-298.

Nojomi, M. and S. Najamabadi, 2006. Obesity among university students, tehran, iran. Asia Pacific J. Clin. Nutr., 15: 516.

Oguntibeju, O., R. Orisatoki and E. Truter, 2010. The relationship between body mass index and physical activities among medical students in saint lucia. Pak. J. Med. Sci., 26: 827-831.

Onyike, C.U., R.M. Crum, H.B. Lee, C.G. Lyketsos and W.W. Eaton, 2003. Is obesity associated with major depression? results from the third national health and nutrition examination survey. Am. J. Epidemiol., 158: 1139-1147.

Pantic, I., M. Malbasa, S. Ristic, D. Turjacanin, S. Medenica, J. Paunovic and S. Pantic, 2011. Screen viewing, body mass index, cigarette smoking and sleep duration in belgrade university student population: Results of an observational, cross-sectional study. Rev. Med. Chile, 139: 896-901.

Peixoto, Maria do Rosario Gondim, M.H.D. Benicio and Jardim, Paulo Cesar Brandao Veiga, 2007. The relationship between body mass index and lifestyle in a brazilian adult population: A cross-sectional survey. Cadernos De Saude Public., 23: 2694-2740.

Pouliou, T. and S.J. Elliott, 2010. Individual and socio-environmental determinants of overweight and obesity in urban canada. Health and Place, 12: 389.

Rivenes, A.C., S.B. Harvey and A. Mykletun, 2009. The relationship between abdominal fat, obesity and common mental disorders: Results from the HUNT study. J. Psychosomatic Res., 66: 269-275.

Sahin, H., B. Cicek, M. Yilmaz, D. Ongan, N. Inanc, M. Aykut and F. Elmali, 2011. Obesity prevalence, waist-to-height ratio and associated factors in adult turkish males. Obes. Res. and Clin. Practice, 5: 29-35.

Sakamaki, R., K. Toyama, R. Amamoto, C. Liu and N. Shinfuku, 2005. Nutritional knowledge, food habits and health attitude of chinese university students a cross sectional study. Nutr. J., 4: 4.

Sanigorski, A.M., A.C. Bell, P.J. Kremer and B.A. Swinburn, 2007. High childhood obesity in an Australian population. Obes., 15: 1908-1912.

Sanlier, N. and N. Unusan, 2007. Dietary habits and body composition of turkish university students. Pak. J. Nutr., 6: 332-338.

Shields, M., M.D. Carroll and C.L. Ogden, 2011. Adult obesity prevalence in canada and the united states. NCHS Data Brief, 56: 1-8.

Sidik, S. M. and L. Rampal, 2009. The prevalence and factors associated with obesity among adult women in selangor, malaysia. Asia Pacific Family Med., 8: 1-6.

Simon, G.E., Von M. Korff, K. Saunders, D.L. Miglioretti, P.K. Crane, van G. Belle and R.C. Kessler, 2006. Association between obesity and psychiatric disorders in the US adult population. Arch. Gen. Psychiatry, 63: 824.

Singh, G.K., M. Siahpush, R.A. Hiatt and L.R. Timsina, 2011. Dramatic increases in obesity and overweight prevalence and body mass index among ethnic-immigrant and social class groups in the united states, 1976-2008. J. Comm. Health, 36: 94-110.

Slattery, M.L., C. Sweeney, S. Edwards, J. Herrick, M. Murtaugh, K. Baumgartner and T. Byers, 2006. Physical activity patterns and obesity in hispanic and non-hispanic white women. Med. and Sci. in Sports and Exercise, 38: 33-41.

Sneve, M. and R. Jorde, 2008. Cross-sectional study on the relationship between body mass index and smoking and longitudinal changes in body mass index in relation to change in smoking status. The tromso study. Scandinavian J. Public Health, 36: 397-407.

Sousa, T.F.d., M.V. Nahas, D.A.S. Silva, Del G.F. Duca and M.A. Peres, 2011. Factors associated with central obesity in adults from florianópolis, santa catarina: A population based-study. Revista Brasileira De Epidemiologia, 14: 296-309.

Stunkard, A.J., M.S. Faith and K.C. Allison, 2003. Depression and obesity. Biolog. Psychiatry, 54: 330-337.

Suleiman, A.A., O.K. Alboqai, N. Yasein, J.M. El-Qudah, M.F. Bataineh and B.A. Obeidat, 2009. Prevalence of and factors associated with overweight and obesity among jordan university students. J. Biolog. Sci., 9: 738-745.

Swinburn, B., I. Caterson, J. Seidell and W. James, 2004. Diet, nutrition and the prevention of excess weight gain and obesity. Public Health Nutr., 7: 123-146.

Tamim, H., N. Dumit, A. Terro, R. Al-Hourany, D. Sinno, F. Seif and U. Musharrafieh, 2004. Weight control measures among university students in a developing country: A cultural association or a risk behavior. J. Am. Coll. Nutr., 23: 391-396.

Trichopoulou, A., C. Gnardellis, V. Benetou, P. Lagiou, C. Bamia and D. Trichopoulos, 2002. Lipid, protein and carbohydrate intake in relation to body mass index. Eur. J. Clin. Nutr., 56: 37-43.

Van Reedt Dortland, A., E. Giltay, Van T. Veen, F. Zitman and B. Penninx, 2010. Metabolic syndrome abnormalities are associated with severity of anxiety and depression and with tricyclic antidepressant use. Acta Psychiatrica Scandinavica, 122: 30-39.

Wang, Y. and M.A. Beydoun, 2007. The obesity epidemic in the United States-gender, age, socioeconomic, racial/ethnic and geographic characteristics: A systematic review and meta-regression analysis. Epidemiol. Rev., 29: 6-28.

Wardle, J. and L. Cooke, 2005. The impact of obesity on psychological well-being. Best Practice and Res. Clin. Endocrinol. and Metab., 19: 421-440.

WHO and Regional Office for the Western Pacific, 2010. Noncommunicable disease risk factors and socioeconomic inequalities-what are the links? A multicountry analysis of noncommunicable disease surveillance data.

Wilson, S., A. Gallivan, C. Kratzke and A. Amatya, 2012. Nutritional status and socio-ecological factors associated with overweight/obesity at a rural-serving US-mexico border university. Rural and Remote Health, 12.

World Health Organization, 2000. Obesity: Preventing and managing the global epidemic World Health Organization.

World Health Organization, 2013. BMI classification. 2010. Available From Http://www.Who. int/features/factfiles/obesity/facts/en/.Accessed, 27.

Zarei, M., M. Taib, M. Nasir and F. Zarei, 2013. Lifestyle factors and dietary intake of iranian postgraduate students in universiti putra malaysia (UPM). Electronic Physician, 5.

Zhao, W., Y. Zhai, J. Hu, J. Wang, Z. Yang, L. Kong and C. Chen, 2008.Economic burden of obesity-related chronic diseases in Mainland China. Obes. Rev., 9.