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Physical Activities Associated with Overweight and Obesity among University Students in Jeddah

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Abstract

***Background &Objectives*:** Available studies on obesity in Eastern Mediterranean Region countries indicate that obesity has reached out an alerting level among both children and adults. Factors associated with the occurrence of obesity have not been well investigated. The purpose of this study is to investigate the effect of lifestyle factors in obese male and female university students in Jeddah, Kingdom of Saudi Arabia. To explore the relationship between obesity and PA of young youth in KAU and to investigate differences due to gender. **Material & Methods:** A number of 91 adult students (48) of the surveyed parsons were male, with about (52.7%), while the female were (43), with about (47.3%) their age ranges from18-26 years from KAU attending the University in 2011-2012 completed a self-administered questionnaire, including providing correct self-reported data on height, weight and PA. The study conducted cross-sectional analysis of the correlation between obesity, defined as stated by KSA standards, and measures of physical activity and inactive behaviors (exercise-related PA; walking, running, biking, moderate and vigorous activities self-defense, weight training, housework and other activity) adjusted for age, sex and matched in relation to a range of personal characteristics.

Results: There was a significant difference in the t tests according to obesity level in physical activity steps counted by the pedometer monitors (P=0.046). The P-value for the t tests (according to gender) for Min Walking =0.021 < 0.05; that is a significant difference (towards male); for min jogging =0.004 < 0.01; that is a highly significant difference (towards male), for min vigorous activity = 0.012 < 0.05; that is a significant difference (towards male), for min weight training =0,006 < 0.01; that is a highly significant difference (towards male) and for distance =0.037 < 0.05; that is a significant difference (towards female). Majority of participants (51.6%) were skip meal sometimes. One fourth of the students skipped breakfast, drink soft drinks seven times per week, and only eat fruit once per week. Significant differences in the PA levels of youth were evident with regard to gender. The present study has demonstrated that the occurrence of PA among KAU students is relatively high. Therefore, there is a need to the stages of PA adoption and support by university and public policies to encourage active living and discourage sedentary habits.

Keywords: Physical Activity, Sedentary, Obesity, Young Youth, KSA, Eating habits

Introduction

Obesity is a serious worldwide medical condition, considered by some researchers as one of the most serious public health problems of the 21st century. Obesity is a leading cause of mortality and morbidity and all types of research in this field is required to promote better health at the individual and community levels (**Waleed M Sweileh, et al. 2014).** According to the World Health Organization, there were 400 million obese people in 2005 and the number will jump to 700 million people by 2015 (**Mariel M. Finucane and Gretchen A Stevens2011**). Obesity is usually determined by BMI (body mass index) measurements. Someone with a BMI of 30 or more is considered obese. According to the US Department of Health and Human Services (HHS), from 1960-2006 "the percentage of obese adult's ages 20 years and older more than doubled, increasing from 13% to 35%." Between 1980 and 2008 the average body mass index (BMI) increased globally by 0.4 per decade for men and 0.5 per decade for women **(CDC. 2010) and (Mariel M. Finucane and Gretchen A Stevens2011**)), Currently, 21.8% of the total global population (**Mariel M. Finucane and Gretchen A Stevens2011**) and 33.9% of the US population is obese. Centers for Disease Control and Prevention (**CDC. 2011**) and (**Katherine M. Flegal et al.2010**).

Documenting and pointing out of individuals at high risk for obesity is of serious importance given that obesity is a worldwide epidemic (**WHO, 1998**). It is quite known and reported that diet and nutrition play major roles in preserving health and avoiding diseases (**OMS/WHO, 2003 and Department of Agriculture and U.S. Department of Health and Human Services, 2002**). Reduction in morbidity and mortality associated with lifestyle illnesses may be possible if appropriate dietary habits are adopted in early life and maintained later in life (**Bertsias, et al., 2005 and Gliksman, 1993**).

All through adolescence, young people are assuming responsibility for their own nutritional habits, health arrogance and behavior (**Fleming-Moran and Thiagarajah, 2005)**. Actually, attitudes play an important role in the adoption and maintenance of a variety of health and nutritional habits. It is well known and recognized that diet and nutrition plays significant roles in maintaining health and avoiding diseases (**OMS/WHO, 2003 and Department of Agriculture and U.S. Department of Health and Human Services, 2002).** Reduction in morbidity and mortality linked with lifestyle illnesses could be attainable if suitable dietary behaviors are started in early life and be continued in the long term (**OMS/WHO, 2003 and Department of Agriculture and U.S. Department of Health and Human Services, 2002).** During youth, young people are assuming concern for their personal eating behaviors, health approaches and conducts. Actually, attitudes play a significant part in the assumption and preservation

of a diversity of health and dietary behaviors (**Fleming-Moran and Thiagarajah, 2005).**

While youths' growing independence is frequently related to unusual eating patterns (**Veugelers, et al., 2005 and Kubik, et al., 2005**) and dietary manners through puberty might be temporary in some persons, health-related manners display tracking through puberty (**Kelder, et al., 1994**) and there is strong indication of their primary association.

The Gulf Cooperation Council Countries with the Kingdom of Saudi Arabia (KSA) have observed major lifestyle variations due to fast development, dominance of cars for individual transport, institution of effort-saving devices for household and work issues, accessibility of high fat and dense-caloric nutrients, digital TV, augmented dependence on computer, and telecommunication technology, on top of decreased job-related-work stresses (**Al-Hazzaa, et al., 2010**). These daily life alterations have had a significant influence on decreasing the physical requests of daily life and have stimulated inactive lives amid both young people and adults. Accordingly, such notable daily life alteration is supposed to be seriously accountable for the epidemic of non-communicable diseases in the entire area (**Musaiger, 2004 and WHO, 2002**).

Physical inactivity (PA) and unhealthy foods are considered amid the foremost reasons of chief non-communicable diseases, including cardiovascular disease, type 2 diabetes, and certain types of cancer, thus contributing considerably to the worldwide load of disease, death, and debility in the Arab nations (**Khatib, 2004 and Physical Activity Guidelines Advisory Committee, 2008**). Furthermore, new research results have revealed that TV watching (an inactive action) and PA seem to be distinct entities and are independently linked with metabolic threat (**Musaiger, 2004).**

A shocking high degree of physical sedentariness among the Saudi peoples has been recognized, leading to health problems (**Al-Nozha, 2007**). Moreover, Saudi youth are not protected from the worldwide obesity epidemic. Even though childhood obesity has been reported and extensively documented in developed regions, recently, there is an ever-growing occurrence in rising nations. This frequency of juvenile fatness is great in the Middle East, Central and Eastern Europe (**James, 2004**). Latest countrywide guesses of mutual overweight and obesity dominance between Saudi youths aged 13–18 years were 36.6% for males and 38.4% for females (**ElMouzan, et al., 2010**).

A study by **Swelleh, et al. 2014** in Arab countries reported that the total number of original and review research articles published globally about obesity was 110,167. The leading country in obesity research was United States of America (42.47%). Turkey, Israel, and Iran were in the top 30 countries while Kingdom of Saudi Arabia (KSA), Egypt, and Kuwait ranked 39th, 43rd, and 47th, respectively. A total of 1,121 documents about "obesity" were published by Arab countries, representing 1.0% of the global research output, with 13,343 citations (average citation of 11.9 per document) and an h-

index of 44. The Arab countries' research output was very low until the mid-1990s and then increased steadily. Of the 1,121 documents, 107 (9.55%) were published in the Saudi Medical Journal. KSA, with a total of 318 publications ranked first among Arab countries in research quantity while Kuwait ranked first after adjustment based on population size. King Saud University in KSA was the most productive institution with a total of 140 documents. Compared with other non-Arab Middle Eastern countries, the research productivity from Arab countries was lower than that from Turkey, higher than that from Iran, and close to that from Israel. However, the h-index of documents about obesity published from Arab countries was lower than that of Turkey and Israel, but slightly higher than that from Iran.

Studies on the PA arrays and inactive performances as associated to obesity between Saudi youths are rare. Consequently, the main goals of this study were (1) to search daily life and health behaviors of young persons living in KSA; (2) to explore potential variances because of sexual category, age. Exceptional devotion will be directed to the occurrence of PA and inactive conducts of adolescence from both sex and how that narrates to their obesity level as evaluated by Body Mass Index (BMI). It is anticipated that the results from this countrywide study will deliver applicable data on PA/inactivity patterns and health behaviors of young males and females in this situation.

Material and Methods

In order to achieve the study's aims, objective measurements were collected of participant's physical activity using electric pedometer, for a period of three days. The participants completed a self-administered questionnaire, which contained questions regarding important determinants of physical activity and lifestyle factors. Body mass index (BMI) was calculated from participants' weight and height (BMI = weight (Kg) / height2 (m)) to detect level of obesity and overweight among them. The study was a cross sectional survey, using subjective and objective methods to measure physical activity. University male and female students were chosen to participate in the study from Faculty of Applied Medical Sciences in King Abdulaziz University, Jeddah. Participants were provided with details of the study and their permission was sought to take part in the research. Students could withdraw from the study at any time. A 48 of the surveyed persons were male, with about 52.7%, while the female were 43, with about 47.3%. A total of ninety one university students aged ranged between 18-24 years from all regions of KSA attending the king Abdel-Aziz University.

Study design: A cross-sectional descriptive study conducted at KAU, Jeddah KSA.

Study Duration: The data were collected starting from) October 2011to April 2012.

Study population: The target study population was KAU male and female scholars.

Questionnaire: The questionnaire was based on the Arab Teens lifestyle Study (ATLS) questionnaire, which is a school-based cross-sectional multicenter collaborative

study (**Al-Hazzaa, et al., 2011)**. Slight modifications were made on the questionnaire according to the current study objectives and the participant's age.

A self-administered questionnaire, including documenting appropriate self-reported data on:

a) **Age, gender** which were entered as they reported (**Al-Hazzaa, et al., 2011**).

b) **Anthropometric Measurements**:

- Weight and height were measured with the subjects wearing light wear, without shoes and was note down to the nearest 0.1 kg, and 0.1 cm, respectively. Waist circumference was documented according to (**Kuczmarski et al. 2002).**
- Body mass index (BMI) and BMI percentiles for age and sex were determined according to the established (**World Health Organization (WHO), 1998**) international anthropometrical standards.

c) **Food habits**: Similarly collected data from the participants about consumed breakfast, sugar-sweetened drinks including milk and dairy products, soft beverages, vegetables, fruit, fast food, french-fries and potato chips, cake and donuts, chocolate and candy, energy drinks; these questions healthy and unhealthy dietary habits (**Rockett, et al., 1995**).

d) **Physical activity practices:** The questionnaire was designed to collect information on frequency, duration, and intensity of a variety of light, moderate, and vigorous-intensity activities during a typical week. Moderate-intensity activities (normal-pace walking, brisk walking, swimming, household activities) and moderate-intensity sports (volley ball, bowling and table tennis). Vigorous-intensity activities (stair-climbing, jogging, running, cycling, self-defense, weight training) and vigorous sports (soccer, basketball, handball, and single tennis) (**Al-Hazzaa, et al., 2011**).

Pedometer

Electronic pedometer was used to measure habitual physical activity for three consecutive week days. Three days of measurements were shown to offer a reliable assessment of daily step counts, with an interclass correlation coefficient of 0.80 (**Tudor-Locke, et al., 2005)**.

Statistical analysis

Data statistical analysis was performed to establish associations and differences in patterns of PA and obesity of young people. PA levels and BMI of youth were analyzed according to gender and age-group using 2-way and 3-way analyses of variance (ANOVA). Chi-square analysis was conducted on the frequency to examine differences in PA index between youth. Descriptive statistics were used to high spot the occurrence of overweight and obesity along with groupings according to activity index. Moreover, Pearson's correlations were used to form relations between health state variables (e.g., BMI and PA ranks) and inactive PA. SPSS statistical package version 15

(**1994**) was used for all analyses and the results were tabulated and used the Harvard graphics packages version 4 for representing the results graphically **(Harvard 1998).**

Result and Discussion

Obesity is a leading cause of mortality and morbidity and all types of research in this field is required to promote better health at the individual and community levels. There is no doubt that a large amount of research has been carried out and published from the Arab world regarding obesity especially in recent years. Obesity is a leading cause of mortality and morbidity and all types of research in this field is required to promote better health at the individual and community levels. There is no doubt that a large amount of research has been carried out and published from the Arab world regarding obesity especially in recent years. This is a reflection of the global increase in the attention of health workers to obesity as a common and preventable risk factor for a wide range of endocrine and cardiovascular diseases, (**Musaiger A.O. 2011)** The drive of this study was to evaluate the obesity rates between male and female university undergraduates at King Abdulaziz University and to relate their body weight state and structure with their physical activity ranks and eating behaviors. A total of ninety one university characteristics of the study participants are displayed. It is clearly seen that, (48) of the surveyed parsons were males, with about (52.7%), while the females were (43), with about (47.3%) as in the table (1); the high percent of the students participated in our study from third year (38.5%), followed by second year (31.9%), then by fourth year (26.4%). Whereas, minimum number of participated from intern students (3.3%) as shown in figure (1). The present facts verified that more than one third of the students were above the average body weight. Obese students denoted (44%) of the sample while, (56%) were non-obese as show in the same table. These results were as per the results of alike studies in Saudi Arabia, other Middle East and some Western countries. A study was conducted in Qassim University revealed that the incidence of overweight and obesity was (21.8% and 15.7%), respectively among male students (**Al-Rethaia, *et al*., 2010**). In Lebanon, the corresponding percentages were (37.5% and 12.5%), respectively (**Yahia, *et al*., 2008**). While in Kuwait percentages were (32% and 8.9%) (**Al-Isa, 1999**), and in the United States and the United Arab Emirates overweight and obese represent about (35%) of the male college students (**Huang, *et al*., 2003; Lowry, *et al*., 2000; Musaiger, *et al*., 2003**). A study was conducted in Malaysia found that (14.8%) of students were overweight, pre-obese students accounted for (15.9%) and (5.2%) were obese (**Gopalakrishnan, *et al*., 2012**). In addition, in India, the prevalence of overweight and obesity was found to be (18.5% and 4.5%), respectively (**Thakkar, *et al*., 2013**). In contrast, only (7.9%) of Iranian male college students were directly above the normal array of body weight (**Nojomi and Najamabadi, 2006**). This rate declined to (2.9%) among Chinese college students with a percentage of obesity as low

as (0.4%) (**Sakamaki, *et al*., 2005**). In spite of the small sample sizes and the fact that self-stated height and weight were used in some of the above mentioned studies, their results still reveal variances in the severity of obesity problems between young adult's crosswise countries.

The skewness of the age was positive, which means that most of the sample's ages were younger than the mean (namely younger than 21 years); the standard deviation was (21.0±1.3). The same situation can be noticed for the weight, most of the sample's weights were less than the mean of (69.2 kg), and the standard deviation for weight was (69.2±23.5) as in table (2). The current study showed a negative relationship between pedometer-determined physical activity and BMI. Likewise a negative relationship was reported in a Japanese study (**Mitsui, *et al*., 2008**). The skewness of the BMI was positive, which means that most of the sample's BMI having value less than the mean (namely 25.3 kg/m2), and a standard deviation of (25.3±7.5) as shown in table (2) &figure (2). Figure (3) Suggesting that obese individuals were less physically active than non-obese individuals ($r=0.046$, $P<0.05$). Pedometer-determined physical activity (measured as daily step count) and its relationship with BMI has been examined before in many studies. A study was conducted in Canada among Canadian working adults and an American study among African-American middle aged women showed similar findings ($r= -0.4005$, $P<0.0001$) ($r = -0.417$, $P <0.0001$) respectively (**Chan CB, et al., 2003**) (**Thompson DL, et al., 2004**).

This study also assessed the Mean ±SD of time in minutes spent per week in different types of physical activity by the study participants of university males and females, and examined the extent to which sex differences in physical activity were present among them as shown in tables (3). Although some health benefits can occur through an average of 30 minutes of physical activity per day (**Janssen & Leblanc, 2010**), physical-activity guidelines for children and adolescents recommend that they should participate in at least 60 minutes of moderate to vigorous physical activity on a daily basis (**Strong *et al*., 2005; Tremblay *et al*., 2011**).

In the present study the level of physical activity examined by using a self-reported questionnaire and found that males were more engaged in vigorous activities than females as shows in table (4). These findings were similar to those revealed by a study conducted in Czech Republic, stating that men show more physical activity in total than women, which was explained mainly by the differences in vigorous physical activity (**Dagmar, *et al*., 2011**), as well as a study comparing between Latino men and Latina women showing that men reported more hours per week occupational and overall activity than women (**Marquez and McAuley, 2006).**

When comparing objective and subjective measures of physical activity, the objective measurements of physical activity derived from electronic pedometer were qualitatively consistent with findings based on self-report. In the same table the level of

activity examined by a pedometer (step count), unexpectedly revealed that females had a greater step count than males (22883.39 vs. 18651.58) as presented in the same table but the differences not significant. Likewise P-value for the t tests (according to gender) for distance =0.037 < 0.05; that is a significant difference (towards female). Our findings were opposed by the results of the Latinos study which showed that men had greater average daily activity counts than women when measured using an accelerometer (**Marquez and McAuley, 2006**) as well as a study in the United States, which reported that mean counts per minute (during wear time of accelerometer) were consistently higher for males than females (**Troiano, *et al*., 2008**). Crosswise the UK, it has been stated that boys are more expected than girls to be active at nearly every age, with an average of 32% of boys and 24% of girls meeting the suggested levels of bodily activity for young persons. Moreover, physical activity appears to decrease with age in both sexes, but more sharply in girls (**The Department of Health, 2011**).

The same table presented the P-value for the t tests (according to gender) for Min Walking =0.021 < 0.05; that is a significant difference (towards male); for Min Jogging =0.004 < 0.01; that is a highly significant difference (towards male), for Min Vigorous Activity = 0.012 < 0.05; that is a significant difference (towards male), for Min Weight Training =0,006 < 0.01; that is a highly significant difference (towards male). A positive correlation in the same table was found between the level of physical activity and each of: minutes of walking, number of steps, distance and the amount of calories burnt. Our results matching with Crosswise the UK, it has been stated that boys are more expected than girls to be active at nearly every age, with an average of (32%) of boys and (24%) of girls meeting the suggested levels of bodily activity for young persons these results agreement with our results. Moreover, physical activity appears to decrease with age in both sexes, but more sharply in girls (**The Department of Health, 2011**).

The lifestyle factors and nutritive behaviors of young persons in both advanced and developing nations have undertaken a foremost change over the previous few years. This is mainly obvious in high-income nations as Saudi Arabia, where an inactive lifestyle and an unhealthy nutrition that is centered on high-density treated nutrients obtainable by a vast variety of fast food outlets has contributed to a lower level of bodily activity and a great rate of obesity between young person's. Studies by **Al-Nakeeb, *et al*., (2012**) about Adolescence living in two cities in Central England were more bodily active than their equivalents existing in a city in the Eastern Province of Saudi Arabia. Males were commonly more energetic than females, with females showing higher degrees of overweight/obesity. Young males and females from Al-Ahsa described lower bodily activity and noted greater percentage of overweight and obesity than adolescence in Birmingham and Coventry. The difference in physical activity and weight state amid adolescents in UK and in Saudi Arabia could be because of traditional

and environmental variances as the deficiency of chances to workout, mainly for females, due to social customs and restraints in addition to way of lifestyles traditions.

Generally, engagement in physical activity by young people in Saudi Arabia is not regarded as a leisure time activity due to cultural attitudes and beliefs. It is commonly perceived that the pursuit of academic excellence has greater status than physical activity.

Food habits: The low levels of physical activity and high percentage of obesity amongst males and females might be related to certain aspects of their lifestyle, dietary habits and environmental factors. For example, using saturated fat in traditional cooking is commonplace in the Gulf countries. The present study as in table (5) show that mean of ingestion of fast foods, potato, cakes and sweets per week of the study participants were (3.0 ; 2.9; 2.2 and 2.8) respectively with maximum (7) time per week . Our study similarly for a recent study by **Washi and Ageib (2010)** on poor diet quality and food habits of Saudi youth found an increase in dietary intake or energy from fats as well as the fact that rice, bread and meat are regarded as the staple diet and are used in almost every meal. This seems to concur with other studies (on this age group) which found that obese adolescents consume significantly more servings of meat, grain products, fast foods, sugar, sweetened drinks and potato chips. These contribute to a higher caloric intake compared to non-obese adolescents (**Gillis and Bar-Or, 2003**).

The results of our study showed that, the skipped meals was very common among the students, it's reporting that the most two meals to be skipped breakfast and dinner. The majority of participants (51.6%) were skip meal sometimes, and (26.4%) were skip the meals, (22.0%) they didn't skip meals and most of participate (38.5%) were skip the breakfast While, (34.1%) were skip the dinner, and (18.7%) skip lunch. as illustrate in figures (4&5). Comparing our results with equivalent studies from Lebanon and China (**Yahia*, et al*., 2008; Sakamaki, *et al*., 2005**), vegetables and fruits consumption was uncommon habit among Saudi students. On the other hand, (83.5%) of Chinese and (56.3%) of Lebanese male students consume vegetables three times or more per week. Moreover, (49%) of Lebanese students eat fruits at the same rate. The vast majority of Saudi and Chinese students eat three meals per day. While in Lebanon most of students eat only two meals per day. On the other hand, **de Graaf Cees, 2006** reported that snacks consumption may contribute to a positive energy balance and increased body weight. Contrarily, results of the present study revealed an inverse relationship between BMI and snacks eating rate. That can be explained by the high-calorie larger meals taken by the students in absence of snacks. This is supported by several epidemiological studies, as cited by **Bellisle *et al*. (1997)**, which revealed an inverse relationship between habitual frequency of eating and BMI, leading to the assumption that increased eating of both meals and snacks frequency i.e. "nibbling meal pattern" helps in

avoidance of obesity rather than the "gorging meal pattern". Moreover, a recent study on rats demonstrated that obesity development is associated with increased Calories per meal rather than per day, suggesting that the large size of meal, but not the over nutrition, could be responsible for obesity **(Furnes, *et al*., 2009). Conclusion and recommendation**

The current study has demonstrated that the prevalence of PA among KAU student is relatively high. Therefore, there is a need to the stages of PA adoption and supported by university and public policies to encourage active living and discourage sedentary habits. Furthermore, students are recommended to replicate this study with more representative sample to address this issue of physical inactivity among Saudi youth add more**.**

Table (1): Number and percent distribution of the participants as gender & obesity (n=91).

Variables	Number	%
Male	48	52.7
Female	43	47.3
Non Obese Students	51	56
Obese students	40	44
Total	91	100

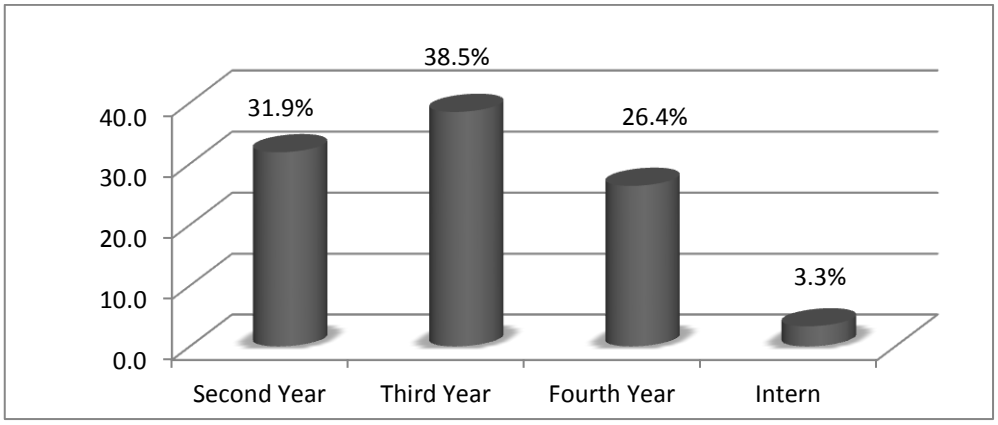

Fig 1: The characteristics stratified by University grades.

Table (2): Mean ± SD, Skewness, Min. & Max. of Age, Anthropometric measurements, characteristic physical activity steps, distance and burning calories of the participants by pedometer (n=91)

Variables	(Mean ± SD)	Skewness	Min.	Max.
Age	21.0 ± 1.3	1.0	18.0	26.0
Height	164.6±8.5	- 0. 2	138.4	180.0
Weight	69.2±23.5	1.6	34.8	181.0
BMI	25.3±7.5	1.85	15.5	63.4
Waist Circumference	81.3±18.5	0.6	51.00	130.00
Physical Activity Steps	20601.1±12095	1.9	1929	81331
Distance	5.4± 5.3	3.1	0.45	29.90
Calories	394.6± 218.6	1.6	39.6	1415.3

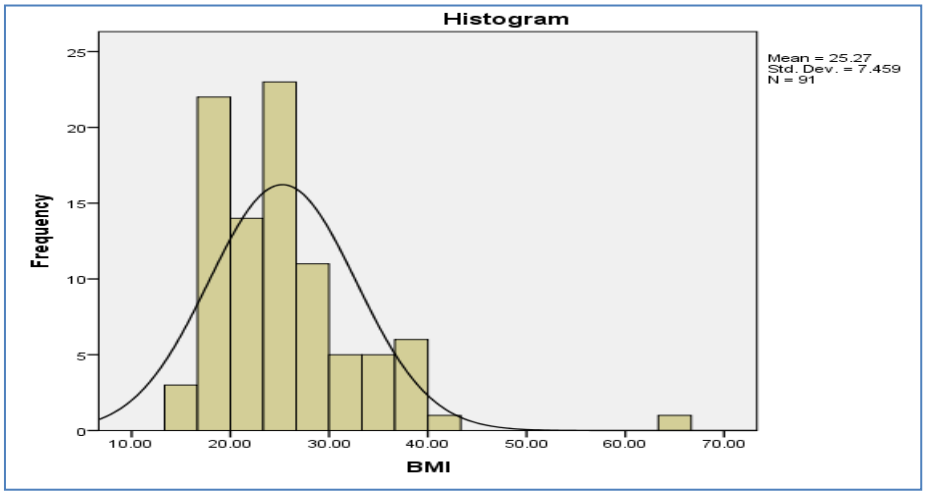

Figure (2): Histogram analysis of the BMI

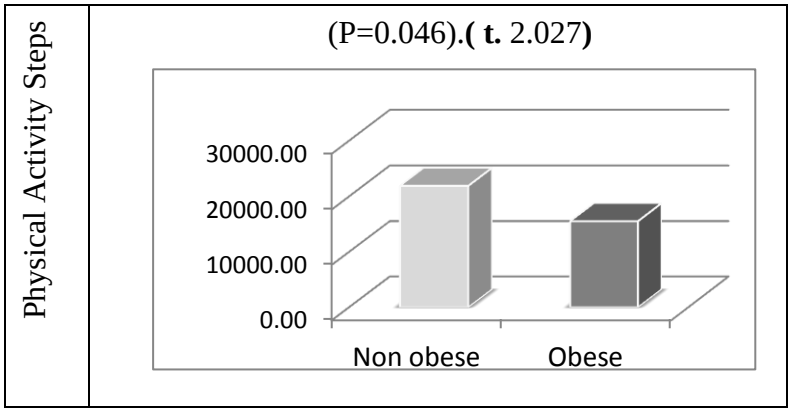

Fig (3): Percentage of Vigorous -Intensity Physical Activity minutes time spent per week.

Table (3) Descriptive analysis for some Physical Activities per day and Walking per week in a regular way (boys & girls) (n=91)

Times / day Activities	None		1-2 times		3-5 times		6-7 times		Missing		Total	
	No	%	No	%	No	%	No	%	No	%	No	%
Stairs use	3	3. 3	30	33%	45	49.5	13	14.2	0	0	91	100
Jogging / Running	57	62.6	27	29.7	6	6.6	1	1.1	0	0	91	100
Biking	83	91.2	3	3.3	3	3.3	0	0	2	2.2	91	100
Swimming	79	86.8	10	11	0	0	1	1.1	1	1.1	91	100
Moderate Activity	70	76.9	17	18.7	1	1.1	0	0	3	3.3	91	100
Vigorous Activity	68	74.7	19	20.9	2	2.2	0	0	2	2.2	91	100
Weight Training	80	87.9	3	3.3	6	6.6	2	2.2	0	0	91	100
Household Activity	44	48.4	26	28.6	15	16.5	6	6.6	0	0	91	100
Walking per week in a regular way	32	35.2	39	42.9	15	16.5	5	5.5	0	0	91	100

Table 4: Correlation between the time spent in Physical Activities of participants and the mean values per minutes according to gender (total n = 80).

		N	Mean	SD	t	P-value	Significance
Min. Walking	**Male**	39	31.15	±24.13	**2.351**	**0.021**	**Sig**
	Female	41	20.56	±15.43			
	Total	80	25.73	±20.71			
Min. Jogging	**Male**	27	32.41	±28.70	**3.018**	**0.004**	**H Sig**
	Female	20	10.55	±17.32			
	Total	47	23.11	±26.62			
Min. Biking	**Male**	5	13.00	±11.51	0.377	0.712	NS
	Female	10	9.50	±18.89			
	Total	15	10.67	±16.43			
Min. Swimming	**Male**	10	51.10	±45.52	0.135	0.895	NS
	Female	8	47.50	±67.77			
	Total	18	49.50	±54.70			
Min. Moderate Activity	**Male**	13	33.85	±33.55	0.717	0.482	NS
	Female	9	24.44	±24.42			
	Total	22	30.00	±29.88			
Min. Vigorous Activity	**Male**	19	77.63	±44.61	**2.699**	**0.012**	**Sig**
	Female	10	26.50	±55.43			
	Total	29	60.00	±53.65			
Min. Self-defense	**Male**	3	6.67	±11.55	0.226	0.826	NS
	Female	8	5.00	±10.69			
	Total	11	5.45	±10.36			
Min. Weight Training	**Male**	12	67.50	±57.03	**3.148**	**0.006**	**H Sig**
	Female	8	3.13	±7.04			
	Total	20	41.75	±54.30			
Min. Household Activity	**Male**	18	45.83	±43.60	0.892	0.377	NS
	Female	27	59.81	±56.10			
	Total	45	54.22	±51.40			
Min. other activity	**Male**	2	60.00	±0.00	3.000	0.095	NS
	Female	2	22.50	±17.68			
	Total	4	41.25	±23.94			
Physical Activity Steps	**Male**	48	18651.58	±13161.16	1.662	0.100	NS
	Female	41	22883.39	±10411.98			
	Total	89	20601.07	±12095.04			
Distance	**Male**	48	4.35	±4.44	**2.116**	**0.037**	**Sig**
	Female	41	6.69	±5.94			
	Total	89	5.43	±5.29			
Calories	**Male**	48	354.75	±233.31	1.889	0.062	NS
	Female	41	441.31	±192.43			
	Total	89	394.63	±218.60			

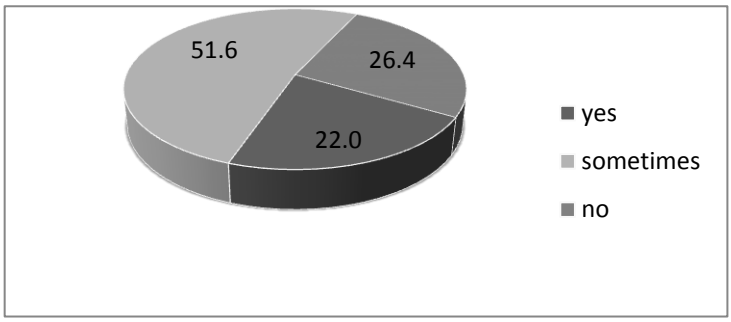

Fig 4. Percentage of participant's Skip meals.

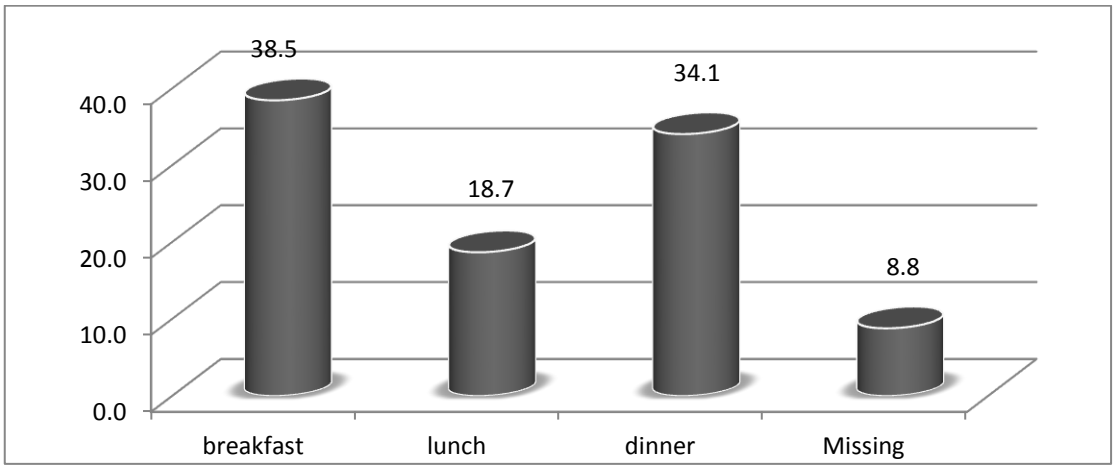

Fig 5. Percentage of participant's which meal they skip

Table 5: Ingestion of fast food, potato, cakes, sweets and energy drink per week of the study participants

	Total (n = 91)				
	Mean	**±SD**	**Skewness**	**Min**	**Max**
Fast foods per week	3.0	1.8	0.6	0	7
Potato	2.9	1.9	0.7	0	8
Cakes/Donuts	2.2	1.8	1.1	0	7
Sweets	2.8	2.1	0.6	0	7
Energy Drinks	0.6	1.3	3.2	0	7

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