Body Weight Status among Urban High School Girls and Its Related Determinants in Urmia, IRAN, 2005

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Abstract

Background & Aims: To date, it has been well known that high body weight, weather in adulthood or in growing ages, is related to some serious medical conditions. So, this study tried to investigate the body weight status among urban high school girl students of Urmia, Iran.

Material and Methods: In this cross sectional study, we measured weight, height and BMI of 956 girl students. Then a questionnaire was completed based on their dietary habits and behaviors related to their physical activity.

Results: Underweight prevalence in the studied population was 8.47% (95% CI: 8.3%-8.9%). The prevalence of overweight and obesity among the studied students were 14.33% (95% CI: 13.46%-15.2%), and 5.02% (95% CI: 4.4%-5.6%) respectively. Factors that are significantly correlated with the participants' body weight, are the frequency of high energy foods intake time during a week($P<0.001$), duration of computer use per day($P<0.01$), educational state of their mothers ($P<0.01$), feeding pattern in the infancy (breastfed or non-breastfed) ($P<0.05$) and the kind of their schools ($P<0.05$).No significant association was found between other studied dietary variables (such as the time spent for eating over 24-hours, and breakfast eating times per week) and overweight / obesity.

Conclusion: In this study, we have shown there were two changeable parameters (i.e. the number of times for intake of high energy foods during a week, and working with computers) which influence the high schoolgirls' body weight in the region of study.

Keywords: Prevalence, Under nutrition, Overweight, Obesity, High school girls

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Introduction

To date, body weight disorders including obesity have reached epidemic proportions in the world so that in developing countries the increasing rate of obesity often coexists with existing problems of stunting and wasting in developing countries (1, 2). In Iran, obesity has been shown as an emerging problem in nutrition transition, while malnutrition and under-nutrition in high school children remains an important issue especially in urban areas, and for women (3, 4).

Obesity in adults is not easy to be treated, and it is often correlated with obesity during childhood.1, 3. The presence of obesity in the adolescent period and in very young adults is a strong predictor of chronic disease, independent of adult weight (5).Obesity may be defined as excessive accumulation of adipose tissue in the body (3). Healthy eating behavior during adolescence is a fundamental prerequisite for physical growth, psychosocial development and cognitive performance, as well as for the prevention of diet-related chronic diseases in adulthood. It has been shown that adult overweight

was associated with cardiovascular disease, hypertension, type 2 diabetes, atherosclerosis, gout, arthritis and some of the malignancies (3, 6, 7). Furthermore, many of the studies detected that childhood and adolescence obesity was correlated with adulthood mortality (3, 7, 8). On the other hand, obesity exerts a remarkable social and psychological stresses over the girls. As a result, the girls are the most important group to studying the prevalence of overweight and obesity (9, 10).Overweight and obesity have known as the major etiological roots at the developing of eating disorders especially in girl adolescences (11).

The study, as the first one, was conducted to investigate the problem of underweight, overweight and obesity among the female high school students of Urmia, the capital of West Azerbaijan. The findings of the study could be applied as a baseline for future studies.

Materials and Methods

In this cross-sectional study, we selected 16 secondary schools from the 96 ones existing at the city. From these 16 schools, we selected 956 students randomly with the age range of 15 to 19 years old by randomized multistage sampling. Urmia city composes two regions. In each region, the city possesses governmental and private high schools. According to the education and training office of the census center of the province, the city composes 42 governmental, and 54 private girl's schools. We selected 16 schools from both regions randomly. Then we selected one class from every educational stage. Therefore, we selected entirely 16 schools with 44 classes therein (n=956).

At the first step, a pilot study with 52 students at the same age range was conducted to test the field actions, and to improve the validity and reliability of the questionnaire. Then, an educated research team was formed. The team included three field workers. The field actions were divided into three sets including weighing, stature measurement and filling in a questionnaire. This study was completed at the end of 2005.

To weigh the students, we used a digital scale made by TEFAL Company (with 100 gram accuracy). As these scales are automatic, they don't need to be arranged on zero. We wanted students to take off their overcoat and to stand on scale with no movement; then we read and recorded their weight on the questionnaire. BMI over 85th centile of BMI curve was known as overweight, and over 95th centile of BMI curve was known as obese. BMI through 5th to 85th centile was taken into account as normal (7, 11).

To measure the students' height, we applied a tailor's tape installed vertically on the wall of the classroom. The students took off their shoes, and they stood in front of the tape with heels together and toes apart, then we were setting their head position on Frankfort horizontal plane, and we measured their length by a square, and recorded them on the questionnaire (with 0.5 centimeter accuracy).

The educated field workers were three persons. The first person was weighing the students, the second one was measuring their length, and the third one was filling the questionnaires. The questionnaire filler was explaining each of the questions to the students, and then she ticked the question. The students were asked about some variables possibly affecting their body weights including nutrition in the first year of life, their fathers' and mothers' educational level, their birth time, the occupational status of their parents, weight status of the father and mother, the number of times for intake of high energy foods during a week, their breakfast eating status, and finally being active or inactive in a usual day (including study duration, sleep duration, daily duration of computer use, TV watching duration, class time, sedentary games and walking duration).The studied dietary variables included the time spent for eating over 24-hours, and the times of eating a battery of high energy foods including potato chips, fried fast foods, pizza, butter, nuts and seeds over a week.

Pearson's Chi-square test and Fischer exact test are applied to do the statistical analysis (with 95%

confidence interval). We applied t-Student's test to examine the equality of the means.

Results

The total number of the students was 956 girls from which 446 students belonged to Region (1), and 510 students to Region (2) of Urmia city with the age range of 15 to 19 years old. The mean of BMI for all of the participants was 20.56±1.89 (95% CI: 19.95-21.17).

This study revealed that the prevalence of overweight and obesity among the studied students were 137 (14.33%, 95% CI: 13.46%-15.2%), and 48 (5.02%, 95% CI: 4.4%-5.6%) respectively. The prevalence of underweight was 81 (8.47%, 95% CI: 8.3%-8.9%) (figure1). The residue of the participants were at the normal range of BMI curve (72.18%, n= 690).

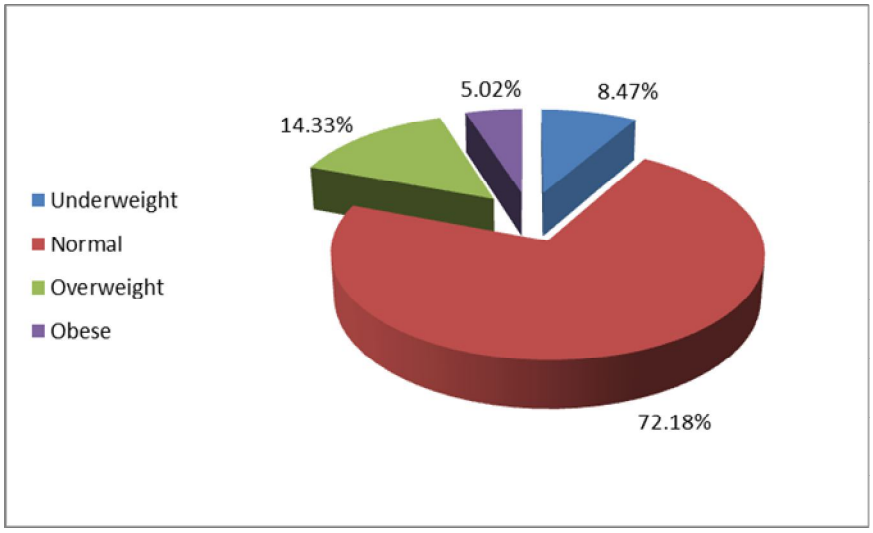

Figure 1.The Prevalence of underweight, overweight and obesity among Urmia Urban High school girls (n=956); Iran

Factors that were significantly associated with the participants body weight, included the number of intaking high energy foods per week (P<0.001) (table 1), duration of computer use per day (P<0.01) (table 2), educational state of their mothers (P<0.01), feeding pattern in the infancy (breastfed or non-breastfed) (P<0.05), and the kind of their schools (P<0.05).

Table1. Absolute and relative Frequency of subjects' weight status concerning times for intake of high energy foods per week, Urmia, Iran

	Times for intake of high energy foods per week											
	< 2		2- < 3		3-< 4		4-< 5		≥ 5		Total	
Weight status	n	%	n	%	n	%	n	%	n	%	n	%
Underweight	3	3.70	15	18.52	23	28.40	25	30.86	15	18.52	81	100
Overweight	5	3.65	6	4.38	6	4.38	69	50.36	51	37.23	137	100
Obese	3	6.25	7	14.58	6	12.50	12	25.00	20	41.67	48	100
Normal	15	2.18	98	14.20	218	31.59	256	37.10	103	14.93	690	100

The mean and standard deviation of duration of computer use per day for obese plus overweight (OB+OW) and the underweight students were 3.89±1.29 and 2.06±0.96 respectively (P<0.01).

Table2. Absolute and relative Frequency of participants' weight status concerning duration of computer use per day, Urmia, Iran

Weight status	Duration of computer use per day (hrs.)									
	< 1		1- < 2		2- < 3		≥ 3		Total	
	n	%	n	%	n	%	n	%	n	%
Under weight	9	11.11	23	28.39	39	48.15	10	12.35	81	100
Over weight	21	15.33	24	17.52	18	13.14	74	54.02	137	100
Obese	3	6.25	2	4.17	16	33.33	27	56.25	48	100
Normal	24	3.48	69	10.00	283	41.01	314	45.51	690	100

We could not detect a statistically significant difference between OB+OW students and the others for the factors of spent time for eating over 24-hours, breakfast eating times per week, and family size. As a result, the OB+OW students have smaller family size than that of non-OB+OW students (i.e. 4.86±1.28 vs. 4.72±1.37 respectively).

Discussion

The percent of the overweight and obesity were 14.33 and 5.02 respectively (i.e. totally 19.35%). That is representing a high prevalence of the OW+OB in the study population; so that around one fifth of the students were suffering from the overweight and/or obesity adverse outcomes. In a study conducted in high-school girls aged 14–18 years in Sistan and Baluchistan province, Islamic Republic of Iran, it was shown the prevalence of underweight, overweight and obesity were 16.2%, 8.6% and 1.5% respectively (4).The incidence of underweight prevalence is higher than that of our study but the ones about obese and overweight prevalence are lower than those of our findings in this context. The criteria used in the study, were the same criteria as ours. It should be noted that Sistan and Baluchistan province is one of the most deprived provinces in Iran mostly due to its warm, dry and droughty climate.

The authors of the study had been mentioned that their findings were higher than those of other parts of Iran. In our study we revealed that the kind of the schools was correlated with the participants' weight status significantly. The kind of schools could be taken into account as one of the indices for socioeconomic status of the households (12).Then these different figures in our study and the mentioned study may be due to the different socioeconomic status of the study populations.

In another research (in Hamedan city, Iran), the figures were 2.55% and 3.5% respectively (i.e. totally 6.65%) (13). The cut off points used to defining of the overweight and obesity in Hamedan study were not the same as ours. Also, the population of the mentioned study were both the girl and boy students (n=2000).

The results of a meta-analysis study regarding the prevalence of obesity (and not overweight) in Iran (14) showed that overall prevalence was 5.5% for under 18 years old population. The obesity prevalence in under 18 years old girls was 4.58 percent. This study included 62 provincial studies with 2 studies in east Azerbaijan, the nearest province to Urmia as the largest city in west Azerbaijan. On the other hand, ethnic differences were not taken into account. In Canadian girls aged 12 to 19 years old the prevalence of overweight and obesity was estimated 3% and 10% respectively (15). The defining

cut offs in this study were also not identical with our study.

In our study, the times of intaking high energy foods per week associated with weight status of the children (P<0.001). As a result, the more frequent the students had intake of high energy foods per week, the more chance they will have to get obese. In a case-control study conducted on 114 students at 6 to 12 years of old, the authors confirmed the role of an unhealthy diet, notably calorie-dense snacks, in childhood obesity (16). In a cross-sectional study on boys and girls aged 6 to 18 years conducted in Bahrain, the authors revealed high sugar consumption, low intake of dietary fiber and high energy foods rich in fats and dietary cholesterol by many Bahraini children is likely a factor in increasing their risk of obesity and cardiovascular diseases in later life (17).

Our study revealed also that the highest prevalence of the OW+OB students belonged to breast fed cases, and the lowest percent of the OW+OB students belonged to cow's milk fed cases. This finding is surprising; because many studies have demonstrated the breast fed infants would have low probability to be obese (7, 9, 10). It is acceptable that this is not a valid result as we were asking the students about their feeding at the infancy, and not their mothers in this context. On the other hand, it has been observed that in the under-developed countries because of the ignorance on the importance of mother milk, they provide their children the cow's milk and formula milk wrongfully (7), which is one of the protein-energy malnutrition causes at the children.

Working with computer is another variable affecting the weight status in our study. In a study fulfilled in Urmia, Iran (18), it has been detected that the time spent on watching TV were associated with an increased risk of obesity and overweight [Odds ratio (OR).Tremblay et al., suggested both organized and unorganized sport and physical activity are negatively associated with being overweight (10-24% reduced risk) or obese (23-43% reduced risk), while TV watching and computer use are risk factors for being overweight (17-44% increased risk) or obese (10-61% increased risk) (15). They concluded that first physical activity and sedentary behaviors partially account for the association of high socioeconomic status, and secondly two-parent family structure increases the likelihood of being overweight or obese. Wake and coworkers in Australia fulfilled a study and found that child mean BMI z-score was significantly related to TV watching (P<0.001), but not video game/computer time (P=0.09) and it account for only 1 and 0.2% of total BMI variance, respectively (19). When parental BMI, parental education, number of sibling, food intake, organized exercise and general activity level were included, television ceased to be significantly related to child BMI independently (20). They concluded a small proportion of variance in child BMI was related to television, but not video/game/computer time.

In conclusion, we have shown there were two changeable parameters (i.e. the number of times for intaking high energy foods during a week, and working with computers) which influence the high school girls' body weight in the region of study.

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Conflicts of Interest:

The authors declare no conflict of interest.

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