Eating Behavior and Problems in Egyptian Adolescents; Relation to Dietary Intake

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Abstract: Objective of this study is to examine the presence of disordered eating (ED) behavior among Egyptian adolescent boys and girls and detect the influence of obesity, body image, depression, somatic symptoms, binging and weight teasing by peers and family members as well as assessing dietary intake of macronutrients and micronutrients and its correlation to obesity and eating disorder. *Subjects and Methods*: The sample consisted of 1124 adolescents (642 girls & 482 boys) aged from 14-17 years, divided according to their BMI into four groups. The questionnaires used were EAT, ACDI, body image, and teasing, 24hr- dietary recall. and sociodemographic data were collected. *Results*: we found that 25.5% & 38.6% of boys and girls reported ED that was significantly correlated to body image, bad eating habits, depression and somatic symptoms. ED is more prevalent among overweight-obese adolescents of high social class. Adolescents have deficient intake of vitamin A, calcium, thiamine and niacin; girls are more deficient in iron and boys are deficient in vitamin C. On assessing weight teasing by peers and family member by weight status and ED after adjustment for socioeconomic standard; there was statistically significant association with obesity in girls & boys. *Conclusion*: Social back ground, obesity, negative body image , depression and teasing are the main risk factors for developing ED. Early detection and intervention for ED by biological and psychological approaches, treatment of overweight and obesity using family based treatment; early detection of depression and encouraging sports practice are recommended.
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1. Introduction:

As the world has become a global village due to advances in communications, dietary habits have changed especially among adolescents through introduction of all types of fast food with its heavy fat content that goes hand in hand with changes in life style & physical activity. These factors lead to eating disorders, one of the most important risk factors for obesity, hypertension and cardiovascular diseases in adult life. Non Communicable Diseases (NCD) is emerging as a major health problem in Egypt, where 41 percent of all deaths are caused by chronic diseases. It is expected that NCD burden will rise to 60% by the 2020. The increasing NCD burden places a huge demand on health services in Egypt (WHO, 2005). Therefore action to reduce these major NCD should focus on preventing and controlling the risk factors in an integrated manner (WHO, 2003).

Aim of the Study:
Assessment of eating disorders among Egyptian adolescent girls and boys in relation to weight status, dietary intake, teasing, and psychosocial risk factors.

2. Methods
Study population:

The study population included 1124 adolescents (482 boys & 642 girls) attending four high schools in Giza; two public schools one for boys (264) and one for girls (458) and another two mixed private schools (218 boys & 184 girls) with age range from 14-17 years old.

Study design:

Data for the present study were drawn from project eating attitude among adolescents attending four high schools, after the approval of the scientific ethical committee at the National Research Centre and agreement of the ministry of education province office. A signed consent from parents was obtained. Survey and anthropometric data were collected from students within their classrooms under the direction of the research staff & a teacher. Height and weight were assessed by the research staff within the classrooms.

Survey development:

We preferred to use an Arabic scale for surveying eating disorders, binging and bad eating habits using Shoukeir assessment scales (Shoukeir 2002& Shoukeir 2000), derived from Marshall (1998). For Assessment of depression we used the Arabic Children's Depression Inventory (ACDI)

derived from Kovacs (1992) and Kazdin (1986) and constructed for Egyptian children by Abdel Khalek (1993). The questionnaires on body image were adopted from the original questionnaires by Moore (1998). Questionnaires for assessing teasing were quoted from Neumark (Neumark el al., 2002), that was based on the survey items developed by Thompson et al., (1995).

Measures:

Weight status was based on height and weight measurements taken by research trained staff in the classroom. Standardized equipments and procedures were employed. Body mass index (BMI) values were calculated according to WHO published standards

BMI = weight (kg)/ Height (meter)^2

Using gender, age specific cut-off points respondents were classified as underweight (BMI< 15th percentile); average weight (BMI 15^{th-} < 85th percentile), overweight (BMI >85th. <95th percentile) and obese (BMI > 95th percentile).

We assess the frequency of teasing, source of teasing (peers or family members), and the effect of teasing, (i.e. how much it bothers those teased). The degree to which they were bothered by weight-teasing by peers and family members making them east more or less was then assessed; response categories were (1) never; (2) sometimes; (3) often.

School level and birth date were taken from the school files. Socio demographic data were based on self report. The prime determinant of socioeconomic status (SES) was parental educational level defined by 4 categories. (1) Illiterate; (2) primary-preparatory; (3) high school or similar; (4) university education; and parental occupation level defined by (1) not working; (2) workers; (3) employee; (4) professional. Family number and birth order of the participant were recorded.

Every student filled a 24hr dietary recall sheet; that was analyzed by a nutritionist to calculate the intake of macronutrients and micronutrients.

Data analysis:

Unadjusted association between eating disorder and psychosomatic variables as well as micronutrients and macronutrients intake as well other risk factors that include parental education and occupation, family number and birth order was studied. We studied also association between weight statuses, eating disorder and teasing using χ2 TEST and associations adjusted for SES and school level were conducted using logistic regression. Among the students who reported being teased by peers or family members, percentage of girls and boys bothered by teasing were examined across weight status using χ2.

Eating disorder and its association to weight teasing and weight status were examined using χ2 tests and associations adjusted for BMI, SES were examined using logistic regression. To conduct all analyses, SAS release 6.12 was used.

3. Results

Fig.1 shows that nearly 5% of boys and 3% of girls have lean body mass index (BMI) whereas, 58% of boys and 55% of girls have normal BMI; while the percentage of overweight of boys and girls were 17% & 27% and the obesity of boys and girls were 20% & 14.5 respectively, added to this obesity increases in girls with age and decreases in boys with age.

Fig.2 shows that 78% boys, 80% girls take ≥ 80% of RDA of their proteins; 94% boys and 93% girls receive ≥ 80% of RDA of their carbohydrates & 66% boys & 74% girls receive calories ≥ 80% RDA.

Fig.3 shows the micronutrients intake according to RDA whereas we found that the most prevalent deficient intake was in vitamin A intake and to less extent in both thiamine and niacin in boys, whereas in girls we found that the most deficient intake was in vitamin A, iron, thiamine and niacin & lesser percentage were deficient in calcium and vitamin C.

Table1 shows that BMI is significantly correlated to animal protein, animal fat in boys and girls (P = 0.00 & 0.01; P = 0.00 & 0.00 respectively). No statistically significant difference in caloric intake between normal weight and overweight-obese adolescent.

Table 2 shows that iron is negatively correlated with BMI in girls and boys (P = 0.01); vitamin A is positively correlated to BMI, and vitamin C is negatively correlated to obesity and overweight. Comparing dietary intake in girls to BMI, it was found that plant protein and vitamin C are positively correlated to obesity and overweight (P = 03.01 & 0.04 respectively); while in boys vitamin C intake only shows a significant difference between normal weight and obese (P = 0.04).

Table 3 shows psychosomatic symptoms in correlation to sex difference, it shows that: a. boys have more concern about overeating than girls (P = 0.05) and girls are concerned more about their bulimic behavior (P = 0.01). b. as regard body image there is statistically significant difference between girls and boys as girls are more concerned about their shape, size and fear of gaining weight as well, concerned for losing weight (P = 0.001). c. Somatic symptoms in boys was more significant as regard swelling of foot & hand (P = 0.000) while girls have more stomach aches (P= 0.001). d. girls show more

statistically significant difference in binging than boys (P = 0.001).

Table 4 assesses psychosomatic symptoms according to weight status in girls and boys; in girls, body image (P = 0.000), bad eating habits (P = 0.00), depression (P = 0.01) and eating disorder are positively correlated to overweight and obesity; while in boys, depression (P = 0.00), somatic symptoms (p = 0.03) and eating disorder (P = 0.01) are the factors that were correlated to overweight and obesity.

Table 5 assesses psychosomatic symptoms in relation to eating disorder in girls and boys. Body image, bad eating habits, depression and somatic symptoms have statistically significant values (P = 0.00) in both boys and girls.

Table 6 shows that girls with eating disorder shows statistical negative correlation with calcium intake (P = 0.04).

Table 7 shows that boys with eating disorder show statistical significant positive relation to animal fat (P = 0.04); calcium (P = 0.001); vitamin A (P = 0.01) and vitamin C (P = 0.01).

Table 8 shows significant statistical correlation of social status and weight status to eating disorder in boys and girls (RR = 3.48, 95%, CI = 2.37- 5.1; RR= 3.44, 95% CI= 2.6-4.55, RR= 7.83, 95% CI= 5.76 – 10.64 & RR = 2.04, 95% CI= 1.7-2.45 respectively). Eating disorder increases with highest parental education & occupation and obesity.

Association between weight status and weight teasing wer found to be statistically significant among girls and boys; high percentage of obese girls (74.3%) reported being teased sometimes (P < 0.001); 22.97% of girls reported being teased by peers (P < 0.000); and (28.88%) of girls reported being teased by family member (P < 0.000). A significant percentage of obese boys (49.0%) reported being teased sometimes (P < 0.001); 56.0% of boys reported being teased by peer (P < 0.001) and 33% of boys reported being teased by family member. There was also, a statistically significant association between underweight and weight teasing (51.9%) & (37%) of girls and boys respectively, reported being teased ; 21% & 41% of girls and boys reported frequent teasing by peers and (27% and 14%) of girls and boys reported being teased by family member. Normal weight and lean boys are more likely to be teased about their weight by peers but not by family members (table, 9).

In analysis adjusted for socio demographic characteristics overweight and obese girls but not underweight girls were at greater risk for being teased for their weight, some observation was found in boys. In analysis adjusted for sociodemographic characteristics overweight and obese girls but not under weight girls were at risk for being teased for their weight (P = 0.05 & 0.00); also over weight and obese boys were at risk for being teased for their weight (P = 0.05 & 0.00) (table, 10).

Table 11 shows number and percentage of overweight girls and boys reporting eating disorder behavior. High percentage of over weight and obese girls and boys who were teased about their weight engaged in bad eating habits and binging behavior, as compared to overweight boys & girls who were not teased about their weight. Overweight youth who experienced weight teasing were at significantly greater risk for engaging in bad eating habits and binging; all associations were statistically significant except for the association between weight teasing by family members and binging among boys, this association was of marginal statistical significance.
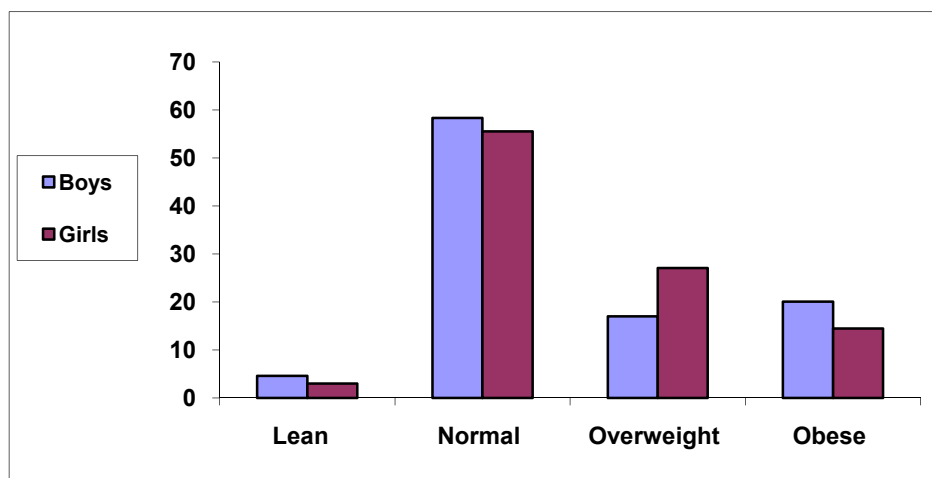

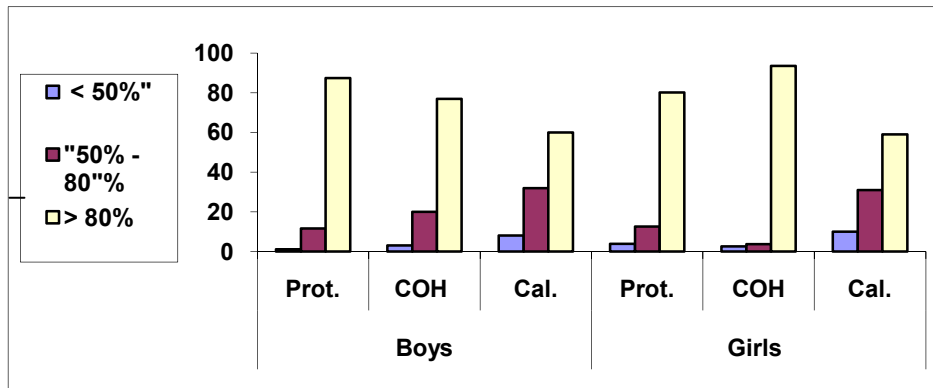**Fig. (1): Distribution of boys and girls according to weight status.**

Fig. (2): Dietary intake of macronutrients of adolescent boys and girls according to RDA
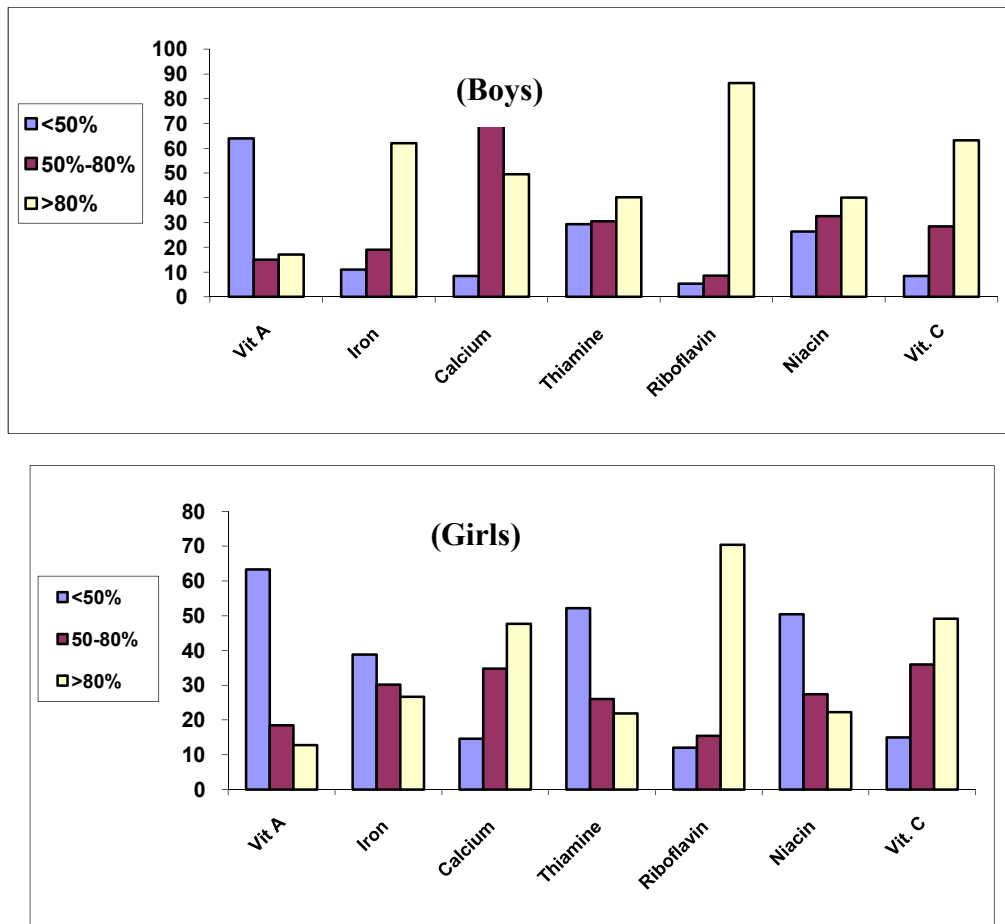
Fig. (3): Dietary intake of micro nutrient in adolescent boys and girls according to RDA

Table (1): BM1 in adolescent boys and girls in correlation to macronutrient intake.

	BMI	SEX	N	Mean	St. error of mean	t	Sig. (2- tailed)
Calories (cal./day)	Normal	M	52	1830.4	83.9	1.4	0.17
		F	155	1696.7	51.3		
	Over-obese	M	40	1776.4	97.4	0.5	0.63
		F	123	1721.2	57.6		
Protein animal (gm/day)	Normal	M	52	36.3	2.7	21.9	0.00
		F	155	27.8	1.5		
	Over-obese	M	40	34.5	3.1	2.5	0.01
		F	123	26.1	1.4		
Protein plant (gm/day)	Normal	M	52	32.8	2.1	1.2	0.24
		F	155	36.0	1.6		
	Over-obese	M	40	33.9	2.1	1.0	0.30
		F	123	31.1	1.5		
Fat animal (gm/day)	Normal	M	52	39.6	2.4	3.6	0.00
		F	155	29.1	1.6		
	Over-obese	M	40	37.8	3.1	2.7	0.00
		F	123	28.3	1.5		
Fat plant (gm/day)	Normal	M	52	31.5	2.5	-0.04	0.96
		F	155	31.6	2.0		
	Over-obese	M	40	29.6	3.4	-0.9	0.34
		F	123	33.8	3.0		
Carbohydrate (gm/day)	Normal	M	52	248.9	15.5	-0.3	0.73
		F	155	255.2	10.0		
	Over-obese	M	40	233.3	17.7	-1.3	0.20
		F	123	269.8	22.8		

Table (2): BM1 in adolescent boys and girls in correlation to micronutrient intake.

	BMI	SEX	N	Mean	St. error of mean	t	Sig. (2- tailed)
Iron (mg)	Normal	M	52	21.8	4.6	-10.1	0.01
		F	155	14.4	2.2		
	Over-obese	M	40	23.4	4.6	-11.8	0.01
		F	123	18.9	2.8		
Vit. A (*ug*)	Normal	M	52	515.1	70.9	4.8	0.000
		F	155	159.9	21.5		
	Over-obese	M	40	392.0	55.4	4.9	0.000
		F	123	107.0	17.5		
Thiamine (mg)	Normal	M	52	1.6	0.8	-0.8	0.40
		F	155	4.9	3.9		
	Over-obese	M	40	11.7	10.5	0.7	0.47
		F	123	3.8	2.7		
Riboflavin (mg)	Normal	M	52	2.1	0.2	2.6	0.01
		F	155	1.5	0.1		
	Over-obese	M	40	2.6	0.6	-0.8	0.55
		F	123	4.5	3.1		
Niacin (mg)	Normal	M	52	11.5	0.87	2.3	0.01
		F	155	8.9	0.60		
	Over-obese	M	40	11.9	1.1	4.3	0.00
		F	123	6.9	0.5		
Vit. C (mg)	Normal	M	52	61.0	12.5	-0.8	0.45
		F	155	71.8	6.8		
	Over-obese	M	40	28.8	9.1	-2.1	0.04
		F	123	52.4	6.4		

Table (3): Psychosomatic symptoms in to correlation to sex:

a. Depression

Question	Gender	No	Some times	Often	P
Nervous for polyphagia	Boy	68	19.5	12.7	0.4
	Girl	70	16.4	13.6	
No self confidence about food control	Boy	75	17.1	8	0.2
	Girl	79	14.04	6.8	
Nervous when over eat	Boy	80	14.4	5.3	0.1
	Girl	80	15.5	5	
Depressed for bulimic behavior	Boy	84	11.6	4.7	0
	Girl	79	11.9	9.1	

b. Body image

Question	Gender	No	Some times	Often	P
Concern about body shape	Boy	9.7	30.8	59.5	0
	Girl	6.3	20.2	63.4	
Worried for size	Boy	53	19.7	27.3	0
	Girl	41	16.6	42.8	
Fear of gaining weight	Boy	36	18.1	45.6	0
	Girl	23	16.3	60.6	
Unsatisfied about shape & size	Boy	42	24.2	33.9	0
	Girl	35	30.6	34.6	
Concerned for losing weight	Boy	42	28.5	29.7	0
	Girl	28	31.8	39.9	

d. Binging

	Gender	No	Some times	Often	P
Eat huge amount every time	Boy	46	42	12	0
	Girl	63	32	5	
Swallow food without mastication	Boy	67	22	11	0
	Girl	74	18	8	
Don't enjoy binging	Boy	42	20	38	0.5
	Girl	41	18	41	
Feel nausea	Boy	69	20	11	0
	Girl	65	19	16	

c. Somatic symptoms

Question	Gender	No	Some times	Often	P
Suffer swelling of foot & hand	Boy	85	8.5	6.3	0
	Girl	91	3.9	4.7	
Stomach aches	Boy	52	32.7	15	0
	Girl	41	36.7	22.3	
Menstrual problems (girls)	Boy	-	-	-	
	Girl	53	23	23.8	

Table (4): Psychosomatic symptoms by weight status in girls & boys

		Girls			Boys		
	BMI	Mean	t	P	Mean	t	P
Body image	Normal	62.7	20.3	0.000	53.2	1.5	0.22
	Over-obese	127.5			45.8		
Bad eat habits	Normal	120.8	12.7	0.005	53.8	2.3	0.13
	Over-obese	143.8			44.8		
Binging	Normal	107.3	4.6	0.20	53.2	1.5	0.22
	Over-obese	138.8			45.8		
Depression	Normal	105.4	10.2	0.01	54.9	3.4	0.00
	Over-obese	147.2			42.0		
Somatic symptoms	Normal	105.7	3.2	0.36	54.9	4.5	0.03
	Over-obese	140.4			43.0		
Eat disorder	Normal	74.3	6.7	0.03	64.1	4.1	0.01
	Over-obese	86.5			75.4		

Table (5): Psychosomatic symptoms by eating disorder score (ED) in girls and boys.

		Girls			Boys		
	ED	Mean rank	M. Wh S*	P	Mean rank	M. Wh S*	P
Body image	< 20	88.4	2669.0	0.000	29.70	339.0	0.002
	≥ 20	148.9			54.5		
Bad eat habits	< 20	92.7	2834.5	0.000	33.2	395.0	0.008
	≥ 20	148.2			53.8		
Binging	< 20	131.5	4350.5	0.45	37.8	438.0	0.050
	≥ 20	141.9			53.0		
Depression	< 20	97.2	3011.5	0.000	28.1	314.0	0.000
	≥ 20	147.5			54.8		
Somatic symptoms	< 20	109.2	3480.0	0.008	34.0	407.0	0.000
	≥ 20	145.6			53.7		

*=Mannwhitney score

Table (6): Dietary intake in girls by eating disorder.

	ED	N	Mean	St. error of mean	t	Sig. (2 tailed)
Calories	male	54	1674.57	80.29	-0.944	0.348
	female	315	1757.48	35.67		
Protein Animal	male	54	28.38	2.57	-0.491	0.625
	female	315	29.74	1.02		
Protein Plant	male	54	32.31	1.88	-0.486	0.628
	female	315	33.34	0.95		
Fat Animal	male	54	31.51	2.56	0.097	0.923
	female	315	31.79	1.08		
Fat Plant	male	54	38.79	4.76	1.350	0.182
	female	315	32.06	1.48		
Carbohydrates	male	54	245.59	16.26	-0.184	0.854
	female	315	248.82	6.50		
Calcium	male	54	420.22	34.36	-2.066	0.042
	female	315	501.98	15.38		
Iron	male	54	15.51	2.80	-0.293	0.770
	female	315	16.40	1.21		
Vitamin A	male	54	330.33	34.17	-0.767	0.445
	female	315	360.88	20.42		
Thiamine	male	54	1.82	0.60	-1.330	0.184
	female	315	5.32	0.25		
Riboflavin	male	54	1.45	0.10	-1.212	0.226
	female	315	2.93	1.20		
Niacin	male	54	8.80	0.76	-0.224	0.824
	female	315	8.99	0.39		
Vitamin C	male	54	48.00	12.83	-0.934	0.361
	female	315	60.73	4.54		

Table (7): Dietary intake in boys by eating disorder.

	ED	N	Mean	St. error of mean	Sig. (2 tailed)
Calories (cal/day)	≤ 20	15	1686.00	167.91	0.242
	> 20	81	1905.75	69.82	
Protein (gm)	≤ 20	14	35.50	6.61	0.907
Animal (gm)	> 20	81	36.32	2.03	
Protein (gm)	≤ 20	15	30.86	3.10	0.208
Plant (gm)	> 20	81	35.52	1.82	
Fat	≤ 20	14	32.14	3.53	0.041
Animal (gm)	> 20	80	41.01	2.04	
Fat	≤ 20	15	28.13	4.66	0.611
Plant (gm)	> 20	81	30.77	2.09	
Carbohydrates (gm)	≤ 20	15	217.53	23.26	0.195
	> 20	81	252.78	12.48	
Calcium (mg)	≤ 20	14	321.28	58.08	0.001
	> 20	81	275.34	35.32	
Iron (mg)	≤ 20	15	24.64	9.52	0.739
	> 20	81	21.28	2.77	
Vit. A (ug)	≤ 20	15	297.26	55.62	0.010
	> 20	81	504.21	52.23	
Thiamine (mg)	≤ 20	15	3.47	2.05	0.617
	> 20	81	6.28	5.20	
Riboflavin (mg)	≤ 20	15	1.80	0.24	0.091
	> 20	81	2.5	0.33	
Niacin (mg)	≤ 20	15	10.14	1.44	0.160
	> 20	80	12.53	0.79	
Vit. C (mg)	≤ 20	6	19.18	9.79	0.018
	> 20	36	56.03	10.24	

Table (8): Correlations of social status and BMI to eating attitude in boys and girls.

Eating disorder	Boys		Girls		Boys		Girls	
	High social	Low social	High social	Low social	High social	Low social	High social	Low social
> 20	95	28	198	46	83	40	98	146
< 20	143	216	159	239	18	341	61	337
	RR = 3.48 95%CI = 2.37 - 5.1		RR = 3.44 95%CI = 2.6 – 4.55		RR = 7.83 95%CI = 5.76 – 10.64		RR = 2.04 95% CI = 1.7 – 2.45	

* 25.5% of boys have ED > 20, 36.6% of girls have ED < 20.

Table (9): Number and percentage of adolescent girls and boys who report sometimes weight teasing, weight teasing by peers and weight teasing by family across weight status.

	Teasing sometimes		Weight-teasing by peers		Weight teasing by family	
	n	%	n	%	n	%
Girls						
Lean (n = 52)	27	51.9	11	21.15	14	26.92
Normal (n = 195)	84	43.07	19	9.74	24	12.31
Overweight (n = 74)	66	48.17	9	6.57	15	10.95
Obese (n = 74)	55	74.3	17	22.97	21	28.88
	$X^2 = 40.5$ P < 0.001		$X^2 = 23.47$ P < 0.001		$X^2 = 26.78$ P < 0.001	
Boys						
Lean (n = 22)	8	37.0	9	41.0	3	14
Normal (n = 281)	37	3.0	40	14.0	28	10

Overweight (n = 82)	18	22.0	20	26.0	14	17
Obese (n = 97)	47	9.0	57	56.0	32	33
	$X^2 = 44.5$		$X^2 = 28.36$		$X^2 = 25.77$	
	$P < 0.001$		$P < 0.001$		$P < 0.001$	

Table (10): Weight teasing among adolescent girls & boys by weight status odds ratio (OR) and 95% confidence interval (CI)[a,b]

Weight status [c]	Weight teasing			
	OR	CI	X^2	P
Girls				
Lean (n = 52)	2.977	1.47-6.01	0.647	0.42
Overweight (n = 74)	1.46	0.93-2.27	2.78	0.09
Obese (n = 74)	3.51	0.93-6.6	16.21	0.0001
Boys				
Lean (n = 22)	3.85	2.48-5.21	0.544	0.35
Overweight (n = 82)	2.06	0.93-2.84	2.85	0.05
Obese (n = 97)	4.51	0.95-8.07	15.51	0.001

a) Adjusted for SE and school level.   b) Odds ratios significant ($P < 0.05$ when 1 is not included in the 95% CI).
c) Reference group adolescent girls and boys of average weight (BMI $15^{th} – 85^{th}$ percentile).

Table (11): Number and percentage of overweight girls and boys reporting eating disorder behavior by perceived weight leasing.

	Bad eating habits				Binge eating			
	Total No.	n^a	%	P	Total No.	n^b	%	P
Girls								
Frequent weight teasing								
Yes	105	89	78	0.001	73	22	30	0.0001
No	140	39	67		138	21	15	
Weight teasing by peers								
Yes	95	74	77.5	0.001	90	25	28	0.001
No	123	83	67.5		120	17	14	
Weight teasing by family								
Yes	65	54	82	0.001	83	52	27	0.001
No	132	85	64.4		130	22	16.5	
Boys								
Frequent weight teasing								
Yes	77	48	62	0.0001	76	14	18.2	0.001
No	131	56	43		130	10	7.8	
Weight teasing by peers								
Yes	94	56	60	0.0001	90	13	14	0.05
No	119	50	42		115	9	8	
Weight teasing by family								
Yes	54	35	64.5	0.01	53	33	15	0.09
No	155	71	45.5		153	14	9	

a. number reporting bad eating habits.   b. number reporting binge eating.

4. Discussion:

Based an BMI cut-off points 17% & 27% of boys and girls were overweight and (20% & 14.5%) of boys and girls were obese: comparison of cross sectional data from United States and 13 European countries has shown that the prevalence of overweight varied between 5.2% - 28.9% for boys and 8.1% - 31.0% for girls; the prevalence of obesity varied between 1.9% - 13.9% for boys and 1.1-15.1% for girls among adolescents (Lissau, et al., 2004). The prevalence of overweight and obesity for Iranian has been found to be 12.1% and 7.8%

(Mohamed et al., 2004), and among adolescent Mexican 12.1% & 6.2%. In other Egyptian data the prevalence was 15.9% and 18.4%; lower than our results (Martinez et al., 2006).

Prevalence of over weight and obesity was found to be higher in boys than girls in Swedish adolescents (Berg et al., 2001) unlike our results and other Egyptian results (Martinez et al., 2006) the prevalence of over weight among girls was found to be higher than boys, in the same time the prevalence of obesity in our cases was found to be higher in boys (20%) than girls 14.5%. We found that percentage of obesity in girls increases with age while it decreases in boys with age. On the contrary Klein et al., (2008), reported that adolescents who perceived themselves to be overweight at baseline were 2-3 times more likely to be overweight at follow up compared to those with a normal weight. Boys were more likely (3 times) to transition to obesity at follow up compared with girls.

In our study according to weight status there was significantly statistical correlation of BMI status in girls to body image, bad eating habits , depression and eating disorder , whereas in boys weight status was significantly correlated to depression , somatic symptoms and eating disorder . French et al. (1995) found and inverse relationship between BMI and both self esteem and body image, also found that the most common consequences of obesity in children is poor psychological & social functioning, impaired academic success and reduced fitness & heath.

It was found that adolescents from more advantaged family backgrounds are more likely to be overweight with higher percentage of eating disorder (RR = 3.48, 95% Cl= 2.37-5.1 for boys and RR = 3.44, 95% Cl = 2.6 – 4.55 in girls & RR = 7.83, as Cl = 5.76 – 10.64 for boys & RR = 2.04, 95% Cl = 1.7 – 45 for girls) respectively; same results were found in Mexican adolescent (Martinez et al., 2006) whereas in USA adolescents from high socioeconomic level are less likely to be over weight (Needlham & Crosnoe, 2005) . Added to this, Ozmen, (2007) concluded that being male and being of higher socio economic level were predicators of obesity overweight based on BMI.

In this study, we used 24-hr dietary recall method as screening tool to throw the light on dietary pattern of Egyptian adolescents. Epidemiological studies on dietary pattern of Egyptian adolescents are scarce (Hassanyn, 2000).

Dietary assessment showed that energy consumption was inadequate among 40% of adolescent, close to 13% had low protein intake & 23% had low intake of carbohydrates. Data derived from several national surveys conducted by national nutrition institute in Egypt revealed, that Egyptian

adolescents do not fulfill the recommendations of WHO for healthy diet, as only, 38% obtain their full requirement of energy (100 – 120% RDA) (Hassanyn, 2000) in our study 30% of boys & 28% of girls obtain their full requirements of energy. In our study animal protein ratio to plant protein was found to be (1.06 – 1 & 1 – 1.24 in boys & girls respectively) while in Hassanyn's study they found the total ratio to be 1-2. this reflects a problem of concern related to the low biological value of consumed protein on one hand and the low bioavailability of micronutrients mainly mineral, aggravated by the low daily intake of these mineral particularly iron & zinc.

Although it is often assumed that overweight children eat more than non-overweight children do, no data have been published to support this belief. In our study we found no significant difference in caloric intake between normal and overweight obese boys and girls. Rocandio et al., (2001) found that the percentage of energy intake was significantly lower in the overweight group compared to the non overweight children (8948 as 9590 K/day; P < 0.01) and carbohydrate intake was significantly greater in the non-overweight school children (250.9 + 58.8 us 221.1 + 77.4 g/day; P < 0.01) similar results were obtained by Bandini et al., (1999).

These findings suggested that the positive energy balance causing overweight and obesity is rather due to low energy out put due to lack of physical activity and the sedentary life adolescents are obliged to practice especially those running for high school certificate; where mostly parents stop all activities other than learning.

There was a significant difference in animal protein in boys and girls in both normal and overweight obese, where boys eat more animal protein than girls (P < 0.001), the same results were noticed in animal fat intake, this can be explained by the still existing cultural preference of males over females. Some studies found no differences in dietary protein and fat intakes between over weight and obese and normal weight (Ricardio et al., 2001) other studies noted that the proportion of fat in the diet was greater in obese children (Gazzaniga, and Bruns, 1993).

As regard micronutrients intake, girls have deficiency in vitamin A, iron, calcium, riboflavin, thiamine, niacin and vitamin C ; while boys have deficiency in vitamin A, thiamine, riboflavin, niacin and vitamin C .There were statistically significant difference in Iron, vitamin A & niacin intake between boys & girls normal or overweight-obese; also there was a significant difference in riboflavin intake in normal weight boys & girls, as girls have higher intake of vitamin C than overweight-obese boys.

Rocandio et al., (2001), found that vitamin A & vitamin D intakes were lower than recommended but in the contrary he found no significant difference between overweight and non-overweight. Ferandez et al.,(1996) and Failde et al.,(1997), found similar results. Szabo et al (2007), found that the average energy intake was appropriate, protein and fat intake was some what higher than the RDA; the intake of Ca and vitamin D was inadequate, Iron in girls was insufficient. In this study, 25.5% of adolescent boys have been found to have eating disorder (> 20) & 38.6% of girls were found to have scores > 20 as well, that was positively correlated to social status as it was significantly higher among high social standards as well as among those with higher BMI. Austin et al., (2008) in his study for screening eating disorder at high school's in USA observed less percentages than our results whereas 25% of girls & 11% of boys reported disordered eating (> 20); Sepulveda et al., (2008) in his study of eating disorder among Spanish university students reported the prevalence rate of students at high risk for eating disorder to be 14.9% (11.6 – 18) for males and 20.8% (181.7 – 22.8) for females (ED > 20) with statistically significant differences by gender.

Among adolescent girls, depressive symptoms for their bulimic behavior were significantly higher than boys, while boys were more concerned than girls about their overeating and binging most of the time, girls were more concerned about body image than boys; whereas boys have more physical complains than girls ; girls practice binging more than boys.

Field et al. (2008) found that among children (9-15 years old) girls show higher percentage of binging than boys (4.3% and 2.3%) as well as purging (5.3% & 0.8% respectively). On the contrary Sepulveda et al., (2008) found that males (11.6%) practice binging more than females who practice unhealthy weight control behaviors more than males (dieting, laxatives or self induced vomiting). Crosby et al., (2009) reported that depression is intimately tied to bulimic behavior and may in fact precipitate such behavior and that treatment of depressive symptoms can produce longitudinal decrease in bulimic symptoms.

According to BMI we found a significant statistical correlation of weight status in girls to body image, bad eating habits, depression, eating disorder ; whereas weight status in boys was significantly correlated to depression , somatic symptoms and eating disorder . Also, we found in our study that eating disorder (> 20) in girls was highly correlated to negative body image, bad eating habits, depression and somatic symptoms. In boys it was highly correlated to body image, bad eating habits, binging,

depression and somatic symptoms. Some results were found by Costa et al., (2009) where he found that BMI and depressive symptoms for both sexes were positively associated with eating disorder symptoms. On opposition to our results; as we found that eating disorder in both sexes is higher in adolescents from higher socioeconomic level; Cost et al., (2009) found a sex effect on the association between socioeconomic status and eating disorder as girls with higher socioeconomic status and boys with lower socioeconomic status presented more eating disorder symptomatology. Suris et al., (2008) found that health risk behaviors in adolescents with chronic diseases are more than normal adolescents. Mahraj et al., (2009) stated that overweight and obesity are among the risk factors of eating disorder (11 & 7% respectively) and that many of the risk behaviors in adolescents were shown to be related to the adolescents family origin, home environment and parent child relationship as well the protective effect of the family and school connectedness and increased religiosity. Moreover Sampei et al., (2009) found that among premenarch group there is increase eating score (EAT-26) above 20 with a high correlation to body image that means that the concerns about body image develop at an earlier age.

Other studies (Mirza et al., 2005), Labera et al., (2009) and Calderon et al., (2009) stated that body weight status especially severe obesity is correlated to more concern about body image, in the same time adolescents with normal weight showed specific factor for developing eating disorders in the future (Calderon, et al., 2009). It has been suggested that body image may predict depression (Stice et al., 2000) and eating disordered symptoms that may lead to an increased prevalence of adverse psychological and health concern (Mirza, 2005).

As regard weight teasing, our results clearly showed that perceived weight teasing by both peers and family members is common among adolescents' girls who were teased more than boys; that may be due to extra sensitivity of girls towards their weight; this is evident in non-overweight girls who reported being teased for their weight more than boys. In analysis adjusted for sciodemographic characteristics, overweight and obese but not under weight girls were at greater risk for being teased for their weight by their family member, similar associations were found among boys, as they were mostly likely to be teased by family members and peers; in comparison normal weight boys and lean were more likely to be teased about their weight by peers but not by family member. Our results agree with Neumark et al., (2002) results who assessed the prevalence of weight teasing among adolescents as well, Sobal et al., (1995) who found that overweight students,

especially girls, were stigmatized regarding dating activities, added to these Jackson et al., (2000) found that obese women reported more weight and size teasing than non obese women.

We found strong associations between weight teasing and disordered eating behaviors, boys and girls who were bothered by being teased were significantly more likely to engage in these behaviors, our findings regarding association between weight teasing and unhealthy weight control/ binge eating behavior are consistent with findings from previous studies (Neumark et al., 2002, and Brown et al., 1989).

In this study, The nature of the study population (population based sample), allowed for more generalization than that of the clinical samples, added to this, collection of the anthropometric measurements was done more accurate than other studies that depend on collecting the self-reported measures. Also, its inclusion of a big number of boys and girls, and the trial to assess all the risk factors of eating disorders as well their dietary intake and the inclusion of teasing to body weight as another risk factor that may aggravate eating disorder, encourages us to assess bulimia and anorexia on those with high eating disorders scores ,that will be published later.

Early identification and treatment of disordered eating by weight control behaviors may prevent progression and reduce the risk of chronic health consequences, physician should have a high index of suspicion for eating disorders in adolescents by using the DSM-PC (Diagnostic and statistical manual for primary care); paying attention to risk factors (Musie, et al., 2003). Programs aimed at prevention and reduction of overweight and use of family-based treatment may result in a decrease in body dissatisfaction and increase in self-esteem, in turn, improving body image and self esteem may help with efforts to decrease obesity among high-risk youth population. Furthermore, school based educational interventions to learn the students about the balanced healthy food and the etiology of obesity as well as, the potential harmful effects of weight teasing and to improve the general attitude towards different body sizes and shapes. Added to this it is important for the community to change the criteria of evaluating a person only for his achievement disregarding the value of shape and size.

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