



RESEARCH REPORT

Associations of overweight and of weight dissatisfaction among Palestinian adolescents: findings from the national study of Palestinian schoolchildren (HBSC-WBG2004)

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Abstract

Background Overweight and obesity as well as weight dissatisfaction have been increasing in prevalence worldwide. Body weight dissatisfaction and fear of fatness are potential contributors to disordered eating. The present study aimed to investigate the prevalence of self-reported overweight and weight dissatisfaction along with associations with socio-demographic characteristics, body image, health complaints, risk behaviours, physical activity and television viewing in adolescents in Palestine.

Methods The 2003/04 Palestinian Health Behaviour in School-aged Children (HBSC) is a cross-sectional survey of 17 817 adolescents from 405 randomly selected schools. Students from a representative sample of grades 6, 8, 10 and 12 (aged 12–18 years) self-completed a modified version of the international World Health Organization collaborative Health Behaviour in School-aged Children (HBSC-2002) questionnaire.

Results Although 16.5% of the adolescents were overweight, almost twice that number (32.1%) were dissatisfied with their weight (i.e. dieting or perceiving a need to diet). Of those adolescents, two-thirds were not actually overweight (56.4% boys; 73.5% girls). One-fifth of the total number of adolescents (16.0% boys; 24.0% girls) were not overweight but were dissatisfied with their weight. Boys reporting overweight or weight dissatisfaction were more likely to have mothers with higher education or to be from more affluent families. Among both genders, but especially among girls, weight dissatisfaction was positively associated with most of the outcome variables (body image, health complaints, risk behaviours, and television viewing) regardless of weight status, whereas weight status was associated with only a few of the outcome variables.

Conclusions Weight dissatisfaction, independent of weight status, is associated with body image, health complaints, risk behaviours and television viewing, and represents a potential health risk factor for adolescents. Preventive interventions should focus not only on weight status, but also on body weight dissatisfaction.

Conflict of interests, source of funding and authorship

The authors declare that they have no conflict of interests.

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HAS, ZA, CV and LM participated in the conception, design, analysis and interpretation of data, and the reviewing and commenting of the manuscript, and also approved the final version submitted for publication. EC revised and edited the manuscript.

Introduction

Overweight, obesity and dieting to lose weight are increasingly prevalent and have recently become a focus of concern among health professionals worldwide (French & Jeffery, 1994). It has been consistently shown that overweight adolescents are at increased risk for greater body dissatisfaction (Crow *et al.*, 2006) and unhealthy weight control behaviours (Boutelle *et al.*, 2002; Mellin *et al.*, 2002; Neumark-Sztainer *et al.*, 2002) compared to nonoverweight adolescents, although only a few associations between being overweight and risky behaviours, particularly bullying behaviours (Janssen *et al.*, 2004) or psychological symptoms (Neumark-Sztainer *et al.*, 1997; Mellin *et al.*, 2002; Needham & Crosnoe, 2005; Crow *et al.*, 2006), have been found. Being overweight during childhood can be expected to continue into adult life (Goran, 2001), and preventing being overweight during childhood is an important issue.

In Western countries, it has been shown that dieting is correlated with risk behaviours, includ-

ing extreme dieting, smoking, alcohol and substance use (Mellin *et al.*, 2002; Crow *et al.*, 2006), and psychosocial factors, including low self-esteem, body dissatisfaction, emotional distress and depressive symptoms (French & Jeffery, 1994; French *et al.*, 1995; Crow *et al.*, 2006), as well as with several demographic characteristics (Neumark-Sztainer *et al.*, 1999). Given the correlations of dieting with risk behaviours (Crow *et al.*, 2006) and psychosocial factors (French & Jeffery, 1994; French *et al.*, 1995; Canpolat *et al.*, 2005; Crow *et al.*, 2006), the health risks of body image distortion and or emphasis on weight control that may lead to unnecessary dieting are also a concern. Body weight dissatisfaction and a fear of fatness in early adolescence are important risk factors for disordered eating later in life (Smolak *et al.*, 1996; Barker & Galambos, 2003).

Studies have found that the perception of being overweight is one reason that adolescents decide to attempt weight loss, regardless of whether they are truly overweight (Story *et al.*, 1997; Strauss, 1999b; Mikkila *et al.*, 2003; Canpolat *et al.*, 2005; Page *et al.*, 2005). Previous studies suggest that dieting occurs not only in overweight adolescents, but also in normal weight individuals (French & Jeffery, 1994; Chugh & Puri, 2001; Boutelle *et al.*, 2002; Fonseca & de Matos, 2005; Bener & Tewfik, 2006; Crow *et al.*, 2006) and underweight adolescents (Chugh & Puri, 2001; Kim & Kim, 2005).

To develop effective interventions to reduce the incidence of overweight and weight dissatisfaction in nonoverweight adolescents, there is a need to better understand the factors associated with being overweight and the desire to lose weight in both overweight and nonoverweight adolescents.

To the best of our knowledge, to date, no study has assessed the prevalence of overweight and weight dissatisfaction among adolescents in Palestine and the characteristics of these adolescents. The present study aimed to describe the

prevalence of overweight and weight dissatisfaction among adolescents in Palestine; and to investigate associations of overweight and weight dissatisfaction with socio-demographic characteristics, body image, health complaints, risk behaviours, physical activity and television viewing in adolescents in Palestine.

Materials and methods

The Health Behaviour in School Aged Children (HBSC) cross-national survey by the World Health Organization (WHO) is a unique international study of health, health behaviours and lifestyle of adolescents across more than 35 countries (Currie *et al.*, 2002). In 2003/04, a similar survey using the 2001/02 HBSC questionnaire was conducted for the first time in an Arab country. A stratified random sample of 17 817 schoolchildren, grades 6, 8, 10 and 12 (aged 12–18 years) was selected. All students agreed to participate. After excluding 102 questionnaires that were not correctly completed, responses from a final total of 17 715 questionnaires (48% boys; 52% girls), 53% from the West Bank and 47% from Gaza, were entered into the computer and analyzed. Details of the study and methodology have been described elsewhere (Al Sabbah *et al.*, 2007).

Measures

Main variables

Weight status

Body mass index (BMI) was calculated using self-reported weight and height. Adolescents were categorized as normal, overweight and obese, using the international age- and gender-specific BMI cut-off points defined by Cole *et al.* (2000). Normal weight adolescents were classified as 'nonoverweight', whereas overweight and obese adolescents were classified as 'overweight'. Missing and extreme values (i.e. values so far beyond the typical range for weight and height for adolescents as to be unlikely) for weight or height and/or height values exceeding the possible limits for age and gender subgroups were excluded from the analysis (11.3% for weight and 20.0% for

height, resulting in 27.5% of the data missing for BMI; $n = 4868$).

Weight dissatisfaction

The adolescents were asked, 'at present, are you on a diet or doing something else to lose weight?' Response categories were: 'no, my weight is fine', 'no, but I need to lose weight', 'no, I need to put on weight' and 'yes'. Adolescents were categorized as: (i) 'satisfied with weight' if the response was weight is fine and (ii) 'dissatisfied with weight' if the responses indicated 'yes' or 'no, I need to lose weight'. Those who reported needing to put on weight 2217 (12.5%) were excluded from the analysis because the main focus of the present study is weight dissatisfaction (dieting or perceiving a need to diet) relative to being overweight/obesity.

Factors related with overweight and weight dissatisfaction

Family affluence scale (FAS)

This four-item measure of material affluence, developed by the WHO Health Behaviour in School-aged Children Study (Boyce & Dallago, 2004; Boyce *et al.*, 2006), assigns points to: 'owning a car', 'owning a computer', 'sharing a bedroom' and 'travelling while on holiday'. A sum score was calculated for each student and categorized as: (i) low FAS (score = 0–2); (ii) medium FAS (score = 3–5); and (iii) high FAS (score = 6–9) (Boyce & Dallago, 2004; Boyce *et al.*, 2006).

Parents' educational level

This was based on adolescents' self-reports and categorized into *low* (i.e. graduated from high school) or *high* (i.e. continued studies after high school).

Body image

This was measured by two questions: (i) Body Perception: adolescents were asked, 'do you think your body is ...' 'much too thin', 'a bit too thin', 'about the right size', 'a bit too fat' or 'much too fat'? The dichotomized responses are: (0) much too thin, too thin and about the right size or (1) a bit too fat and much too fat. (ii) Perceptions of

appearance: adolescents were asked, 'do you think you are ...' 'very attractive looking', 'quite attractive', 'about average', 'not very attractive' or 'not at all attractive'? The dichotomized responses are: (0) very attractive, quite attractive and about average or (1) not very attractive and not at all attractive.

General health

The students were asked to indicate, 'whether their health is ...' 'excellent', 'good', 'fair' or 'poor'? The dichotomized responses are: (0) excellent and good or (1) fair and poor.

Somatic and psychological health complaints

The students were asked, 'in the last 6 months, how often have you had ...' 'headache', 'stomach ache', 'back ache', 'feeling low', 'irritability or bad temper', 'feeling nervous', 'difficulty sleeping' and 'feeling dizzy'? In accordance with the HBSC report (Torsheim *et al.*, 2004), 'headache, stomach-ache, back-ache and feeling dizzy' were combined to represent somatic health complaints, whereas 'feeling low, irritability or bad temper, feeling nervous and difficulties in sleeping' were combined to represent psychological health complaints. The dichotomized responses are: (0) low: symptoms less than weekly or (1) high: symptoms weekly or more often.

Life satisfaction

A picture of a ladder was shown to students who were asked, 'in general, where on the ladder do you feel you stand at the moment?', with the top of the ladder '10' representing the best possible life and the bottom '0' representing the worst possible life. Responses were dichotomized to: (0) 6–10 best life scoring or (1) 0–5 worst life scoring.

Feeling lonely

The students were asked, 'do you feel lonely?' The dichotomized responses are: (0) sometimes and not very often or (1) very often and often.

Risk behaviours

Risk behaviours were measured with several questions: 'fighting in the last 12 months', 'being injured in a fight in the last 12 months', 'being

bullied at school in the past couple of months', 'bullying another student(s) at school in the past couple of months', 'smoking tobacco (at least one cigarette, cigar or pipe)' and 'smoking nargilah (water pipe)'. The dichotomized response categories are: (0) no or (1) yes.

Physical activity

Students were asked two questions about their physical activity status: (a) Over the past 7 days, on how many days were you physically active for a total of at least 60 min per day? (b) Over a typical or usual week, on how many days are you physically active for a total of at least 60 min per day? Response categories were: 0 days, 1, 2, etc., up to 7 days. The average response $[(a + b)/2]$ from both questions was dichotomized into: (0) physical activity <5 days a week and (1) physical activity ≥ 5 days a week.

Television viewing

Students were asked about how many hours a day do they usually watch television (including videos) in their free time during the schooldays and during the weekend? Response categories were: 'none at all', 'about half an hour a day', 'about 1 h a day' or '2', '3', '4', '5', '6', '7 or more' hours a day'. Mean hours for television viewing were derived by calculating mean hours per day from reported schooldays and weekend days and dichotomized into: (0) <4 h a day and (1) ≥ 4 h a day.

Statistical analysis

The data was analyzed using SPSS, version 12 (SPSS Inc., Chicago, IL, USA). Binary logistic regression analyses were run to test associations of the outcome variables with weight status and weight dissatisfaction, controlling for region, grade, and weight status or weight dissatisfaction. Socio-demographic characteristics were tested with chi-squared statistics. Separate analyses were run for boys and girls. For each outcome variable, probable interaction effects of weight status and weight dissatisfaction were examined (separately for boys and girls), controlling for grade and region, to determine

whether the associations between weight dissatisfaction and the other variables were significantly different for overweight versus nonoverweight participants. $P < 0.05$ was considered statistically significant.

Results

The only significant interaction effects found between weight status and weight dissatisfaction were related to somatic health and feeling lonely among boys and physical activity among girls ($P < 0.05$); therefore, no separate analyses were run for overweight and nonoverweight adolescents.

Prevalence of overweight and of weight dissatisfaction

Although 16.5% of the adolescents (20.4% boys; 13.0% girls) were classified as being overweight (13.3% overweight; 3.2% obese), almost one-

third (32.1%) were dissatisfied with their weight and either were dieting (8.6%) or perceived a need to diet (23.4%) (Tables 1 and 2). Of the adolescents reporting dissatisfaction with their weight, 56.4% of boys and 73.5% of girls were not overweight. Fig. 1 further shows that, of the total number of adolescents, 20.5% were not overweight but were dissatisfied with their weight, whereas 7.5% were overweight and satisfied with their weight.

Socio-demographic characteristics

Overweight boys were more likely to have highly educated mothers or come from more affluent families (high FAS) (Table 1). Among boys, dissatisfaction with weight was more common among those who were from the Gaza Strip, had more affluent families (high FAS), were in grade 8, or had highly educated mothers, whereas girls who were dissatisfied with their weight were more frequently found to live in the West-Bank, be in

Table 1 Socio-demographic characteristics of nonoverweight and overweight/obese adolescents by gender in the Palestinian HBSC-2004 study

Characteristics	Boys: Weight status				P^*	Girls: Weight status				P^*
	Nonoverweight		Overweight [†]			Nonoverweight		Overweight [†]		
	<i>n</i>	%	<i>n</i>	%		<i>n</i>	%	<i>n</i>	%	
Total (12 847)	4853	79.6	1246	20.4	–	5873	87.0	875	13.0	–
<i>Region</i>										
West Bank	2778	78.8	747	21.2	0.088	3072	87.5	440	12.5	0.277
Gaza	2075	80.6	499	19.4		2801	86.6	435	13.4	
<i>Grade</i>										
6th	1230	80.2	304	19.8	0.100	1407	85.3	242	14.7	0.017
8th	1044	81.6	236	18.4		1507	86.2	241	13.8	
10th	1313	79.0	349	21.0		1538	88.2	206	11.8	
12th	1266	78.0	357	22.0		1421	88.4	186	11.6	
<i>Mother's education</i>										
Low education	3546	80.5	858	19.5	<0.001	4454	86.9	671	13.1	0.435
High education	1030	76.0	326	24.0		1159	87.7	162	12.3	
<i>Father's education</i>										
Low education	3030	79.2	797	20.8	0.499	3863	87.0	575	13.0	0.845
High education	1650	79.9	414	20.1		1844	86.9	279	13.1	
<i>Family Affluence Scale (FAS)</i>										
FAS 1 (Low)	3494	80.5	849	19.5	<0.001	4486	86.8	685	13.2	0.434
FAS 2 (Moderate)	1006	78.3	278	21.7		1035	87.9	143	12.1	
FAS 3 (High)	189	70.5	79	29.5		241	88.6	31	11.4	

*A significant difference by the chi-squared test.

[†]Defined as the combined prevalence of being overweight and obese.

Table 2 Socio-demographic characteristics of adolescents categorized on weight satisfaction by gender in the Palestinian HBSC-2004 study

Characteristics	Boys: weight dissatisfaction				P*	Girls: weight dissatisfaction				P*
	Satisfied		Dissatisfied [†]			Satisfied		Dissatisfied [†]		
	n	%	n	%		n	%	n	%	
Total (15 032)	4817	70.1	2050	29.9	–	5395	66.1	2770	33.9	–
<i>Region</i>										
West Bank	2708	71.6	1072	28.4	0.003	2643	62.6	1580	37.4	<0.001
Gaza	2109	68.3	978	31.7		2752	69.8	1190	30.2	
<i>Grade</i>										
6th	1294	69.8	561	30.2	<0.001	1615	74.3	560	25.7	<0.001
8th	1066	64.9	576	35.1		1379	62.8	816	37.2	
10th	1241	71.4	496	28.6		1232	62.3	747	37.7	
12th	1216	74.5	417	25.5		1169	64.4	647	35.6	
<i>Mother's education</i>										
Low education	3531	71.6	1403	28.4	<0.001	4105	66.0	2115	34.0	0.952
High education	1020	65.8	529	34.2		1014	65.9	525	34.1	
<i>Father's education</i>										
Low education	3112	70.9	1276	29.1	0.110	3602	66.0	1855	34.0	0.837
High education	1529	69.0	687	31.0		1618	66.3	824	34.7	
<i>Family Affluence Scale (FAS)</i>										
FAS 1 (Low)	3464	72.0	1345	28.0	<0.001	4202	66.8	2088	33.2	0.049
FAS 2 (Moderate)	985	67.4	476	32.6		867	63.5	499	36.5	
FAS 3 (High)	192	61.7	119	38.3		195	64.4	108	35.6	

*A significant difference by the chi-squared test.

[†]Defined as the combined prevalence of dieting and a perceived need to diet

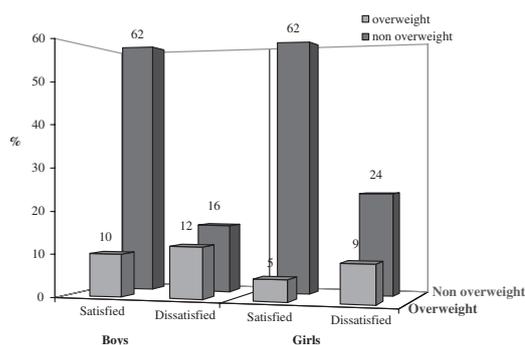


Figure 1 Weight status and weight dissatisfaction by gender, Palestine; HBSC-2004.

grade 10 or have more affluent families (high FAS) (Table 2).

Body image

Overweight adolescents were more likely to feel fat than nonoverweight adolescents ($P < 0.001$) and overweight girls were more likely to perceive their bodies as not being attractive compared to no-

noverweight girls ($P < 0.001$). Adolescents who reported being dissatisfied with their weight were more likely to feel fat or not attractive than those satisfied with their weight (Tables 3 and 4).

Health complaints

Overweight boys were slightly more likely to perceive their general health as fair or poor than nonoverweight boys, and overweight girls were more likely to feel dissatisfied with their lives than nonoverweight girls (Tables 3 and 4). Adolescents who were dissatisfied with their weight were more likely to report a high frequency of somatic and/or psychological health complaints than adolescents who were satisfied with their weight ($P \leq 0.001$). Moreover, girls who were dissatisfied with their weight evaluated their general health as fair or poor, felt lonely very often or often, and reported a lower life satisfaction than girls satisfied with their weight (Tables 3 and 4).

Table 3 Selected variables for body image, health complaints, risk behaviours, physical activity and television viewing for boys in the Palestinian HBSC-2004 study

Variable	Overweight*					Weight dissatisfaction†				
	Yes (%)	No (%)	OR	95% CI	P	Yes (%)	No (%)	OR	95% CI	P
<i>Body image</i>										
Perception of body weight status (too fat)	41.6	9.5	3.80	(3.16–4.56)	<0.001	45.3	5.4	14.40	(11.96–17.34)	<0.001
Perception of body looks (not attractive)	3.8	2.0	1.36	(0.89–2.08)	0.155	4.4	1.7	3.11	(2.07–4.68)	<0.001
<i>Health complaints</i>										
General health (fair or poor)	13.9	12.2	1.24	(1.01–1.54)	0.042	14.9	12.0	1.25	(1.02–1.52)	0.029
Somatic health complaints (high: weekly or more often)	29.4	27.8	1.03	(0.87–1.21)	0.756	36.1	26.5	1.42	(1.22–1.65)	<0.001
Psychological health complaints (high: weekly or more often)	49.6	47.0	1.09	(0.94–1.27)	0.255	51.0	44.9	1.27	(1.10–1.46)	0.001
Life satisfaction (0–5: worse life scoring)	25.3	26.1	0.96	(0.82–1.14)	0.655	27.1	26.2	1.05	(0.90–1.23)	0.514
Feeling lonely (very often or often)	23.2	21.0	1.07	(0.90–1.27)	0.440	26.8	20.9	1.21	(1.03–1.42)	0.021
<i>Risk behaviours</i>										
Fighting in the last 12 months	59.9	60.8	0.98	(0.85–1.14)	0.806	61.2	59.3	1.01	(0.88–1.16)	0.898
Being injured in a fight in the last 12 months	47.3	48.5	0.95	(0.82–1.09)	0.445	51.7	47.7	1.07	(0.94–1.22)	0.306
Been bullied in the past 2 months	50.9	50.1	1.01	(0.88–1.17)	0.872	55.4	48.6	1.22	(1.07–1.40)	0.003
Bullying others at school	40.0	40.5	0.98	(0.85–1.13)	0.788	44.0	38.5	1.19	(1.04–1.36)	0.011
Ever smokes	30.3	25.9	1.13	(0.96–1.33)	0.134	27.1	24.8	1.16	(0.99–1.35)	0.058
Smokes nargilah (water pipe)	33.1	29.4	1.08	(0.92–1.26)	0.362	31.5	27.8	1.25	(1.08–1.44)	0.003
<i>Physical activity and television viewing</i>										
Physical activity (≥5 days per week)	20.3	23.8	0.80	(0.67–0.96)	0.014	22.9	22.9	0.97	(0.83–1.14)	0.726
Television viewing (≥4 h per day)	19.4	17.8	1.01	(0.84–1.21)	0.951	20.2	17.4	1.15	(0.97–1.36)	0.118

OR, odds ratio; CI, confidence interval; P, P-value for significance of the difference.

Overweight and nonoverweight, based on self reported weight and height; Regression analysis controlling for region, grade, weight status and weight dissatisfaction; Reference in weight dissatisfaction, satisfied; Reference in overweight status, nonoverweight.

*Defined as the combined prevalence of being overweight and obese.

†Defined as the combined prevalence of dieting and a perceived need to diet.

Risk behaviours

Students reporting dissatisfaction with their weight were more likely to be involved in risky behaviours, such as bullying others at school, being bullied and smoking nargilah, compared to adolescents satisfied with their weight (Tables 3 and 4). Furthermore, girls, who were dissatisfied with their weight reported more involvement in risky behaviours, such as fighting or fighting that resulted in an injury ($P < 0.001$), compared to girls who were satisfied with their weight. Actual weight status did not account for significant dif-

ferences in involvement in risk behaviours (Tables 3 and 4).

Physical activity and television viewing

Overweight boys reported being significantly less physically active than nonoverweight boys ($P < 0.05$). Dissatisfaction with weight was associated with more hours of television viewing among girls ($P < 0.05$) but not boys. No significant difference in television viewing was found between overweight and nonoverweight adolescents (Tables 3 and 4).

Table 4 Selected variables for body image, health complaints, risk behaviours, physical activity and television viewing for girls in the Palestinian HBSC-2004 study

Variable	Overweight*					Weight dissatisfaction†				
	Yes (%)	No (%)	OR	95% CI	P	Yes (%)	No (%)	OR	95% CI	P
<i>Body image</i>										
Perception of body weight status (too fat)	48.0	12.8	3.75	(3.10–4.54)	<0.001	46.0	4.7	15.68	(13.14–18.71)	<0.001
Perception of body looks (not attractive)	4.5	1.8	2.08	(1.39–3.12)	<0.001	3.9	1.6	2.17	(1.50–3.17)	<0.001
<i>Health complaints</i>										
General health (fair or poor)	19.4	15.7	1.20	(0.99–1.46)	0.070	20.5	15.6	1.36	(1.17–1.58)	<0.001
Somatic health complaints (high: weekly or more often)	29.6	30.5	0.87	(0.73–1.03)	0.106	35.4	29.6	1.43	(1.26–1.62)	<0.001
Psychological health complaints (high: weekly or more often)	58.2	53.2	1.14	(0.96–1.34)	0.132	61.5	48.5	1.54	(1.36–1.74)	<0.001
Life satisfaction (0–5: worse life scoring)	34.8	29.3	1.22	(1.03–1.44)	0.020	36.9	28.8	1.24	(1.10–1.40)	0.001
Feeling lonely (very often or often)	30.4	26.1	1.11	(0.93–1.31)	0.244	33.6	24.1	1.44	(1.27–1.63)	<0.001
<i>Risk behaviours</i>										
Fighting in the last 12 months	34.4	32.9	0.93	(0.79–1.09)	0.351	37.3	31.2	1.37	(1.22–1.54)	<0.001
Being injured in a fight in the last 12 months	34.1	31.7	0.97	(0.82–1.14)	0.677	37.3	32.3	1.35	(1.20–1.52)	<0.001
Been bullied in the past 2 months	50.1	45.7	1.06	(0.91–1.24)	0.428	51.6	43.4	1.34	(1.19–1.49)	<0.001
Bullying others at school	27.2	25.3	0.97	(0.81–1.15)	0.688	30.0	22.9	1.45	(1.28–1.65)	<0.001
Ever smokes	6.3	5.8	1.05	(0.76–1.45)	0.769	7.6	5.1	1.21	(0.96–1.54)	0.108
Smokes nargilah (water pipe)	9.2	9.5	0.85	(0.65–1.12)	0.256	11.8	7.7	1.36	(1.12–1.64)	0.002
<i>Physical activity and television viewing</i>										
Physical activity (≥5 days per week)	18.0	17.7	0.97	(0.79–1.19)	0.765	18.8	17.2	1.12	(0.96–1.30)	0.142
Television viewing (≥4 h per day)	18.1	18.5	0.91	(0.74–1.11)	0.353	20.4	16.5	1.16	(1.01–1.34)	0.043

OR, odds ratio; CI, confidence interval; P, P-value for significance of the difference.

Overweight and nonoverweight, based on self reported weight and height; Regression analysis controlling for region, grade, weight status and weight dissatisfaction; Reference in dieting status, satisfied; Reference in overweight status, nonoverweight.

*Defined as the combined prevalence of being overweight and obese.

†Defined as the combined prevalence of dieting and a perceived need to diet.

Discussion

The main purpose of the present study was to describe the prevalence of overweight and of weight dissatisfaction among Palestinian adolescents and to investigate the associations of weight status and weight dissatisfaction with body image, health complaints, risk behaviours, physical activity and television viewing. In general, the findings indicate that, among adolescents in Palestine, although being overweight is an issue for some, weight dissatisfaction also occurs in this population independently of actual

weight status, and is a predictor of health complaints, general dissatisfaction with life and risk behaviours.

Two problematic groups identified in the present study represent a challenge for intervention. The first group includes those who are dissatisfied with their weight but are not overweight and the second group includes those who are satisfied with their weight even though they are overweight. Those who are overweight and satisfied with their weight may be only mildly overweight, or their body composition might be a factor (e.g. muscle accounts for extra weight).

Weight dissatisfaction is common among non-overweight Palestinian adolescents, especially girls. The present study found that more girls than boys were dissatisfied with their weight although they were not overweight, whereas more boys than girls were satisfied with their weight although they were overweight. These results are consistent with other studies demonstrating that adolescent girls are more dissatisfied with their bodies than adolescent boys (Chugh & Puri, 2001; Lowry *et al.*, 2002; Jackson *et al.*, 2003; Mikkila *et al.*, 2003; Canpolat *et al.*, 2005; Page *et al.*, 2005; Wang *et al.*, 2005; Wong *et al.*, 2005) and that dieting to lose weight occurs most frequently among girls (Gabhainn *et al.*, 2002; Lowry *et al.*, 2002; Fonseca & de Matos, 2005; Page *et al.*, 2005), although most of them are of normal weight (Mikkila *et al.*, 2003; Kim & Kim, 2005).

The present study found that the prevalence of being overweight among Palestinian adolescents is 16.5% and being overweight is more prevalent among boys (20.4%) than among girls (13.0%). In the Eastern Mediterranean Region, 15%–45% of adolescents are overweight (Musaiger, 2004). The gender difference results of this study are comparable with the international HBSC survey, which also found that the prevalence of being overweight was higher among boys (14.5%) than girls (8.8%) (Mulvihill *et al.*, 2004). The prevalences among Palestinians, however, were considerably higher than the international averages.

In the present study, more boys who were overweight or dissatisfied with their weight had highly educated mothers and were from more affluent families, whereas more girls who were dissatisfied with their weight were from more affluent families. Contributing factors to being overweight among Palestinian adolescents in Palestine with mothers of higher educational level might be the higher consumption of sweets and soft drinks and television viewing in this group (Al Sabbah *et al.*, 2007). Several other studies have shown that different indicators of high socioeconomic status of the family are positively associated with an adolescent's weight status (Jackson *et al.*, 2003; Chhatwal *et al.*, 2004; Raja'a *et al.*, 2005) and weight dissatisfaction (Mikkila *et al.*, 2003; Wang *et al.*, 2005).

Body image has been found to be one of the most significant factors associated with an adolescent's efforts to change weight (French *et al.*, 1995; Middleman *et al.*, 1998). In the present study, being overweight is associated with feeling fat in both genders, and with negative perceptions of appearance in girls but not in boys, whereas dissatisfaction with body weight is associated with feeling fat and with negative perceptions of appearance in both genders. Studies have shown that girls are less confident of their physical appearance, whereas boys perceive themselves to be less overweight (Lowry *et al.*, 2002; Canpolat *et al.*, 2005; Wong *et al.*, 2005), are happier with their looks and either want to stay at the same weight or try to gain weight (Middleman *et al.*, 1998). One of the HBSC studies (Fonseca & de Matos, 2005), however, found that overweight adolescents perceived their bodies as fat and reported having a bad appearance.

The present study of Palestinian adolescents found strong associations between dissatisfaction with body weight and health complaints (poor health, somatic and psychological health, feeling lonely, and life dissatisfaction), except for life dissatisfaction among boys. However, minimal associations were found between being overweight and health complaints. In the literature, no clear picture of the associations between being overweight and psychological health symptoms can be found (Goodman & Whitaker, 2002; Mellin *et al.*, 2002; Fonseca & de Matos, 2005; Crow *et al.*, 2006), whereas numerous studies have shown that dieting or trying to lose weight is associated with psychological health symptoms in adolescents (Gabhainn *et al.*, 2002; Canpolat *et al.*, 2005; Bener & Tewfik, 2006).

The present study found that actual body weight was not significantly associated with involvement in various risk behaviours. However, dissatisfaction with body weight, especially among girls, was associated with involvement in risk behaviours such as fighting, being injured in a fight, being bullied, bullying others at school and smoking nargilah. These symptoms may increase the probability that these girls will engage in risk behaviours later in life. Janssen *et al.* (2004) found

that the prevalence of bullying increased with increasing BMI category in girls but not in boys. In addition, studies have found that smoking is more common among girls who are dissatisfied with their weight (Mikkila *et al.*, 2003) and girls who are trying to lose weight (Gabhainn *et al.*, 2002; Lowry *et al.*, 2002; Crow *et al.*, 2006).

Studies have shown that overweight adolescents are less likely to engage in physical activity than nonoverweight adolescents (Boutelle *et al.*, 2002; Mikkila *et al.*, 2003; Fonseca & de Matos, 2005; Raja'a *et al.*, 2005; Veugelers & Fitzgerald, 2005; Wong *et al.*, 2005). In the present study, overweight boys were less active than nonoverweight boys, whereas this pattern was not found among girls. This could be explained by the low prevalence of physical activity among Palestinian girls in general (Al Sabbah *et al.*, 2007). In addition, the present study found a slight positive association between weight dissatisfaction and television viewing in girls but not in boys, whereas no significant difference was found between overweight and nonoverweight adolescents in terms of television viewing. These results are consistent with the HBSC study in Portugal (Fonseca & de Matos, 2005) that also found no significant differences in television viewing between overweight and nonoverweight adolescents. By contrast, other studies found a positive association between being overweight and television viewing (Mellin *et al.*, 2002). Girls who are dissatisfied with their weight may be exposed to television advertisements about weight control and body shape. It is possible that increasing exposure to Western values through the media and popular culture has resulted in a preference for thinness. In a Qatari study (Bener & Tewfik, 2006), girls' body perceptions were affected by media: the majority of these girls obtained their information on dieting and body weight and shape from magazines, television and radio and most of these girls reported that television was their primary source of information.

The strength of the present study lies in the large number of students participating in the survey. In addition, a reliability and validity study of all the Palestine HBSC variables was conducted on 300 students who were selected from an adolescent school that was not included in the final sample.

Limitations

A possible limitation of the present study lies in the fact that data were collected from students using self-report questionnaires. Self-reported data may be subject to socially desirable answers (e.g. overweight people under-reporting their weight). However, the questionnaires of the students are anonymous; therefore, students had no reason to deliberately misrepresent the truth in their responses or misreport their height or weight. Moreover, many other studies have used self-reported weight and height for adolescents (Boutelle *et al.*, 2002; Lowry *et al.*, 2002; Mellin *et al.*, 2002; Mikkila *et al.*, 2003; Janssen *et al.*, 2004; Fonseca & de Matos, 2005; Needham & Crosnoe, 2005; Page *et al.*, 2005; Wong *et al.*, 2005). Some studies have shown that self-reported weight and height data are valid for identifying relationships in epidemiological studies (Spencer *et al.*, 2002) and that adolescent's reports can provide indications that are as valid representations as actually measured weight and height (Strauss, 1999a; Goodman *et al.*, 2000). Cole's standard was used to differentiate between overweight and nonoverweight adolescents (Cole *et al.*, 2000); however, this standard is based on measured height and weight. The lack of information on indicators of puberty among the adolescents in the present study prevents adjustment of the prevalence of overweight relative to maturation because being overweight in girls is associated with earlier maturation, whereas, for boys, early maturation is associated with a low BMI (Wang, 2002). Although a high proportion of missing data on height and weight is common in this age group, and has been found in other countries (Mulvihill *et al.*, 2004), the fact that one-quarter of the sample did not report their height or weight (and therefore their BMI was not calculated) is also a limitation.

Additionally, the measurement of weight dissatisfaction used in the present study was an indirect one, derived from a question on dieting: those who reported either dieting or perceiving themselves as needing to lose weight were defined as being dissatisfied with their weight. Thus, because the degree of weight dissatisfaction is not identified and a direct measure of adolescents' weight dissatisfaction is not available through the HBSC survey,

any assumptions made may not be accurate. Finally, because the study was cross-sectional, we are unable to draw conclusions about the direction of causality between the variables of interest.

Conclusions

Weight dissatisfaction appears to be a characteristic of a significant portion of adolescents, including nonoverweight adolescents; therefore, preventive interventions should not only focus on weight status, but also on weight dissatisfaction. Health professionals should be aware of two risk groups in the adolescent population: those who are not overweight but are dissatisfied with their body weight and those who are overweight and are satisfied with their body weight. Given the associations between being overweight and physical health complaints among boys and overweight and life satisfaction among girls, as well as the links between weight dissatisfaction and risky behaviours among both boys and girls, further research is warranted. More in-depth investigation of possible factors contributing to overweight and weight dissatisfaction among adolescents in Palestine (e.g. the influence of television on adolescent girls) should be used to educate health providers and the public and to support the development of appropriate interventions for at-risk groups.

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