



Adolescent health brief

Determinants of Weight Loss Dieting Among Adolescents: A Longitudinal Analysis

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 A B S T R A C T

Purpose: To prospectively assess characteristics associated with dieting behaviors in adolescence.

Methods: We analyzed 1,640 adolescents evaluated at 13 and 17 years old (EPITeen cohort), Porto, Portugal. Dieting was assessed only at 17 years, as self-reported frequency of dieting to lose weight in the previous 12 months. The association between participants' characteristics and dieting was summarized using multinomial logistic regression for girls and binary logistic regression for boys.

Results: Dieting at 17 years old was significantly more prevalent in girls than in boys (respectively 27.6% and 10.5% for occasional dieting and 12.2% and 2.6% for frequent dieting). In both sexes, overweight and obese adolescents were significantly more likely to engage in dieting but body dissatisfaction was the strongest determinant among girls. Furthermore, dieting frequency also increased with depressive symptomatology and among those involved in health compromising behaviors.

Conclusions: Besides body mass index, body image concerns and depressive symptomatology predict dieting throughout adolescence.

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**IMPLICATIONS AND
 CONTRIBUTION**

Dieting in adolescence can have harmful consequences. Among girls, body dissatisfaction was the strongest determinant of this behavior. This highlights the importance of promoting a healthy body image beginning in early adolescence and the challenge of developing obesity prevention strategies that do not cause excessive weight concerns.

Throughout adolescence body image becomes one of the major components of self-esteem, enhancing adolescents' desire to pursue the ideal body standard. This ideal is often impossible to attain, resulting in body dissatisfaction that peaks during adolescence [1].

Among adolescents, dieting has often been described as one of the most common strategies for weight control. Although it sometimes implies healthier choices, dieting may compromise adequate nutrient intake and nutritional status [2]. This behavior has been associated with low self-esteem, depression and suicidal thoughts [3], and with the onset of eating disorders

[4]. Furthermore, dieting promotes weight gain [5]. This becomes even more relevant because dieting seems to track into adulthood [6].

Previous studies have evaluated factors associated with dieting and this information provides useful insight in developing prevention strategies. However, results are often limited to females and do not establish a temporal relationship. Our aim was to prospectively assess characteristics at 13 years old associated with dieting at 17 years old, in a unique sample of Portuguese adolescents.

Methods

This study was developed in a population-based cohort (EPITeen), which included adolescents born in 1990 enrolled in public and private schools of Porto, Portugal, in 2003/2004 [7]. The information was collected by self-administered questionnaires

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Table 1
Participants' characteristics at 13 years old according to the reported frequency of dieting at 17 years old, by sex

	Girls			<i>p</i> *	Boys			<i>p</i> *
	Never n (%)	Occasional n (%)	Often n (%)		Never n (%)	Occasional n (%)	Often n (%)	
Body Mass Index								
<85th	430 (87.6)	153 (65.9)	63 (63.6)	<.001	521 (80.0)	22 (30.1)	3 (15.0)	<.001
≥85th and <95th	42 (8.6)	49 (21.1)	20 (20.2)		91 (14.0)	26 (35.6)	8 (40.0)	
≥95th	19 (3.9)	30 (12.9)	16 (16.2)		39 (6.0)	25 (34.2)	9 (45.0)	
Missing	26	5	6		28	9	0	
Body dissatisfaction								
Satisfied	234 (50.4)	83 (37.7)	27 (28.1)	<.001	208 (34.5)	17 (23.6)	3 (15.0)	<.001
Body shape > desired	129 (27.8)	115 (52.3)	65 (67.7)		173 (28.7)	51 (70.8)	16 (80.0)	
Body shape < desired	101 (21.8)	22 (10.0)	4 (4.2)		222 (36.8)	4 (5.6)	1 (5.0)	
Missing	53	17	9		76	10	0	
BDI-II								
Score ≤13	411 (84.9)	183 (78.9)	75 (76.5)	.042	595 (94.3)	69 (93.2)	17 (85.0)	.222
Score >13	73 (15.1)	49 (21.1)	23 (23.5)		36 (5.7)	5 (6.8)	3 (15.0)	
Missing	33	5	7		48	8	0	
Tobacco consumption								
Never	369 (75.9)	165 (71.7)	68 (69.4)	.269	521 (82.7)	56 (77.8)	15 (75.0)	.419
Smokes or has already tried	117 (24.1)	65 (28.3)	30 (30.6)		109 (17.3)	16 (22.2)	5 (25.0)	
Missing	31	7	7		49	10	0	
Alcohol consumption								
Never	223 (46.2)	96 (41.4)	30 (30.6)	.015	306 (47.8)	28 (39.4)	9 (45.0)	.400
Drinks or has already tried	260 (53.8)	136 (58.6)	68 (69.4)		334 (52.2)	43 (60.6)	11 (55.0)	
Missing	34	5	7		39	11	0	
Sports practice								
Never	142 (29.5)	59 (25.4)	24 (25.0)	.083	75 (11.7)	9 (12.2)	1 (5.0)	.292
≤1 time/week	136 (28.3)	57 (24.6)	29 (30.2)		102 (15.9)	16 (21.6)	4 (20.0)	
2–3 times/week	131 (27.2)	89 (38.4)	26 (27.1)		201 (31.3)	29 (39.2)	8 (40.0)	
>3 times/week	72 (15.0)	27 (11.6)	17 (17.7)		264 (41.1)	20 (27.0)	7 (35.0)	
Missing	36	5	9		37	8	0	
Parents' educational level (years)								
0–6	158 (30.7)	58 (24.5)	16 (15.4)	.039	156 (23.0)	16 (19.5)	6 (30.0)	.494
7–9	99 (19.3)	49 (20.7)	19 (18.3)		124 (18.3)	23 (28.0)	3 (15.0)	
10–12	129 (25.1)	63 (26.6)	35 (33.7)		190 (28.0)	21 (25.6)	6 (30.0)	
>12	128 (24.9)	67 (28.3)	34 (32.7)		208 (30.7)	22 (26.8)	5 (25.0)	
Missing	3	0	1		1	0	0	
Age at menarche (years)								
≤11	125 (24.6)	62 (26.3)	33 (31.4)	.576	–	–	–	–
12	156 (30.7)	73 (30.9)	29 (27.6)		–	–	–	
13	136 (26.8)	64 (27.1)	21 (20.0)		–	–	–	
≥14	91 (17.9)	37 (15.7)	22 (21.0)		–	–	–	
Missing	9	1	0		–	–	–	

* *p* values are based on χ^2 statistics.

and a physical examination. The second evaluation was performed during 2007/2008, using similar procedures.

Data collection

Dieting was assessed only at 17 years of age, using the question, "How many times have you dieted (changed the way you eat in order to lose weight) in the previous 12 months?" According to the variable distribution participants were categorized into three groups: "never," "occasional" (1–4 times), and "often" (≥5 times). In boys "often" and "occasional" categories were merged for the regression analysis.

Body shapes were evaluated using the Stunkard's Figure Rating Scale [8]. Body dissatisfaction was assessed as the difference between self-perceived and desired shapes. Participants were classified as: satisfied (difference = 0); having a larger body shape than that desired (difference ≥1), and having a thinner body shape than that desired (difference ≤−1).

Depressive symptomatology was evaluated by the Beck Depression Inventory-II (BDI-II) and a score >13 defined the presence of relevant depressive symptoms [9]. Parental

educational level was measured as the number of successfully completed years of formal schooling. Sports practice was assessed by the frequency of extracurricular sports for at least 20 minutes.

Weight and height were obtained in light indoor clothes and without shoes. Participants were classified according to the age- and sex-specific Body Mass Index (BMI) references from the U.S. Centers for Disease Control and Prevention [7]. Because less than 2% of the participants were classified as underweight, the lower category was <85th percentile.

Participants

At baseline, 2,160 adolescents agreed to participate (participation rate of 77.5%) [7]. Of these, 1,716 (79.4%) participated in the second evaluation. After the exclusion of 76 individuals due to missing data on dieting, we included 1,640 participants (47.6% females).

The study protocol was approved by The Ethics Committee of Hospital de S. João and a written informed consent for each evaluation was obtained from parents and adolescents.

Table 2
Associations between participants' characteristics at 13 years old and dieting at 17 years old

	Girls						Boys		
	Crude OR (95% CI)		Model 1 ^a OR (95% CI)		Model 2 ^b OR (95% CI)		Crude OR (95% CI)	Model 1 ^a OR (95% CI)	Model 2 ^b OR (95% CI)
	Occasional ^c	Often ^c	Occasional ^c	Often ^c	Occasional ^c	Often ^c	Occasional + Often ^c	Occasional + Often ^c	Occasional + Often ^c
Body Mass Index									
<85th	1	1	1	1	1	1	1	1	1
≥85th and <95th	3.28 (2.09–5.15)	3.25 (1.79–5.89)	2.93 (1.75–4.91)	2.84 (1.43–5.65)	2.24 (1.40–3.59)	2 (1.08–3.72)	7.79 (4.44–13.66)	3.94 (2.04–7.59)	5.71 (3.18–10.26)
≥95th	4.44 (2.43–8.16)	5.75 (2.81–11.76)	3.84 (1.66–8.90)	2.76 (.94–8.07)	2.64 (1.41–4.95)	2.96 (1.40–6.24)	18.17 (9.87–33.45)	5.34 (2.41–11.80)	10.55 (5.28–21.07)
Body dissatisfaction									
Satisfied	1	1	1	1	1	1	1	1	1
Body shape > desired	2.51 (1.76–3.58)	4.37 (2.66–7.18)	2.12 (1.46–3.09)	3.59 (2.13–6.06)	1.79 (1.23–2.61)	2.91 (1.74–4.90)	4.03 (2.35–6.90)	2.08 (1.15–3.80)	2.74 (1.52–4.94)
Body shape < desired	.61 (.36–1.04)	.34 (.12–1.01)	.64 (.38–1.09)	.35 (.12–1.02)	.87 (.50–1.53)	.47 (.16–1.40)	.23 (.09–.64)	.32 (.12–.88)	.26 (.10–.73)
BDI–II									
Score ≤13	1	1	1	1	1	1	1	1	1
Score >13	1.51 (1.01–2.25)	1.73 (1.02–2.93)	1.53 (1.01–2.29)	1.81 (1.06–3.11)	1.30 (.85–1.99)	1.41 (.81–2.46)	1.54 (.69–3.42)	2.13 (.87–5.17)	2.20 (.93–5.19)
Tobacco consumption									
Never	1	1	1	1	1	1	1	1	1
Smokes or has already tried	1.24 (.87–1.77)	1.39 (.86–2.24)	1.27 (.89–1.82)	1.46 (.90–2.38)	1.15 (.80–1.67)	1.32 (.80–2.17)	1.41 (.83–2.40)	1.44 (.80–2.60)	1.22 (.70–2.12)
Alcohol consumption									
Never	1	1	1	1	1	1	1	1	1
Drinks or has already tried	1.22 (.89–1.67)	1.94 (1.22–3.10)	1.29 (.93–1.78)	2.07 (1.28–3.33)	1.21 (.86–1.69)	1.97 (1.21–3.22)	1.34 (.86–2.09)	1.22 (.75–2)	1.13 (.71–1.81)
Sports practice									
Never	1	1	1	1	1	1	1	1	1
≤1 time/week	1.01 (.65–1.56)	1.26 (.70–2.28)	1 (.64–1.55)	1.18 (.64–2.16)	.89 (.11–.79)	1.11 (.60–2.06)	1.47 (.65–3.32)	1.03 (.41–2.56)	1.13 (.48–2.68)
2–3 times/week	1.64 (1.09–2.45)	1.17 (.64–2.15)	1.67 (1.10–2.52)	1.23 (.66–2.26)	1.61 (1.04–2.48)	1.16 (.62–2.18)	1.38 (.65–2.92)	1.18 (.52–2.70)	1.26 (.57–2.77)
>3 times/week	.90 (.53–1.54)	1.40 (.71–2.77)	.95 (.55–1.63)	1.47 (.73–2.95)	.85 (.49–1.50)	1.37 (.67–2.80)	.77 (.36–1.66)	.63 (.27–1.47)	.73 (.32–1.63)
Parents' educational level (years)									
0–6	.70 (.46–1.07)	.38 (.20–.72)	.62 (.40–.95)	.30 (.26–.59)	.75 (.48–1.17)	.39 (.20–.77)	1.09 (.60–1.98)	1.21 (.62–2.35)	1.37 (.72–2.58)
7–9	.95 (.60–1.49)	.72 (.39–1.34)	.84 (.53–1.34)	.60 (.32–1.14)	.97 (.60–1.56)	.72 (.38–1.38)	1.62 (.90–2.89)	1.77 (.92–3.41)	1.90 (1.02–3.54)
10–12	.93 (.61–1.42)	1.02 (.60–1.74)	.88 (.57–1.35)	.89 (.51–1.53)	.90 (.58–1.40)	.98 (.56–1.70)	1.10 (.62–1.93)	.88 (.47–1.65)	1.10 (.61–1.99)
>12	1	1	1	1	1	1	1	1	1
Age at Menarche (years)									
≤11	1.22 (.75–1.99)	1.09 (.60–2)	1.07 (.65–1.77)	.93 (.50–1.72)	1.03 (.62–1.73)	.91 (.48–1.71)	–	–	–
12	1.15 (.72–1.85)	.77 (.42–1.42)	1.21 (.75–1.95)	.69 (.37–1.30)	1.06 (.64–1.75)	.72 (.38–1.37)	–	–	–
13	1.16 (.71–1.88)	.64 (.33–1.23)	1.16 (.71–1.89)	.60 (.31–1.16)	1.11 (.66–1.85)	.62 (.31–1.22)	–	–	–
≥14	1	1	1	1	1	1	–	–	–

Statistically significant results are shown in bold.

^a Model 1: adjusted for BMI at 17 years old.

^b Model 2: adjusted for body dissatisfaction at 17 years old.

^c Reference class: "never."

Statistical analysis

Statistical analysis was performed using SPSS Statistics, version 19.0 for Windows (IBM, Armonk, NY). Odds ratio (OR) and respective 95% confidence intervals (95% CI) were estimated using multinomial logistic regression for girls and binary logistic regression for boys. Two regression models were presented, one adjusted for BMI at 17 years of age (model 1), the other adjusted for body dissatisfaction at 17 years of age (model 2).

Results

At 17 years old, 27.6% of girls and 10.5% of boys reported dieting occasionally. Values for dieting often were 12.2% and 2.6%, respectively. Participants' characteristics according to dieting frequency are described in Table 1.

In both sexes, BMI and body dissatisfaction at 13 years old appeared as major determinants of dieting at 17 years of age, even after adjustment for their values at 17 years. The presence of depressive symptoms was also positively associated with dieting in both sexes, but it was significant only among girls. Alcohol use at 13 years of age is associated with a higher probability of dieting at 17 years in girls. We found a higher probability of dieting among daughters of more educated parents (Table 2).

Discussion

In this sample, more than 39% of girls and 13% of boys reported dieting in the previous year. Among girls, this behavior is mainly associated with body image concerns and we found a high dieting prevalence even among those who were normal weight, which may be explained by the strong social pressure to be thin experienced by females [1]. Additionally, the increase of body fat mass that occurs in girls throughout adolescence may prompt them to engage in weight loss behaviors. In contrast, for males, puberty increases lean body mass, which inclines boys toward the desired muscular ideal and, therefore, dieting is not an expected practice. Accordingly, in our study, overweight was the major determinant of dieting among boys.

We observed that adolescents who reported depressive symptoms at 13 years of age had higher odds of dieting later on, which may reflect an attempt to boost self-esteem [3].

Dieting has also been described as more prevalent among those who engage in health compromising behaviors such as alcohol consumption and smoking [3]. We found this effect from early adolescence, particularly among girls. In this context, dieting may also result from the desire to be socially accepted, as an attempt to decrease the negative affection toward the self [1,3].

Girls from families with higher socioeconomic status were more likely to diet, probably because they may experience greater levels of drive for thinness and body dissatisfaction [10]. However, results in the literature are conflicting [3,10].

Some limitations of our study need to be acknowledged. Because we did not further characterize dieting, it is not possible to understand what these adolescents really do when they state they are dieting, nor is it possible to differentiate whether this is a desirable and properly monitored response to overweight. Nevertheless, the strong association of body dissatisfaction with dieting among girls supports that this is an undesirable behavior, at least for females. Despite the longitudinal approach of our analysis, because data concerning dieting frequency was not available at 13 years old, the temporal relationship is difficult to establish.

In conclusion, we found a high prevalence of dieting for weight loss, especially among girls. The desire to be thinner in early adolescence was the strongest determinant of dieting later in adolescence. These results highlight the challenge of developing efforts to build up adolescents' self-esteem and to deconstruct idealized body standards, placing focus on health-promoting behaviors rather than appearance-related behaviors.

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