Food habits, body image and weight control practices of young male and female adolescents

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Abstract The food habits, body image and weight control practices of 470 young adolescents (173 male, 297 female) aged 11.1 to 14.7 years were studied by questionnaire. Body mass index (BMI kg/m^2) ranged from 12.7 to 30.2 and 13.3 to 33.3 for males and females respectively. Females had a higher mean standard body weight (SBW) than males and males were taller than females. Females of Middle Eastern ethnicity were more likely to be 110% or more of SBW and females of Caucasian Northern European background were more likely to be less than 90% of SBW ($p < 0.01$). All of the weight control practices listed (with the exception of slimming pills among males) had been used by males and females. Females were more likely to use weight control practices but there were no gender differences for the mean number of potentially health damaging practices used. Pubescent adolescents had greater BMIs ($p < 0.05$) and pubescent females were more likely to perceive themselves as overweight ($p < 0.001$) and desire a lower body weight compared to prepubescent females ($p < 0.001$). Participants in the 110% and greater SBW group were more likely to skip snacks, eat more when bored or sad, want to build up their bodies, be dieting and trying to lose weight, perceive themselves as overweight and desire lower body weights ($p < 0.05$). The results suggest young male and female adolescents are involved in numerous weight control practices, some of which are dangerous, and that some adolescents receive inappropriate advice about their weight and their diet. **(Aust J Nutr Diet 1996;53:32–38).**

Keywords: adolescents, food habits, body image, weight control, dietary advice.

Introduction

The transformation from childhood to adulthood is characterised by rapid physical growth, large increases in hormone levels and the appearance of secondary sexual characteristics (1). Pubertal development is an important life transition that affects the adolescent at biological, psychological and sociological levels (2). The nutritional status of adolescents may be influenced by the many factors affecting pubertal development such as physical growth, peer group pressure, environmental factors (e.g. the media) and psychological factors (e.g. body image). As well, nutritional status may influence physical growth and development (3).

The interrelationship between biological and psychosocial factors in pubertal development has been noted by several authors who identify the links between these factors in affecting the physical, psychological and social development of adolescents (4–6).

Weight gain and fat gain are a normal part of adolescent development (7), yet a significant proportion of young people today seek the cultural ideal of slimness perpetuated by Western society (8–9). It is appropriate that young people learn sensible methods of weight control, as well over one-third of our adult population is overweight or obese (10). Studies of adolescents have shown that dieting and weight control practices are undertaken by 20 to 45% of adolescents (11–13) and may begin among children as young as eight years of age (14,15). Numerous authors have warned of the dangerous pattern of escalating weight loss practices among young people, in particular young females (16–18), and others identify the risks associated with fad diets and extreme weight control practices among children and adolescents (19–21).

Studies of body image and weight control practices among Australian (9) and New Zealand (12) adolescents have examined gender differences and found that females are more likely to be dissatisfied with their bodies, undertake weight losing behaviours and adopt health-damaging weight loss methods. The two latter studies were conducted among older adolescents (mean age 15 years). The present study focuses on younger adolescents and investigates ethnic differences which previous studies have not examined.

Methods

Subjects

Students attending Years 7 and 8 at two public schools in Sydney were invited to participate in the study which involved the completion of a questionnaire and the taking of anthropometric measurements. The schools were selected because they were public schools and were located within the same region. The two schools drew from a wide range of ethnic and socioeconomic backgrounds and were typical of the wider adolescent population. School principals, staff and participants gave consent to take part in the study which was approved by the Human Ethics Committee, University of Sydney.

Anthropometric measurements

All anthropometric measurements were taken by one investigator (J.O'D.). Height was measured without shoes to the nearest 0.5 centimetre using a portable Krupps stadiometer. Weight was measured without shoes in light clothing using calibrated Soenle digital scales to the nearest 0.01 kilogram.

Questionnaires

Participants completed a questionnaire relating to demographic details, weight control practices, food habits and body image. The questionnaire was used to obtain information about age, gender, ethnicity, educational level of

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parents, pubertal development, height and weight. Ethnicity was established by asking participants the country in which they were born, the country in which their parents were born and the language spoken at home. Participants also were asked to identify one of the six ethnic categories to which they believed they belonged (Caucasian, Northern European; Caucasian, Southern European; Middle Eastern; Asian; Aboriginal or Torres Strait Islander; and Pacific Islander or Maori).

Educational level of parents was established by asking students to indicate the highest level of education achieved by one or both parents (finished primary school; finished Year 10; finished Higher School Certificate; technical and further education, trade; tertiary education).

Pubertal development was assessed by asking girls whether they had had their first menstrual period ('yes' or 'no') and at what age this had occurred. Boys were asked 'Do you think you have reached puberty?' ('yes' or 'no' or 'don't know'). Females were classified pubescent if they had reached menarche and prepubescent if they had not. Males were not included in analyses of puberty and other puberty-related variables due to the possible unreliability of such self-reported data in males.

Food habits were addressed using questions about usual consumption of meals and snacks, dieting to lose or gain weight, weight control practices, consumption of takeaway foods, vitamin supplementation, body building, exercising habits, and attitudes toward eating and exercise. All of these questions were answered 'yes' or 'no'. Body weight perception questions were scored (too fat = 3, about right = 2, too thin = 1) and also as a range of eight categories (very obese = 1, through to very underweight = 8). Desired body weight was scored using the same categories as well as a five-point scale ranging from a lot heavier (score 1) to a lot lighter (score 5). Twenty-one common weight control practices were listed and participants were asked to circle the practices that they had ever used ('yes' or 'no') and to list any additional practices that they had ever used that were not included in the list. Participants were asked to indicate whether they currently received advice about food intake, weight control, exercise or body building ('yes' or 'no') and from whom.

Data analysis

Questionnaires were analysed using the Statistical Package for the Social Sciences (SPSS-X) (22). As there are no established standards for body mass index (BMI, weight/height^2, kg/m^2) among this age group both BMI and standard body weight (SBW) were used to compare body weight between and within groups. Measured weights were expressed as SBW using the National Centre for Health Statistics (NCHS) standards (23). SBW was calculated by dividing the actual weight of each participant by the expected weight for gender, age and height. This was then converted to a percentage. For statistical comparison participants were divided into the following groupings of SBW: less than 90%, 90 to 109.9%, and 110% and greater. The mean BMI (± standard deviation) was compared with the appropriate age group from Australian BMI (entire distribution) (24). To compare differences between groups Chi square, ANOVA and ANCOVA values were calculated. The data were normally distributed.

Results

Sample characteristics

Of the 470 students, 297 were female and 173 were male. Ages ranged from 11.0 to 14.4 years for females (mean 12.9 ± 0.6) and 11.7 to 14.3 years for males (mean 13.0 ± 0.6). No student refused or was unable to participate. Data on all absentees were obtained on subsequent visits to the schools. Table 1 summarises the results of anthropometric measurements. Males were taller than females, but there were no significant differences between sexes for age, weight or BMI.

Figure 1 illustrates the proportion of adolescents classified according to SBW. There were no statistical differences between the proportions of males and females classified according to SBW ($\chi^2 = 6.06$, $p > 0.05$) but females had a greater mean SBW than males ($F = 9.67$, $df = 469$, $p < 0.01$).

Weight, BMI and SBW grouping were not associated with the educational level of parents ($p > 0.05$).

The proportion of males and females according to ethnicity and SBW group is presented in Table 2. The majority of participants were of Caucasian Northern European background (62.9%, n = 285) followed by Asian (20.6%, n = 97), Southern European (10.6%, n = 55), Middle Eastern (2.6%, n = 15), Pacific Islander or Maori (2.0%, n = 11), and Aboriginal or Torres Strait Islander (1.3%, n = 7). Females of Middle Eastern ethnicity were more likely to be 110% and more of SBW. Females of Caucasian Northern European ethnicity were more likely to be less than 90% of SBW. There were no statistical differences between males for ethnicity and SBW.

Table 1. Anthropometric measurements of young adolescents

	Males n = 173			*Females n = 297*			
	Range	*Mean*	*sd*[(a)]	*Range*	*Mean*	*sd*[(a)]	*F statistic*
Weight (kg)	28.1-79.2	50.6	11.3	27.0-90.1	49.9	10.8	0.45
Height (cm)	141.0-182.0	158.9	8.7	137.5-175.0	155.8	7.4	16.04***
BMI (kg/m^2)	12.7-30.2	19.4	3.4	13.3-33.3	19.9	3.6	2.83
% SBW [(b)]	68.9-172.5	102.7	16.9	65.7-183.3	108.2	20.6	9.67**

(a) standard deviation.
(b) % of SBW = weight/ideal weight x 100.
** $p < 0.01$, *** $p < 0.001$, df = 469.

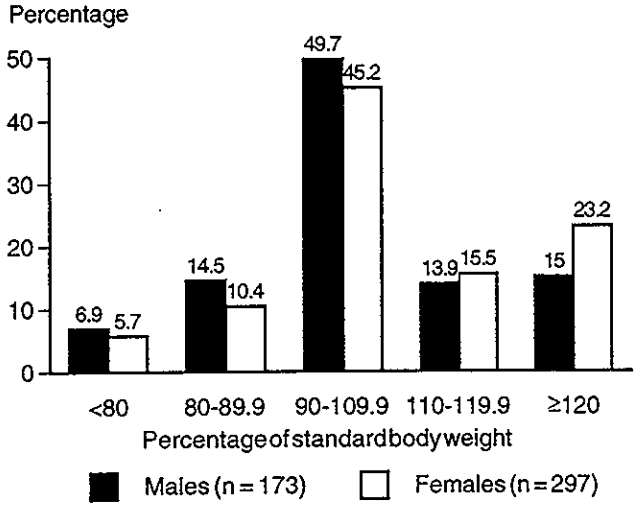
The proportion of females who reported having reached menarche was 56.1% with a mean age of menarche of 12.2 years (± 1.5 years). The majority of males (59.0%) indicated that they thought they had reached puberty with 11.0% indicating that they had not and 30.0% were uncertain.

Body image and desired weight

The majority of participants (66.7%) perceived their body weight as about right. There were 11.6% of males and 7.5% of females who perceived themselves as too thin and 18.6% of males and 27.6% of females who perceived themselves as too fat. Twice as many post-menarchial females perceived themselves as being too fat compared to pre-menarchial females (39.2% versus 16.3%, ($\chi^2 = 6.49$, $p < 0.05$). In general, more males perceived themselves as too thin and more females perceived themselves as too fat. More males desired a body weight heavier than their current weight (30.5% of males wanted their body weight to be a little or a lot heavier, versus 14.6% of females) and more females desired a lighter weight than their current weight (53.4% of females wanted their body weight to be a little or a lot lighter, versus 31.0% of males). Analysis of covariance showed that the category of pubertal development of participants was associated with variables of body image, but age was not associated with these.

Body weight perception and desired body weight were associated with pubertal development among females. Post-menarchial females were significantly more likely to describe themselves as overweight ($F = 14.29$, $df = 296$, $p < 0.001$) and to desire a body weight below that of current weight compared to pre-menarchial females ($F = 11.12$, $df = 296$, $p < 0.001$).

Figure 1. Proportion of subjects classified according to percentage of standard body weight for age, gender and height



Food habits, exercising behaviours and attitudes toward fitness and eating

Table 3 summarises subjects' food habits. A total of 22.1% of participants reported that currently they were trying to lose weight and 21.4% said currently they were dieting to lose weight. A total of 5.6% were trying to gain weight and 3.9% were dieting to gain weight. More females reported trying to lose weight than males ($\chi^2 = 13.04$, $p < 0.001$) but there was no statistically significant difference between males and females for weight gaining behaviour ($p > 0.05$).

There were very few significant differences between males and females for most variables. A quarter of the group were using vitamin supplements and an average of 12.1% reported that they regularly skipped breakfast, 8.6% skipped the midday meal and 1.4% skipped the evening meal. Males reported a greater frequency of consumption of takeaway foods ($\chi^2 = 8.47$, $p < 0.01$).

In addition, 59.4% of participants reported that they were currently trying to become physically fit. Males were more likely than females to be involved in building up their bodies (44.4% versus 33.9%) but this difference was not statistically significant. Females reported a greater frequency than males of eating more when they felt sad or bored (44.2% versus 25.0%) ($\chi^2 = 16.13$, $p < 0.001$). The majority of participants (68.7%) reported that they had good eating habits (70.8% male, 67.0% female).

Table 2. Proportion of adolescents according to ethnicity and standard body weight (SBW)

	Males (n=173)					*Females (n=297)*				
	n	*<90% SBW* %	*90-109.9% SBW* %	*≥110% SBW* %	*Chi square*[b]	*n*	*<90% SBW* %	*90-109.9% SBW* %	*≥110% SBW* %	*Chi square*
Caucasian - Northern European	124	23.8	46.7	29.5	13.12	161	25.8	37.7	36.5	23.43**
Caucasian - Southern European	10	-	80.0	20.0		45	8.9	42.2	48.9	
Asian	36	28.6	54.3	17.1		61	6.7	45.3	48.0	
Middle Eastern	1	-	-	100.0		14	7.1	35.7	57.3	
Pacific Islander, Maori	1	-	100.0	-		10	-	70.0	30.0	
Aboriginal, Torres Strait Islander	1	-		100.0		6	-	66.7	33.3	

(a) % of SBW = weight/ideal weight x 100.
(b) Chi square calculated on collapsed group numbers. Calculation includes first three ethnic groupings only.
** $p < 0.01$.

Weight loss practices

Of the 21 weight loss practices listed, all previously had been used by both males and females, except for slimming pills which had been used only by seven females. The frequencies of weight loss methods used by males and females are shown in Table 4. 'Exercise', 'not eating between meals' and 'keeping busy to avoid eating' were the three most popular weight control practices among males and females. Females compared to males reported a greater frequency of use of all 21 methods of weight loss and, in particular, were significantly more likely to 'avoid snacking', 'keep busy', 'use their own diet', 'eat only low kilojoule foods', 'drink water before meals', 'become vegetarian', 'avoid situations where there will be food', 'take advantage of illness to avoid eating' and 'adopt a weight loss diet from a magazine' ($p < 0.001$). An average of 5.0% of participants (five males, 18 females) reported having used weight loss practices other than those listed. Among males the practices listed included 'eating only from the five food groups', 'not eating lollies', 'eating less', 'going to the gym', 'choosing healthy foods' and 'being supervised by a dietitian'. Other practices added to the list by females included 'eating only nutritious foods (such as nuts, yoghurt and dried fruits)', 'eating less fats', 'calorie counting', 'eating only three times a day', 'eating the right foods', 'watching what you eat', 'eating only salads', 'starving', 'drinking water instead of soda', 'swimming', 'staying in my room and listening to music to take my mind off it', 'dancing', 'seeing a dietitian', 'not eating junk food', 'eating only when you want to' and 'drinking diet tea'.

Of the health-damaging weight loss practices, 48 females (16.2%) and 12 males (6.9%) had used at least one potentially dangerous method to lose weight. These included 'starvation', 'laxative abuse', 'vomiting', 'smoking cigarettes' and 'using slimming pills to lose weight'.

Of the 21 common weight loss practices listed, females had used an average of 4.00 (± 3.0) and males had used 2.0 (± 2.0). The range was zero to 16 for females and zero to 13 for males. Females on average used a greater number of weight loss methods than males ($t = -7.78$, $df = 451$, $p < 0.0001$) but there was no difference between males and females in the mean number of health-damaging methods used. Males used an average of 0.1 (± 0.5) health-damaging weight loss practices and females used 0.3 (± 0.7) ($t = 2.29$, $df = 469$, $p > 0.05$). Of the 29 females who had used starvation to lose weight, five had also used another method in combination with starvation (three used smoking, two used slimming pills and three used both vomiting and slimming pills in combination). Of the 12 males who had used at least one of these health-damaging weight loss methods, two had used combinations (one used laxatives and vomiting, and one used fasting, vomiting and smoking cigarettes).

Advice adolescents receive about body weight

Table 5 illustrates the relationship between actual weight grouping and advice adolescents receive from others about their body weight. The 110% and more of SBW group reported a greater frequency of being advised to lose weight ($p < 0.0001$) and to get more exercise ($p < 0.0001$) and that they eat too much ($p < 0.01$). The less than 90% of SBW group reported a greater frequency of being told that they should gain weight ($p < 0.0001$) and that they do not eat enough ($p < 0.0001$). Participants ranked parents, peers, grandparents, teachers and sports coaches or dancing teachers as the major sources of this advice. Four participants (two male, two female) listed a dietitian as the source of this advice. There were no gen-

Table 3. Food habits of young adolescents

	Males N = 173		*Females N = 297*		*Males and females N = 470*		
	n	*%*	*n*	*%*	*n*	*%*	*Chi square*
Skipping meals and snacks							
Skip breakfast	19	11.0	51	17.3	70	14.9	2.90
Skip morning snack	51	29.5	66	22.4	117	25.1	2.99
Skip lunch	14	8.1	23	7.8	37	7.9	0.02
Skip afternoon snack	27	15.7	41	13.9	68	14.6	0.28
Skip dinner	2	1.2	11	3.7	12	2.6	5.90
Skip supper	71	41.3	123	42.1	194	41.8	1.85
Consumption of takeaways							
Daily	1	0.6	10	3.4	11	2.4	8.47**(a)
Once or twice a week	34	19.8	37	12.5	71	15.2	
Twice a fortnight	84	48.8	140	47.5	224	48.0	
Less than monthly or never	53	30.8	108	36.6	161	34.5	
Eating behaviour							
Diet to lose weight	21	12.4	79	26.6	100	21.4	13.04***
Diet to gain weight	5	2.9	13	4.5	18	3.9	0.70
Take vitamin pills	38	22.2	70	23.7	108	23.0	0.14

(a) Chi square calculated on overall consumption of takeaways.
** $p < 0.01$, *** $p < 0.001$.

Table 4. Methods of weight loss used by young adolescents

	Males		*Females*		*Males and females*		
	n	%	*n*	%	*n*	%	*Chi square*
Exercise	93	53.8	213	72.9	306	65.8	1.63
Not eating between meals	42	24.3	129	44.3	171	36.9	18.75***
Keeping busy	23	13.3	110	37.7	133	28.6	30.43***
Own diet	27	15.6	103	35.3	130	28.0	19.90***
Selecting low joule foods	26	15.0	95	32.5	121	26.0	16.40***
Drinking water before meals	19	11.0	83	28.4	102	21.9	18.30***
Skipping meals	22	12.7	57	19.5	79	17.0	3.10
Excessive exercise	22	12.7	54	18.5	76	16.3	2.25
Becoming vegetarian	7	4.0	48	16.4	55	11.8	14.83***
Avoiding situations where there will be food	9	5.2	43	14.7	52	11.2	8.98**
Diet from magazine	5	2.9	47	16.1	52	11.2	17.77***
Taking advantage of illness to avoid eating	6	3.5	40	13.7	46	9.9	11.63***
Natural laxatives e.g. bran	9	5.2	33	11.3	42	9.0	4.20
Fasting, starvation	6	3.5	29	9.9	35	7.5	5.62
Other method	5	2.9	18	6.2	23	5.0	1.80
Laxatives	6	3.5	11	3.8	17	3.7	0.01
Trying to vomit	4	2.3	10	3.4	14	3.0	0.16
Vomiting	3	1.7	11	3.8	14	3.0	0.92
Smoking	4	2.3	7	2.4	11	2.4	0.07
Slimming pills	0	0	7	2.4	7	1.5	2.75
Not swallowing food	1	0.6	6	2.1	7	1.5	0.76

** $p < 0.01$, *** $p < 0.001$.

der differences in relation to the source of dietary advice. A significant proportion of the less than 90%, and 90 to 109.9% of SBW groups reported being advised that they should lose weight (5.7% and 15.5% respectively) and that they eat too much (11.2% and 22.1%). Likewise, 6.1% of the 110% and more of SBW group were told that they should gain weight and 8.5% were told that they do not eat enough.

Relationship between food habits, body image and weight grouping

There was a significant relationship between SBW grouping and variables of eating behaviour, body image and exercise behaviours. There were no statistically significant differences between males and females for variables of food habits, body image and weight grouping. Participants in the 110% and more of SBW group were more likely to be currently trying to lose weight ($\chi^2 = 31.28$, $p < 0.0001$), dieting to lose weight ($\chi^2 = 25.61$, $p < 0.0001$), perceive themselves as too fat ($\chi^2 = 100.37$, $p < 0.0001$) and desire a lower body weight than their lower body weight counterparts ($F = 58.73$, $df = 449$, $p < 0.0001$). This analysis also showed that while the majority of participants in the 110% and more of SBW group perceived themselves as being overweight, a significant proportion of the lower weight groups also perceived themselves as overweight and desired lighter body weights. Of the total 24.4% of participants who perceived themselves as too fat, 7.2% were less than 90% of SBW, 23.2% were 90 to 109.9% of SBW, and 69.6% were 110% and more of SBW. Likewise, 32.4% of the 90 to 109.9% of SBW group and 8.8% of the less than 90% of SBW group reported that they were currently trying to lose weight.

Table 5. Percentage of young adolescents who receive advice about food intake, body weight and exercise according to percent ideal weight grouping

	Percentage of ideal body weight grouping				
Advice	*< 90*	*90–109.9*	*≥ 110*	*All weight groups*	*Chi square*
Lose weight	5.7	15.5	40.4	22.6	50.2***
Gain weight	33.7	18.0	6.1	16.8	31.6***
Build up body	20.2	19.5	14.6	17.9	1.87
More exercise	22.5	42.9	59.1	44.8	31.9***
Less exercise	1.1	10.3	6.1	17.1	8.4*
Eat too little	24.7	20.6	8.5	17.1	13.9***
Eat too much	11.2	22.1	29.4	22.6	11.0**

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, $df = 469$.

Eating patterns were significantly associated with the SBW grouping. Participants in the 110% and more of SBW grouping were more likely to skip morning snacks ($\chi^2 = 6.80$, $p < 0.05$) and afternoon snacks ($\chi^2 = 5.91$, $p < 0.05$) and report that they eat more when bored or sad ($\chi^2 = 5.2$, $p < 0.05$). This group was significantly more likely to report that they were trying to build up their bodies ($\chi^2 = 9.13$, $p < 0.01$) and to believe that they should get more exercise ($\chi^2 = 22.11$, $p < 0.0001$).

Discussion

The few statistically significant differences for most variables among males and females suggest that adolescents' food habits, consumption of regular meals and snacks, and vitamin supplements are similar between the sexes. Males reported a greater frequency of consumption of takeaway foods and females were more likely to be dieting to lose weight and were more likely to use the weight control practices listed.

An unexpected finding was that one-third of the males did not know if they had reached puberty. This finding has implications for education about pubertal development in school health and nutrition education curricula and school syllabuses.

It is difficult to make judgements about normal weight for height in growing adolescents but it is reasonable to conclude that 15.0% of males and 23.2% of females in this study were classified as obese (≥ 120% of SBW) and 18.6% and 27.6% respectively perceived themselves as 'too fat'. The perceptions of the majority of these adolescents would thus appear to be accurate. An average of 22.0% currently were trying to lose weight and some of these adolescents (both males and females) were not classified in the 110% and more of SBW group. This suggests that whilst the majority of adolescents' perceptions and desires are appropriate in relation to their actual body weight, a small proportion of adolescents seek weight loss despite being of average or low body weight. The fact that all of the 21 listed weight loss practices had been used by both males and females (with the exception of slimming pills by males) shows that weight control practices are already entrenched in this 11- to 14-years age group and that younger children of both sexes are likely to be attempting weight loss by similar means.

It is obvious from these results that young adolescents are concerned about body weight and body image issues and that they actively seek to manipulate their body weight through the use of numerous weight control practices. The majority of weight control practices used by this group were relatively safe, were undertaken by overweight adolescents and unless taken to extremes will do little to harm the normal growth, development and nutritional status of most healthy adolescents. Some of the additional weight loss practices cited by adolescents, including eating only nutritious foods (such as nuts, yoghurt and dried fruits), eating only three times a day, and drinking diet tea, indicate that adolescents are subject to food fads and receive inaccurate nutrition information.

A small proportion of boys and girls were involved in practices that are potentially dangerous to their health and may precede more severe eating disorders. The use of methods such as excessive exercise, taking advantage of illness to avoid eating and undertaking unsupervised diets that are likely to be fad diets indicates that young adolescents undertake some extreme methods of weight control. The use of more dangerous methods, such as laxatives, starvation, self-induced vomiting or trying to vomit, smoking and slimming tablets, is alarming.

What is of real concern is the use near the onset of puberty and during the pubertal growth spurt, of caloric restriction and other health-damaging methods which are known to impair growth (25), bone density (26), sexual maturation and normal menstrual function (27). The risks associated with electrolyte imbalance due to vomiting and laxative abuse are well documented (28) and the use of cigarette smoking by a similar proportion of males and females confirms previous suggestions that smoking for weight control purposes is one of the main reasons for the high teenage smoking prevalences in Australia today (29). These results are similar to those in the studies of Worsley (12) in New Zealand and Paxton et al. (9) in Melbourne although comparison is difficult because the ages of the adolescents in their samples were approximately 15 years and 11 to 18 years respectively. The adolescents in this study were aged 11.1 to 14.4 years and as such, were a younger group.

Both male and female young adolescents receive information about their weight, food intake and exercise patterns from parents, peers, other family members, teachers, sports coaches and ballet teachers rather than from qualified dietitians. On the whole, the advice is accurate but some adolescents receive inaccurate information and information that is inappropriate in relation to their actual body weight. Seeking advice about body weight and diet from a qualified dietitian or health professional may benefit these adolescents by providing effective weight control strategies and reducing confusion and nutrition misinformation.

Post-menarchial females had greater BMI and were more likely to perceive themselves as overweight and to desire lighter body weights. Use of Tanner staging methods (30) would provide a more accurate indication of pubertal stage in males and may reveal a relationship between variables of body perception and puberty. The results for post-menarchial females are similar to those of other studies which show that as puberty progresses in females, BMI (31), body dissatisfaction and the desire for thinness increase (32).

The results of this study suggest that young adolescents are actively employing weight control practices, mainly to lose weight, and that the majority are relatively safe methods. A small proportion of males and females use harmful methods of weight loss and these are more likely to be adolescents whose weight is 110% and more of SBW and post-menarchial females. Nutrition education should focus upon the desire of young people to maintain a healthy weight and should provide accurate information and skills to help adolescents adopt sensible methods of weight control and exercise. Adolescents need to be made aware of the dangers of extreme weight loss practices and the general inefficacy of such practices. Providing positive messages about pubertal changes, normal adolescent growth and healthy eating may reassure young adolescents that the rapid bodily changes that they are undergoing are normal and expected.

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Letter to the Editor

Nutrition, dietetics and the World Wide Web

To the Editor: I would like to bring to the attention of dietitians and nutritionists the information and communication that can be obtained from the Internet World Wide Web.

The Internet has grown from a tool of the United States Defence Services 20 years ago to an international link to universities and now to an important device for dietitians and nutritionists. The Internet is the world's largest information network that links the largest libraries and databases across the world and allows this information to be rapidly acquired by modems or optic fibres into personal computers. There are over four million sites that contain electronic magazines, journals, databases, graphic images, interest groups and help lines.

There is now an opportunity for dietitians, nutritionists and health practitioners to become involved with the World Wide Web even if a company uses it as an in-house closed web of its own.

The Dietitians Association of Australia has a home page with membership details, goals and visions. There are similar pages on other sites giving position statements on various issues or dietary advice on health supplements, food allergies and food supplements. Dietitians can obtain information about equipment, dietary supplements, conferences and workshops or the composition of retail foods from food company sites.

Most sites are interactive multimedia services providing easy accessibility to, and on-demand delivery of, healthcare educational and product information to people worldwide. As multimedia services they are capable of transmitting audio and video files in addition to text and graphics. Another feature of the web is the links that most sites have to other sites with further information.

The web can allow the following operations:

- joining a specific forum that interacts through e-mail;
- searching for information using international databases on literature and patents;
- obtaining fact sheets on product specifications from suppliers;
- obtaining information from government agencies such as the National Institute of Health, Medline or Medicare;