A B S T R A C T

The relationship of puberty to body image, social physique anxiety, preoccupation with weight and nutritional status was examined in 77 non-obese females (7-16 years). Results showed that 34% of the pre-pubescent girls, 36% of the early pubescent girls and 76% of the post-pubescent girls were dissatisfied with their body shape. Social physique anxiety, determined by the SPAS scale, and preoccupation with weight, measured by the Eating Disorder Inventory were observed in all pubertal groups but were more evident in the early and post-pubescent groups. No significant difference existed among the maturation groups in mean caloric and nutrient intake. The results showed that antecedents for developing an eating disorder existed in all maturational groups studied, although no health risk behaviours regarding nutritional status were observed.

A B R É G É

On a examiné la relation qui existe entre d'une part la puberté et, d'autre part, l'image du corps, l'anxiété sociale associée à son physique, l'obsession par rapport à son poids et la nutrition chez 77 jeunes femmes ne souffrant pas d'obésité (âgées de 7 à 16 ans). Les résultats montrent que 34 % des jeunes filles pré-pubères, 36 % des jeunes filles au début de leur puberté, et 76 % des post-pubères ne sont pas satisfaites de la forme de leur corps. On a constaté un état d'anxiété sociale associée au physique (déterminé par l'échelle SPAS) et une préoccupation par rapport au poids (mesurée en fonction du Eating Disorder Inventory) dans tous les groupes à la puberté, avec une tendance plus marquée pour les pré et post pubères. Aucune différence significative n'a été constatée pour tous les groupes aux plans de l'apport calorique et de l'apport en éléments nutritifs moyens.

Les résultats montrent que des prédispositions au développement d'un trouble alimentaire existent chez tous les groupes étudiés bien que l'on n'ait pas constaté de comportement dangereux pour la santé au plan de la nutrition.

The Relationship of Pubertal Status to Body Image, Social Physique Anxiety, Preoccupation with Weight and Nutritional Status in Young Females

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Research suggests that the incidence of eating disorders in adolescent females has risen dramatically since the 1960s.¹⁻³ Recognizing the physiological and psychological consequences, health care costs, and the suffering of the individuals affected and of their families, health professionals are now endorsing preventive initiatives.⁴⁻⁷ Paxton⁵ suggests that changing sociocultural factors, family dynamics and personality deficits are not feasible goals of a general prevention program. Given this, strategies should target more modifiable risk factors of eating disorders such as eating, dieting behaviours and dissatisfied body images.⁵ Early detection of these factors is critical if preventive measures are to be effective, since once acquired these attitudes and behaviours are resistant to change.⁷

Many of the primary prevention initiatives in the eating disorder literature have targeted adolescent girls.^{6,8,9} Other studies have provided support for an even earlier sociocultural indoctrination for thinness, highlighting the need for further research during this developmental period.¹⁰⁻¹⁵ Kostanski and Gullone¹⁶ advised that if research is to further our understanding of factors that are central to the development of perceived body image dissatisfaction, it needs to be of a prospective nature. Future investigations need to examine the relationship of various risk factors to age, which includes various levels of maturation,

to help clarify the nature, timing and relative contributions of risk factors associated with eating disorders.¹⁷ Therefore, the purpose of this study was to determine the relationship of pubertal status to body image, social physique anxiety, preoccupation with weight and nutritional status in young, non-obese females.

METHODS

Participants

Seventy-seven Caucasian females, who were in families that had middle to upper socioeconomic status, volunteered to take part in this study. The subjects were divided into three groups according to their pubertal status which was defined as the onset of menses. Girls who had reached menarche were considered post-pubescent since menarche occurs late in the physiological maturation of girls.¹⁸ Based on this classification system, 32 girls were categorized as pre-pubescent, 28 as early pubescent and 17 as post-pubescent.

Measures

Anthropometric Measurements

Height, weight and selected skinfold measurements (triceps, subscapular, biceps, iliac crest, supraspinal, abdominal, front thigh and medial calf) of each girl were taken by a trained anthropometrist according to the protocol outlined by Ross and Marfell-Jones.¹⁹ Body Mass Index (BMI) was calculated and used along with the triceps skinfold measurement to determine the level of obesity of the subjects.²⁰

Body Image Questionnaire (BIQ)

Subjects completed a pictorial BIQ which consisted of a series of six silhouettes

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that represented variations in levels of body fatness in the physique of young females. The BIQ was modified from an instrument used by Dwyer et al.²¹ and Carrol et al.²² to represent variations in the physique of young females rather than that of adult females.

Social Physique Anxiety Scale (SPAS)

Subjects completed the SPAS to measure the level of anxiety they felt over the real or perceived evaluation of their physique by others. This questionnaire was based on a 12-item self-report scale designed by Hart et al.²³ but was modified to allow for comprehension by younger females. The modified SPAS was pilot-tested on 19 female gymnasts ranging in age from 6 to 15 to ensure question comprehension, item-total correlation ($\alpha = 0.91$) and test-retest reliability ($R = 0.88$).

Eating Disorder Inventory (EDI)

The EDI was used to assess psychological and behavioural traits common in individuals with eating disorders.²⁴ Although eight scales were constructed in the EDI, subjects completed only the subscales of 'Body Dissatisfaction', 'Bulimia' and 'Drive for Thinness', as these addressed the body image concerns related to the purpose of the present investigation.

Nutritional Assessment

The young females and their guardian(s) kept a three-day food diary over one typical weekend day (Saturday or Sunday) and two typical weekdays (Monday to Friday). Daily energy and nutrient intakes from the three-day food diary were analyzed using the West Diet Analysis '91 computer software program.²⁵

Data Analysis

One-way analyses of variance (ANOVA) were used to: 1) assess differences in physical characteristics among maturation groups, and 2) determine if pubertal status was related to social physique anxiety, preoccupation with weight and nutritional status when subjects were grouped according to maturation level. A Chi-square analysis was also used to determine if pubertal status was related to body image.

TABLE I
Physical Characteristics of the Females (n = 77) According to Pubertal Status

Group	Pre-pubescent (n = 32)	Early Pubescent (n = 28)	Post-pubescent (n = 17)	Total (n = 77)
Age (yrs)	8.5 $\pm$ 0.1	11.4 $\pm$ 0.2	14.4 $\pm$ 0.2	10.9 $\pm$ 0.3
Height (cm)	134.7 $\pm$ 1.4	150.7 $\pm$ 1.7	163.2 $\pm$ 1.5	146.8 $\pm$ 1.6
Weight (kg)	28.6 $\pm$ 0.9	39.4 $\pm$ 1.3	53.4 $\pm$ 1.6	38.0 $\pm$ 1.3
Sum of Skinfolts (mm)*	73.8 $\pm$ 4.8	73.7 $\pm$ 4.2	99.4 $\pm$ 6.4	79.4 $\pm$ 3.1
Triceps Skinfold (mm)	11.2 $\pm$ 0.7	11.5 $\pm$ 0.8	14.9 $\pm$ 1.1	12.1 $\pm$ 0.5
BMI†	15.7 $\pm$ 0.3	17.2 $\pm$ 0.3	20.0 $\pm$ 0.5	17.2 $\pm$ 0.3

* sum of triceps, subscapular, biceps, iliac crest, supraspinal, abdominal, front thigh and medial calf skinfolts
† body mass index (ht/wt²)

TABLE II
Nutritional Data of the Females (n = 77) According to Pubertal Status

Group	Pre-pubescent (n = 32)	Early Pubescent (n = 28)	Post-pubescent (n = 17)	Total (n = 77)
Kcal (% RNI)*	100.3 $\pm$ 3.5	97.5 $\pm$ 4.1	92.1 $\pm$ 5.8	97.5 $\pm$ 2.4
% Protein	13.6 $\pm$ 0.4	14.0 $\pm$ 0.5	13.7 $\pm$ 0.5	13.7 $\pm$ 0.3
% CHO†	54.8 $\pm$ 0.9	53.0 $\pm$ 1.0	53.3 $\pm$ 1.6	53.8 $\pm$ 0.6
% Fat	31.8 $\pm$ 0.8	33.2 $\pm$ 1.0	32.9 $\pm$ 1.4	32.5 $\pm$ 0.6

* % of calories consumed compared to Recommended Nutrient Intakes (RNI)
† Carbohydrate

RESULTS

The data in Table I illustrate the physical characteristics (age, height, weight, sum of skinfolts, triceps skinfold, BMI) of the participants according to three maturation groups (pre-pubescent, early pubescent, post-pubescent). As expected, mean height, weight, and body fat increased as the girls got older. All of the girls, except for two, were below the 85th percentile of triceps skinfold thickness and BMI.

Results from the BIQ indicated a significant ($p < 0.01$) increase in body shape dissatisfaction as the girls matured. Specifically, 34% of the pre-pubertal girls, 36% of the pubescent girls and 76% of post-pubescent girls chose a smaller body shape as their preferred body type. None of the girls participating in this study chose a larger body shape.

The results from the analysis of the responses to the SPAS are illustrated in Figure 1. The SPAS scores were significantly ($p < 0.05$) larger in the post-pubescent group (36.6 ± 1.6) compared to the early (29.3 ± 1.5) and pre-pubescent (23.6 ± 1.1) groups. These findings suggest that as the girls matured physically, they experienced more anxiety over the real or per-

ceived evaluation of their physique by others.

The data in Figure 2 illustrate the results from the EDI subscales of 'Body Dissatisfaction', 'Bulimia' and 'Drive for Thinness'. The 'Body Dissatisfaction' scores were significantly ($p < 0.05$) higher in the post-pubescent girls (8.8 ± 1.7) compared to the early (3.3 ± 1.1) and pre-pubescent (1.4 ± 0.3) girls. Similarly, the 'Bulimia' scores were significantly ($p < 0.05$) higher in the post-pubescent group (2.5 ± 0.7) compared to the early (0.9 ± 0.3) and pre-pubescent (0.9 ± 0.3) groups. The 'Drive for Thinness' scores were also significantly ($p < 0.05$) greater in the post-pubescent girls (7.1 ± 1.4) compared to the early (3.6 ± 0.8) and pre-pubescent (3.1 ± 0.4) girls. These results suggest that physically mature girls (post-pubescent) were more preoccupied and dissatisfied with their body weight and shape compared to the younger, less mature girls (early pubescent or pre-pubescent).

The nutritional data for all maturational groups are presented in Table II. Although the post-pubescent girls consumed less of their recommended total calories compared to the younger two maturation groups, this difference was not significant. The percentage of protein, carbohydrates

Figure 1. Results ($\bar{X} \pm SE$) from the Social Physique Anxiety Scale in the three pubertal groups (pre-pubescent, early pubescent, post-pubescent) of females ($n = 77$).

Figure 2. Results ($\bar{X} \pm SE$) from the Eating Disorder Inventory Subscales of Body Dissatisfaction, Bulimia and Drive for Thinness in the three pubertal groups (pre-pubescent, early pubescent, post-pubescent) of females ($n = 77$).

and fat contained in the foods consumed by each group were similar to those recommended by Health Canada (i.e., 15% protein; 55% carbohydrate; 30% fat).²⁶

DISCUSSION

The results of the study showed that body shape dissatisfaction, social physique anxiety, and preoccupation with weight were evident in all maturational groups studied. These findings suggest that this health concern is not confined to the post-pubescent age group, but present in pre and early pubescent females as well. This lends support to the work of Tiggemann and Wilson-Barrett²⁷ which showed that preoccupation for a thin body was as prevalent in 7 to 8 year olds as in older girls, aged 11 to 12 years. Earlier studies have also found that body image concerns and preoccupation with body weight increased as girls became older^{5,28-31} as observed in this investigation. The findings from the present study further suggest that social physique anxiety may be another factor in the development of disordered eating in this age group, and thus must be emphasized in prevention-based strategies.

The risk factors associated with eating disorders stem from an extreme preoccupation with body weight and shape that are related to the cognitive, social and physical maturity of the young female. As girls mature cognitively, they become more aware of the societal pressures to attain the ideal thin body shape. Cultural messages on the rewards of thinness and punishments of obesity are presented in subtle and aggressive ways by the media.^{32,33} These media images and messages are particularly salient to young girls who are searching for the look that will make them fit in and be popular.¹³ The results from the present study would suggest that although this awareness is evident in girls prior to puberty, it becomes heightened during and immediately following pubescent development. This was illustrated by the large percentage of girls (76%) in the post-pubescent group who preferred a thinner body shape.

Although society can have a tremendous effect on a girl's perception of herself, her peers also have a significant influence on her self-perceptions, especially as she

matures socially.^{5,13,33} Since the social pressure to be popular is at its extreme during the pubescent years,⁵ it may be one of the primary catalysts in the development of body dissatisfaction. Popularity is synonymous with attractiveness and attractiveness is equated with thinness, thus, maintaining a normal body weight does not suffice for society's standards of beauty.^{22,32,34,35} Subsequently, a young female feels that it is important to obtain a thin physique in order to make a favourable impression on her peers. In the current study the post-pubescent females, who may be influenced by their peers to a greater extent than the pre- and early pubescent females, had the greatest dissatisfaction with their body shape and experienced the highest levels of social physique anxiety.

As girls mature physically, their body fat increases dramatically in preparation for pregnancy and lactation.³⁶ In the present study this was observed in the girls who were post pubertal and had the greatest amount of body fat. Although an increase in body fat is a natural biological change, the effects of puberty and changing morphology that a girl experiences leads to negative changes in her level of body satisfaction.^{32,34,37} In fact, the further a pubescent girl is in the process of maturation, the more she tends to be dissatisfied with her body weight and shape.²⁸ This was observed in the present study where the post-pubescent group had the highest percentage of girls who were dissatisfied with their current body shape, even though they were below the criteria for obesity classification in children.

Freedman³⁸ suggests that once the risk factors for developing an eating disorder become evident, there is a greater likelihood that a variety of health-risk behaviours such as dieting, fasting, bingeing and purging will be adopted. In this study, there was no support in the nutritional or EDI data to indicate that any of the maturation groups were engaging in these types of behaviours. Nevertheless, future development of eating disorders remains a possibility. It should be recognized that eating disorders lie on a continuum that begins with girls feeling fat.³⁸ These feelings progress to a preoccupation with food and weight that may lead to health-risk behav-

iours that place individuals at extreme medical risk.³⁸⁻⁴⁰ Furthermore, Herman and Polivy⁴¹ suggested that dieting usually occurs after body dissatisfaction and a drive for thinness are experienced. The results from the present investigation would suggest that the subjects have only reached the first step along the continuum of body weight and shape concerns as outlined by Freedman.³⁸ Future research endeavours are needed to further examine the risk factors and their progression along the eating disorder continuum during adolescent growth and development.

The findings from the present study have identified the extent to which preoccupation with weight, body dissatisfaction, and social physique anxiety is present in pre-pubertal, pubertal and post-pubertal Caucasian females of middle to upper socioeconomic status. These results provide a strong rationale for targeting all maturational groups in prevention-based strategies. Throughout their growing years, girls need to be exposed to a program that will empower them to make healthier lifestyle choices so that they may be less likely to become obsessed with trying to obtain the "ideal" body type and to succumb to extreme methods of dieting and obsessive exercise. Ultimately this may lead to a more satisfying and fulfilling life.

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