Relation of Peer and Media Influences to the Development of Purging Behaviors Among Preadolescent and Adolescent Girls

Alison E. Field, ScD; Carlos A. Camargo, Jr, MD, DrPH; C. Barr Taylor, MD; Catherine S. Berkey, ScD, MA; Graham A. Colditz, MD, DrPH

Objective: To assess prospectively the relation of peer and media influences on the risk of development of purging behaviors.

Design: Prospective cohort study.

Setting: One year follow-up of 6982 girls aged 9 to 14 years in 1996 who completed questionnaires in 1996 and 1997 and reported in 1996 that they did not use vomiting or laxatives to control weight.

Main Outcome Measure: Self-report of using vomiting or laxatives at least monthly to control weight.

Results: During 1 year of follow-up, 74 girls began using vomiting or laxatives at least monthly to control weight. Tanner stage of pubic hair development was predictive of beginning to purge (odds ratio [OR] = 1.8; 95% confidence interval [CI], 1.3-2.4). Independent of age and Tanner stage of pubic hair development, importance of thinness to peers (OR = 2.3; 95% CI, 1.8-3.0) and trying to look like females on television, in movies, or in magazines (OR = 1.9; 95% CI, 1.6-2.3) were predictive of beginning to purge at least monthly. Regardless of the covariates included in the logistic regression model, the risk of beginning to purge increased approximately 30% to 40% per 1-category increase in frequency of trying to look like females on television, in movies, or in magazines.

Conclusions: Both peers and popular culture, independent of each other, exert influence on girls’ weight control beliefs and behaviors. Therefore, to make eating disorder prevention programs more effective, efforts should be made to persuade the television, movie, and magazine industries to employ more models and actresses whose weight could be described as healthy, not underweight.


Editor’s Note: The solution to the problem identified in this study: purge television and magazines of models who don’t look like anyone from the world we live in. Let’s get real!

Catherine D. DeAngelis, MD

Concerns with weight and body shape and dieting to lose weight are common among preadolescent and adolescent girls1-6 and have been suggested as risk factors for eating disorders of at least subsyndromal severity.7 Little is known, however, about how these weight-related concerns arise. The results from predominantly cross-sectional studies of grade school–through college-aged samples suggest that early puberty,8 female sex,9 frequent dieting,10,11 weight concerns,12,13 peer pressure and teasing about weight,14 low self-esteem,15-17 and a history of being overweight18 are positively associated with binge eating and purging. The role of the mass media in encouraging girls to form unrealistically thin body ideals19-24 has been widely accepted despite a paucity of research directly assessing this association.

There has been little prospective research on the development of bulimic behaviors and eating disorders. Therefore, it is unclear whether some of the risk factors identified only in cross-sectional and retrospective studies are due to differential recall of past events or reverse temporal ordering (ie, the “risk factor” occurred after the behavior or disorder of interest). To our knowledge, no investigators have prospectively assessed the influences of both the media and peers on the development of bulimic behaviors. We analyzed data from approximately 7000 preadolescent and adolescent girls in the Growing Up Today Study, a prospective cohort study, to determine risk factors for beginning to purge to control weight.

RESULTS

At baseline, the sample was almost equally distributed over the age range, and 79% of girls reported being in Tanner stages 2
PATIENTS AND METHODS

The Growing Up Today Study was established in 1996 by sending letters to women participating in the Nurses’ Health Study II who indicated that they had a child 9 to 14 years of age. The letter briefly explained the goals of the new study and requested permission from the nurse to contact the child or children. Mothers who gave permission provided each child’s name, age, sex, and address (if different from the mother’s address). The children were then sent a packet including a letter inviting them to participate in a new study and a sex-specific questionnaire. Return of a completed questionnaire was considered consent to participate. The study was approved by Human Subjects Committees at the Harvard School of Public Health and Brigham and Women’s Hospital, Boston, Mass. After 2 mailings of the follow-up questionnaire and a reminder e-mail message, approximately 81% of the girls (n = 7299) and 72% of the boys (n = 5633) returned the 1997 questionnaire.

Mothers who gave us permission to contact their children were slightly less likely to smoke (8% vs 10%) and had slightly lower body mass indices (calculated as weight in kilograms divided by the square of height in meters) (23.3 vs 25.7 kg/m²) and younger (37.7 vs 37.8 years) than the women who did not grant us permission. In addition, among those given permission to participate, children who decided to participate had leaner (25.2 vs 25.5 kg/m²) mothers than children who did not return the baseline questionnaire. However, there was no difference in age (37.7 vs 37.8 years) between ages of mothers of children who decided to join the study and those who declined to participate.

MEASURES

Predictors

All information used to predict incident “cases” of purging in 1997 was collected in 1996 on the baseline questionnaire. Height, weight, and (for the girls) menarcheal status and age at menarche (year and month) were self-reported. Pubertal development was assessed with drawings of the 5 Tanner stages of development of pubic hair. Domains of self-esteem (athletic, social, scholastic, and global) were measured with a modified version of the Self-Perception Profile for Children.26 Although the possible range of values on the modified global self-esteem scale were from 6 to 18, in our sample very few girls had scores below 10. Therefore, all girls with values between 6 and 9 were combined and included in the referent category. Thus, the range of values on the global self-esteem scale was from less than or equal to 9 (counted as 9) to 18.

Purging was defined as using laxatives or vomiting at least monthly to control weight. Girls who began to purge at least monthly than was age (OR = 1.2, 95% CI, 1.3-2.4) was more predictive of beginning to purge at least monthly than was age (OR = 1.2, 95% CI, 0.9-1.5). Independent of age and Tanner stage of pubic hair development, frequency of dieting in 1996 (OR = 1.5, 95% CI, 1.3-1.7) was predictive of beginning to purge at least monthly in the following year (Table 2). Concern with weight and shape (OR = 2.3, 95% CI, 1.9-2.9), importance of thinness to peers (OR = 2.3, 95% CI, 1.8-3.0), changing eating patterns around peers (OR = 2.1, 95% CI,
reported no use of laxatives or vomiting in 1996, but who reported purging in 1997 were classified as incident "cases."

VALIDITY OF SELF-REPORT MEASURES—HEIGHT, WEIGHT, TANNER STAGE, AND WEIGHT CONCERNS

Although self-reported weight and height are assumed to be valid and reliable measures of actual weight and height in adult populations, there are minimal data on their validity among preadolescents and adolescents. Shannon et al, in a sample of 806 subjects in the sixth grade, report moderately high correlations for weight and height for both boys (r = 0.90, r = 0.74) and girls (r = 0.84, r = 0.62). More children tended to underreport their weight, with the taller and heavier children and girls showing the greatest tendency to do so. The authors did not find a systematic bias in reported heights. Preliminary results from a pilot study we conducted among 39 girls aged 10 to 17 years in Lynn, Mass, did not find a systematic bias in reported weights. Ten percent of the girls who reported their weight underreported it and 3% overreported it. The mean difference between self-reported and measured weight was 1.215 kg (2.7 lb). The correlations between self-report and actual measurements were r = 0.98 (P < .001) for weight and r = 0.73 (P < .001) for height. We observed correlations of a similar magnitude among 436 female students at a large urban public high school in the northeast (r = 0.92 for weight, r = 0.89 for body mass index). Thus, the results suggest that preadolescent and adolescent girls provide information on weight and height that is as valid as the information provided by adults.

Self-assessment of maturation has been validated separately by 3 teams of investigators. Overall, subjects' assessments correlate highly with physicians' assessments. Duke et al found k coefficients between 0.81 to 0.88 for male and female subjects aged 11 to 18 years. Morris and Udry, assessing a sample of African American, white, and Hispanic children, report moderately high correlations for height (r = 0.92 for height, r = 0.89 for body mass index). Thus, the results suggest that preadolescent and adolescent girls provide information on weight and height that is as valid as the information provided by adults.

The McKnight Risk Factor Survey is a validated self-report instrument for preadolescents and adolescents. Among girls in junior high school, the test-retest correlations and Cronbach α were moderate to high for the 7 sub-scales relevant to our study: overconcern with weight (test-retest = 0.84, Cronbach α = .86), influence of the media (test-retest = 0.66, only 1 question so no Cronbach α), teasing or comments about weight by peers (test-retest = 0.76, Cronbach α = .85), teasing or comments about weight by adults (test-retest = 0.63, Cronbach α = .67), importance of thinness to parents (test-retest = 0.59, Cronbach α = .75), and change in eating patterns around peers (test-retest = 0.77, Cronbach α = .63).

SAMPLE

The analysis was restricted to girls because the incidence of purging was too low among the boys to conduct meaningful analyses. Among the 9039 girls who completed the 1996 questionnaire, 8882 were eligible for the prospective analysis because they reported they were not using vomiting or laxatives to control weight. An additional 1693 girls were excluded from the analysis because they did not return the 1997 questionnaires. Although girls who returned only the baseline questionnaire were more likely than girls who completed both questionnaires to have been trying to lose weight in 1996 (35% vs 30%), the 2 groups of girls were similar in the prevalence of being overweight (18% vs 19%) and of constant dieting (3% vs 2%).

Participants were excluded from analysis if they were older than 14 years in 1996 (n = 140), provided no or implausible information on height or weight for height (n = 110), or failed to provide information on purging in 1997 (n = 11). Thus, 6928 girls were included in the analysis.

ANALYSIS

All analyses were conducted with SAS software. Logistic regression was used to assess the risk factors for purging at least monthly. All logistic regression models were adjusted for age and Tanner stage of pubic hair development. All P values are 2-sided, with P < .05 considered statistically significant.

In a 1-year period, we observed that approximately 1% of the preadolescent and adolescent girls began to purge at least monthly to control weight. Personal, peer, and cultural factors were independently associated with the development of purging. Independent of age, girls who were further along in their maturational development were more likely than their less developed peers to begin purging to control their weight. Thus, our findings are con-
sistent with those of Killen et al who observed that, even after adjusting for age and body mass index, the risk of having an eating disorder of at least subthreshold severity increased approximately 1.8-fold with each increase in sexual maturational stage.

Our results were consistent with previous research that has found that concern with weight and dieting were common among preadolescent and adolescent girls and are predictive of the development of bulimic behaviors among them. A more novel but related finding was that the more girls changed their eating patterns around peers, the more likely they were to begin purging within the next year. Thus, we observed that seemingly “benign” weight control behaviors were an early step in a pathway to developing unhealthy weight control behaviors. Thus, our findings support the continuum theory of eating disorders. Identifying risk factors for eating disorders and their precursors is essential for the development of effective prevention programs. The severity of the mental and physical health consequences of eating disorders, coupled with the fact that they are difficult to treat, suggests that the emphasis should be placed on prevention. Owing to the paucity of prospective studies, little is known with certainty about risk factors. With the exception of factors that do not change over time, such as sex, associations observed in cross-sectional or retrospective studies can be misleading owing to either erroneous recall of past events or reverse causality (ie, the suspected “risk factor” occurred after or because of the disorder of interest). Nevertheless, our results are consistent with those from several cross-sectional and retrospective studies that

### Table 1. Distribution of Age and Tanner Stage of Pubic Hair Development Among 6928 Preadolescent and Adolescent US Girls

<table>
<thead>
<tr>
<th>Distribution Factor</th>
<th>No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, y</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>834 (12)</td>
</tr>
<tr>
<td>10</td>
<td>1378 (20)</td>
</tr>
<tr>
<td>11</td>
<td>1373 (20)</td>
</tr>
<tr>
<td>12</td>
<td>1284 (19)</td>
</tr>
<tr>
<td>13</td>
<td>1142 (17)</td>
</tr>
<tr>
<td>14</td>
<td>917 (14)</td>
</tr>
<tr>
<td>Tanner Stage of Pubic Hair Development*</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1435 (21)</td>
</tr>
<tr>
<td>2</td>
<td>1488 (22)</td>
</tr>
<tr>
<td>3</td>
<td>1171 (17)</td>
</tr>
<tr>
<td>4</td>
<td>1609 (24)</td>
</tr>
<tr>
<td>5</td>
<td>1086 (16)</td>
</tr>
</tbody>
</table>

*Missing this information for 139 girls.

### Table 2. Odds Ratios (95% Confidence Intervals) for Predictors of Developing Purging Behaviors Between 1996 and 1997* Among Preadolescent and Adolescent Girls in the Growing Up Today Study

<table>
<thead>
<tr>
<th></th>
<th>Adjusted Only for Age and Tanner Stage of Pubic Hair Development</th>
<th>Multivariate Models†</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Model 1</td>
<td>Model 2</td>
</tr>
<tr>
<td>Self-esteem‡</td>
<td>0.8 (0.7-0.8)</td>
<td>0.9 (0.8-1.0)</td>
</tr>
<tr>
<td>Frequency of dieting</td>
<td>1.5 (1.3-1.7)</td>
<td>1.2 (1.0-1.4)</td>
</tr>
<tr>
<td>Concern with weight and body shape§</td>
<td>2.3 (1.9-2.9)</td>
<td>1.5 (1.1-2.0)</td>
</tr>
<tr>
<td>Importance of thinness to peers§</td>
<td>2.3 (1.8-3.0)</td>
<td>NA</td>
</tr>
<tr>
<td>Changing eating habits around peers§</td>
<td>2.1 (1.7-2.6)</td>
<td>NA</td>
</tr>
<tr>
<td>Trying to look like females on television, in movies, and in magazines</td>
<td>1.9 (1.6-2.3)</td>
<td>1.3 (1.1-1.7)</td>
</tr>
</tbody>
</table>

* Seventy-four of the 6982 girls started to purge at least monthly in the 1-year period.
† Adjusted for age, Tanner stage of pubic hair development, and other covariates listed in model. NA indicates not applicable.
‡ Global self-esteem assessed by a modified version of Self-Perception Profile for Children.
§ Mean response on the subscale adapted from the McKnight Risk Factor Survey.
observed that frequent or unhealthy dieting is associated with an increased risk of bulimic behaviors\(^{11,40}\) or eating disorders\(^{13,41}\) and high levels of self-esteem, with a decreased risk.

We observed that both friends and popular culture, independent of each other, exert influence on girls' weight control beliefs and behaviors. We are unaware of any other prospective study that has assessed the influence of the media on the development of bulimic behaviors. We observed that, independent of known and suspected predictors, the more effort a girl reported that she made to look like females on television, in movies, or in magazines, the higher her risk of beginning to use vomiting or laxatives to control her weight. Thus, our results support those from several cross-sectional studies that have observed an association between weight concerns and frequency of reading fashion magazines\(^{41,43}\) or trying to look like females in the media.\(^7\) Moreover, the more emphasis a girl's peers placed on thinness, the more likely she was to begin using laxatives or vomiting to control weight. Therefore, for eating disorder prevention programs to be effective, they must include components aiming to increase girls' resistance to peer pressure. It is unclear where the girl's peers learned to place such emphasis on thinness, but our results suggest that the mass media exerted some of the influence.

To date, no eating disorder prevention program has proved to be effective at changing weight-related attitudes or weight-control behaviors.\(^{44,46}\) Our observation that friends or peers and popular culture have powerful influences on young girls and adolescents supports the suggestion by Taylor and Altman\(^8\) that a successful intervention must address personal, peer, and cultural factors. Unfortunately, most of the research on the effects of the media has been indirect, only discussing the trend toward an increasingly thin and androgenous body ideal for female models, or documenting the increasing number of articles related to diet and weight.\(^{47}\) Nevertheless, our results demonstrate that the popular media are partially responsible for creating unrealistic body-image goals for young girls and adolescents. However, it is important to note that we did not ask the girls how they were trying to look like models and actresses. Thus, it is possible that some girls were trying to emulate the clothing and hairstyles, but not weight or shape, of these females.

Our findings offer further evidence of the negative effect of the media on preadolescents and adolescents. The media should be discouraged from using actresses and models who would be considered severely underweight by the medical community. According to the World Health Organization, a woman with a body mass index below 17 kg/m\(^2\), the equivalent of a woman 165.24 cm (5 ft 6 in) tall weighing less than 47.25 kg (105 lb), is severely underweight.\(^{48}\) Although the print media publishes articles on the deleterious effects of severe dieting, bulimic behaviors, and maintaining a very low body weight, the articles frequently are included in the same issue as pictures of excessively thin models. It is likely that these pictures undermine the beneficial effect of the articles, as opposed to lessen the detrimental impact of the photos. More research is needed to determine why and how girls are trying to look like females in the media. Moreover, additional prospective studies are needed to assess the relative influence of striving to look like models and actresses on television, in movies, and in magazines on the development of excessive weight concerns and initiation of purging to control weight.

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Corresponding author: Alison E. Field, ScD, Channing Laboratory, 181 Longwood Ave, Boston, MA 02115 (e-mail: Alison.Field@channing.harvard.edu).

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