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Eating disorders

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EATING DISORDERS: BEST AGE FOR

EDUCATION AND PREVENTION

Jayshri R. Chasmawala, D.O.

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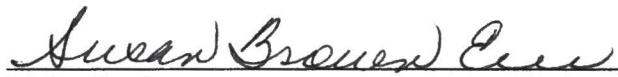

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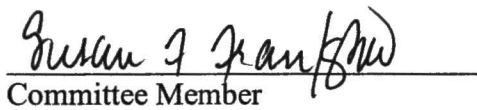

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EATING DISORDERS: BEST AGE FOR EDUCATION AND PREVENTION

PROBLEM IN LIEU OF THESIS

Presented to the School of Public Health

University of North Texas
Health Science Center at Fort Worth

in Partial Fulfillment of the Requirements

for the Degree of

Master of Public Health

By

Jayshri R. Chasmawala, D.O.

Fort Worth, Texas

May 2004

ACKNOWLEDGEMENTS

I thank Dr. Susan Franks, my acting major professor, for all of her help and guidance throughout this project. Her contributions were invaluable. I also like to thank Dr. Muriel Marshall for her help in finding a source of study subjects and her contributions as a member of my committee. I thank Dr. Susan Eve for all of her help as my major professor. I would like to thank Dr. Michael Bah, principal at Lake Country Christian School, for his help in administering the survey and allowing me to use his students as subjects. I also thank the students, parents, and teachers who participated in the survey.

EATING DISORDERS: BEST AGE FOR PREVENTION AND EDUCATION

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EATING DISORDERS

ABSTRACT

Chasmawala, Jayshri R., Eating Disorders: Best Age for Prevention and Education. Master of Public Health (Dual Degree D.O./M.P.H), May 2004, 22 pp., 11 tables, 6 illustrations, references, 16 titles.

Objective: This study attempts to determine the best age to design a prevention program to prevent the development of eating disorders based on adolescents' behavior and attitudes towards eating disorders.

Methods: Forty students aged 11-17 answered a self-reported questionnaire regarding dieting and weight, identification of emotional states, and general awareness of eating disorders. Age group divided the sample: 13 years of age and younger; and 14 years of age and older. Multivariate analyses were performed to determine existence of any differences between the populations.

Results: An overall difference in the age groups exists with statistic significance. The difference in mean values of interoceptive awareness is statistically significant between the age groups.

Conclusion: Interoceptive Awareness, not awareness level of eating disorders, is more indicative of the best age for prevention. Younger age children may benefit more from prevention due to lack of emotional maturity which leads to higher risk of development of eating disorders.

EATING DISORDERS: BEST AGE FOR PREVENTION AND EDUCATION

Eating disorders are a growing epidemic in America. According to the Harvard Eating Disorders Clinic [HEDC] (2002), more than 5 million Americans experience eating disorders. Prevention and education are integral missing steps in addressing eating disorders and their impact on health. Bulimia Nervosa and Anorexia Nervosa are the two most common eating disorders. Bulimia nervosa is the most common type with 1.1-4.2% of females affected. Anorexia Nervosa affects 0.5-3.7% of females. (National Institute of Mental Health [NIMH], 2001). Together both of these disorders are considered to be one of the most common psychiatric disorders to affect young women in the west. (Hsu, 1996). Eating disorders frequently co-occur with other psychiatric conditions such as depression, substance abuse, and anxiety disorders. (NIMH, 2001). However, more significantly, eating disorders are chronic disorders with serious medical conditions and a significant risk of mortality and long-term morbidity. Patrick Sullivan (1995) found mortality for females with anorexia nervosa is 12 times higher than that for other females.

Eating disorders also cause other adverse health effects. Patients with eating disorders are at high risk for decreased bone mineral density, osteopenia, and frank osteoporosis. (Rickert & Siedenfeld, 2001; Castro, Halperin, Lazaro, & Pons, 2000). Adolescents with eating disorders can develop osteoporosis in life

but also during the adolescent years. (Rickert & Siedenfeld, 2001). Patients with anorexia are also more prone to stress fractures. (Rickert & Siedenfeld, 2001; Castro, et. al., 2000). Patients with disordered eating who do not meet the diagnostic criteria for a full eating disorder are also at risk for the same problems. In *Prevention of Eating Disorders: Challenges and Opportunities,* 2001, NIMH reports even dysfunctional eating patterns can lead to considerable impairment in health and psychosocial functioning and is associated with nutrition deficiencies. The adverse effects of eating disorders necessitate the implementation of well-designed prevention programs.

Eating disorders frequently develop during adolescence or early adulthood. In 2002, the National Association of Anorexia Nervosa and Associated Disorders [ANAD] reported 86% of patients report onset of illness by age 20 with 33% emerging between the ages of 11-15. However, eating disorders can start as early as age 10, with 10% of patients affected reporting onset prior to this age. One study found third-grade children to be highly concerned about being overweight and highly dissatisfied with their bodies. (Chang, Haydel, Killen, & Robinson, 2001). Other studies have shown that these concerns along with dieting at a severe level lead to the development of eating disorders. (Carlin, Coffey, Patton, Selzer, & Wolfe, 1999; Walling, 1999). Therefore, early education is critical in preventing eating disorders.

Traditionally, eating disorders stereotypically affect the female population. However, they do not spare the male population. According to ANAD, (2002), approximately, one out of ten adults affected by an eating disorder is male. In 2001, Chang, et al. report 26% of boys in the third-grade expressed desire to lose weight. A study by Anda, Byers, Collins, Pamuk, Serdula, & Williamson in 1993, uncovers that 10-15% of male high school students were actively trying to control their weight, either by trying to lose weight or trying to keep from gaining more weight. It is essential that a prevention program target both males and females at an early age.

Treatment can be very costly and, in many instances, ineffective, with a cure rate of less than 50%. (HEDC, 2002) Therefore research on prevention is critical. Prevention may prove to be more cost effective and more beneficial to treating eating disorders than treatment once the disease process has begun. Most studies to date on eating disorders focus on health effects of eating disorders and treatment. Few focus on risk factors on the development of eating disorders. However, this study focuses on finding the best age for prevention to better design a prevention program aimed especially for that age group. The study examines the attitudes and awareness level of adolescents on the prevalence and effects of eating disorders.

METHODS/ SUBJECTS

The study protocol was approved by the Institutional Review Board at the University of North Texas Health Science Center prior to implementing the study at the participating center. Study subjects consisted of students in the sixth through twelfth grade recruited from Lake Country Christian School, Fort Worth, Texas. Parents provided written informed consent and the participating students offered assent. Distribution of two hundred self-reported surveys took place during school hours. Submission of completed surveys occurred over 1 week and resulted in forty surveys. Answering the survey questionnaire regulated the involvement of human subjects. The collection of data revealed no identifiers except age and sex.

The survey consisted of a modified version of the survey instrument, Eating Disorder Inventory-2 (EDI-2), published by Psychological Assessment Resources, Inc., and a short questionnaire assessing eating disorder awareness. The modified survey provided a short and straightforward method to survey the participants.

The modification of the survey included two of the eleven subscales most clinically relevant to eating disorders. The EDI-2 offers an economical means of identifying individuals who have subclinical eating problems or those who may be at risk for developing eating disorders. The subscales included were Drive for

Thinness (DFT) and Interoceptive Awareness (IA). DFT questions help assess the attitudes and behaviors concerning eating, weight, and shape. The DFT subscale assesses the excessive concern with dieting, preoccupation with weight, and fear of weight gain, which are considered to be the cardinal feature of eating disorders. IA questions examine more general organizing constructs or psychological traits clinically relevant to eating disorders. The IA subscale measures confusion and apprehension in recognizing and accurately responding to emotional states. The modified survey included 17 questions as opposed to the full 91-question survey of the EDI-2.

Respondents must rate whether each item on the survey applies "Always or Usually", "Often or Sometimes", or "Rarely or Never". Responses from each item are weighted 0-3 with a score of 3 assigned to the farthest in the symptomatic direction, "Always or Usually" in positively scored items. A score of 0 is assigned to the responses in the asymptomatic direction, "Rarely or Never." A score of 2 was used for the intermediate response, "Often or Sometimes." Two of the 17 questions were reverse-scored which are weighted in the opposite manner than described above.

The sum of the scores for each question comprised the score for each subscale. The higher the score, the more likely a pathology may be present. Each subscale is scored separately. The score range for DFT is from 0 to 21. The higher the score, the higher the preoccupation with weight and fear of weight

gain. IA has a score range from 0 to 30. The higher the score for Interoceptive Awareness, the less aware the student is in recognizing and accurately responding to emotional states.

In addition to the EDI-2 questionnaire, the development of a brief 8-question questionnaire assisted in assessing the attitudes of the population on eating disorders, the impact of the diseases, and if they are aware if they have it. Each statement on the questionnaire rated as true or false. An answer of false, weighted as 1, indicated awareness of eating disorders. A response of true, weighted as 0, indicated lack of awareness. The sum of the scores denoted the level of awareness. A higher score signifies a higher student awareness of the prevalence and effects of eating disorders. The maximum score possible is seven. The minimum possible score is 0.

After data collection, the next step involved using SPSS, Statistical Package for Social Sciences, software to perform the analysis of the results. Pearson correlations test for associations between age, DFT, IA, and Awareness. Multivariate analysis proved necessary as Pearson Correlations determined variability interaction. For further statistical analysis, two categories divided age: Age Group 1 consisted of students 13 years of age and younger and Age Group 2 consisted of students 14 years of age and older. After removal of outliers, multivariate analysis of the variances examined the effects of the independent variable, age group, on the means of the dependent variables and investigated the

interactions between the variables. The variables tested were Awareness, DFT, and IA. Multiple regression determined if Age, Drive for Thinness, and Interoceptive Awareness can predict awareness.

The median of DFT divided the data into DFT groups. DFT group 1 contained cases with DFT less than and equal to the median of 3. DFT group 2 contained cases with DFT greater than the median. Analysis of variance compared the means of IA for each DFT group to assess any significant difference.

RESULTS

Of the forty completed surveys, the population included 18 males and 22 females. Figure 1 displays the age distribution of the participating students. Table 1 displays the average age of the participants as well as the average scores of each test.

Figure 1: Age of Participants

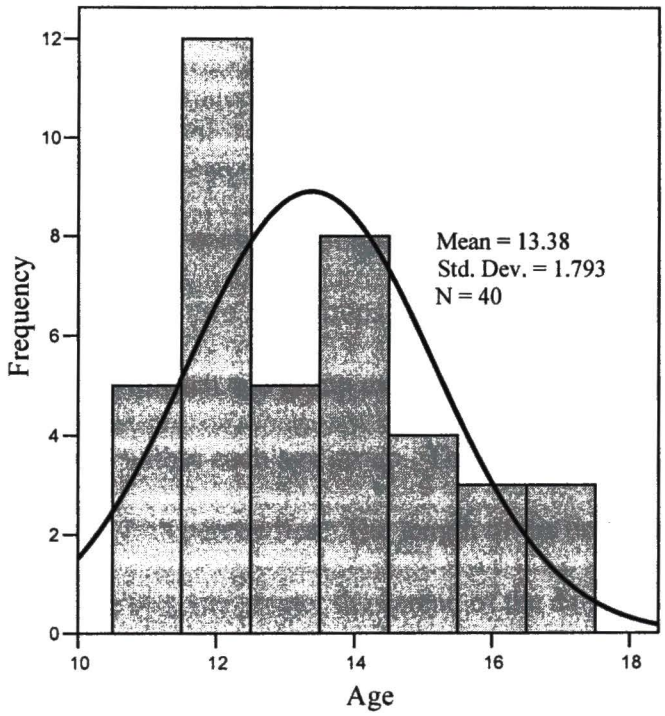


Table 1: Mean values of Age, DFT, IA, and Awareness

	Mean	SD
Age	13.38	1.79
DFT	4.78	5.73
IA	4.38	4.24
Aware	5.83	1.32

DFT = Drive for Thinness, IA= Interoceptive Awareness, Aware = Awareness of Eating Disorders, SD = standard deviation

Table 2 displays the Pearson Correlations between age, drive for thinness, interoceptive awareness, and awareness of eating disorder consequences. The number of the sample is 40.

Table 2: Pearson Correlations of Age, Awareness, DFT, and IA

		Age	Aware	DFT	IA
Age	Correlation	1	.311*	.241	-.103
	Sig. (1-tailed)	.	.026	.067	.263
Aware	Correlation		1	.236	.154
	Sig. (1-tailed)		.	.071	.171
DFT	Correlation			1	.500**
	Sig. (1-tailed)			.	.001
IA	Correlation				1
	Sig. (1-tailed)				.

*Correlation significant at 0.05 level (1-tailed)
**Correlation significant at 0.01 level (1-tailed)

Two age groups divided the sample: 1) 13 years old and younger; 2) 14 years of age and older. Age group 1 contained 22 students. Age group 2 contained 18 students. Calculations for the mean values of each age group included the mean of the ages in each age group, and the scores for DFT, IA, and Awareness for each age group. (See Tables 3 and 4). The mean values assisted in comparing the two age groups to determine if any difference between the variances of each age group exist. Figure 2 illustrates the dispersion of the variables within each age group. The box represents the difference between the 25th and 75th percentiles. The length of the box determines the variability; the larger the box, the greater the spread of the data. The horizontal line inside the box represents the median. Vertical lines from the ends of the box to the largest and smallest values that are not outliers are referred to as whiskers. The circles (o) indicate outliers, or observations more than 1.5 but less than 3.0 box-lengths from the 75^{th} or 25^{th} percentiles.

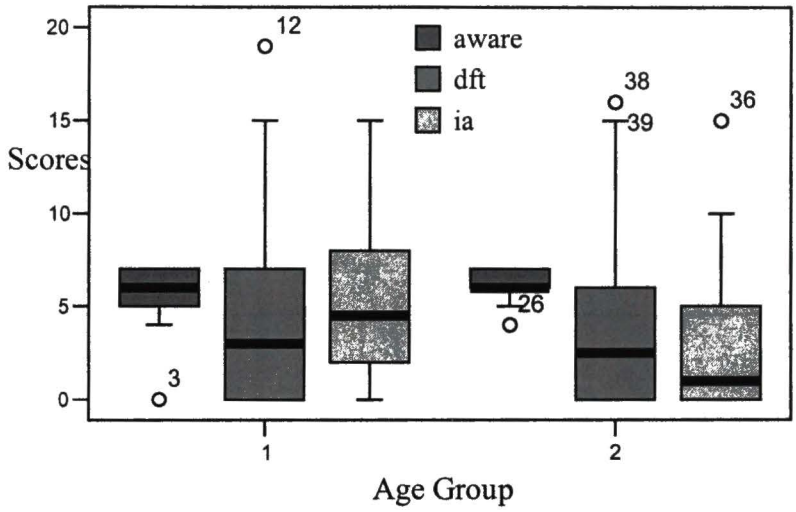
Table 3: Mean Values of Age Group 1

N = 22	Mean	SD
Aware	5.55	1.565
DFT	4.73	5.642
IA	5.41	4.113

Table 4: Mean Values of Age Group 2

N = 18	Mean	SD
Aware	6.17	0.857
DFT	4.83	5.993
IA	3.11	4.157

Figure 2: Score by Age Group



Figures 3, 4, and 5 display the plots of the estimated marginal means of each variable for each age group after removal of the outliers. These figures allow visualization of the differences in mean values between Age Group 1 and 2 for each of the variables: Awareness, Drive for Thinness, Interoceptive Awareness.

Figure 3: Estimated Marginal Means of Awareness

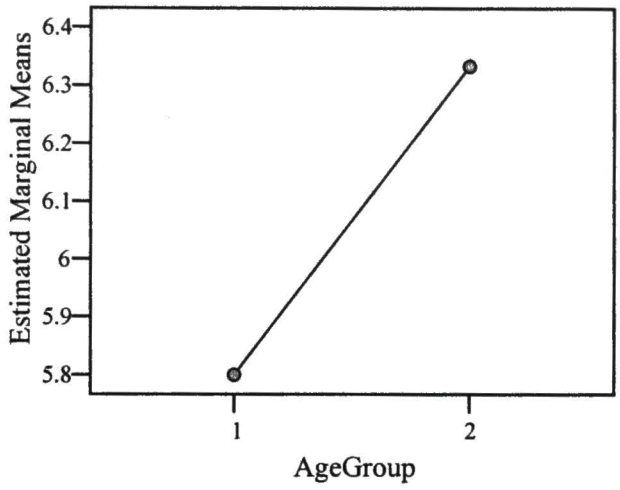


Figure 4: Estimated Marginal Means of DFT

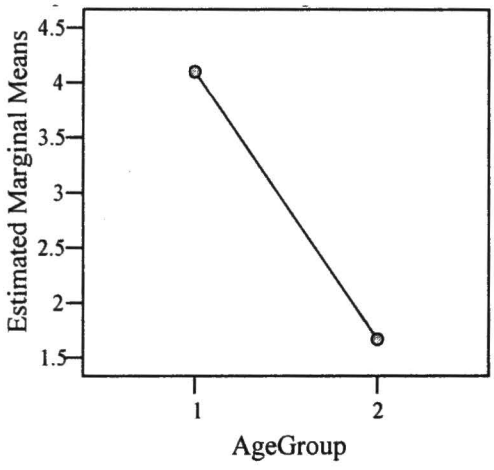
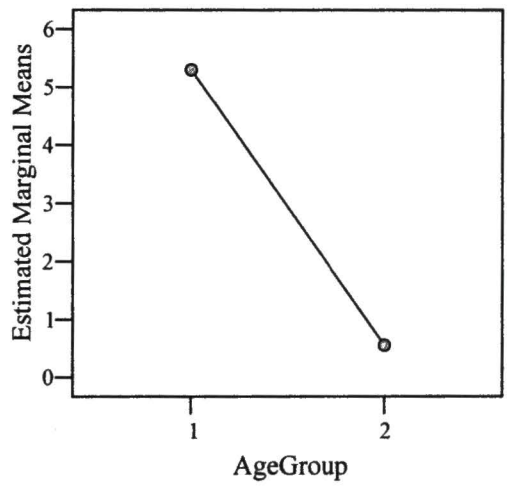


Figure 5: Estimated Marginal Means of IA



After removal of the outliers, Age Group 1 contained 20 samples and Age Group 2 contained nine samples. Tables 5 and 6 display the multivariate analysis of variables. Table 5 contains the multivariate test of significance performed. Wilk's Lambda is a positive-valued statistic ranging from 0 to 1, in which

decreasing values indicate a more contributory effect. Table 6 reveals the between-subject effects of each variable. Table 7 presents Levene's test of equality of error variances which tests the null hypothesis that the error variance of the dependent variable is equal across groups.

Table 5: Multivariate Test for Age Groups

Test	Value	F	Sig.
Wilk's Lambda	.542	7.037[a]	.001

a Exact statistic

Table 6: Test of Between-Subjects Effects for Age Groups

Dependent Variable	F(1,28)	Sig.
IA	11.348	.002
DFT	2.077	.161
Aware	2.249	.145

Table 7: Levene's Test of Equality of Error Variances for Age Group

	F	Sig.
IA	11.502	.002
DFT	4.975	.034
Aware	4.938	.035

Table 8 displays the results of the multiple regression of Awareness predicted by age, DFT, and IA.

Table 8: Multiple Regression to Predict Awareness

	F	Sig.
Regression	2.075	.129[a]

a Predictors of Awareness: Age, DFT, IA

After regrouping the data by drive for thinness, univariate analysis tested the significance in variance between the two groups of DFT for IA. (Tables 9 and 10). The median of DFT determined the groups: DFT group 1 included cases with DFT less than and equal to the median, DFT group 2 included cases with DFT greater than the median. Table 11 display's Levene's test of equality of error variances for DFT groups.

Table 9: Mean Values of IA for Each DFT Group

DFT Group	N	Mean	SD
1	24	2.67	2.729
2	16	6.94	4.864

Table 10: Tests of Between-Subjects Effects for DFT Groups

Dependent Variable	F(1,39)	Sig.
IA	12.644	.001

Table 11: Levene's Test of Equality of Error Variances

	F	Sig.
IA	7.308	.010

Figure 6 illustrates the score profiles of cases whose DFT scores exceeded the mean plus one-half standard deviation.

Figure 6: Profiles of Selected Cases

Case	Age	Gender	DFT	Aware	IA
1	12	F	19	6	10
2	12	F	15	5	8
3	12	F	14	7	6
4	12	F	13	7	15
5	16	F	15	7	4
6	16	F	14	6	15
7	17	F	16	7	10
8	17	F	16	7	0

DISCUSSION

The results of this study provide evidence that prevention programs for eating disorders would be more appropriately targeted toward adolescents ranging in age from 11 to 13. It appears that adolescents in this age range are significantly different from 14 to 17 year olds with regard to Interoceptive Awareness, an important variable considered critical in the development and maintenance of eating disorders.

Interoceptive Awareness refers to the ability to understand and react appropriately to internal emotional states, and portrays uncertainty in identification of sensations of hunger and satiety. In this respect, it is a gauge of psychophysiological maturity. A lower degree of interoceptive awareness (equivalent to a higher score) leads to a higher risk of developing eating disorders. As it appears that adolescents between 11 and 13 years of age are significantly less able than those over 14 years old to accurately interpret internal psychophysiological states, the most effective time for preventive is most likely during this critical stage of development.

No difference exists between age groups in Drive for Thinness, a cardinal feature of eating disorders. As the concern about body weight and shape are essentially equally distributed across age groups, targeting preventive efforts toward the younger age group is essential. Comparing groups with a higher and

lower drive for thinness without regard to age finds that they are substantially different in Interoceptive Awareness. This finding indicates that it may be critical to target prevention efforts during a time when the ability to make meaning of psychophysiological events is still under development, as the added problem of body weight and image disturbance essentially heralds the onset of an eating disorder.

Despite a low and equivalent drive for thinness in both age groups, 25% of the students received a score of 7 or higher indicative of the presence of body dissatisfaction and desire to lose weight. Examining selected cases in which this body weight and image dissatisfaction is significantly outside the group mean may help understand the need for earlier prevention. (Figure 6).

Case 2 shows a 12-year old female with a Drive for Thinness score of 19, the highest score of the sample. The subjects Interoceptive Awareness score is 10, which is greater than the mean plus one standard deviation. Due to the subject's high Drive for Thinness score and Interoceptive Awareness score, this person is at high risk of developing an eating disorder if she does not already have one. She may benefit from education and prevention and may represent the age for such measures. The majority of the cases with high Drive for Thinness are 12 years old and three out of the four have high Interoceptive Awareness score.

From the completed survey, no student responded positively to having an eating disorder. However, the completed survey reported the presence of the risk

factors for developing eating disorders with no significant difference between the age groups. Although eating disorders frequently develop during adolescence or early adulthood, some reports indicate they may occur as early as childhood. (NIMH, 2001). Studies uncover that while many adolescents and young adults do not meet strict diagnostic criteria for eating disorders, they do have disordered eating patterns. This type of behavior also has significant adverse impact on health. (Pritts & Susman, 2003). Studies show that children with these attitudes and behaviors are at high risk of developing an eating disorder or even dysfunctional eating patterns. (Carlin, et al., 1999; Walling, 1999; Hetherington & Rolls, 2001). Directing prevention to those at high risk but have not yet developed an eating disorder may prove effective.

There is increasing pressure for adolescents to be thin due to the marked trend toward an increasingly thin ideal in women's beauty. Even the ideal man's body is lean and muscular. (Rodin, 1993). Children are exposed to these images at an earlier age through television, magazines, and even video games. Previous studies show that children as young as third grade are already preoccupied with their body appearance and have started dieting. (Chang, et al., 2001) To achieve the ideals presented by the media, adolescents skip meals and exercise as means to lose weight. (Anda, et al., 1993). Early introduction of a prevention program combats the growing pressures imposed upon adolescents.

This study showed no difference in awareness of eating disorders and their effects or drive for thinness between the age groups. The level of awareness does not affect the Drive for Thinness, indicating that despite awareness subjects are still at risk for developing eating disorders. While dieting may lead to eating disorders, exercise as a method of losing weight may pose less risk. (Carlin et al., 1999). A good education and prevention program therefore needs to consider the pressures felt by adolescents to be thin and direct them towards exercise instead of dieting as a means of weight control.

Due to the low prevalence of eating disorders in the general population, a study needs to have very high participation rate to provide significance. However, because of the lack of consenting population willing to take the survey the number of participants in this study was low. The project surveyed students, excluding the youth population not currently enrolled in school. Administration of the survey happened at a private school which may have different population demographics than a public school. Recall bias, under-reporting, and other biases inherent to self-reported surveys may also affect the results obtained. Voluntary completion of the survey consist may present bias as to who participates. The study provides a framework for future studies to build on. It is the first to survey a wide age group, include both males and females, and gauge adolescent awareness of eating disorders and its complications. The study demonstrates that

due to developmental differences in psychophysiological awareness, prevention efforts would likely be more effective for younger adolescents.

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APPENDIX

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April 23, 2004

Michael Strober, Ph.D., Editor-in-Chief
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Los Angeles, CA 90024

Dear Mr. Strober,

Enclosed you will find the original manuscript *Eating Disorders: Best Age for Education and Prevention* and an electronic file on disk for review and possible publication in *The International Journal of Eating Disorders*. The submission is in accordance to the guidelines provided on the website. The information is consistent with past submissions published in the journal and the topic of our manuscript has yet to be explored.

Authors include Jayshri Chasmawala, DO; Susan Franks, PhD; Muriel Marshall, DO; DrPH; Susan Eve, PhD.

My contact information is at the top of the page. Please direct all correspondence to me. I am a second year family practice resident completing a dual degree of Doctor of Osteopathy (D.O.) and Masters in Public Health (M.P.H.).

Thank you for your consideration of our manuscript. Please do not hesitate to contact me with any questions, comments, or concerns. We hope this manuscript meets the expectations of your publication.

Sincerely,

Jayshri Chasmawala, D.O.

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