ASSESSMENT OF DISORDERED EATING BEHAVIORS IN COLLEGE-AGED FEMALE HEALTH AND HUMAN SERVICES MAJORS

A thesis submitted to the Kent State University College of Education, Health, and Human Services in partial fulfillment of the requirements for the degree of Master of Nutrition

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The purpose of this study was to examine disordered eating behaviors in Dietetic majors versus Nursing and Human Development and Family Studies majors at the Kent State University campus. The aforementioned majors at Kent State University primarily consist of the female population. Female Health and Human Services majors (n=345, ages 18-25) participated in an online questionnaire and included questions from the EAT-26, EAT-26 behavioral questions and the ORTO-15 questionnaire. Remaining questions collected demographic data. Variables measured included major (Nursing, HDFS, Nutrition & Dietetics) and class standing (Freshman, Sophomore, Junior, Senior). An ANOVA factorial design and independent t-tests were used to determine the differences in disordered eating scores. The data were compiled and analyzed using social sciences (SPSS) software (version 18.0.3). There was no significant difference in disordered eating behaviors between majors or between class standing. However, 28% of the population was classified as being at-risk for orthorexia nervosa, 18% of the population was classified at-risk for an eating disorder based off of EAT-26 scores, and 30% were classified at-risk for an eating disorder based off of EAT-26 Behavior scores. An apparent problem exists concerning disordered eating and eating disorders in the female
college-aged population, suggesting that education and screening needs to expand further than the population of Nutrition & Dietetics majors.
ACKNOWLEDGEMENTS

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CHAPTER I
INTRODUCTION

It is estimated that 24 million individuals suffer from an eating disorder, including anorexia nervosa, bulimia nervosa, and binge eating disorder, in the United States. Eating disorders are considered psychiatric disorders that include diagnostic criteria based on psychologic, behavioral, and physiologic characteristics (“Position of the American Dietetic Association: Nutrition Intervention in the Treatment of Eating Disorders”, 2011; National Association for Anorexia Nervosa and Associated Disorders, 2011). Guidelines for identification of eating disorders as well as treatment methods can be found in the fourth edition of the Diagnostic and Statistical Manual of Mental Disorders. Almost 50% of individuals with a diagnosed eating disorder meet the criteria for depression (National Association for Anorexia Nervosa and Associated Disorders, 2011). Only about one in ten individuals seek treatment for eating disorders, and of the people who seek treatment, 35% receive treatment from a specialized treatment facility for eating disorders. Of any mental illness, eating disorders have the highest mortality rate.

Women are much more likely than men to develop an eating disorder (National Association of Anorexia Nervosa and Associated Disorders, 2011; Herpertz-Dahlmann, 2008; Scherag, 2010; Edman, 2005). Only an estimated 5-15% of diagnosed cases come from the male population (Binge Eating Disorder Association, 2011). An estimated 0.5 to 3.7 percent of the female population suffers from anorexia nervosa in their lifetime.
Research suggests approximately 1% of female adolescents have anorexia nervosa (National Association of Anorexia Nervosa and Associated Disorders, 2011; Gralen, 1989; Binge Eating Disorder Association, 2011). An estimated 1.1 to 4.2% of women have bulimia nervosa in their lifetime, and 2-5% percent experience binge-eating disorder in a six-month period (National Association of Anorexia Nervosa and Associated Disorders, 2011). Fifty percent of individuals with anorexia nervosa develop bulimia nervosa or bulimic patterns.

Eating disorders and disordered eating behaviors are seen in females from adolescence through the college ages. In adolescents, anorexia nervosa is the third most common chronic illness (National Association of Anorexia Nervosa and Associated Disorders, 2011; Aime, 2008). Over one-half of teenage girls use unhealthy weight control behaviors such as fasting, skipping meals, smoking cigarettes, vomiting, and taking laxatives (Aime, 2008). Eighty-six percent of females report the onset of an eating disorder by age 20 and 46% report the onset between the ages of 16 and 20. Ninety-five percent of those with eating disorders are between the ages of 12 and 25. The range of ages proceeds into the college years where statistics have found that 91% of women surveyed on a college campus had attempted to control their weight through dieting (National Association of Anorexia Nervosa and Associated Disorders, 2011).

Dietetic professionals are believed to be free from having issues with food-related issues due to their extensive background knowledge and training in their career (Houston, 2008; “Tufts University Newsletter”, 1999; Korinth, 2008). This is not always the case,
however, since dietetic professionals face the same issues as the rest of the public-
including obesity, displaying disordered eating behaviors and exhibiting eating disorders
(Korinth, 2008). Many studies suggest that dietitians, diet technicians and dietetic
students are at greater risk for disordered eating and diagnosed eating disorders compared
to their health-profession counterparts (Houston, 2008). There is a theory that Nutrition
& Dietetics majors have a higher prevalence of eating disorders due to their
manifestations through food-related activities such as collecting recipes, preparing food
for others, or choosing to pursue a career in nutrition (Kiziltan, 2008; Korinth, 2008).
This was shown in one study which displayed that 24% of Dietetic majors had
characteristics of anorexia nervosa and may choose a career in dietetics due to their
personal experience and obsession with food (Kiziltan, 2008; Fredenberg, 1999).
Fredenberg et al found that twelve of the dietetic students in her study reported their
reason for studying Nutrition & Dietetics was due to current or past weight issues
(Fredenberg, 1999). Supporting evidence comes from a study of dietitians that showed
one-third of the sample of dietitians thought that personal struggles with eating problems
might be the single most motivational reason for studying dietetics (Korinth, 2009).

Statement of the Problem

According to the public, there is a tendency to believe that dietetic practitioner’s
and students are free from food-related issues due to their training and expertise
(Houston, 2008; Mehr, 2005). Often times, they are facing the same issues that the rest
of the population faces, including disordered eating behaviors and diagnosed eating
disorders. In a recent study of dietitians in Austria found that among dietitians, 12.8%
exhibited four or more symptoms of orthorexia nervosa, a disorder which is characterized by an obsession with only consuming healthful foods and avoiding unhealthy foods (Korinth, 2009). Dietitians showing a presence of orthorexia nervosa also reported the existence of a previous or current eating disorder such as anorexia nervosa, bulimia nervosa, or binge eating disorder.

These findings are consistent with the belief that nutrition and dietetics students may start their studies with the motivation to combat their own dietary issues and disordered eating behaviors (Korinth, 2009). Even if the motivations are not pre-existing, there is a possibility that beginning a Nutrition & Dietetics curriculum may intensify disordered eating behaviors during the course of the program of study due to extensive information learned on portion control, weight management, and an exaggerated preoccupation with healthy eating may be produced. Time of entry into the program may be of importance to reveal if specific points of time result in increased disordered eating behaviors (for example, Freshman and Sophomores being at increased risk in relation to Juniors and Seniors and vice versa) (Fredenberg, 1999).

The thought is that nutrition and dietetics students are more prone to eating disorders due to their preoccupation of thoughts with food (Mehr, 2005). Earlier research has shown that dietetics students have a higher tendency toward eating disorders compared to students in other majors that are non-health related (Korinth, 2009; Houston, 2008; “Tufts University Health and Nutrition Letter”, 1999; Kiziltan, 2008). In a Turkish study, 18% of Dietetic majors were at risk for eating disorders based on EAT-26 scores, and nearly 100% reported physical appearance as being important to social success being
a registered dietitian (Kiziltan, 2008). Anxiety and self-esteem also play a significant role in the development of disordered eating behaviors. Low self-esteem may lead to feelings of ineffectiveness which in return restricting the diet is initiated as a way to gain control. Dietetic students were found to have lower self-esteem issues compared to non-dietetic majors (Kiziltan, 2008). STAI scores, which measure anxiety, were found to be significantly higher in dietetic students which shows a positive association due to the idea that anxiety disorders precede eating disorders.

Comparing Nutrition majors to those majors in a more similar realm such as the Health and Human Services field seems to be an appropriate option to identify if nutrition students are in fact prone to eating disorders and disordered eating compared to other health-related majors, more specifically Nursing and Human Development and Family Studies majors. Dietetic professionals work on evaluating the unhealthy dietary habits of other individuals on a daily basis, and are expected to be seen as an example to clientele and to society. This may reflect a preoccupation with adhering to health standards such as healthy eating but in return may also reflect disordered eating patterns. If nutrition and dietetic students are in fact at greater risk, it is of importance to help directors of Nutrition & Dietetics programs establish dialogue and protocols concerning disordered eating with their students. An example may include screening before entering a Nutrition & Dietetics program in order to help to know if a particular group is at risk and being able to make the appropriate referrals.
Purpose Statement

The purpose of this study is to examine disordered eating behaviors in Dietetic majors versus the Health and Human Services majors of Nursing and Human Development and Family Studies majors at the Kent State University campus. Nutrition and Dietetics, Nursing, and Human Development and Family Studies are majors at Kent State University primarily consisting of the female population.

Hypothesis

1.) Female Dietetic majors will have higher disordered eating scores compared to female Nursing majors and female Human Development and Family Studies majors.

2.) There will be a difference in disordered eating scores in relation to class standing (Freshman, Sophomore, Junior, Senior).

3.) Body Mass Index (BMI) will play a role in disordered eating scores.

Operational Definitions

College-Aged Female: Defined as females ages 18-25; for the purpose of this study, only college-aged females in undergraduate studies are being examined between this age range.

Nutrition Major (Undergraduate): The Bachelor of Science in Nutrition provides students with a broad general education and a strong foundation in nutrition, dietetics and the sciences. The emphasis is integrating theory, research and application of knowledge to the profession of dietetics.
*Human Development and Family Studies Major (Undergraduate):* The Bachelor of Science in Human Development and Family Studies comprises six concentrations: Case Management for Individuals and Families, Child and Youth Development, Family Life Education, Gerontology, Nursing Home Administration and Human Services Technology. For the purpose of this study all Pre-Human Development and Family Studies majors as well as declared majors are included.

*Nursing Major (Undergraduate):* The Bachelor of Science in Nursing is designed to prepare practitioners for professional nursing, help them understand their role in society and prepare them for graduate study. The program emphasizes professional knowledge, skills and compassionate nursing practices. For the purpose of this study, all pre-nursing and declared majors are included.

*Disordered Eating:* Characterized by extreme weight control practices, such as vomiting, laxative use, starvation, laxative usage, and diuretics, with an EAT-26 score of greater than 20, and threshold values less than 40 in the ORTO-15 test.

*Class Standing:* “Freshman”, “Sophomore”, “Junior”, and “Senior” are based off of self-reported data from the student.
CHAPTER II
REVIEW OF LITERATURE
Overview of Eating Disorders

Eating Disorders Defined

Eating disorders are considered psychiatric disorders that include diagnostic criteria based on psychologic, behavioral, and physiologic characteristics (“Position of the American Dietetic Association: Nutrition Intervention in the Treatment of Eating Disorders”, 2011; National Association for Anorexia Nervosa and Associated Disorders, 2011). Guidelines for identification of eating disorders as well as treatment methods can be found in the fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 2000).

General Statistics on Eating Disorders

Almost 50% of individuals with a diagnosed eating disorder meet the criteria for depression (National Association for Anorexia Nervosa and Associated Disorders, 2011). Only about 1 in 10 individuals seek treatment for eating disorders, and of the people who seek treatment, 35% receive treatment from a specialized treatment facility for eating disorders. It is estimated that 24 million individuals suffer from an eating disorder, including anorexia nervosa, bulimia nervosa, and binge eating disorder, in the United States. Of any mental illness, eating disorders have the highest mortality rate.

Statistics on Mortality Rates of Eating Disorders

As mentioned earlier, eating disorders have the highest rate of mortality over all mental illnesses (National Association for Anorexia Nervosa and Associated Disorders,
There has been much variance in the reported number of deaths due to the idea that individuals who suffer from eating disorders ultimately die of things such as heart failure, organ failure, malnutrition, and suicide. The medical complication oftentimes gets cited as the cause of death over the eating disorder. In a 2009 study shown in the *American Journal of Psychiatry*, crude mortality rates for eating disorders are as followed: 4% for anorexia nervosa, 3.9% for bulimia nervosa, 5.2% for eating disorders not otherwise specified (National Association for Anorexia Nervosa and Associated Disorders, 2011; American Psychiatric Association, 2000).

**Anorexia Nervosa**

**Anorexia Nervosa Defined**

Most often diagnosed in females (up to 90%), Anorexia is characterized by failure to maintain body weight of at least 85% of what is expected, fear of losing control over your weight or of becoming ‘fat’ (AllPsych and Heffner Media Group Inc, 2004). There is typically a distorted body image, where the individual sees themselves as overweight despite overwhelming evidence to the contrary.

There are two subtypes of anorexia nervosa (Binge Eating Disorder Association, 2011; National Association for Anorexia Nervosa and Associated Disorders, 2011). In the restricting subtype, people maintain their low body weight purely by restricting their food intake and, possibly, by excessive exercise. Individuals with the binge eating/purging subtype also restrict their food intake, but also regularly engage in binge eating and/or purging behaviors such as self-induced vomiting or the misuse of laxatives, diuretics, or enemas. Many people move back and forth between subtypes during the
course of their illness. Starvation, weight loss, and related medical complications are quite serious and can result in death. People who have an ongoing preoccupation with food and weight even when they are thin would benefit from exploring their thoughts and relationships with a therapist. The term anorexia literally means loss of appetite, but this is a misnomer. In fact, people with anorexia nervosa often ignore hunger signals and thus control their desire to eat. Often they may cook for others and be preoccupied with food and recipes, yet they will not eat themselves. Obsessive exercise that may accompany the starving behavior can cause others to assume falsely that the person must be healthy.

**Onset of Occurrence: Anorexia Nervosa**

Like all eating disorders, anorexia nervosa tends to occur in pre- or post-puberty, but can develop at any time throughout the lifespan (Binge Eating Disorder Association, 2011; National Association for Anorexia Nervosa and Associated Disorders, 2011). Anorexia nervosa predominately affects adolescent girls and young adult women, although it also occurs in boys, men, older women and younger girls. One reason younger women are particularly vulnerable to eating disorders is their tendency to go on strict diets to achieve an "ideal" figure. This obsessive dieting behavior reflects today's societal pressure to be thin, which is seen in advertising and the media. Others especially at risk for eating disorders include athletes, actors, dancers, models, and TV personalities for whom thinness has become a professional requirement. People with anorexia nervosa will often mention that the sense of control they develop over eating and weight helps them feel as if other aspects of their life are under control. The presence of depression and anxiety disorders may increase the risk of developing anorexia nervosa.
Prevalence of Anorexia Nervosa

Conservative estimates suggest that one-half to one percent of females in the U.S. develop anorexia nervosa (Binge Eating Disorder Association, 2011). Because more than 90 percent of all those who are affected are adolescent and young women, the disorder has been characterized as primarily a woman's illness.

Losing Weight in Anorexia Nervosa

People with anorexia nervosa usually lose weight by reducing their total food intake and exercising excessively (Binge Eating Disorder Association, 2011). Many persons with this disorder restrict their intake to fewer than 1,000 calories per day. Most avoid fattening, high-calorie foods, and often eliminate meats. The diet of persons with anorexia nervosa may consist almost completely of low-calorie foods and or beverages like lettuce and carrots, popcorn, and diet soft drinks.

Medical Complications of Anorexia Nervosa

The starvation experienced by persons with anorexia nervosa can cause damage to vital organs such as the heart, kidneys, and brain (Binge Eating Disorder Association, 2011). Pulse rate and blood pressure drop, and people suffering from this illness may experience irregular heart rhythms or heart failure. Nutritional deprivation along with purging causes electrolyte abnormalities such as low potassium and low sodium. Nutritional deprivation also leads to calcium loss from bones, which can become brittle and prone to breakage (osteoporosis). Nutritional deprivation also leads to decreased brain volume. In the worst-case scenario, people with anorexia can starve themselves to death. Anorexia nervosa has the highest mortality rate of any psychiatric illness (National
Association for Anorexia Nervosa and Associated Disorders, 2011; Aime, 2008). The most frequent causes of death are suicide and complications of the malnutrition associated with the disorder.

**Bulimia Nervosa**

**Bulimia Nervosa Defined**

The key characteristics of bulimia nervosa include binging (the intake of large quantities of food) and purging (elimination of the food through artificial means such as forced vomiting, excessive use of laxatives, periods of fasting, or excessive exercise) (AllPsych and Heffner Media Group Inc, 2004). There are two types of bulimia nervosa (Binge Eating Disorder Association, 2011). In the purging type, the person regularly engages in self-induced vomiting or the misuse of laxatives, diuretics, or enemas. In the non-purging type, the individual uses fasting or excessive exercise to control weight, but does not regularly purge.

People with bulimia nervosa often feel a lack of control during their eating binges (Binge Eating Disorder Association, 2011). Food is often eaten secretly and rapidly. A binge is usually ended by abdominal discomfort, social interruption, or running out of food. When the binge is over, the person with bulimia often feels guilty and purges to rid his or her body of the excess calories. To be diagnosed with bulimia nervosa, a person must have had, on average, a minimum of two binge-eating episodes a week for at least three months. However any amount of binge eating and purging is unhealthy and is worthy of an evaluation.
Prevalence of Bulimia Nervosa

The typical age of onset for bulimia nervosa is late adolescence or early adulthood, but onset can and does occur at any time throughout the lifespan (Binge Eating Disorder Association, 2011). Bulimia nervosa typically begins in adolescence or early adulthood although it can strike at any age. Like anorexia nervosa, bulimia nervosa mainly affects females. Ten percent to 15 percent of affected individuals are male although this may be an underestimate (Binge Eating Disorder Association, 2011). An estimated two percent to three percent of young women develop bulimia nervosa, compared with the one-half to one percent that is estimated to suffer from anorexia. Bulimia strikes across racial and ethnic groups and across the socioeconomic spectrum. Studies indicate that about 50 percent of those who have anorexia nervosa later develop bulimia nervosa (Binge Eating Disorder Association, 2011).

Losing Weight in Bulimia Nervosa

People with bulimia nervosa are overly concerned with body shape and weight (Binge Eating Disorder Association, 2011). They make repeated attempts to control their weight by fasting and dieting, vomiting, using drugs to stimulate bowel movements and urination, and exercising excessively. Weight fluctuations are common because of alternating binges and fasts. Unlike people with anorexia, people with bulimia are usually within a normal weight range. However, many heavy people who lose weight begin vomiting to maintain the weight loss. Laxatives are dangerous and ineffective weight control measures. Laxatives work in the part of the intestine after the food has already
been absorbed. They do not help you shed calories, only water and valuable electrolytes (like potassium and sodium).

**Eating Disorder Not Otherwise Specified**

The Diagnostic and Statistical Manual – 4th Edition (DSM-IV) recognizes two distinct eating disorder types, anorexia nervosa and bulimia nervosa (Binge Eating Disorder Association, 2011; American Psychiatric Association, 2000). If a person is struggling with eating disorder thoughts, feelings or behaviors, but does not have all the symptoms of anorexia or bulimia, that person may be diagnosed with eating disorder not otherwise specified (EDNOS). The following section lists examples of how an individual may have a profound eating problem and not have anorexia nervosa or bulimia nervosa (American Psychiatric Association, 2000).

- A female patient could meet all of the diagnostic criteria for anorexia nervosa except she is still having her periods
- A person could meet all of the diagnostic criteria for anorexia nervosa are met except that, despite significant weight loss the individual's current weight is in the normal range.
- A person could meet all of the diagnostic criteria for bulimia nervosa are met except that the binge eating and inappropriate compensatory mechanisms occur at a frequency of less than twice a week or for duration of less than three months.
- The person could use inappropriate compensatory behavior by an individual of normal body weight after eating small amounts of food (e.g., self-induced
vomiting after the consumption of two cookies). This variant is often called purging disorder.

- The person could repeatedly chewing and spitting out, but not swallowing, large amounts of food.

- Binge-eating disorder is also officially an EDNOS category: recurrent episodes of binge eating in the absence if the regular use of inappropriate compensatory behaviors characteristic of bulimia nervosa.

- Orthorexia nervosa is characterized as a disorder where individuals have an obsession with consuming healthy foods and avoiding unhealthy food (Korinth, 2009).

The examples provided above illustrate the variety of ways in which disordered eating can look when a person has EDNOS, but this list of examples does not provide a complete picture of the many different ways that eating disorder symptoms can occur (Binge Eating Disorder Association, 2011).

The “not otherwise specified” label often suggests to people that these disorders are not as important, as serious, or as common as anorexia or bulimia nervosa. Far more individuals suffer from EDNOS than from bulimia and anorexia combined, and the risks associated with having EDNOS are often just as profound as with anorexia or bulimia because many people with EDNOS engage in the same risky, damaging behaviors seen in other eating disorders.
Individuals with EDNOS who are losing weight and restricting their caloric intake often report the same fears and obsessions as patients with anorexia. They may be overly driven to be thin, have very disturbed body image, restrict their caloric intake to unnatural and unhealthy limits, and may eventually suffer the same psychological, physiological and social consequences of anorexic people. Those who binge, purge, or binge and purge typically report the same concerns as people with bulimia, namely, that they feel they need to purge to control their weight, that they are afraid of getting out of control with their eating, and that binging and/or purging often turn into a very addictive, yet ineffective coping strategy that they feel they cannot do without. In all meaningful ways, people with EDNOS are very similar to those with anorexia or bulimia, and are just as likely to require extensive, specialized, multidisciplinary treatment.

**Binge Eating Disorder**

When identifying and diagnosing binge eating disorder (BED), doctors and mental health professionals refer to the criteria in the Diagnostic and statistical Manual IV (DSM-IV) which says, a person must have had, on average, a minimum of two binge-eating episodes a week for at least six months (Binge Eating Disorder Association, 2011). Although this is a somewhat arbitrary criterion and any amount of binge eating should be attended to. Individuals with binge eating disorder (BED) engage in binge eating, but in contrast to people with bulimia nervosa they do not regularly use inappropriate compensatory weight control behaviors such as fasting or purging to lose weight. Binge eating, by definition, is eating that is characterized by rapid consumption
of a large amount of food by social comparison and experiencing a sense of the eating being out of control. Binge eating is often accompanied by uncomfortable fullness after eating, and eating large amounts of food when not hungry, and distress about the binge eating. There is no specific caloric amount that qualifies an eating episode as a binge. A binge may be ended by abdominal discomfort, social interruption, or running out of food.

**Prevalence of binge eating disorder.** The most commonly diagnosed disorder among individuals seeking professional help for an eating disorder comes in the form of an “eating disorder not otherwise specified”, or EDNOS (Binge Eating Disorder Association, 2011). A 2007 study by Dalle Grave and Calugi reviewed the prevalence of EDNOS within an inpatient setting (Machado, 2007). A total of 40.3% of 186 patients who were being treated for eating disorders received a diagnosis of EDNOS. Estimates vary about the prevalence of BED; however, recent statistics indicate that in the United States BED affects an estimated three and one-half percent of females and two percent of males at some point in their lifetime [compared to anorexia nervosa, for example, which affects an estimated one-half to one percent of the population]. The prevalence of BED among obese individuals is even higher (approximately five percent to eight percent). The average age of onset for BED is in young adulthood (early 20’s) and slightly later in life compared to BN and AN. Recognition of binge eating in children is increasing in the recent years.

**Orthorexia Nervosa**

Orthorexia Nervosa, ON, is classified as an eating disorder not otherwise specified or EDNOS (Binge Eating Disorder Association, 2011). Orthorexia nervosa is
characterized by an unhealthy obsession with eating “healthy” foods and avoiding “unhealthy” foods (Korinth, 2008; Donini, 2005). In a 2005 Italian study, Donini et al. spoke of ON stating: “the desire to eat healthy foods is not in itself a disorder, but the obsession for these foods, together with the loss of moderation and balance and the withdrawal from life caused by this food habit, can then lead to orthorexia” (Donini, 2005). Individuals with ON may turn to food as a religion, invoking a sense of spirituality. The “worshipping” of food causes a transformation of lifestyle causing an individual to spend a great deal of time thinking about food, dedicating their whole existence to the planning, purchasing, preparation, and consumption of food considered “healthy”.

The proposal of ON was first described by a United States physician named Steven Bratman. Bratman describes ON as the consequence of attempting to change one’s diet for healthy reasons, whether that be in order to improve overall health or to possibly treat an inner illness (Bratman, 2000). Little research has been conducted on the topic of ON, with much of the research being conducted in Italy and translated into other languages (Donini, 2005). Estimates on the prevalence of orthorexia nervosa can only be guessed in those with subclinical or threshold eating disorders (“Anorexia Nervosa and Related Eating Disorders”, 2011). Although these individuals have a preoccupation with food and weight that is classified as not normal, they are not disturbed enough for a formal diagnosis.
Disordered Eating and Nutrition & Dietetics Students

Dietetic professionals are believed to be free from having issues with food-related issues due to their extensive background knowledge and training in their career (Houston, 2008; “Tufts University Newsletter”, 1999; Korinth, 2008). This is not always the case, however, since dietetic professionals face the same issues as the rest of the public-including obesity, displaying disordered eating behaviors and exhibiting eating disorders. Many studies suggest that dietitians, diet technicians and dietetic students are at greater risk for disordered eating and diagnosed eating disorders compared to their health-profession counterparts (Korinth, 2008; Houston, 2008; “Tufts University Health and Nutrition Newsletter”, 1999; Mehr, 2005).

There is a theory that Dietetics majors have a higher prevalence of eating disorders due to their manifestations through food-related activities such as collecting recipes, preparing food for others, or choosing to pursue a career in nutrition (Kiziltan, 2008; Korinth, 2008). This was shown in one study which displayed that 24% of Dietetic majors had characteristics of anorexia nervosa and may choose a career in dietetics due to their personal experience and obsession with food (Kiziltan, 2008; Fredenberg, 1999). Fredenberg et al found that twelve of the dietetic students in her study reported their reason for studying Nutrition & Dietetics was due to current or past weight issues (Fredenberg, 1999). Supporting evidence comes from a study of dietitians that showed one-third of the sample of dietitians thought that personal struggles with eating problems might be the single most motivational reason for studying dietetics (Kinzl, 1999).
In a Turkish study looking at dietetics students risk of having disordered eating behaviors compared to non-Dietetics majors, 18.6% of dietetics students were at risk for developing disordered eating behaviors according to EAT-26 and BITE test scores (Kiziltan, 2008). Results between the two groups were similar concerning eating attitudes test scores and bulimia investigatory scores. Dietetic students were more apt to use dieting as a form of weight control however non-dietetic students were more likely to use laxatives and diet pills than did dietetic students. In the present study, the findings showed that even though female dietetic students practice healthy balance in making nutritious choices or having healthy eating attitudes, their attitudes were not controlled by rationale and nutrition knowledge alone, but were also controlled by cultural, social and emotional needs as well (Kiziltan, 2008). One-half of dietetic students had a fear of being fat and results indicated that dietetic students are sensitive to body shape eating attitudes, and body mass index. Almost all of the dietetic students thought they should have the ideal body shape due to importance of physical appearance as a registered dietitian’s social success (Kiziltan, 2008).

This relationship was also tested by Fredenberg and colleagues when they examined the two groups of dietetic vs. non-dietetic students (Fredenberg, 1996). Students in the Dietetics program had noticeably higher scores on a test concerning disordered eating with a higher percentage of students scoring at the symptomatic level. Other studies showed similar results. Crockett and Littrell found that Dietetics majors in their Junior and Senior years practiced at least some degree of vomiting after eating and
Larson et al believed that dietitians were at greater risk for bulimic tendencies due to the emphasis on weight, body image, and food in their careers (Fredenberg, 1996).

Fredenberg took a new approach by looking further into two types of Dietetic students: Coordinated Program (CP) and Didactic Program in Dietetics (DPD)(Fredenberg, 1999). Fifteen percent of DPD students “often” engaged in dieting behaviors, in comparison to only 3% in CP students. Twenty-one percent of DPD students “very often engaged in dieting compared to the 7% in CP students. These percents are consistent with DPD students believing they gave too time and thought to thinking about food (21% and 7% respectively). There was tremendous difference in beliefs about fear of being overweight, where 24% of DPD students had a fear versus 3% of CP students. These results show that DPD students displayed an increased risk of disordered eating patterns in relation to CP students.

Classification of Female Types

Rationale for Observing Females with Eating Disorders

Reviewing the statistics shows the significance of the importance to focus on eating disorders in females. Women are much more likely than men to develop an eating disorder (National Association of Anorexia Nervosa and Associated Disorders, 2011; Herpertz-Dahlmann, 2008; Scherag, 2010; Edman, 2005). Only an estimated 5-15% of diagnosed cases come from the male population (National Association of Anorexia Nervosa and Associated Disorders, 2011). An estimated 0.5 to 3.7 percent of the female population suffers from anorexia nervosa in their lifetime. Research suggests at approximately 1% of female adolescents have anorexia nervosa (National Association of
Anorexia Nervosa and Associated Disorders, 2001; Gralen, 1989). An estimated 1.1 to 4.2% of women have bulimia nervosa in their lifetime, and 2-5% percent experience binge-eating disorder in a six-month period. Fifty percent of individuals with anorexia nervosa develop bulimia nervosa or bulimic patterns.

**Statistics on Female Students and Eating Disorders**

Eating disorders and disordered eating behaviors are seen in females from adolescence through the college ages. In adolescents, anorexia nervosa is the third most common chronic illness (National Association of Anorexia Nervosa and Associated Disorders, 2011; Aime, 2008). Over one-half of teenage girls use unhealthy weight control behaviors such as fasting, skipping meals, smoking cigarettes, vomiting, and taking laxatives. 86% of females report the onset of an eating disorder by age 20 and 46% report the onset between the ages of 16 and 20. A total of 95% of those with eating disorders are between the ages of 12 and 25 (National Association of Anorexia Nervosa and Associated Disorders, 2011). The range of ages proceeds into the college years where statistics have found that 91% of women surveyed on a college campus had attempted to control their weight through dieting and 22% reported dieting “often” or “always”. A total of 25% of college-aged women use binging and purging as a weight-management technique. A survey of 185 students on a college campus indicated that 58% felt pressure to be at a certain weight; of the 83% who dieted for weight loss, 44% were in a healthy weight range. Lastly, the mortality rate for eating disorders for student-aged females of 15-24 were 12 times higher rate of mortality from anorexia nervosa over
all other leading causes of death for females in that age range (National Association of Anorexia Nervosa and Associated Disorders, 2011).

**Females and Obesity Related to Eating Disorders**

Dieting and disordered eating have been linked to problematic outcomes, including an increased risk for weight gain, obesity, and eating disorders in adolescents (Neumark-Sztainer, 2011; Neumark-Sztainer, 2006; Tanofsky-Kaff, 2004; Haines, 2010; Fonseca, 2008; Claus, 2006). In a 2011 study by Neumark-Sztainer, findings showed that adolescents who engaged in dieting and reporting unhealthful dieting behaviors were two to three times more likely to be overweight five years later, versus adolescents that did not engage in unhealthful weight management behaviors (Neumark-Sztainer, 2011). In a three-year longitudinal study by Field et al, dieters were at an increased risk for weight gain compared to non-dieters (Field, 1999). In two separate four-year longitudinal studies on female middle girl girls and female high school girls, Stice et al found that the girls were at increased risk for obesity onset (Stice, 1996). In the high school girl study, Stice also found that high school females were at an increased risk for binge eating two years later. Patton et al. found that dieting increased both partial and full eating disorders (Stice, 1996). Adolescent girls who have dieted were 18 times more likely to develop an eating disorder versus those girls who did not diet. Even dieting at the moderate level provided girls at higher risk for the development of and eating disorder versus those who did not. Retrospective studies have shown that individuals with binge eating disorder are 3.3 times more likely to have been overweight as a child compared with children with other psychiatric diagnosis (Claus, 2006). Moreover, obese
binge eaters in relation to non-obese binge eaters, are retrospectively at a higher occurrence of childhood obesity, have more frequent use of weight loss strategies, and a more common experience of weight fluctuations (Claus, 2006).

In a five-year longitudinal study conducted by Neumark-Sztainer et al, adolescents were assessed on their dieting and weight control behaviors as well as risks for weight gain binge eating, extreme weight control behaviors and eating disorders (Neumark-Sztainer, 2006). Results showed that adolescents who used unhealthy weight control behaviors from baseline increased their body mass index by one unit more than adolescents that did not use the behaviors. These individuals were also three times as likely to become overweight at a second time point during the five-year study, as well as at an increased risk for binge eating with loss of control and using extreme weight loss behaviors such as laxative and diet pill usage.

**Female Athletes**

**Statistics on Athletes and Eating Disorders**

When comparing judged versus non-judged sports, the prevalence of eating disorders is 13% in those who participate in judged sports compared to 3% in refereed sports (National Association for Anorexia Nervosa and Associated Disorders, 2011). A study comparing elite athletes and a control of females found that eating disorder rates were significantly higher in elite athletes at 20% compared to only 9% in the control group (Beals, 2006). Among type of sport, aesthetic sports such as gymnastics, ballet, and figure skating were found to be at the highest risk for eating disorders compared to other sports. In a study looking at the comparison of psychological profiles of athletes
versus individuals with anorexia nervosa, there were similar factors in common (National Association for Anorexia Nervosa and Associated Disorders, 2011). Both reported perfectionism, high-expectations of self, competitiveness, hyperactivity, repetitive exercise routines, compulsiveness, tendency toward depression, body image distortion, and a pre-occupation with dieting and weight.

**Eating Disorders and Athletes**

**The female athlete triad.** There have been increasing amounts of disordered eating, menstrual dysfunction, and low bone mineral density in female athletes in the recent years (Beals, 2006). The combination of these factors has been given the name of the Female Athlete Triad (Beals, 2002; Gibson, 2004). It is believed that the Triad begins when a female athlete believes she will have greater success with athletics if thin, so dieting behaviors begin. Eating behaviors tend to become increasingly restrictive as well as unhealthful. The low intakes of energy intake and weight control behaviors leads to menstrual dysfunction and a decrease in bone mineral density.

The factors of disordered eating, menstrual dysfunction and low bone mineral density all have links to eating disorders (Beals, 2006). Disordered eating has been associated with menstrual dysfunction, and menstrual dysfunction has been linked to low bone mineral density. Disordered eating has been independently linked to low bone mineral density. Cobb et al. examined the relationship between these factors in 91 young female competitive distance runners (Cobb, 2003). Results showed that menstrual dysfunction was associated with low bone mineral density as well as disordered eating. Gibson et al. conducted a study on 50 elite British female middle and long distance
runners and found that disordered eating was significantly related to menstrual
dysfunction and low bone mineral density (Gibson, 2004).

In the study by Beals et al, 112 female athletes representing seven different sports
(diving, cross country, field hockey, softball, swimming, tennis, and field and track) were
examined on the factors of the Female Athlete Triad (Beals, 2006). Two athletes, both in
lean-build sports, reported being diagnosed with anorexia nervosa and one athlete, also in
lean-build sport reported being diagnosed with bulimia nervosa. Four athletes, all in
lean-build sports (cross country, track, diver) reported a belief for having an eating
disorder, and 22 athletes (20) met the criteria for disordered eating behaviors. More
athletes in lean-build sport at 30% reported binging compared to 13% of non-lean-build
sport. In regard to menstrual dysfunction, 70% of athletes reported irregular menstrual
cycles, and percentages were similar in lean versus non-lean-building sport. With bone
mineral density, percentages were significantly lower in lean-built sport versus non-lean-
built sport. Factors shown to lead to an increase in low bone mineral density are family
history of osteoporosis, scoliosis, stress fracture prevalence, and low dairy intake.
Twelve athletes (six lean and six non-lean-build athletes) had a history of osteoporosis in
their family. Three athletes (two lean and one non-lean-build) reported scoliosis.
Twenty-one athletes reported at least one stress fracture in their career (13 lean-build and
eight non-lean-build), and 51 athletes (28 lean-build and 23 non-lean-build) reported less
than one serving of dairy products consumed daily.

**Eating disorders and ballet dancers.** Adolescent ballet dancers are at increased
risk for developing eating disorders versus non-dancing peers (Thomas, 2004). Studies
suggest that 1.6% to 7% of ballet dancers have anorexia nervosa (Abraham, 1996). Other studies show that ballet dancers weigh significantly less and perceive unusually low body weights more normally than non-dancing high school students (Neumark-Sztainer, 2001). In addition, ballet students are less satisfied with their weight compared to their non-dancing peers, and oftentimes wish to lose additional weight despite their already low body weight. Klump et al. found that female ballet students had a higher family history of eating disorders compared to those who were non-dancers (Klump, 2001). This suggests that genetics plays an important role. Although ballet dancers are at an increased risk for the development of eating disorders, a majority of dancers do not have an eating disorder; however, certain subgroups may be at greater risk. Those ballet dancers that are studying at highly competitive ballet schools which prepare students for professional dancing are at a higher risk for anorexia nervosa than those studying at a less professional-based school (Thomas, 2004). Thomas et al. looked at the differences between ballet students in a national affiliated school versus regionally affiliated schools. Results showed that students at nationally affiliated schools had significantly greater body dissatisfaction and dieting behaviors compared to those at regionally affiliated schools. Both school types reported significant scores for perfectionism and dive for thinness.

**Females and Racial Determinants**

Traditionally, dissatisfaction with body image and presence of disordered eating patterns have been thought to exclusively occur in upper class, Caucasian females, however, research may point in another direction (Littleton, 2003; Edman, 2005;
Lewinsohn, 2002). Joiner and Kashubeck conducted research in central Texas with a sample of 120 adolescent Hispanic females (Joiner, 1996). A total of 20% reported anorexic behavior while 15% reported bulimic behavior as evidenced by their scores on a self-report measure of disordered eating. Snow and Harris looked at multiple races including Hispanic and Native American adolescent females in rural New Mexico (Littleton, 2003). A total of 90% of the 95 girls sampled indicated worrying about being too fat and 11% met DSM criteria for bulimia nervosa based on self-reported responses. In a study by Edman et al, Filipino females were at a higher risk of eating disorders than Caucasians (Edman, 2005). Females reported a higher drive for thinness, dieting, and self-dissatisfaction scores.

In a study of adolescent Israeli girls and their peers, 15% were found to be at risk for eating disorders (Kaluski, 2008; Latzer, 2001). Up to one in five Jewish female adolescents reported abnormal eating attitudes (Latzer, 2005). In a study of tenth-grade Jerusalem girls, 17% of the population was classified as obese, but a larger percentage expressed dissatisfaction with body weight and shape (Latzer, 2005). In a study by Kaluski, et al of 2978 Israeli school girls, 14% reported initiating vomiting after a feeling of fullness (Kaluski, 2008). 45% of the girls reported feeling a fear of losing control of the amount of food they eat, and 47% reported reducing their energy intake over a three month period. Approximately 30% of the sample was defined as operationally having disordered eating behaviors.

In a study by Lopez-Guimera et al, examination of 349 secondary school aged female adolescents were the focus of dieting and disordered eating behaviors (Lopez-
Guimera, 2008). 14% of the girls reported dieting and 69% of the dieters were overweight. 70% had disordered eating attitudes and 70% were influenced by the body shape model, a tool to evaluate the impact on society on attitudes toward body shape and satisfaction.

A comprehensive study was conducted by Neumark-Sztainer et al to examine disordered eating and dieting in relation to ethnicity (Littleton, 2003; Neumark-Sztainer, 2006). The study examined a sample of 10,000 Caucasian, Asian, Hispanic, and African Americans. Dieting and disordered eating was found to be high in all racial groups. Asian and Caucasian Americans were most comparable, with 41% and 40% consecutively. Although African and Hispanic Americans had lower rates of dieting, behaviors were still present in a significant percentage. 22% of African American females and 33% of Hispanic females reported current dieting.

Several studies looked at the incidence of dieting in female adolescence across several races. (Littleton, 2003; Kiziltan, 2008; Edman, 2005). In a study by Paxton, a sample of 130 adolescent girls from private Australian schools were examined on dieting behaviors (Paxton, 2007). A total of 30% reported at least occasional calorie counting and 53% reported eating a low calorie diet at least occasionally. Also, Neumark-Sztainer, Butler, and Palti found that in a sample of 340 Israeli 15 and 16-year-old girls, 55% reported dieting in the past two months (Neumark-Sztainer, 1995).

In a study conducted by Ackard et al, 34.7% of African American women and 50% of Hispanic women were least likely to report dieting when compared to Caucasian women (71.1%) (Ackard, 2001).
Risks

Individual Risk Factors

Dieting and eating disorders. Dieting has been considered to be a necessary cause of eating disorders (Bulik, 1996; Tanofsky-Kraff, 2004). Statistics show that 35% of dieters progress to pathological dieting (National Association of Anorexia Nervosa and Associated Disorders, 2011). Of those, 20-25% progress into partial or full-syndrome eating disorders. This statement has been supported by Kendler et al. when findings demonstrated that fluctuations in weight in relation to diet status were related to the development of bulimia nervosa in a population-based study of female twins (Scherag, 2009). The findings of the study are consistent with several clinical and empirical descriptions made of females with bulimia nervosa in which a majority stated binge eating started to occur after a period of restricting foods (Scherag, 2009). While the term “dieting” implies making healthy behaviors to reduce weight, some individuals use unhealthy weight-control efforts such as skipping meals, fasting, and eliminating food groups (Ackard, 2001). In a national population-based survey of high school females, 58% reported they have dieted, and in a study of over 4000 adults, 75% of women indicated they have been on a diet before (Schoen, 1997; Ackard, 2001). The study conducted by Ackard et al showed that dieting frequency had a positive association with having symptoms of bulimia as well as feelings of ineffectiveness, and perfectionism (Ackard, 2001). The study also showed that the higher the number of times an individual recorded they have dieted, the more the individual appeared to struggle.
There are issues of concern when dieting comes into play. Often times, unhealthful weight-reduction practices are used when dieting such as fasting and appetite suppressants rather than limiting fats and sweets in the diet and including regular physical activity (Ackard, 2001). In a community-based prevention program for weight-gain, 22% of women reported the use of at least one unhealthy weight reduction behavior within the past year (Neumark-Sztainer, 1999). This has also been seen in adolescents as well. In a state wide survey of 133,794 based in Minnesota, 43% of girls in grades 9 through 12 reported fasting or skipping meals to lose weight, 8% reported using diet pills or speed, and 2% reported laxative usage to control or lose weight (“Minnesota Department of Children, Families, and Learning”, 1998). In a Neumark-Sztainer sample of 15-year old females, a total of 39% engaged in at least one form of disordered eating behaviors, such as fasting, restricting diet to one or two foods, or self-inducing vomiting while 35% engaged in binge eating (Littleton, 2003; Newmark-Sztainer, 1999; Ackard, 2001).

Another issue of concern is the restraint theory, which assumes that dietary restraint is significant in the development of eating disorders (Ackard, 2001). To support the restraint theory, a prospective study of 1010 adolescent girls indicated that among 34.6% of the population that indicated they have dieted, 21% of these girls developed an eating disorder within the time of the 12-month follow up (Ackard, 2001). In a study by Bulik et al, a sample of 108 females who met the diagnostic criteria for being diagnosed with bulimia nervosa were examined to determine if dieting behaviors preceded the full development of an eating disorder (Bulik, 1996). Of the sample, 96% of the subjects reported dieting prior to the onset of bulimia nervosa.
Personality, Beliefs, and Behaviors in Eating Disorders

**Personality and disordered eating.** Perfectionism has often been linked to anorexia nervosa and bulimia nervosa (Humphreys, 2007; Scherug, 2010; Littleton, 2003). Those individuals with eating disorders will often exhibit obsessions that are usually associated with perfectionism, such as being obsessed with ordering, symmetry, and doing things in a correct manner, as well as cleaning and checking other compulsions (Littleton, 2003).

Serotonin activity may also be linked to perfectionism behaviors (Scherug, 2010). Several lines of evidence imply the serotonergic system in the regulation of body weight and specifically in eating disorders. In cerebrospinal fluid, serotonin levels were elevated in long-term, weight-restored patients with anorexia nervosa and bulimia nervosa in comparison with a control group. This suggests that hyperserotonergic function is a trait marker for eating disorders. This high level of serotonin may also lead to the psychopathological features of eating disorders, such as perfectionism and obsessiveness commonly seen in patients with anorexia nervosa.

**Self-esteem and disordered eating.** There have been multiple studies that found an association between self-esteem and disordered eating (Kiziltan, 2008; Joiner, 1996; Littleton, 2003; Thomas, 2000). Self-esteem in relation to body weight and shape, as well as fear of weight gain, body dissatisfaction and a drive for thinness are all essential elements of eating disorders and the risk for developing them. Low self-esteem has been identified as an important risk factor for developing eating disorders (Kiziltan, 2008; Littleton, 2003).
As with body dissatisfaction, two pathways have been determined in explaining the connection between self-esteem and disordered eating (Joiner, 1996, Littleton, 2003, Tiggemann, 2001). The first pathway is that low self-esteem leads to body dissatisfaction. Having dissatisfaction with body image as a result leads to disordered eating. The reverse is also true, in that dissatisfaction with body image is associated with a low self-esteem. The next pathway is based on the idea that low self-esteem may lead to feelings of ineffectiveness which in return restricting the diet is initiated as a way to gain control.

In a Turkish study looking at the risk of disordered eating behaviors in Dietetic vs. Non-Dietetic majors, the dietetic students were found to have lower self-esteem issues compared to the Non-Dietetic majors (Kiziltan, 2008). STAI scores, which measure anxiety, were found to be significantly higher in dietetic students which shows a positive association due to the idea that anxiety disorders precede eating disorders.

**Behavioral and environmental influences.** Behavioral and environmental influences also play a role in vulnerability to the illness (Binge Eating Disorder Association, 2011). In studies of the biochemical functions of people with eating disorders, scientists have found that the neurotransmitters serotonin and norepinephrine are decreased in those with anorexia nervosa who are at a low weight. People with anorexia nervosa also tend to have higher than normal levels of cortisol (a brain hormone released in response to stress) and vasopressin (a brain chemical found to be abnormal in patients with obsessive-compulsive disorder) (Binge Eating Disorder Association, 2011).
Stressful life events or transitions may precipitate eating disorders. (Binge Eating Disorder Association, 2001; Smyth, 2007; Suisman, 2010). Felitti et al. found that children who were exposed to adverse events had an increased risk of smoking, alcoholism, drug use, sexual behavior, obesity, depression, and suicide (Felitti, 1998). Research suggests that childhood sexual abuse has been found to be a risk factor for eating disorders later in life (Smyth, 2007). There is limited evidence toward physical abuse contributing to eating disorders later in life, whereas studies have found evidence of unhealthy eating habits due to emotional abuse (Smyth, 2007). Other trauma such as interpersonal loss or separation, sexual conflict, and major life changes have an association with eating disturbances. Johnson et al. found that maladaptive parental behaviors, physical neglect, and childhood adversities were related to clinical and subclinical eating disturbances (Smyth, 2007).

**Temperament and disordered eating.** Temperament has been a focus for several investigators in the development of disordered eating (Littleton, 2003; Humphreys, 2007). One of the largest studies to date conducted by Martin et al. followed early-adolescents for a period of several months (Martin, 2000). Results showed that negative emotionality, which is defined as possessing high levels of negative reactivity such as inflexibility, irritability, low levels of cooperativeness and manageability, is a risk factor for developing disordered eating behaviors. In the study, the risk of temperament was much higher in females versus males. Negative emotionality was found to be a strong predictor of longitudinal disordered eating (Martin, 2000).
Personality disturbances and psychological traits. Personality disturbances and psychopathological traits are also risk factors found higher in female adolescents (Littleton, 2003; Aime, 2008). A longitudinal study by Attie and Brooks-Gunn showed that internalizing personality disturbances were predictive in eating disorders within two years of the disturbance (Littleton, 2003; Attie, 1989). Another study by Chandarana et al. found that high school students with disordered eating had more psychopathological traits versus those students without disordered eating patterns (Littleton, 2003; Chandarana, 1988).

There have been studies showing a link between eating disorders and obsessive compulsive disorder (Humphreys, 2007). One study found that a lifetime incidence of obsessive compulsive disorder was 22% among those individuals with anorexia nervosa, and 12% among individuals with bulimia nervosa (Speranza, 2001; Humphreys, 2007). Other studies have shown that individuals with anorexia and bulimia nervosa possess symptoms of OCD, however, they are not strong enough to meet the diagnostic criteria for OCD (Halmi, 2003; Humphreys, 2007). There is a belief by some that eating disorders are part of a continuum of diseases housed under the obsessive compulsive realm (Hollander, 2000; Humphreys, 2007). In a study reviewing the neuropsychological similarities between the two, it was found that neurotransmitter serotonin has shown to play a key role in regulating symptoms of OCD as well as disordered eating patterns (Cavadini, 2004; Murphy, 2004; Humphreys, 2007). Obsessive Compulsive Disorder and eating disorders are linked due to the common feature of them both involving obsessive thinking (Humphrey, 2007). The involuntary fixation on food and calories
have been seen in individuals with eating disorders and shares some common features of “obsessive behaviors” linked to OCD. Previous studies have research the similarities further past obsessive thoughts on food and calories. For example, individuals with diagnosed eating disorders have reported obsessions common with OCD, including obsessions with order and symmetry (Halmi, 2003; Humphreys, 2007).

**Orthorexia nervosa and behavioral disorders.** Orthorexia nervosa is classified as an eating disorder not otherwise specified or EDNOS, and is not formally recognized as an eating disorder under DSM IV criteria (Donini, 2005). Orthorexia nervosa may be considered a serious behavioral disorder characterized by an obsession with consuming “healthy” foods and avoiding “unhealthy” foods. In general, orthorexia can be considered when the eating disorder is long-term and when behaviors have a significant negative impact on the quality of life of the individual. In extreme circumstances, some individuals with orthorexia would prefer to starve themselves rather than eat foods that are “impure” or harmful to their health. A 2005 study by Donini et al sampled four groups of subjects totaling 404 individuals on their eating behaviors and obsessive-phobic personality traits (Donini, 2005). Diagnosing the presence of orthorexia nervosa was based off of the presence of both: “health fanatic” eating habits (based off of foods classically considered healthy versus foods classically considered unhealthy and awarded a point system based on the classification of the food); and obsessive-compulsive traits and phobia linked to the personality of the subject based on Minnesota Multiphasic Personality Inventory or MMPI. Analyzing these two facets lead to the finding of 4 groups of subjects: normal eating behavior and MMPI; normal eating behavior and
pathological MMPI; “healthy” eating behavior and normal MMPI; and “orthorexic” in which “healthy” eating behavior is associated with a pathological MMPI. The Donini study showed a significant difference in the ORTO-15 score and the different groups of subjects and also showed good predictive capability.

**Early Onset of Puberty in Females**

There has been an association between disordered eating and females with an early onset of puberty (Littelton, 2003; Gralen, 1989; Williams, 2000). There are several hypotheses as to why early onset of puberty would be a risk factor for disordered eating. One such hypothesis states that the physical changes of puberty, specifically the accumulation of body fat, could be a reason for females to deviate from the ideal perception of Western society’s idea of body image (Attie, 1988; Williams, 2000; Littleton, 2003). This can be especially true for those females who enter puberty early due to having a high body mass index prior to starting their menstrual cycle. The discrepancy that builds from actual versus ideal body weight may be a cause for the increase in body dissatisfaction and therefore, disordered eating and eating disorder development.

Another hypothesis lies in the idea that early puberty leads to issues with adaptation, placing the adolescent in a social category in regards to appearance in relation to her peers who did not have an early onset in puberty (Littelton, 2003; Gowers, 2001; Williams, 2000). In an attempt to be placed in the “normal” social category, disordered eating may be initiated.
Participation in activities that the adolescent is not yet developmentally ready for is another hypothesis that early onset of puberty leads to disordered eating (Gowers, 2001; Williams, 2000; Littleton, 2003). Activities such as dating and engaging in sexual behaviors at an early age can increase stress levels which would affect eating patterns.

**Negative Body Image/Body Dissatisfaction**

Within the last 20 years, there has been an increase in awareness of the prevalence of disordered eating patterns and the development of eating disorders in adolescents (Littelton, 2003; Herpertz-Dahlmann, 2008; Aime, 2008; Neumark-Sztainer, 2011). This is particularly true to female adolescents, especially in Western societies. Body image dissatisfaction has been seen in children in elementary school, and body distortion seems to increase with age, with a peak during the adolescent stage particularly in females (Littleton, 2003). The idea that body dissatisfaction increases with age was tested in a California study by Adams, Katz, Beaucham, Cohen and Zavis when a sample of 600 girls in eighth through twelfth grades were found to be significantly more dissatisfied with their bodies when compared to fifth grade girls (Adams, 1993).

In order to conceptualize the etiology of body dissatisfaction and disordered eating behaviors, a theoretical model has been developed by Streigel-Moore and Cachelin (Streigel-Moore, 1999). The model contains two pathways. The first pathway is called the “restraint” pathway, which involves internalization of societal ideas about beauty and thinness. The discrepancy between the individual’s actual body shape and society’s idea of body shape leads to disordered eating patterns and dieting. Binging and purging may be a result of biological and affective consequences of restrictive dieting behaviors.
The second pathway is called the “interpersonal vulnerability” pathway, which begins with inadequate nurturing from parents (Streigel-Moore, 1999). The result is disturbances in self-image as well as social functioning. The feelings of ineffectiveness then lead to the development of disordered eating and dieting. Although it is possible for dieting and disordered eating to arise from one single pathway, it most often occurs from a combination of the two.

**Familial Variables**

There has been some research on the family influence on producing negative body image thoughts (Littleton, 2003; Canals, 2009; Shuster, 2003; Annus, 2006; Haines, 2010). One hypothesis is that family may influence a young woman to lose weight and the pressure may lead the female to view her body in a negative manner (Byely, 2000; Gowers, 2001). Other hypotheses show that family members, in particular mothers, may model preoccupation with the body as well as disordered eating patterns (Annus, 2006).

Family relationships that are strained may also lead to disordered eating in a female as well (Littleton, 2003; Canals, 2009; Shuster, 2003). In a year long longitudinal study on adolescent girls, having a poor family relationship was a predictor of increased dieting behavior over time (Littleton, 2003). Another longitudinal study taking place over 2-years time conducted by Attie and Brooks-Gunn saw that girls with more disordered eating behaviors came from families that did not have cohesion, organization or cohesiveness (Attie, 1988). Similarly, McVey et al. found that a lack of paternal support was a predictor of disordered eating (McVey, 2002). Lastly, Neumark-Sztainer et al. looked at children who came from a home with low levels of parental caring, low
expectations, and low familial communication (Neumark-Sztainer, 1999). The result was that the children had increased disordered eating symptoms. Familial strain due to physical and/or sexual abuse was also a cause for elevated levels of disordered eating symptoms (Aime, 2008).

Eating disorders also tend to run in families, with female relatives most often affected (Binge Eating Disorder Association, 2011). Relatives of someone with anorexia nervosa are over 10 times more likely to have an eating disorder themselves than relatives of someone without anorexia nervosa (Binge Eating Disorder Association, 2011). The heritability of anorexia nervosa has been estimated to be over 50%. Specific learning experiences, such as observing one’s mother using maladaptive eating behaviors, are believed to contribute to women’s overall knowledge about the benefits of eating and dieting (Annus, 2007; Canals, 2009; Shuster, 2003). The gained knowledge is thought to lead to the development of eating disorders.

**Genetic factors in eating disorders.** There have been a variety of studies conducted on twins to examine the relationship between genetics and the development of eating patterns (Wade, 2003; Scherag, 2010; Suisman, 2010). Research conducted at Flinders University suggests that there are complex interactions between several genes as well as many different aspects of the environment that can lead to the development of eating disorders (Wade, 2003). This shows that it has been ruled out that one single factor contributes solely to the development of eating disorders. Disturbances in neurotransmitter, neuropeptide, and neuroendocrine systems have been shown in patients
that are acutely ill and were studied longitudinally, so there is a possibility that there is an involvement of these systems in the development of eating disorders (Scherag, 2010).

Twin studies have shown a substantial contribution concerning genetics and eating disorders. Klump et al. found that there was significance in mid to late adolescence versus pre-pubertal adolescence for disordered eating, suggesting that puberty is a critical time period to genetic factors to activate, which make some individuals more susceptible to the development of eating disorders (Klump, 2000). According to the Swedish Twin Registry, Bulik et al. estimates that the heritability of anorexia nervosa is 56% with the remaining percentages coming from the shared environment and the non-shared environment, at 5% and 39% respectively (Bulik, 1997). In two family studies using controls, 3% lifetime risk of anorexia nervosa was found between first-degree relatives of patients. The relative risks for bulimia nervosa were 4.2 and 4.4 respectively for first-degree relatives of patients with anorexia nervosa or bulimia nervosa (Bulik, 1997).

**Eating habits with family.** Results from longitudinal and cross sectional studies have shown that adolescents who participate in regular family meals may be less likely to engage in disordered eating behaviors (Haines, 2010; Neumark-Sztainer, 2008). In a Minnesota prospective study of 2516 adolescent females, results showed that regular family meals were associated with lower prevalence of eating disorders among females (Neumark-Sztainer, 2008). Important factors of family meal time include parental role modeling of disordered eating behaviors and parental comments to their child concerning their weight (Canals, 2009; Haines, 2010). These factors have proven to have a strong influence on risk for eating disorders in adolescents. It is possible that within families
that are dieting, or in families where the adolescent’s thinness is important to the parents, or within families that have negative comments about their child’s weight, an increase in family meals may not be enough to overcome parental attitudes and beliefs. In a study by Haines et al, 17.5% of females never had family meals together, 39.4% sometimes had family meals together and 43.2% always had family meals together (Haines, 2010). Among females, those who ate frequent family meals together had a lower incidence of purging behavior compared to those who never ate family meals together. Also, more frequent family meals were linked to less incidence of dieting in females (Haines, 2010).

**Family pressure.** Pike and Rodin conducted a study on 77 high school girls who had symptoms of eating disorders or some level of disordered eating behavior (Pike, 1991; Littleton, 2003). The mothers of girls who possessed the disordered eating characteristics engaged in significantly high amounts of disordered eating behaviors themselves. This suggests that modeled this type of behavior. The same mothers provided a rating of their daughters being less attractive than the daughters rated themselves. The mothers also wanted them to lose more weight versus mothers of girls who did not have disordered eating behaviors, suggesting that pressures from family may be important in the development of disordered eating (Pike, 1991; Littleton, 2003). Keel et al. looked at parental comments on their daughter’s weight and found that the comments were associated with dieting as well as dissatisfaction in body image in their daughters (Keel, 1997). Vincent and McCabe looked at parental comments as well, and found that comments made regarding their daughter’s weight as well as encouragement to lose weight had an association with dieting, disordered eating, and body dissatisfaction (Vincent, 2000).
Social Variables

Statistics on media influence on eating disorders. • The body type portrayed in advertising as the ideal is possessed naturally by only 5% of American females (National Association of Anorexia Nervosa and Associated Disorders, 2011).

• 47% of girls in fifth through twelfth grade reported wanting to lose weight because of magazine pictures.

• 69% of girls in fifth through twelfth grade reported that magazine pictures influenced their idea of a perfect body shape.

Media influence on eating disorders. Mass media is a major part of the lives of many children, adolescents and adults (Levine, 2009; Tiggemann, 2005; Carney, 2006; Harper, 2007). Media is used for entertainment, distraction, and developmental issues of curiosity, education, popularity, gender roles, and sexuality. An on-going variable that is constantly being termed a key factor in disordered eating is the exposure to thinness as portrayed in the media, particularly among adolescent females (Littleton, 2003; Levine, 2009; Tiggemann, 2005; Carney, 2006; Harper, 2007). Western cultures have a tendency to value thinness, and an increased emphasis on thinness is important in the development of eating disorders (Annus, 2007; Furnham, 1997; Harper, 2008). One example is that female models have been progressively thinner, and as a result, female women and adolescents report pressure to be thin. Studies in an experimental environment have shown that females already experiencing body dissatisfaction and being exposed to media images of thinness, body dissatisfaction greatly enhances (Harper, 2008). To support this idea, meta-analysis in females with body dissatisfaction who were exposed to media
portrayals of thinness even for a brief amount of time reliably lead to a further increase in satisfaction with body image, with an effect size of $d=0.50$ (Harper, 2008).

In a study of Australian and Italian college women, fashion magazines predicted body dissatisfaction and disordered eating in Australian women, however, both groups wished to be thinner (Tiggemann, 2005). Tiggemann also studied the impact of media exposure of magazines versus television in body dissatisfaction and disordered eating (Tiggemann, 2003). Results showed that both modes of media were associated with body dissatisfaction, however, the amount of magazine reading was correlated with internalization of thinness ideals while time spent watching television was negatively correlated with awareness of sociocultural ideas and self esteem. Calado et al looked specifically at types of programming on television that contributes to disordered eating (Calado, 2010). Results showed that females with disordered eating behaviors significantly were exposed to sport, dieting, fitness, beauty, health, fashion, and music video sections of television. Carney et al examined the effects of disordered eating behaviors and media exposure (Carney, 2006). The factors of sex and media exposure were significant in determining scores on the EAT-26 test to examine disordered eating behaviors, meaning that those with higher EAT-26 scores are at greater risk to develop eating disorders. Female gender and those with exposure to the media were at greater risk of having high EAT-26 scores. Harper et al looked at the effects of pro-eating disorder websites versus professional websites giving information on eating disorders (Harper, 2006). For a sample of 1585 participants, 13% viewed one or more pro-eating disorder sites. Those who frequented pro-eating disorder websites had elevated levels of
body dissatisfaction and eating disturbances versus those who only viewed the eating disorder websites providing professional viewpoints.

There have also been studies looking at the long-term effects of media exposure and body dissatisfaction (Littleton, 2003). Becker et al. completed a cohort study of Fijian adolescents looking at the levels of disordered eating in two cohorts (Becker, 2002). The first group had television exposure for only a few weeks, while the second group had a television exposure of three years. The adolescents that had longer exposure rates to television had an increased level of disordered eating behaviors. Individuals with a few weeks of television exposure exhibited no form of disordered eating, while 11% of the teens exposed to longer durations of television engaged in self-induced vomiting as a way to control weight.

A damaging effect may take place with media images in adolescent females who possess disordered eating patterns. The idea is that adolescents internalize the messages and use the media as a source of knowledge in order to improve their appearance (Carney, 2006; Tiggemann, 2005; Harper, 2006). One study of adolescent females found that the extent of reported media as influencing their conception of ideal body image accounted for 25-40% variance in disordered eating (Tiggemann, 2005). A study containing 800 adolescent females found that the desire to have the body shape promoted by the media, plus the idea that this body image was normal was associated with an increase in disordered eating as well as poor satisfaction with body image (Tiggemann, 2005).
The damaging effects of the media continue with defining self-worth through one’s appearance, using foods of non-nutritious value as a means for coping, and promoting change in appearance through diet or exercise products (Tiggemann, 2005). These ideas can easily be internalized by the female adolescent, decreasing body satisfaction and causing the teen to engage in behaviors such as binge eating and using diet products.

**Social and peer influence on eating disorders.** Peer relationships have been studied to test their impact on self-esteem and body image in adolescent females (Schutz, 2007; Striegel-Moore, 1990; Annus, 2007). Research suggests that the negative qualities of relationships have more of an impact on health and well-being versus positive qualities of relationships (Annus, 2007). Negative aspects such as intrusiveness, demanding attitudes, and non-supportiveness contribute to decreased well-being. The feeling of alienation from friends has also been associated with behavior problems in adolescents, including depression, drug use, and suicide (Annus, 2007). Within groups of adolescents with bulimia nervosa, higher levels of negative interactions have been observed. In non-clinical studies, there has been shown to be a relationship between the negative aspects of friendship and body concerns with disordered eating (Schutz, 2007).

Societal influences are also an important factor when speaking of female adolescents and disordered eating (Schutz, 2007). The existence of social anxiety and social insecurity are likely obstacles in achieving healthy social relationships. Girls who experience social anxiety may have anxiety toward their physical appearance in the context of social situations. These social anxieties may attribute to perceived standards
of external appearance and attractiveness. Clinically speaking, women with anorexia nervosa and bulimia nervosa have been found to have high levels of social anxiety, insecurity, and isolation. In non-clinical studies, evidence supports the relationship between social anxiety with disordered eating and body dissatisfaction (Schutz, 2007). Gilbert and Meyer studied the aspect of social anxiety on having a fear of negative evaluation by people in general, and found that it is associated with restrictive eating patterns in a sample of non-clinical young adults (Gilbert, 2003). This is consistent with the model by Paxton et al. in which states engagement in restrictive eating behaviors is a mechanism in which an individual can gain acceptance from peers (Paxton, 2006).

**Treatment**

**Types of Treatment**

Recovery from anorexia nervosa is possible (Binge Eating Disorder Association, 2011). In long term follow-up studies, about half of individuals fully recover from the illness, a small percentage continued to suffer from anorexia, and the remainder continue to have other eating disorders. For some, anorexia nervosa can be relatively short-lived, whereas for others it can become a chronic and debilitating illness.

Most people with bulimia can be treated through individual outpatient therapy because they are not in danger of starving themselves as are persons with anorexia nervosa. However, if the binge purge cycle is out of control, admission to an eating disorders treatment program may help the individual interrupt their cycle to give them a head start on getting their symptoms under control (Binge Eating Disorder Association, 2011).
Treatment for binge eating disorder targets both the elimination of binge eating and the development and maintenance of a healthy weight (Binge Eating Disorder Association, 2011). Most people with BED can benefit from psychotherapy based on cognitive-behavioral principles and/or medication. Usually hospitalization is not required but admission to an eating disorders treatment program could be helpful in interrupting severe binge eating cycles.

**Family and Group Therapy**

Luckily, most of the complications experienced by persons with anorexia nervosa are reversible when they restore their weight (Binge Eating Disorder Association, 2011). People with this disorder should be diagnosed and treated as soon as possible because eating disorders are most successfully treated when diagnosed early. Some patients can be treated as outpatients, but some may need hospitalization to stabilize their low weight. Weight gain of one to three pounds per week is considered safe and desirable. The most effective strategies for treating a patient include weight restoration, individual, family, and group therapies along with psychiatric medications as needed (Binge Eating Disorder Association, Brown, 2006).

Group therapy is often advised so people can share their experiences with others (Binge Eating Disorder Association, 2011; Brown, 2006). Family therapy is important particularly if the individual is living at home and is a child or young adolescent.

Group therapy is especially effective for college-aged and young adult women because of the understanding of the group members. In group therapy, individuals can talk with peers who have similar experiences. Additionally, support groups can be helpful
as they can be attended for as long as necessary, have flexible schedules, and typically have no charge. Support groups, however, do not take the place of treatment. At times, a person with an eating disorder is unable to benefit from group therapy or support groups without the encouragement of a personal therapist (Binge Eating Disorder Association, 2011; Choate, 2009).

Alternate Therapy

**Pharmacotherapy.** A physician or advanced-practice nurse is needed to prescribe medications that may be useful in treating the disorder or associated depression or anxiety (Binge Eating Disorder Association, 2011). Several pharmacotherapies have been shown to be effective in the treatment of eating disorders, specifically binge eating disorder, such as selective serotonin-reuptake inhibitor (SSRI) antidepressants, antiepileptic drugs, the selective norepinephrine reuptake inhibitor atomoxetine, and antiobesity medications (Guerdjikova, 2009).

Research studies have been conducted on tricyclic antidepressants and monoamine oxidase inhibitors in the treatment of bulimia nervosa (Mitchell, 1993). Research has shown significant reduction in binge eating and/or vomiting frequency when compared to subjects taking a placebo (Mitchell, 1993). The only FDA approved medication for bulimia nervosa is fluoxetine (Prozac) showing 50-60% reduction in median binge eating and purging in the short term, although these behaviors often return when the drug is discontinued (Binge Eating Disorder Association, 2011).

**Cognitive behavioral therapy.** Cognitive-behavioral therapy is sometimes used to change unhealthy thoughts and behaviors (Binge Eating Disorder Association, 2011;
Cognitive Behavioral Therapy is a psychotherapeutic method of therapy aimed at helping an individual identify maladaptive conditions and cognitive restructuring (“Position of the American Dietetic Association: Nutrition Intervention in the Treatment of Eating Disorders”, 2011). The idea is that false beliefs and thought patterns on the relationship of food eating patterns and symptoms are challenged with more accurate interpretations. CBT focuses on self-monitoring of eating and purging behaviors as well as changing the distorted thinking patterns associated with the disorder (Binge Eating Disorder Association, 2011).

Cognitive Behavior Therapy has been proven effective at lessening the frequency of binge eating behaviors and normalizing cognitions in bulimia nervosa (“Position of the American Dietetic Association: Nutrition Intervention in the Treatment of Eating Disorders”, 2011; Binge Eating Disorder Association, 2011). CBT either in a group setting or individual therapy session may be the treatment of choice for bulimia nervosa. It can lead to complete abstinence from binge eating and purging in around 40% of patients.

Cognitive Behavioral Therapy is a successful treatment method in binge eating disorder as well through emphasis on binge eating reduction and weight loss if necessary. As evident in a randomized control trial, CBT proved to be significantly more effective compared to behavioral weight loss treatment in completely eliminating binge eating after two years. Modification in psychotherapy is key in the treatment of binge eating disorder since these individuals have lower levels of dietary restraint, higher levels of being overweight or obese.
Unfortunately, CBT in the treatment of anorexia nervosa can be quite challenging due to interruptions in neurotransmitter secretions and may limit a patient’s response to treatment.

**Dialectical behavioral therapy.** Dialectical Behavioral Therapy has had an increase in popularity in the treatment of eating disorders (“Position of the American Dietetic Association: Nutrition Intervention in the Treatment of Eating Disorders”, 2011). Dysregulation in emotion is considered to be an influencing factor for eating disorders and symptomatic behaviors which may affect coping skills. DBT focuses on coming up with new coping skills to be taught and practiced. From there, therapeutic goals are made to replace behaviors with constructive behaviors which will decrease high-risk behaviors while increasing self-respect. There is evidence that suggests that the use of Dialectical Behavioral Therapy has a potential for decreasing binge eating and purging symptoms in anorexia and bulimia nervosa populations.

**Dietitian’s Role**

Understanding the roles and responsibilities of registered dietitians is a critical component to the treatment of individuals with eating disorders (“Position of the American Dietetic Association: Nutrition Intervention in the Treatment of Eating Disorders”, 2011; Binge Eating Disorder Association, 2011). Dietitians are qualified individuals to provide medical nutrition therapy in order to normalize eating patterns and nutritional status. According to the American Dietetic Association, nutrition intervention and nutrition counseling by a registered dietitian is essential to a team approach of patients with anorexia nervosa, bulimia nervosa, and other eating disorders during
assessment and treatment of patient care. Dietitians working with patients with eating disorders need an understanding of professional boundaries, nutrition intervention as well as the psychological aspects of the disease itself. There is great likelihood that a dietitian is the first person to identify symptoms of eating disorder behaviors or at least be the first health care professional consulted by a patient with the disorder. RD’s have a multiple array of nutrition assessments they can use to contribute to treatment plans including conducting food history reports to examine potential deficiencies in anorexia and bulimia nervosa patients, and assessing the readiness or stages of change model conducted through motivational interviewing.

**Prevention**

**Protective Factors**

**Positive family relationships.** One factor that serves as a protective function in disordered eating and eating disorders is a positive family relationship (Littleton, 2003; Annus, 2006; Canals, 2009; Davis, 2003). There have been two longitudinal studies that suggest that having a positive family relationship, including spending quality time with parents, thinking that parents are friendly, and a feeling of closeness with family may all be ways that an adolescent can be insulated from developing eating disorders and dissatisfaction with body image (Byely, 2000). The McVey study found similar results in that adolescents that had high levels of support from their family were less likely to develop an eating disorder or disordered eating patterns when under stress (McVey, 2002).
There are several ways that family support can decrease an adolescent’s chances of having disordered eating habits (Littleton, 2003; Streigel-Moore, 1999). One way is that family can provide the essential social support to help with coping with stress as well as serve as a model for appropriate coping behavior. This could make chances less likely that the adolescent will use disordered eating as a means of coping. A healthier temperament can be achieved by positive parenting, making it less likely that an adolescent has issues with affect regulation and functioning socially. Having a healthy temperament would make it less likely that a teen would begin disordered eating as a response to negative affect (Littleton, 2003). Another way positive parenting can affect adolescents is through the development of a stable identity (McVey, 2002). Having a strong identity would increase self-esteem and physical appearance beliefs, making it less likely that they would begin disordered eating habits.

**Promotion of healthy body image/self esteem.** New research findings are showing that some of the "traits" in individuals who develop anorexia nervosa are actual "risk factors" that might be treated early on (Binge Eating Disorder Association, 2011). For example, anxiety, low self-esteem, body dissatisfaction, and dieting may be identified and interventions instituted before an eating disorder develops. Advocacy groups have also been effective in reducing dangerous media stories, such as teen magazine articles on "being thin" and pro-anorexia (pro-anorexic) websites that may glamorize such risk factors as dieting (Binge Eating Disorder Association, 2011; Harper, 2008).

**Social/peer relationships in prevention.** Relationships from society and peers may serve as a protective factor against disordered eating (Littleton, 2003; Schutz,
2007). Similar to relationships with family members, healthy relationships with peers can model the way for developing appropriate coping skills. Such relationships act as a buffer system in regard to school and societal pressures in relation to dieting, disordered eating, and dissatisfaction in body image.

Peer relationships and their impact on adolescent girls has been a frequent topic of research (Schutz, 2007). Peers provide a pathway to sharing information, giving emotional support, as well as making a contribution to increasing a sense of identity. Friendships are also a way to protect from every-day stresses and strains in life. As mentioned previously, adolescence is a time period for great change in development and self-image (Gralen, 1989; Schutz, 2007; Littleton, 2003). Receiving validation and support from peers has shown to be important in the development of a healthy self-esteem. Friendship has many dimensions, including trustworthiness, communication and acceptance which all foster a positive body image and heightened self-esteem.

Healthy relationships with peers may lead to participation in activities that foster positive identity and body image in adolescents. One such activity that has been shown in changes of positive behavior is inclusion in sports, particularly those that are not aesthetic, such as gymnastics or ballet. A study by Tiggemann in 2011 showed that girls who participated in sport were concerned with good performance and as a result had less dissatisfaction with body image and a higher self-esteem (Tiggemann, 2011).

Environment also needs to be supportive of fostering positive relationships (Littleton, 2003). School environments should be proactive in accepting all body types and sizes and discourage comparisons that are based on appearance or any teasing related
to body size or shape. A healthy environment may help an adolescent to be involved with cultural groups that are accepting of varieties of body types and emphasize healthy approaches to eating.

**Types of Prevention Strategies in Eating Disorders**

**Psychoeducational prevention.** Psychoeducational prevention has been shown to be by far the most common form of prevention in disordered eating in adolescents (Littleton, 2003). The efforts aimed at prevention use nutrition knowledge, healthy eating, and exercise (Baranowksi, 2001; McVey, 2002; Neumark-Sztainer, 1995). To be more specific, some preventative program focus on effective ways to lose weight with providing nutrition education, such as reducing high fat foods. Other means of educating is by using a speaker who describes information on eating disorders, such as symptoms and warning signs as well as the negative effects of the disorders.

The reason behind using psychoeducational efforts is because eating behaviors such as binging and restrictive dieting are due to a lack of nutritional knowledge, the necessity of eating nutritiously, and knowing how to effectively manage weight (Littleton, 2003; McVey, 2002; Neumark-Sztainer, 1995, Baranowksi, 2001). The belief is that by providing information regarding eating disorders and their related effects can help individuals with eating disorders and disordered eating to reach out and seek help, while deterring those who do not have problems in the first place. There is also a hypothesis that those individuals who have disordered eating do not realize the negative effects these actions may have (Littleton, 2003).
**Educating on media and thinness.** Educating on the Media’s perception of thinness is another approach to prevention in disordered eating (Tiggemann, 2005; Carney, 2006; Levine, 2009; Harper, 2007; Calado, 2010; Littleton, 2003). This is done by doing an analysis of media such as television and magazines and looking at content related to thinness and how it translates to success in life and ways to achieve it. Oftentimes this intervention looks at the stereotypes placed on gender and the constraints put on women and men in society. The basis of the intervention focuses on promotion of a healthy body image, and developing strategies in combating pressures to be thin.

**Adaptive functioning in prevention.** Another means of prevention is through the use of adaptive functioning using several techniques that serve as a protection factor against disordered eating (Stewart, 2001; McVey, 2002; O’Dea, 2000; Littleton, 2003). One such technique is called self esteem enhancement (Littleton, 2003). By this approach, self esteem is enhanced through experience in competency and success in the domains that are valued by the individual or significant others. The increase in self esteem protects the individual from developing forms of eating disorders and increasing body image satisfaction. Adaptive functioning in the form of stress management and healthy coping strategies is used in the prevention of eating disorders as well. This mode is done through assertive training, skills for social problem solving, methods of forming relationships with peers, and training in relaxation. Several studies have shown that these techniques serve as buffers in eating disorder development (Littleton, 2003).

**Future directions in prevention programs.** There are several approaches that can be used to improve the successfulness of prevention programs (Neumark-Sztainer,
Implementation of a strong, comprehensive program that extends continued interventions over time could be effective. These programs could focus on individuals with different levels of symptoms and greater emphasis placed on making changes in surrounding social environments. Programs of this type are ideal in a school setting. For further success, training of school staff in identifying disordered eating behaviors, providing food of nutritious nature in vending machines and school cafeterias, and encouraging all individuals, no matter what their size, to participate in sports activities.

Further ideas look toward incorporating knowledge of eating and body image into class curriculum (Littleton, 2003). Ideas to educate on include ways to become an educated consumer, providing information on development and puberty, and education on cultural differences in the perception of beauty and how things vary over time. School professionals can also serve as role models to adolescents by adopting a healthy attitude about their own body image and eating behaviors. Further education can be provided to parent in regard to proper nutrition, differences in healthy versus unhealthy eating, and ways to detect signs of disordered eating. This in return can help parents to be role models for their teenage children. Implementation will require time, effort and money, however these programs are cost-effective in the long run when they lead to long lasting changes in the societal environment.

School environments can also be utilized in including group discussions for students to talk about their concerns in relation to dieting, body image, and eating habits (Piran, 1999). Groups can be lead by a school personnel who is trained in a way that
he/she can help to assist in handling situations and coming up with realistic solutions. Such a program was implemented by Piran in 1999. This program resulted in lowered incidence of disordered eating among students. In relation to students who previously attended the school prior to implementation of the program, students exhibited less disordered eating behavior. The school at hand was known to be high risk for disordered eating problems, so results were significant in the decrease of disordered eating patterns.

It is important to realize that personalization is vital, and that a one-size-fits-all approach may not be the answer (Littleton, 2003). In order to be personalized, prevention programs need to pay attention to developmental level of participants at hand, current level of symptomatology, as well as participant’s current motivation to make changes. This would allow individuals to be placed in groups based off of information provided by screening questionnaires, based on disordered eating patterns, dissatisfaction with body image and willingness to change.

A helpful approach of personalization would be to use the motivational enhancement method which would provide information on short and long-term effects of disordered eating, the nature and details of these behaviors, and different methods to use in managing weight (Littleton, 2003). This method could help those individuals who may be experimenting with disordered eating behaviors but do not know or understand the issues related to the behaviors. This approach might not be as effective for an individual experiencing body dissatisfaction, whereas one that targets stress reduction, regulating emotions, and techniques to modify disordered eating pattern would be.

Lastly, an intervention focused on looking at the changes involved in puberty, ways to
resist peer pressure and helping individuals be informed consumers in the world of media would be beneficial for those who do not have significant amounts of body dissatisfaction or disordered eating patterns.
CHAPTER III

METHODOLOGY

Purpose

The primary purpose of this research was to determine the prevalence of disordered eating behaviors and eating disorders in Nutrition, Nursing, and HDFS majors at Kent State University in Kent, Ohio. This research was to test the theory that exists concerning disordered eating behaviors being more prevalent in Dietetic majors versus other Health and Human Services majors.

Design

The research design was a 3x4 ANOVA factorial design with three levels of major (Nutrition & Dietetics, Nursing, Human Development and Family Studies) and four levels of class standing (Freshman, Sophomore, Junior, Senior). Therefore, the independent variables were college major and class standing. The dependent variables were the disordered eating scores from the Eating Attitude Test-26 and the ORTO-15 Test.

Sample

A convenience sample consisting of college-aged females age 18-25 attending Kent State University was utilized. Selection criteria included: 1.) undergraduate student, both part-time and full-time 2.) student between the ages of 18 and 25 years old 3.) declared major of Nutrition, Pre-Nursing, Nursing, Pre-HDFS, and HDFS majors and 4.) female gender. Exclusion criteria included male students and all other majors as well as graduate students. According to the Kent State University Research, Planning and Institutional
Effectiveness (RPIE) statistics, the College of Nursing had 2,290 Nursing majors as of the Fall 2011 semester. Human Development and Family Studies had 579 total pre and declared majors and Nutrition & Dietetics had 175 majors as of the Fall 2011 semester. Projected sample size was 100 participants from each major.

**Instruments of Measure**

An online survey which consisted of three sections was utilized. The first section of the survey consisted of the Eating Attitude Test-26, found in appendix C part A and B (Garner & Garfinkel, 1982). Permission for use of survey can be found in Appendix B. Eating Attitude Test-26, found in part A of appendix C, encompasses 26 questions from four categories including: dieting behaviors, bulimia, preoccupation with food and oral control. Each question is answered based on a six-point Likert-Scale consisting of the ranges of “Always”, “Usually”, “Often”, “Sometimes”, “Rarely”, to “Never”. “Always” indicates a score of “3”, “Usually” indicates a score of “2”, and “Often” indicates a score of “1” while “Sometimes”, “Rarely”, and “Never” indicate a score of “0”. Scores can range from 0 to 78, with high scores on the test indicating being at-risk for an eating disorder, however, the test is not meant to be utilized as a diagnostic tool. A score of 20 or higher indicates that an individual is recommended to see a health-care professional in order to determine if they meet the requirements for an eating disorder as established by DSM-IV criteria (Garner, 1982). The EAT-26 behavioral questions, found in part B of appendix C, ask five behavioral questions regarding eating behaviors in the last six months. The behavioral questions use a Likert scale ranging from “never” to “once a day or more”. Scoring is interpreted based on scoring criteria listed in Appendix D.
The ORTO-15 test is the test for the diagnosis of orthorexia nervosa, and can be found in part C of appendix C. The test is based off of a United States study by Bratman made up of 10 items with a dichotomous choice of “yes” or “no” (Bratman, 2000). The number of “yes” answers increases with the degree of orthorexia. The ORTO-15 is made up of 15 closed multiple choice items (always, often, sometimes, never). The items investigate the obsessive attitudes of the subjects by choosing, preparing, and consuming food they consider to be healthy. The test is used to explore the emotional and rational aspects of the subject to whom it is administered. The rational-cognitive area is reflected in the following questions: 1, 5, 6, 11, 12, 14. The clinical area is reflected in the following questions: 3, 7, 8, 9, 15. The emotional area is reflected in the following questions: 2, 4, 10, 13. A score of “1” indicates a normal eating behavior and a score of “4” indicates more indicative of orthorexia nervosa. A threshold value was then determined which the diagnosis of orthorexia could be given. A cut-off of 40 is considered to be more predictive of orthorexia in a sample.

The last section of the online survey included demographic data, found in part D of appendix C, including: age, gender, major, class standing to confirm undergraduate status, and self-reported height and weight.

**Procedures**

A web-based survey was administered during the Spring 2012 semester at Kent State University. The contacting of subjects was obtained through the use of the Kent State University listservs in the programs of Nutrition & Dietetics, Nursing, and Human Development and Family Studies. The listservs were obtained through contacting faculty
from the Nutrition & Dietetics program, the Nursing program, and the Human Development and Family Studies program. An email was sent out to the faculty of these departments, explaining the purpose of the study. Faculty forwarded the purpose statement and study out to the listservs to reach the students. The survey was administered through an online link provided to the students via email obtained from the listservs. The survey was sent from SurveyMonkey, an online survey creator website. Participants were asked to disclose their class standing, age, and gender in order to meet qualification standards for participating in the study. The survey was accessible for one month and reminder emails were administered during four periods in the one month time frame (once per week) to remind students to complete and submit the survey. Responses were collected after one month’s period and data was summarized. An incentive was put into place in the form of a $25 gift card in order to increase participation rates.

**Data Analysis**

Data consisted of scores from the EAT-26 questionnaire, EAT-26 behavior questions, scores from the ORTO-15 questionnaire, and demographic data. Scores from the EAT-26 questionnaire were tallied and evaluated based off of scoring instructions reported in “Eating Attitudes Test (EAT-26): Scoring and Interpretation” by David M. Garner, Ph. D. accessed from: [http://www.eat-26.com/Docs/EAT-26IntpretScoring-Test-3-20-10.pdf](http://www.eat-26.com/Docs/EAT-26IntpretScoring-Test-3-20-10.pdf). Scores from the ORTO-15 were evaluated based off of scoring instructions reported in the original use of the ORTO-15 test in the article “Orthorexia Nervosa: Validation of a Diagnosis Questionnaire” by Donini et al in 2005 accessed from:
Statistics were calculated using a multi-factorial ANOVA with three levels of major (Nursing, HDFS, and Nutrition & Dietetics) and four levels of class standing (Freshman, Sophomore, Junior, Senior). A statistical significance was set at P value of ≤ 0.05. Self-reported height and weight was used to determine body mass index (BMI) using the formula (weight in pounds/(height in inches x height in inches) x 704).

The data were compiled and analyzed using social sciences (SPSS) software (version 18.0.3). Statistics were obtained using a multi-factorial ANOVA to test the interaction between major and class standing. An independent t-test was used to compare mean scores of the EAT-26, EAT-26 Behavior test and BMI with regard to classification of orthorexia status (orthorexic versus non-orthorexic). Demographic data such as age, ethnicity, major, class standing, enrollment status, and whether or not the student was a college athlete was summarized as descriptive statistics. Statistical significance was set at P value of ≤ 0.05.
CHAPTER IV
JOURNAL ARTICLE

Introduction

In the United States, it is estimated that 24 million individuals suffer from an eating disorder, including anorexia nervosa, bulimia nervosa, and binge eating disorder. Women are much more likely to develop an eating disorder; only an estimated 5-15% of diagnosed cases come from the male population. (National Association of Anorexia Nervosa and Associated Disorders, 2011; Herpertz-Dahlmann, 2008; Scherag, 2010; Edman, 2005). In adolescents, anorexia nervosa is the third most common chronic illness (National Association of Anorexia Nervosa and Associated Disorders, 2011; Aime, 2008). Of any mental illness, eating disorders have the highest mortality rate. (National Association for Anorexia Nervosa and Associated Disorders, 2011).

The Diagnostic and Statistical Manual – 4th Edition (DSM-IV) recognizes two distinct eating disorder types, anorexia nervosa and bulimia nervosa (Binge Eating Disorder Association, 2011). If a person is struggling with eating disorder thoughts, feelings or behaviors, but does not have all the symptoms of anorexia or bulimia, that person may be diagnosed with eating disorder not otherwise specified (EDNOS). Examples of eating disorders not otherwise specified include binge eating disorder and orthorexia nervosa. Individuals with binge eating disorder (BED) engage in binge eating, but in contrast to people with bulimia nervosa (BN) they do not regularly use inappropriate compensatory weight control behaviors such as fasting or purging to lose weight. Orthorexia nervosa (ON) is characterized by an unhealthy obsession with eating
“healthy” foods and avoiding “unhealthy” foods (Korinth, 2008; Donini, 2005). Individuals with ON may turn to food as a religion, spending a great deal of time thinking about food, dedicating their whole existence to the planning, purchasing, preparation, and consumption of food considered “healthy”. Little research has been conducted on the topic of ON, with much of the research being conducted in Italy and translated into other languages (Donini, 2005).

According to the public, there is a tendency to believe that dietetic practitioner’s and students are free from food-related issues due to their training and expertise (Houston, 2008; Mehr, 2005). Often times, they are facing the same issues that the rest of the population faces, including disordered eating behaviors and diagnosed eating disorders. There is a hypothesis that Dietetics majors may have a higher prevalence of disordered eating behaviors due to their manifestations through food-related activities such as collecting recipes, preparing food for others, or choosing to pursue a career in nutrition (Kiziltan, 2008; Korinth, 2008). This was shown in one study which displayed that 24% of Dietetic majors had characteristics of anorexia nervosa and may choose a career in dietetics due to their personal experience and obsession with food (Kiziltan, 2008; Fredenberg, 1999). Supporting evidence comes from a study of dietitians that showed one-third of the sample of dietitians thought that personal struggles with eating problems might be the single most motivational reason for studying Dietetics (Korinth, 2009). In a recent study of Austrian dietitians, 12.8% exhibited four or more symptoms of orthorexia nervosa (Korinth, 2009). Dietitians showing a presence of orthorexia
nervosa also reported the existence of a previous or current eating disorder such as anorexia nervosa, bulimia nervosa, or binge eating disorder.

With several studies on eating disorders and disordered eating focused on the health profession of dietetics, there has been evidence found that this may be a group of individuals who are at an increased risk for the development of eating disorders. Of the existing studies, few have examined dietetic students in relation to other health majors. The purpose of the present investigation was to examine eating behaviors of college-aged female Dietetics majors versus other Health and Human Services majors. These majors at Kent State University primarily consist of the female population which is significant since many diagnosed eating disorders and disordered eating occur in the female population. Observing college-age students is also significant since 95% of those with eating disorders are between the ages of 18-25, (National Association of Anorexia Nervosa and Associated Disorders, 2011) and the college-age female falls within this range. Comparing Nutrition & Dietetics majors to those majors in a similar realm such as the Health and Human Services field seems to be an appropriate option to identify if nutrition students are in fact more prone to disordered eating behaviors compared to other health-related majors, more specifically Nursing and Human Development and Family Studies majors. If Nutrition & Dietetics majors are in fact at greater risk, it is of importance to help directors of Nutrition & Dietetics programs establish dialogue and protocols concerning disordered eating with their students. An example may include screening before entering a Nutrition & Dietetics program in order to help to know if a particular group is at risk and being able to make appropriate referrals.
In the present study, the research hypotheses included: a) female Dietetic majors will have higher disordered eating scores compared to female Nursing and female Human Development and Family Studies majors; b) there will be a difference in disordered eating scores in relation to class standing (Freshman, Sophomore, Junior, Senior); and body mass index (BMI) will relate to disordered eating scores.

Methodology

Design

The research design was a 3x4 factorial design with three levels of major (Nutrition & Dietetics, Nursing, Human Development and Family Studies) and four levels of class standing (Freshman, Sophomore, Junior, Senior). Therefore, the independent variables were college major and class standing. The dependent variables were the disordered eating scores from the Eating Attitude Test-26 and the ORTO-15 Test.

Sample

A convenience sample consisted of college-aged females age 18-25 attending Kent State University. Selection criteria included: 1.) undergraduate student, both part-time and full-time 2.) student between the ages of 18 and 25 years old 3.) declared major of Nutrition, Pre-Nursing, Nursing, Pre-HDFS, and HDFS majors and 4.) female gender. Exclusion criteria included male students and all other majors as well as graduate students.
**Measures**

An online survey which consisted of three sections was utilized. The first section of the survey consisted of the Eating Attitude Test-26 utilizing two components (Garner & Garfinkel, 1982). The first component of the Eating Attitude Test-26 encompassed 26 questions from four categories including: dieting behaviors, bulimia, preoccupation with food and oral control. Each question was answered based on a six-point Likert-Scale consisting of the ranges of “Always”, “Usually”, “Often”, “Sometimes”, “Rarely”, to “Never”. “Always” indicated a score of “3”, “Usually” indicated a score of “2”, and “Often” indicated a score of “1” while “Sometimes”, “Rarely”, and “Never” indicated a score of “0”. Scores can range from 0 to 78, with high scores on the test indicating being at-risk for an eating disorder. However, the test is not meant to be utilized as a diagnostic tool. The second component of the EAT-26 was the EAT-26 behavioral questions which ask five behavioral questions regarding eating behaviors in the last six months. The EAT-26 behavioral questions used a six-point Likert scale ranging from “never” to “once a day or more” for the first four questions followed by one “yes” or “no” response question. Table 1 refers to the EAT-26 and EAT-26 Behavior questionnaire. Table 2 and Table 3 refer to the EAT-26 and EAT-26 Behavior scoring criteria, respectively.
Table 1. EAT-26 Test and EAT-26 Behavior Test Questionnaire

<table>
<thead>
<tr>
<th>Part B: Check a response for each of the following statements:</th>
<th>Always</th>
<th>Usually</th>
<th>Often</th>
<th>Some times</th>
<th>Rarely</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Am terrified about being overweight.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Avoid eating when I am hungry.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Find myself preoccupied with food.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Have gone on eating binges where I feel that I may not be able to stop.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Cut my food into small pieces.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Aware of the calorie content of foods that I eat.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Particularly avoid food with a high carbohydrate content (i.e. bread, rice, potatoes, etc.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Feel that others would prefer if I ate more.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Vomit after I have eaten.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Feel extremely guilty after eating.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Am preoccupied with a desire to be thinner.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Think about burning up calories when I exercise.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Other people think that I am too thin.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. Am preoccupied with the thought of having fat on my body.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Take longer than others to eat my meals.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. Avoid foods with sugar in them.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. Eat diet foods.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18. Feel that food controls my life.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19. Display self-control around food.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20. Feel that others pressure me to eat.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21. Give too much time and thought to food.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22. Feel uncomfortable after eating sweets.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23. Engage in dieting behavior.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24. Like my stomach to be empty.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25. Have the impulse to vomit after meals.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Part C: Behavioral Questions: In the past 6 months have you:</th>
<th>Never</th>
<th>Once a month or less</th>
<th>2-3 times a month</th>
<th>Once a week</th>
<th>2-6 times a week</th>
<th>Once a day or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Gone on eating binges where you feel that you may not be able to stop? *</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B Ever made yourself sick (vomited) to control your weight or shape?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C Ever used laxatives, diet pills or diuretics (water pills) to control your weight or shape?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D Exercised more than 60 minutes a day to lose or to control your weight?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E Lost 20 pounds or more in the past 6 months</td>
<td>Yes</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Defined as eating much more than most people would under the same circumstances and feeling that eating is out of control.

Source: EAT-26 (Garner et al. 1982, Psychological Medicine, 12, 871-878)
Table 2. EAT-26 Scoring Criteria

<table>
<thead>
<tr>
<th>Score for Questions</th>
<th>Always</th>
<th>Usually</th>
<th>Often</th>
<th>Sometimes</th>
<th>Rarely</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1-25</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>#26</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

Source: EAT-26 (Garner et al. 1982, Psychological Medicine, 12, 871-878)

Table 3. EAT-26 Behavior Test Scoring Criteria

<table>
<thead>
<tr>
<th>In the past 6 months have you:</th>
<th>Never</th>
<th>Once a month or less</th>
<th>2-3 times a month</th>
<th>Once a week</th>
<th>2-6 times a week</th>
<th>Once a day or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gone on eating binges where you feel that you may not be able to stop?</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Ever made yourself sick (vomited) to control your weight or shape?</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Ever used laxatives, diet pills or diuretics (water pills) to control your weight or shape?</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Exercised more than 60 minutes a day to lose or to control your weight?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
</tbody>
</table>

Lost 20 pounds or more in the past 6 months

<table>
<thead>
<tr>
<th></th>
<th>Yes x</th>
<th>No x</th>
</tr>
</thead>
</table>

If you scored in any of the boxes marked “x”, you should seek an evaluation from a trained mental health professional

Source: EAT-26 (Garner et al. 1982, Psychological Medicine, 12, 871-878)

The second section of the online survey utilized the ORTO-15 test which is used in the diagnosis of orthorexia nervosa. The test is based off of a United States study by Steven Bratman and is made up of 15 closed multiple choice items (always, often, sometimes, never). The items investigate the obsessive attitudes of the subjects by choosing, preparing, and consuming food they consider to be healthy. The test is used to explore the emotional and rational aspects of the subject to whom it is administered. The rational-cognitive area was reflected in the following questions: 1,5,6,11,12,14. The
clinical area was reflected in the following questions: 3, 7, 8, 9, 15. The emotional area was reflected in the following questions: 2, 4, 10, 13. A score of “1” indicated more indicative of orthorexia and a score of “4” indicated a normal eating behavior. A threshold value was then determined at a cut-off of 40 which is considered to be more predictive of orthorexia. Table 4 refers to the ORTO-15 questionnaire and scoring criteria.

Table 4. ORTO-15 Questionnaire and Scoring Criteria

<table>
<thead>
<tr>
<th>ORTO-15</th>
<th>Always</th>
<th>Often</th>
<th>Sometimes</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) When eating, do you pay attention to the calories of the food?</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>2) When you go in a food shop do you feel confused?</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>3) In the last 3 months, did the thought of food worry you?</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>4) Are your eating choices conditioned by your worry about your health status?</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>5) Is the taste of food more important than the quality when you evaluate food?</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>6) Are you willing to spend more money to have healthier food?</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>7) Does the thought about food worry you for more than three hours a day?</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>8) Do you allow yourself any eating transgressions?</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>9) Do you think your mood affects your eating behavior?</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>10) Do you think that the conviction to eat only healthy food increases self-esteem?</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>11) Do you think that eating healthy food changes your lifestyle (frequency of eating out, friends, …)?</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>12) Do you think that eating healthy food may improve your appearance?</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>13) Do you feel guilty when transgressing?</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>14) Do you think that on the market there is also unhealthy food?</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>15) At present, are you alone when having meals?</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>


The last section of the online survey included demographic data, including: age, gender, major, class standing to confirm undergraduate status, and self-reported height and weight to determine body mass index (BMI). BMI was calculated using the formula
(weight in pounds/(height in inches x height in inches) x 704) using the participants self-reported height and weight.

**Procedure**

A web-based survey was administered during the Spring 2012 semester at Kent State University. The contacting of subjects was conducted through the use of the Kent State University listservs in the programs of Nutrition & Dietetics, Nursing, and Human Development and Family Studies. The listservs were obtained through contacting faculty from the Nutrition & Dietetics program, the Nursing program, and the Human Development and Family Studies program. An email was sent out to the faculty of these departments explaining the purpose of the study. Faculty forwarded the purpose statement and study out to the listservs to reach the students. The survey was administered through an online link provided to the students via email obtained from the listservs. The survey was made available through SurveyMonkey, an online survey creator website. The survey was accessible for one month’s time beginning on March 1, 2012, and reminder emails were administered during four periods in the one month time frame (once per week) to remind students to complete and submit the survey. Responses were collected after one month’s period on April 1, 2012 and data were summarized. An incentive was put into place in the form of a $25 gift card in order to increase participation rates. To be entered into the drawing for the gift card, participants had the option to provide their email at the end of the survey and one participant was selected at random. Participants were asked to disclose their class standing, age, and gender in order
to meet qualification standards for participating in the study; however, participants were not identifiable with their questionnaire results, as all surveys were anonymous.

**Data Analysis**

Data consisted of scores from the EAT-26 questionnaire, EAT-26 behavior questions, scores from the ORTO-15 questionnaire, and demographic data. Scores from the EAT-26 questionnaire were tallied and evaluated based off of scoring instructions reported in “Eating Attitudes Test (EAT-26): Scoring and Interpretation” by David M. Garner, Ph. D. accessed from: [http://www.eat-26.com/Docs/EAT-26IntpretScoring-Test-3-20-10.pdf](http://www.eat-26.com/Docs/EAT-26IntpretScoring-Test-3-20-10.pdf). Scores from the ORTO-15 were evaluated based off of scoring instructions reported in the original use of the ORTO-15 test in the article “Orthorexia Nervosa: Validation of a Diagnosis Questionnaire” by Donini et al in 2005 accessed from: [http://www.orthorexia.com/wp-content/uploads/2010/06/Donini-Orthorexia-Questionaire.pdf](http://www.orthorexia.com/wp-content/uploads/2010/06/Donini-Orthorexia-Questionaire.pdf). BMI was calculated based on self-reported height and weight as descriptive statistics. Demographic data such as age, ethnicity, major, class standing, enrollment status, and whether or not the student was a college athlete was summarized as descriptive statistics.

The data were compiled and analyzed using social sciences (SPSS) software (version 18.0.3). Statistics were obtained using a multi-factorial ANOVA. The research design included a 3x4 ANOVA factorial design with three levels of major (Nutrition & Dietetics, Nursing, Human Development and Family Studies) and four levels of class standing (Freshman, Sophomore, Junior, Senior). An independent t-test was used to compare mean scores of the EAT-26, EAT-26 Behavior test and BMI with regard to
classification of orthorexia status (orthorexic versus non-orthorexic). Statistical significance was set at P value of ≤ 0.05.

**Results**

A convenience sample of five hundred and twenty eight KSU female Health and Human Services majors of Pre-Nursing, Nursing, Pre-Human Development and Family Studies (Pre-HDFS), Human Development and Family Studies(HDFS), and Nutrition & Dietetics majors participated in the study, but only 345 participants were included in the final results due to: not completing the demographic section of the survey to classify the individual, or did not meet the eligibility requirements (participant was a male, participant was classified outside of the age range).

Table 5 shows the demographic data of the 345 participants. The majority of the participants were white (91.8%), as opposed to other ethnicities. The majority of the population was from Pre-Nursing and Nursing majors (65.8%, N=227), 13.9% (N=48) were Pre-HDFS majors and HDFS majors, and 20.3% (N=70) were Nutrition & Dietetics majors. Participants ranged from Freshman, Sophomores, Juniors, and Seniors, with an almost even distribution across the class standings. The majority of participants were full-time enrollment status (93%, N=321), not collegiate athletes (98%, N=338) and classified as normal weight (BMI= 18.5-24.5, 69% N=238).
Table 5. Demographic Data of Kent State University Female Health and Human Services Majors Completing the Disordered Eating Survey (N=345)

<table>
<thead>
<tr>
<th>Demographic</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (In Years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>47</td>
<td>13.6</td>
</tr>
<tr>
<td>19</td>
<td>64</td>
<td>18.6</td>
</tr>
<tr>
<td>20</td>
<td>58</td>
<td>16.8</td>
</tr>
<tr>
<td>21</td>
<td>68</td>
<td>19.7</td>
</tr>
<tr>
<td>22</td>
<td>49</td>
<td>14.2</td>
</tr>
<tr>
<td>23</td>
<td>26</td>
<td>7.5</td>
</tr>
<tr>
<td>24</td>
<td>20</td>
<td>5.8</td>
</tr>
<tr>
<td>25</td>
<td>13</td>
<td>3.8</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White or Caucasian</td>
<td>314</td>
<td>91.8</td>
</tr>
<tr>
<td>Black /African American</td>
<td>10</td>
<td>2.9</td>
</tr>
<tr>
<td>American Indian/Alaska Native</td>
<td>1</td>
<td>0.3</td>
</tr>
<tr>
<td>Asian or Asian American</td>
<td>9</td>
<td>2.6</td>
</tr>
<tr>
<td>Hispanic or Latino American</td>
<td>5</td>
<td>1.5</td>
</tr>
<tr>
<td>Multiracial</td>
<td>3</td>
<td>0.9</td>
</tr>
<tr>
<td>Major</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nursing Majors</td>
<td>227</td>
<td>65.8</td>
</tr>
<tr>
<td>HDFS Majors</td>
<td>48</td>
<td>13.9</td>
</tr>
<tr>
<td>Nutrition &amp; Dietetics Majors</td>
<td>70</td>
<td>20.3</td>
</tr>
<tr>
<td>Class Standing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Freshman</td>
<td>86</td>
<td>24.9</td>
</tr>
<tr>
<td>Sophomore</td>
<td>94</td>
<td>27.2</td>
</tr>
<tr>
<td>Junior</td>
<td>74</td>
<td>21.4</td>
</tr>
<tr>
<td>Senior</td>
<td>91</td>
<td>26.4</td>
</tr>
<tr>
<td>Enrollment Status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Part-time</td>
<td>24</td>
<td>7</td>
</tr>
<tr>
<td>Full-Time</td>
<td>321</td>
<td>93</td>
</tr>
<tr>
<td>College Athlete</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>No</td>
<td>338</td>
<td>98</td>
</tr>
<tr>
<td>BMI*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18.4 or less (underweight)</td>
<td>4</td>
<td>1.2</td>
</tr>
<tr>
<td>18.5-24.9 (normal weight)</td>
<td>238</td>
<td>69.0</td>
</tr>
<tr>
<td>25-29.9 (overweight)</td>
<td>76</td>
<td>22.0</td>
</tr>
<tr>
<td>30-34.9 (obesity class I)</td>
<td>17</td>
<td>4.9</td>
</tr>
<tr>
<td>35-39.9 (obesity class II)</td>
<td>7</td>
<td>2.0</td>
</tr>
<tr>
<td>40 or more (obesity class III)</td>
<td>3</td>
<td>0.9</td>
</tr>
</tbody>
</table>

HDFS indicates human development and family services majors.


Table 6 shows the mean scores on the EAT-26, EAT-26 Behavior Test, and ORTO-15 by major. Significance was set at P ≤ 0.05. The EAT-26 test was evaluated based on a total of 20 or greater than 20 indicating a high level of concern about dieting, body weight, or problematic eating behaviors.
There was no significant difference between major mean scores and the EAT-26 test (P=0.87). Scoring for the EAT-26 Behavior test was based on if a respondent had a score of anything other than a zero (0) on any of the questions, the respondent should seek an evaluation from a trained mental health professional. There was no significant difference in mean major scores compared to the EAT-26 Behavior Test (P=0.39). The ORTO-15 test was based on a threshold value of a total of 40 or greater than 40 to be more predictive of orthorexia. There was no significant difference between mean of college major and ORTO-15 scores (P=0.10).

Table 6. Mean Scores of EAT-26, EAT-26 Behavior Test and ORTO-15 by Major (N=345)*

<table>
<thead>
<tr>
<th>Questionnaire</th>
<th>Nursing (N=227)</th>
<th>HDSF (N=48)</th>
<th>Nutrition &amp; Dietetics (N=70)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean ± SD</td>
<td>Mean ± SD</td>
<td>Mean ± SD</td>
<td></td>
</tr>
<tr>
<td>EAT-26 a</td>
<td>11.38 ± 10.25</td>
<td>11.50 ± 11.50</td>
<td>10.67 ± 9.81</td>
<td>0.87</td>
</tr>
<tr>
<td>EAT-26 Behavior b</td>
<td>0.34 ± 0.47</td>
<td>0.25 ± 0.44</td>
<td>0.23 ± 0.42</td>
<td>0.39</td>
</tr>
<tr>
<td>ORTO-15 c</td>
<td>36.89 ± 4.12</td>
<td>36.81 ± 3.96</td>
<td>36.63 ± 4.14</td>
<td>0.10</td>
</tr>
</tbody>
</table>

*EAT-26 Scoring: a total of 20 or greater than 20 indicate a high level of concern about dieting, body weight, or problematic eating behaviors.
*EAT-26 Behavior Scoring: If a respondent had a score of anything other than a zero (0) on any of these five questions, the respondent should seek an evaluation from a trained mental health professional.
*ORTO-15 Scoring: A cut-off of 40 is considered to be more predictive of orthorexia in a sample.
*No significant difference between mean scores by major on the EAT-26, EAT-26 behavior test, or ORTO-15 at P ≤ 0.05.

Table 7 describes the mean scores of the EAT-26, EAT-26 Behavior test, and ORTO-15 by class standing. Significance was set at P ≤ 0.05. There was no significant difference in mean of class standing in regard to the EAT-26, EAT-26 Behavior test, and the ORTO-15 test.
Table 7. Mean Scores of EAT-26, EAT-26 Behavior Test and ORTO-15 by Class Standing (N=345)*

<table>
<thead>
<tr>
<th>Questionnaire</th>
<th>Freshman (N=87) Mean ± SD</th>
<th>Sophomore (N=93) Mean ± SD</th>
<th>Junior (N=75) Mean ± SD</th>
<th>Senior (N=90) Mean ± SD</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>EAT-26</td>
<td>11.43 ± 8.62</td>
<td>12.86 ± 12.06</td>
<td>9.31 ± 8.63</td>
<td>11.04 ± 11.02</td>
<td>0.17</td>
</tr>
<tr>
<td>EAT-26 Behavior</td>
<td>0.39 ± 0.49</td>
<td>0.32 ± 0.47</td>
<td>0.20 ± 0.40</td>
<td>0.29 ± 0.46</td>
<td>0.29</td>
</tr>
<tr>
<td>ORTO-15</td>
<td>36.55 ± 4.24</td>
<td>35.90 ± 4.69</td>
<td>37.25 ± 3.77</td>
<td>36.94 ± 4.14</td>
<td>0.16</td>
</tr>
</tbody>
</table>

*EAT-26 Scoring: a total of 20 or greater than 20 indicate a high level of concern about dieting, body weight, or problematic eating behaviors.

b EAT-26 Behavior Scoring: If a respondent had a score of anything other than a zero (0) on any of these five questions, the respondent should seek an evaluation from a trained mental health professional.

c ORTO-15 Scoring: A cut-off of 40 is considered to be more predictive of orthorexia in a sample.

*Class standing based on self-reported data; No significant difference in mean scores by class standing on the EAT-26, EAT-26 behavior test, or ORTO-15 at P ≤ 0.05.

Table 8 shows Health and Human Services Majors classified as orthorexic compared to scores on the EAT-26, EAT-26 Behavior Test and BMI. There was no significant difference in the mean score for BMI in participants classified as orthorexic versus non-orthorexic (mean= 23.56 ± 4.09 and 23.56 ± 4.55, respectively). Respondents classified as non-orthorexic had higher mean scores on the EAT-26 (P≤ 0.001) and the EAT-26 Behavior test (P≤ 0.006) than did participants classified as orthorexic (mean= 13 ± 4.96 and 1.34 ± 2.49, respectively; versus mean=6.13 ± 11.07 and 0.56 ± 1.68, respectively).
Table 8. Orthorexia Status of Health and Human Services Majors Related to Scores on the EAT-26, EAT-26 Behavior Test and BMI (N=345)*

<table>
<thead>
<tr>
<th>Questionnaire</th>
<th>Orthorexic (N=88)</th>
<th>Not Orthorexic (N=257)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>EAT-26 b</td>
<td>6.13 ± 11.07</td>
<td>13.01 ± 4.96</td>
<td>0.001**</td>
</tr>
<tr>
<td>EAT-26 Behavior c</td>
<td>0.56 ± 1.68</td>
<td>1.34 ± 2.49</td>
<td>0.006**</td>
</tr>
<tr>
<td>BMI d</td>
<td>23.56 ± 4.09</td>
<td>23.57 ± 4.55</td>
<td>0.98</td>
</tr>
</tbody>
</table>

* ORTO-15 Scoring: A cut-off of 40 is considered to be more predictive of orthorexia in a sample.  
 b EAT-26 Scoring: a total of 20 or greater than 20 indicate a high level of concern about dieting, body weight, or problematic eating behaviors.  
 c EAT-26 Behavior Scoring: If a respondent had a score of anything other than a zero (0) on any of these five questions, the respondent should seek an evaluation from a trained mental health professional.  
 *A total of seven participants classified as being orthorexic were excluded due to missing or incomplete data  
 **T-test with significance set at P ≤ 0.05

Based on the criteria of a threshold value of greater than or equal to 40 being more predictive of orthorexia nervosa, 28% of the sample population was classified as being orthorexic (N=95), 18% of the population had a score of at least 20 or greater on the EAT-26 test, qualifying them at risk for an eating disorder (N=61), and 30% of the participants scored anything greater than zero on the EAT-26 Behavior Questions (N=104).

Table 9 shows risk of eating disorder based on scores of the EAT-26, EAT-26 Behavior test, and ORTO-15 related to major. The majority of Nursing, HDFS, and Nutrition & Dietetics majors were at risk for an eating disorder based on either the EAT-26, EAT-26 behavior test, or ORTO-15 (N=140, 62%; N= 27, 56%; N= 36, 51%, respectively), totaling 203 individuals (59% of the sample population). With regard to qualifying for being at risk for eating disorders on multiple tests, 27 Nursing majors...
(12%), seven HDFS majors (15%), and six Nutrition & Dietetics majors (9%) were classified at risk for an eating disorder on both the EAT-26 and the EAT-26 behavior test (36% of the sample population). Based on being classified for an eating disorder on the EAT-26 behavior test and the ORTO-15, eight Nursing majors (4%), two HDFS majors (4%) and three Nutrition & Dietetics majors (4%) were at risk on both tests (12% of the sample population). Two Nursing majors qualified at risk for an eating disorder based on all three tests.

Table 9. Risk of Eating Disorders by Major Based on Scores from the EAT-26, EAT-26 Behavior Test, and ORTO-15

<table>
<thead>
<tr>
<th>Classification</th>
<th>Nursing (N=227)</th>
<th>HDFS (N=48)</th>
<th>Nutrition &amp; Dietetics (N=70)</th>
<th>Total (N=345)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Not at Risk</td>
<td>87</td>
<td>38.0</td>
<td>21</td>
<td>44.0</td>
</tr>
<tr>
<td>At Risk</td>
<td>140</td>
<td>62.0</td>
<td>27</td>
<td>56.0</td>
</tr>
<tr>
<td>Screening Test</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EAT-26</td>
<td>38</td>
<td>17.0</td>
<td>11</td>
<td>23.0</td>
</tr>
<tr>
<td>EAT-26 Behavior</td>
<td>76</td>
<td>33.0</td>
<td>12</td>
<td>25.0</td>
</tr>
<tr>
<td>ORTO-15</td>
<td>65</td>
<td>29.0</td>
<td>13</td>
<td>27.0</td>
</tr>
</tbody>
</table>

a EAT-26 Scoring: a total of 20 or greater than 20 indicate a high level of concern about dieting, body weight, or problematic eating behaviors.
b EAT-26 Behavior Scoring: If a respondent had a score of anything other than a zero (0) on any of these five questions, the respondent should seek an evaluation from a trained mental health professional.
c ORTO-15 Scoring: A cut-off of 40 is considered to be more predictive of orthorexia in a sample.

Discussion

The purpose of this study was to examine disordered eating behaviors in Dietetic majors versus the Health and Human Services majors of Nursing and HDFS majors at the Kent State University campus. The study results indicated no significant difference in college major or class standing in regard to the EAT-26, EAT-26 Behavior test, and the ORTO-15 test, therefore; the research hypothesis was rejected.
The results from the present study were somewhat conflicting to previous studies showing that Dietetic majors were at greater risk of eating disorders due to their manifestations through food-related activities such as collecting recipes, preparing food for others, or choosing to pursue a career in nutrition (Fredenberg, 1999; Kiziltan, 2008; Korinth, 2008). This was shown in one study which displayed that 24% of Dietetic majors had characteristics of anorexia nervosa and may choose a career in dietetics due to their personal experience and obsession with food. The results from the present study were comparable. With regard to Nutrition & Dietetics majors, 24% were qualified as orthorexic, 18% were at risk for an eating disorder based on EAT-26 scores, and 23% were at risk based on EAT-26 behavior scores. In a Turkish study looking at Dietetics majors risk of having disordered eating behaviors compared to Non-Dietetics majors, 18.6% of Dietetics majors were at risk for developing disordered eating behaviors according to EAT-26 test scores (Kiziltan, 2008). Fifty-one percent (51%) of Nutrition majors in the current study were at risk for an eating disorder based on either one of three tests, or a combination of those tests. Although Nutrition majors may not have been at greater risk for an eating disorder, results of the current study show similar percentages in terms of risk for eating disorders in Nutrition & Dietetics majors.

Other conflict exists in studies of class standing as well. Crockett and Littrell found that Dietetics majors in their Junior and Senior years practiced at least some degree of vomiting after eating (Fredenberg, 1999). Time of entry into the program may be of importance to reveal if specific points of time result in increased disordered eating behaviors. A study conducted by Fredenberg et al looked further at the difference
between education and experience between Dietetics programs on the impact of disordered eating behaviors (Fredenberg, 1999). Fifteen percent of students enrolled in a Didactic Program in Dietetics (DPD) which is not combined with the additional hands-on education of a Dietetic Internship “often” engaged in dieting behaviors, in comparison to only 3% in Coordinated Program (CP) students. Twenty-one percent of DPD students “very often engaged in dieting compared to the 7% in CP students. These percents are consistent with DPD students believing they gave too much time and thought to thinking about food (21% and 7% respectively), with a tremendous difference in beliefs about fear of being overweight, where 24% of DPD students had a fear vs. 3% of CP students. These results show that DPD students displayed an increased risk of disordered eating patterns in relation to CP students, which may come as a result of class standing and experience level, which showed to not have significance in the current study. The current study did not find significance in class standing with regard to eating disorders based on the ORTO-15, the EAT-26 and the EAT-26 behavior questions. The difference between Didactic Program in Dietetics (DPD) and Coordinated Program in Dietetics (CP) was not able to be assessed because Kent State University does not currently have a Coordinated Program in Dietetics at the undergraduate level.

Although the research hypothesis was rejected, 28% of the sample population was classified as being at-risk for orthorexia nervosa, 18% of the sample population was classified at-risk for an eating disorder based off of EAT-26 scores, and 30% were classified at-risk for an eating disorder based off of EAT-26 Behavior scores. These results suggest: a) although Dietetic majors were not at increased risk for eating disorders
and disordered eating compared to Nursing and HDFS majors, there is a problematic issue with college-aged females in these Health and Human Services majors at Kent State University with being at increased risk for eating disorders and disordered eating, regardless of major; b) although the same individuals completed the EAT-26 test and the EAT-26 Behavior test, a greater percentage of the population qualified as being at risk for an eating disorder based on scores from the EAT-26 Behavior test versus the EAT-26 test alone. This suggests that an individual who uses the EAT-26 test on its own may not be identified as being at risk for an eating disorder or disordered eating behaviors, but when paired with the behavior section may qualify.

Results also revealed an interesting trend in terms of those classified as orthorexic versus not-orthorexic in regard to the EAT-26, EAT-26 Behavior test, and BMI. There was no significant difference between those classified as orthorexic versus non-orthorexic with regard to BMI. Both groups were classified as being normal weight, at N= 23.56 and N=23.57, respectively. Those respondents classified as non-orthorexic had higher mean scores on both sections of the EAT-26 compared to participants classified as orthorexic (mean= 13 ± 4.96 and 1.34 ± 2.49, respectively; versus mean=6.13 ± 11.07 and 0.56 ± 1.68, respectively). These results suggest that those individuals who are classified as orthorexic would not necessarily be detected as having an eating disorder if solely answering the EAT-26 questionnaire. Individuals classified as being at-risk for orthorexia nervosa could possibly “fall through the cracks” and would not rightfully be detected as having an issue with disordered eating if only using the EAT-26 test in diagnosing eating disorders and disordered eating. The combination of the use of
multiple test for disordered eating and eating disorders is important in assessing multiple behavior patterns and beliefs that may differ depending on the type of test used to assess a possible eating disorder.

Applications

The current sample population of female Dietetics majors, Nursing majors, and HDFS majors displayed results of being an at risk population not only for classified eating disorders such as anorexia nervosa and bulimia nervosa, but also for the eating disorder not otherwise specified (EDNOS) known as orthorexia nervosa. The majority of each major sampled was classified at risk for an eating disorder totaling 59% of the sample population being at risk. With such a large percentage of at-risk individuals in the present study, it is important to take preventative measures to ensure that further complications do not arise. Eating disorders have the highest rate of mortality over all mental illness (National Association for Anorexia Nervosa and Associated Disorders, 2011; Aime, 2008). Serious complications can occur if eating disorders are not properly treated, including starvation that causes damage to vital organs such as the heart, kidneys, and brain, a drop in pulse rate and blood pressure, irregular heart rhythms or heart failure, nutritional deprivation of electrolytes such as sodium and potassium, calcium loss from bones, malnutrition, and decreased brain volume (Binge Eating Disorder Association, 2011). In the worst case scenario, these complications can lead to death. Using this knowledge in an application sense with current and future college-aged females enrolled or planning to enroll in a Health and Human Services major may be of importance. Protocols for screening of eating disorders and disordered eating behaviors should not be
limited to Dietetics majors alone, but should expand throughout the university to reach a population of female college-aged individuals since females in the age range of 12-25 are at greater risk (National Association of Anorexia Nervosa and Associated Disorders, 2011; Herpertz-Dahlmann, 2008; Scherag, 2010; Edman, 2005). Examples may include advisors of programs establishing dialogue with female majors early on into a health-related program to assess pre-existing disordered eating thoughts or behaviors. Faculty and staff should be educated on knowing and understanding the signs and symptoms of disordered eating thoughts and behaviors. Staff should also be aware of the signs and symptoms of eating disorders to understand the characteristics of anorexia nervosa, bulimia nervosa, and orthorexia nervosa, how they relate, and how they differ. While most health-related fields are familiar with the diagnosable eating disorders anorexia nervosa and bulimia nervosa, many may be unfamiliar with orthorexia nervosa due to the limited amount of research that exists on the eating disorder not otherwise specified, or EDNOS. This stresses the importance of familiarizing faculty and staff on EDNOS so that they can be properly educated on how to assess disordered eating behaviors. The other issue arises when considering the perception of orthorexia nervosa versus anorexia or bulimia nervosa. Orthorexia is associated with more of a positive behavior aspect dealing with being “healthy”. Unlike the eating disorders anorexia and bulimia nervosa which are obsessions about the “quantity” of food intake, orthorexia nervosa stems from an obsession about the “quality” of food intake, which does not necessarily have the negative-associated perception in society (Bagci Bosi, 2007). Campus facilities may benefit from having locations on campus to screen individuals with disordered eating
behaviors as well as provide counseling for individuals. Only about one in ten individuals seek treatment for eating disorders (National Association for Anorexia Nervosa and Associated Disorders, 2011). These facilities can exist at the campus health center, campus residency halls, or an outreach center. Campus-wide screening or awareness days can benefit individuals by providing education on a mass scale to reach a wide variety of students in a brief amount of time. National Alcohol Screening Day and KSU Depression Screening Day were both available on campus and free to students, however there has not been a screening day available geared toward disordered eating and eating disorders. These events were used as an outreach effort to encourage student participation, provide education and information, and if necessary, provide a referral. Having a screening day focused on eating disorders and disordered eating could reach an even larger population, including additional college majors outside of the Health and Human Services majors. Choosing a select few options or using a combination of these efforts may be beneficial in bringing help and awareness to an at-risk population.

Limitations

The current study was limited by the use of a convenience sample. The sample population size may be a limitation as well with a qualifying 345 participants out of 528. The sample population was unequal with highest representation from Nursing majors versus HDFS and Nutrition majors. Other limitations include the nature of the data collection (self-reported data) and that participants may have distorted their responses based on sensitivity concerns or perceived “correct answer” responses. Another
limitation may have been that those individuals interested in the subject matter of disordered eating and eating disorders chose to participate.

**Strengths**

There was a potential for a high level of confidentiality for survey respondents in this study. The method of delivering the survey online made it possible for respondents to take the survey on their own time and in their own privacy. This may aid in respondents answering questions in a more honest manner.

**Conclusion**

In summary, the results of the current study did not find significance in major and class standing with regard to disordered eating and eating disorders. There was no significant difference in the mean score for BMI in participants classified as orthorexic versus non-orthorexic however, there was a significant difference in EAT-26 scores and EAT-26 behavior scores when comparing orthorexic versus non-orthorexic individuals. These results suggest that those individuals who are classified as orthorexic would not necessarily be detected as having an eating disorder if solely answering the EAT-26 questionnaire. Individuals classified as being at-risk for orthorexia nervosa could possibly “fall through the cracks” and would not rightfully be detected as having an issue with disordered eating if only using the EAT-26 test in diagnosing eating disorders and disordered eating. The combination of the use of multiple tests for disordered eating and eating disorders is important in assessing multiple behavior patterns and beliefs that may differ depending on the type of test used to assess a possible eating disorder.
A total of 28% of the sample population was classified as being orthorexic, 18% of the sample population were at risk for an eating disorder based on the EAT-26 test, and 30% of the sample participants were at risk for an eating disorder based on the EAT-26 behavior questions. These results suggest that the current sample population of female Dietetics majors, Nursing majors, and HDFS majors are an at risk population not only for classified eating disorders such as anorexia nervosa and bulimia nervosa, but also for orthorexia nervosa. Although Dietetic majors are not at increased risk for eating disorders and disordered eating compared to Nursing and HDFS majors, there is a problematic issue with college-aged females in these Health and Human Services majors with being at increased risk for eating disorders and disordered eating, regardless of major.

Adequate resources need to be made available campus-wide to reach those individuals at highest risk to address the potential serious health issues from disordered eating and eating disorders. This includes prevention initiatives, screening from faculty and staff, and education on anorexia nervosa, bulimia nervosa, and orthorexia nervosa in how they relate and differ. Further studies are needed to examine the effectiveness of combined test usage in determining risk for eating disorders and on the impact of educational strategies made available to female college-aged individuals.
APPENDICES
APPENDIX A

CONSENT FORM
Appendix A

Consent Form

Welcome to "Assessment of Disordered Eating Behaviors in College-Aged Female Health and Human Services Majors", a web-based survey that examines disordered eating behaviors in the health and human services majors of nursing, dietetics, and human development and family studies majors at Kent State University. Before taking part in this study, please read the consent form below and click "Next" on the bottom of the page if you understand the statements and freely consent to participate in the study.

This study involves a web-based experiment to examine disordered eating behaviors in the health and human services majors of nursing, dietetics, and human development and family studies majors at Kent State University. The study is being conducted by Lindsay M. Skiba of Kent State University, a candidate for the Master of Science in Nutrition, and has been approved by the Kent State University Institutional Review Board. No deception is involved, and the study involves no more than minimal risk to participants (i.e., the level of risk encountered in everyday life).

Participation in the study typically takes 15 to 20 minutes and is strictly anonymous. Data will be collected through a series of questions including questions from personal demographic characteristics such as age, gender, height, weight, and class standing, as well as questions from the EAT-26 and ORTO-15, both widely used self-report questionnaires to determine disordered eating behaviors. All data collected will be used for research purposes.

All responses are treated as confidential, and in no case will responses from individual participants be identified. All data will be pooled and published in aggregate form only. Participants should be aware, however, that the experiment is not being run from a "secure" https server of the kind typically used to handle credit card transactions, so there is a small possibility that responses could be viewed by unauthorized third parties (e.g., computer hackers).

Taking part in this research study is entirely up to you. You may choose not to participate or you may discontinue your participation at any time without penalty or loss of benefits to which you are otherwise entitled.

As an incentive for taking part in this study, you will be entered into a drawing to win a $25 Starbucks gift card. In order to be entered into a drawing to win the gift card, you must submit your email address at the end of the survey.
If you have any questions or concerns about this research, you may contact Lindsay M. Skiba at (lskiba3@kent.edu) or Dr. Karen Lowry Gordon at klowry@kent.edu. If you have any questions about your rights as a research participant or complains about the research, you may call the IRB at 330-672-2704.

If you are 18 years of age or older, understand the statements above, and freely consent to participate in the study, click on the "I Agree" button to begin the survey.
APPENDIX B

PERMISSION TO USE EAT-26 SURVEY
Appendix B

Permission to Use EAT-26 Survey

Lindsay Skiba <lskiba3@kent.edu>

EAT-26
1 message

eat26_reproduce_permission@eat-26.com <eat26_reproduce_permission@eat-26.com> Thu, Dec 29, 2011 at 9:59 PM
To: lskiba3@kent.edu

Thank you for your permission request to reproduce and use the EAT-26. The EAT-26 is protected under copyright; however, all fees and royalties have been waived because it has been our wish for others to have free access to the test.

Please consider this e-mail as granting you permission to reproduce the test for the purpose suggested in your request as long as the EAT-26 is cited properly. The correct citation is: "The EAT-26 has been reproduced with permission. Garner et al. (1982). The Eating Attitudes Test: Psychometric features and clinical correlates. Psychological Medicine, 12, 871-878."

You can download a copy of the scoring instructions and the test on the homepage of the EAT-26 website. If you use the written version of the test, it is recommended that you provide respondents with the link to the EAT-26 website (www.eat-26.com) so that they can learn more about the test.

Again, thank you for requesting permission to reproduce and use the EAT-26. If you intend on publishing your work, please send me your results so that they can be included in a research database being developed on the EAT-26 website (www.eat-26.com).

Best wishes,

David M. Garner, Ph.D.
Administrative Director
River Centre Clinic
5465 Main Street
Sylvania, OH 43560
dm.garner@gmail.com
APPENDIX C

SURVEY QUESTIONS
Appendix C
Survey Questions

Part A EAT-26 Survey Directions: Consider the following statements and choose one answer that most corresponds to your feelings. Answers range from: "Always", "Usually", "Often", "Sometimes", "Rarely", and "Never". Designate an answer by clicking the circle that corresponds to your answer.

1. I am terrified of being overweight.
   - Always
   - Usually
   - Often
   - Sometimes
   - Rarely
   - Never

2. I avoid eating when I'm hungry.
   - Always
   - Usually
   - Often
   - Sometimes
   - Rarely
   - Never

3. I find myself preoccupied with food.
   - Always
   - Usually
   - Often
   - Sometimes
   - Rarely
   - Never
4. I have gone on eating binges where I feel that I might not be able to stop.

☐ Always
☐ Usually
☐ Often
☐ Sometimes
☐ Rarely
☐ Never

5. I cut my food into small pieces.

☐ Always
☐ Usually
☐ Often
☐ Sometimes
☐ Rarely
☐ Never

6. I am aware of the calorie content of the food I eat.

☐ Always
☐ Usually
☐ Often
☐ Sometimes
☐ Rarely
☐ Never
7. I particularly avoid food with a high carbohydrate content (bread, rice, potatoes, etc.).

☐ Always  ☐ Usually  ☐ Often  ☐ Sometimes  ☐ Rarely  ☐ Never

8. I feel that others would prefer if I ate more.

☐ Always  ☐ Usually  ☐ Often  ☐ Sometimes  ☐ Rarely  ☐ Never

9. I vomit after I have eaten.

☐ Always  ☐ Usually  ☐ Often  ☐ Sometimes  ☐ Rarely  ☐ Never
10. I feel extremely guilty after eating.

☐ Always
☐ Usually
☐ Often
☐ Sometimes
☐ Rarely
☐ Never

11. I am preoccupied with a desire to be thinner.

☐ Always
☐ Usually
☐ Often
☐ Sometimes
☐ Rarely
☐ Never

12. I think about burning up calories while exercising.

☐ Always
☐ Usually
☐ Often
☐ Sometimes
☐ Rarely
☐ Never
13. Other people think I am too thin.

- Always
- Usually
- Often
- Sometimes
- Rarely
- Never

14. I am preoccupied with the thought of having fat on my body.

- Always
- Usually
- Often
- Sometimes
- Rarely
- Never

15. I take longer than others to eat my meals.

- Always
- Usually
- Often
- Sometimes
- Rarely
- Never
16. I avoid foods with sugar in them.

- Always
- Usually
- Often
- Sometimes
- Rarely
- Never

17. I eat diet foods.

- Always
- Usually
- Often
- Sometimes
- Rarely
- Never

18. I feel that food controls my life.

- Always
- Usually
- Often
- Sometimes
- Rarely
- Never
19. I display self-control around food.

- Always
- Usually
- Often
- Sometimes
- Rarely
- Never

20. I feel that others pressure me to eat.

- Always
- Usually
- Often
- Sometimes
- Rarely
- Never

21. I give too much thought and time to food.

- Always
- Usually
- Often
- Sometimes
- Rarely
- Never
22. I feel uncomfortable after eating sweets.
   - Always
   - Usually
   - Often
   - Sometimes
   - Rarely
   - Never

23. I engage in dieting behavior.
   - Always
   - Usually
   - Often
   - Sometimes
   - Rarely
   - Never

24. I like my stomach to be empty.
   - Always
   - Usually
   - Often
   - Sometimes
   - Rarely
   - Never
25. I have the impulse to vomit after meals.

- Always
- Usually
- Often
- Sometimes
- Rarely
- Never

26. I enjoy trying new, rich foods.

- Always
- Usually
- Often
- Sometimes
- Rarely
- Never
Part B EAT-26 Behavior Survey Directions: The following 5 questions relate to behaviors over the last 6 months. Consider the following statements and choose one answer that corresponds to your feelings. Answers for questions #27-30 range from: "Never", "Once a month or less", "2-3 times a month", "Once a week", "2-6 times a week", or "Once a day or more". For question #31, respond either "Yes" or "No". Designate an answer by clicking the circle that corresponds to your answer.

27. In the past 6 months have you gone on eating binges where you feel that you may not be able to stop?

- [ ] Never
- [ ] Once a month or less
- [ ] 2-3 times a month
- [ ] Once a week
- [ ] 2-6 times a week
- [ ] Once a day or more

28. In the past 6 months have you ever made yourself sick (vomited) to control your weight or shape?

- [ ] Never
- [ ] Once a month or less
- [ ] 2-3 times a month
- [ ] Once a week
- [ ] 2-6 times a week
- [ ] Once a day or more
29. In the past 6 months have you ever used laxatives, diet pills, or diuretics (water pills) to control your weight or shape?

- Never
- Once a month or less
- 2-3 times a month
- Once a week
- 2-6 times a week
- Once a day or more

30. In the past 6 months have you exercised more than 60 minutes a day to lose or to control your weight?

- Never
- Once a month or less
- 2-3 times a month
- Once a week
- 2-6 times a week
- Once a day or more

31. In the past 6 months have you lost 20 pounds or more?

- Yes
- No
Part C ORTO-15 Survey Directions: The following 15 questions refer to attitudes towards food and eating. Consider the following statements and choose the one that most corresponds to your feelings. Answers range from: "Always"," Often"," Sometimes", or "Never". Designate an answer by clicking the circle that corresponds to your answer.

32. When eating, I pay attention to the calories of the food.

☐ Always
☐ Often
☐ Sometimes
☐ Never

33. When I go in a food shop, I feel confused.

☐ Always
☐ Often
☐ Sometimes
☐ Never

34. In the last 3 months, the thought of food worried me.

☐ Always
☐ Often
☐ Sometimes
☐ Never

35. My eating choices are conditioned by my worries about my health status.

☐ Always
☐ Often
☐ Sometimes
☐ Never
36. When I evaluate food, the taste is more important than the quality.

☐ Always
☐ Often
☐ Sometimes
☐ Never

37. I am willing to spend more money to have healthier food.

☐ Always
☐ Often
☐ Sometimes
☐ Never

38. The thought of food worries me for more than 3 hours a day.

☐ Always
☐ Often
☐ Sometimes
☐ Never

39. I allow myself eating transgressions.

☐ Always
☐ Often
☐ Sometimes
☐ Never

40. My mood affects my eating behavior.

☐ Always
☐ Often
☐ Sometimes
☐ Never
41. I think that the conviction to eat only healthy food increases my self-esteem.

☐ Always
☐ Often
☐ Sometimes
☐ Never

42. I think that eating healthy food changes my life-style (frequency of eating out, friends, ...).

☐ Always
☐ Often
☐ Sometimes
☐ Never

43. I think that consuming healthy food improves my appearance.

☐ Always
☐ Often
☐ Sometimes
☐ Never

44. I feel guilty when transgressing.

☐ Always
☐ Often
☐ Sometimes
☐ Never
45. I think that on the market there is also unhealthy food.

- Always
- Often
- Sometimes
- Never

46. At present, I am alone when having meals.

- Always
- Often
- Sometimes
- Never
Part D Demographic Data Directions: Please respond to the following questions.

47. Gender

☐ Male
☐ Female

48. Age

Age

49. Height (in inches)

Height (in inches)

50. Weight (in pounds)

Weight (in pounds)
51. What is your ethnicity?

- White or Caucasian
- Black or African American
- American Indian or Alaska Native
- Asian or Asian American
- Native Hawaiians or other Pacific Islander
- Hispanic or Latino American
- Multiracial
- Other (please specify)

52. Major (choose one):

- Pre-Nursing
- Nursing
- Pre-Human Development and Family Studies
- Human Development and Family Studies
- Nutrition & Dietetics
- Other (please specify)

53. Class Standing (choose one):

- Freshman
- Sophomore
- Junior
- Senior
- Graduate
54. Number of credit hours enrolled in this semester:

Number of credit hours enrolled in this semester:

55. Are you a collegiate athlete?

☐ Yes
☐ No

56. Have you changed your major since enrolling in college?

☐ Yes
☐ No

57. If you answered "Yes" to the previous question #56, what was your original major?


Appendix D
Survey Scoring

EAT-26 Scoring

1) Your Eating Attitudes Test (EAT-26) is: ___

A score at or above 20 on the EAT-26 indicates a high level of concern about dieting, body weight or problematic eating behaviors. Because your score is above 20, you should seek an evaluation by a qualified health professional to determine if your score reflects a problem that warrants clinical attention. However, please keep in mind that high scores do not always reflect over-concern about body weight, body shape, and eating. Screening studies have shown that some people with high scores do not have eating disorders. Regardless of your score, if you are suffering from feelings which are causing you concern or interfering with your daily functioning, you should seek an evaluation from a trained mental health professional.

<table>
<thead>
<tr>
<th>EAT-26 SCORE</th>
<th>Scoring System for the EAT-26</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Always</td>
</tr>
<tr>
<td>Score for questions 1-25</td>
<td>3</td>
</tr>
<tr>
<td>Score for question #26</td>
<td>0</td>
</tr>
</tbody>
</table>

Add the scores for each item together for a total score.

3) Behavioral Questions:
If you scored in the any of the checked box (✓), you should seek an evaluation from a trained mental health professional:

<table>
<thead>
<tr>
<th>In the past 6 months have you:</th>
<th>Never</th>
<th>Once a month or less</th>
<th>2-3 times a month</th>
<th>Once a week</th>
<th>2-6 times a week</th>
<th>Once a day or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gone on eating binges where you feel that you may not be able to stop?</td>
<td>□</td>
<td>□</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Ever made yourself sick (vomited) to control your weight or shape?</td>
<td>□</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Ever used laxatives, diet pills or diuretics (water pills) to control your weight or shape?</td>
<td>□</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Exercised more than 60 minutes a day to lose or to control your weight?</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>✓</td>
</tr>
<tr>
<td>Lost 20 pounds or more in the past 6 months</td>
<td>Yes</td>
<td>✓</td>
<td>No</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>
ORTO-15 Scoring

<table>
<thead>
<tr>
<th>SCORING GRID FOR ORTO-15 TEST RESPONSES</th>
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<td>ITEMS</td>
</tr>
<tr>
<td>---------</td>
</tr>
<tr>
<td>2-5-8-9</td>
</tr>
<tr>
<td>3-4-6-7-10-11-12-14-15</td>
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<tr>
<td>1-13</td>
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REFERENCES


http://www.bedaonline.com/abouteatingdisorders.html


