RISK FOR DISORDERED EATING AMONG STUDENTS IN UNDERGRADUATE ATHLETIC TRAINING EDUCATION PROGRAMS

A THESIS

Submitted to the Faculty of the School of Graduate Studies and Research of California University of Pennsylvania in partial fulfillment of the requirements for the degree of Master of Science

BY

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CALIFORNIA, PA

THESIS APPROVAL

Graduate Athletic Training Education

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ACKNOWLEDGEMENTS

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INTRODUCTION

Athletic trainers are responsible for the care and prevention of athletic injuries or illnesses, and as a result are learning more in their undergraduate athletic training education programs (ATEP) about the role of sports nutrition. A healthy diet should be based on variety, moderation, and wholesomeness.\(^1\) Additionally, a healthy diet needs to contain foods from all six major food groups which include grains, vegetables, fruit, milk/dairy, meat/beans, fats, oils and sweets.\(^2\)

Calcium, iron and water, as well as many other vitamins and minerals are key components to a healthy diet and prevention of health problems. Calcium is important in the functions of muscle contraction, blood clotting, transmission of nerve impulses and fluid transport.\(^3\) Iron needs are essential to everyone, especially females because of menstruation. Iron may be consumed in inadequate amounts because of poor nutrient intake or avoidance of meat which can develop into iron-deficiency anemia.\(^2\) Not consuming enough iron will affect its function: transportation and utilization of oxygen.\(^4\)
Water is the most essential substance to sustain human life and one may only survive a few days without it.\textsuperscript{5} Dehydration results from imbalance of water intake and water expulsion; it may also increase the risk of potential life threatening heat injury,\textsuperscript{2} and applies to anyone. Proper nutritional habits and knowledge can benefit an individual’s health and improve performance. However, not following nutritional guidelines can lead to poor diets which, frequently aid in development of serious diseases and conditions (such as malnutrition, iron-deficiency anemia and osteoporosis).\textsuperscript{6} Food is fuel for the body, therefore, fueling the body with enough energy to perform daily tasks is essential.\textsuperscript{2} A negative energy balance caused by patterns of disordered eating or eating disorders results in physiological abnormalities as well as psychological distress.\textsuperscript{7}

The Commission on Accreditation in Athletic Training Education (CAATE) is the group responsible for standards and accreditation of ATEPs. Over the years, accreditation has led to the development of standards and guidelines by the National Athletic Trainers Association Educational Council (NATAEC), for specific competencies within the six domains of athletic training to integrate cognitive, psychomotor skills/clinical proficiency, and affective
The guidelines and standards provide a basis for minimum academic requirements and are helping establish continuing quality improvement in the knowledge base of future athletic trainers. Discontinuing the internship route for certification came about because there was minimal classroom instruction and excessive clinical hours (where experience could not be controlled). Accreditation is a way of standardizing athletic training education to promote continuous quality in the profession.

It is important for anyone studying in the allied health care profession to have an understanding of nutrition, and athletic trainers possess a significantly higher knowledge base and practical background related to sport nutrition and dietary needs compared to coaches. Allied health professionals have various nutritional knowledge and backgrounds; however, due to differences in job tasks and responsibilities, professions vary among the extent of their nutrition education. Athletic trainers specifically have roles and responsibilities within several domains related to nutritional illnesses, or injuries. An athletic training student/certified athletic trainer should possess basic nutritional knowledge of energy/nutrition needs, the ability to recognize current signs/symptoms or
predisposing factors associated with nutritional
deficiencies or illnesses, necessary evaluation
skills/knowledge for a variety of conditions, and effective
communication skills/educational role to educate athletes,
coaches and others of potential risks of disordered eating.
One must also know and follow proper steps in
addressing/referring individuals with nutritional problems
in athletes.11

College students are faced with several nutrition
concerns including eating disorders, disordered eating and
poor nutrient intake that may lead to a variety of
deficiencies and chronic diseases.12 Frequency of eating
disorders from high school to college has increased from 4%
to 19%.13 Additionally, college students possess a large
amount of responsibility both academically and
professionally that may be compounded with other
stressors/responsibilities including financial obligations
and involvement in numerous organizations.13,14 College
students have many academic choices and those who choose
allied health care professions are not immune to developing
patterns of disordered eating just because they work within
the medical field. Females are often exposed to societal
pressure to look young, thin, and beautiful.13,15 Disordered
eating and eating disorders develop for any number of
reasons, and are greatly influenced by family, socio-cultural, biophysical factors and personality traits.\textsuperscript{13,15,16} Low-self esteem and high tendency toward perfectionism are two examples. Abnormal eating can range from severe clinically diagnosed disorders via Diagnostic Statistical Manual of Mental Disorders (DSM-IV) guidelines, to abnormal eating habits and distorted attitudes that do not meet strict DSM-IV criteria. Diagnosis for eating disorders must be done by a licensed professional such as a psychologist, who may use a variety of methods (interview, self questionnaire, etc.) to aid in diagnosis. Diagnosis of disordered eating may occur when an individual lacks one or more eating disorders criteria or symptoms have been erratic.

Practice of proper eating habits will help athletic trainers perform their job tasks efficiently, especially when physical activity is involved. This is because poor nutrition and disordered eating compromise physical and mental health as well as negatively affect social relations and academic performance such as difficulty retaining material.\textsuperscript{12} Allied health professionals need to be attentive and precise in their daily care for patients. Most people do not meet diagnostic criteria for Eating Disorders (ED),\textsuperscript{18} but still possess and practice behaviors and attitudes that
compromise physical and mental well being.\textsuperscript{19} Reportedly, with three out of every 100 people eating in a way disordered enough to warrant treatment,\textsuperscript{20} the topic of disordered eating and proper nutrition is becoming extremely significant in all populations.

The purpose of this study is to determine if the year in the ATEP, academic course load, or status (in season verses out of season) of sport assignment will play a role in the risk for disordered eating in the athletic training student (ATS).
METHODS

Research Design

A descriptive design utilizing the Eating Attitudes Test (EAT-26) (APPENDIX C1) and an additional demographic questionnaire (APPENDIX C2) were used for this study. The dependent variable for this study was the measure of risk for eating disorders which was calculated by students’ scores on the EAT-26. The independent variables were year in ATEP, current academic course load/level of courses, and if their current clinical sport assignment was in-season or out of season which was identified by the demographic questionnaire. This study compared ATEP senior students who may have had a greater number of responsibilities (such as travel), and students who take higher level classes/greater number of academic credit hours as compared to sophomores and juniors in the ATEP. To control the variables, freshmen were not included and only those students who had been formally accepted into their ATEP were eligible. The colleges and universities were selected from within the state of Pennsylvania, by obtaining a complete list of CAAATE accredited programs and determining which schools were specifically in the western half of the state. Schools were then contacted for interest of participation and to
find out how many students were currently in the ATEP program. The strength of this research design was the use of a valid and reliable tool to measure symptoms and risk for eating disorders (disordered eating) as well as an additional demographic questionnaire which addressed specific factors directly related to lives of athletic training students (ATS).

Subjects

Subjects were volunteers from colleges and universities that are NCAA Division I, II or III from the Commonwealth of Pennsylvania who have been formally accepted to the accredited CAATE undergraduate ATEP. The students must have already started clinical rotations. A list of CAATE accredited schools was found on the NATA website, and schools considered to be in western Pennsylvania were contacted for participation. Subject population was determined by the cost of each survey, and the aim was for participation of approximately 150 individuals (as many from accredited CAATE programs in Pennsylvania as possible). The cost was determined to be free other than a $5 fee for an official letter granting permission to use the EAT-26 (APPENDIX C3). Students were
to be from both genders and must have been formally
accepted into their program (sophomore through senior
status only); this assumed that all students were over the
age of 18. Demographic information such as age, gender,
height, weight, course load (credit hours and course
levels), year in program, current clinical assignment, and
collegiate sport participation were all collected from the
demographic information questionnaire (APPENDIX C2). The
only limitation could have been generalizability, meaning
that this assumes students in all ATEPs are generally
similar, which would reflect the other states and ATEPs as
well. Only individuals who had been accepted into the ATEP
and were currently in clinical rotations were considered
eligible volunteers. Consent in this study was obtained by
an informed consent form (APPENDIX C4).

Instruments

The instrument that was used to measure the symptoms
of eating disorders as well as identify individuals who
were experiencing abnormal eating patterns that interfere
with normal psychosocial functioning was the EAT-26
(APPENDIX C1). This instrument has been abbreviated from
its original form (EAT-40) and consisted of 26 questions
scored on a six point Likert scale.\textsuperscript{21} There were also questions about health behaviors (binge eating, self-induced vomiting, laxative use, previous treatment of an eating disorder). The 26 questions were divided into three subscales: dieting, bulimia, and food preoccupation and oral control, and were scored accordingly. A score greater than 20 on the EAT-26 was interpreted as a possible abnormal eating pattern or that there were abnormal thoughts present which should have warranted an interview with a qualified mental health professional.\textsuperscript{21} A score of less than 20 on the EAT-26 should not have been necessarily be overlooked, because there may still be maladaptive unhealthy eating behaviors or attitudes that were present which would require further assessment.\textsuperscript{22} Questions 1-25 on the EAT-26 were assessed using a six point Likert scale with always equal to three and never equal to zero; question 26 was scored negatively with always equal to zero and never equal to three.\textsuperscript{22}

The EAT-26 contains questions addressing height and weight which could have been used to help estimate/identify the Body Mass Index (BMI). The BMI could have been used to identify ‘significantly underweight’ individuals to others of the same age.\textsuperscript{22} BMI is a measure of fat on body compared to lean muscle.\textsuperscript{23} Scoring of the BMI would have been done by
the use of a formula dividing weight in kilograms by height in meters, and then dividing again by height in meters (kg/m²); calculation in pounds is dividing height in inches then divide again by height in inches and multiply by 703. The calculated findings would have been compared to the norms of the chart provided (APPENDIX C5) with the EAT-26 materials and taken into consideration when assessing for risk.

The EAT-26 is a widely used screening tool for eating disorders, patterns of abnormal eating or 'eating disorder risk'. Its reliability (r = .90) may contribute to its frequent use as a free method of self assessment. The EAT-26 may especially be useful in estimating frequency of disordered eating patterns in college students, specifically females, as well as the general population because it is short and easy. BMI assessment in adults is a better predictor of disease risk. It is important to remember that the EAT-26 is not a diagnostic tool, but a screening tool. Its limitation is that of a self-report which means one can lie, and the BMI could be an inaccurate predictor of fatness in athletic people and additionally does not take into consideration racial and ethnic background pertaining to different body compositions.
The additional demographic questions were developed to further categorize the independent variables such as year in ATEP, academic course load, and status of current clinical sport assignment (in season verses out of season) after examining their risk for disordered eating (dependent variable). The athletic training students were categorized into class rank (year in program) and current clinical assignment (status of sport as well as different categories). The questions aimed to identify if the older students, individuals with significant time consuming clinical assignments, and a demanding course load practiced greater patterns of disordered eating. Additional questions asked about collegiate sport participation, times of class/AT responsibilities, and involvement in multiple organizations/clubs which may have affected the likelihood of disordered eating due to time constraints.

Procedures

There were several procedures that needed to be followed in this study. First, was gaining approval from the California University of Pennsylvania IRB committee (APPENDIX C6). Next, the researcher contacted the ATEP program director via e-mail with a letter stating the
purpose of this study (APPENDIX C7) at all western Pennsylvania ATEPs to determine their willingness to allow students to participate in this study via e-mail. The schools were selected from western Pennsylvania by using a complete list of programs from the CAATE website. The researcher sent an appropriate number of questionnaires to the ATEP program director with directions and procedures as well as a self addressed envelope. He or she then became responsible for administering the questionnaires and returning it. The researcher or program director was to then read out loud, the directions and purpose for completing the questionnaires (APPENDIX C8 & APPENDIX C9). Then students who were willing to volunteer signed the consent form (APPENDIX C4). Students filled out the consent form after the instructions were read and then were instructed to complete the questionnaires to the best of his or her ability, honestly and without assistance from anyone else. Students were given 15-20 minutes for completion of two questionnaires. Each student was to return the tests to the program director or researcher, with the consent form still attached. All papers were to then be placed together in a sealed envelope keeping each individual’s two sheets together. A pre-addressed/stamped envelope was provided so it could be sent back to the
researcher immediately. The researcher then entered all data into SPSS 14.0 and analyzed accordingly.

Hypotheses

The following hypotheses were based on the literature reviewed when developing this research study and the insight of the researcher.

1. There will be a difference in EAT-26 scores due to year in ATEP; That a third year ATS will have a higher risk than first year students.

2. There will be a difference in scores on the EAT-26 when individuals undertake a higher course load and/or higher level classes.

2. There will be differences among EAT-26 scores depending on status of current clinical assignment (in season as opposed to out of season). An in season sport may likely reflect greater time commitments.
Data Analysis

The level of significance was set at $\leq 0.05$ to test acceptability of stated hypotheses.

Hypothesis 1: A one way ANOVA test will be used to test the difference in EAT-26 scores to determine if third year ATEP students will possess a higher risk for disordered eating.

Hypothesis 2: A Pearson Product Moment correlation will be used to determine differences in EAT-26 scores relative to course load; and a one way ANOVA will be used to determine differences between EAT-26 score and level of classes to determine if individuals with a higher course load and/or higher level classes will have a higher risk for disordered eating.

Hypothesis 3: An independent $t$ test will be used to observe differences among EAT-26 scores when the current clinical assignment is in season as opposed to out of season. An in season sport may likely reflect greater time commitments.
Results

Demographic Data

There were 229 surveys sent to seven institutions. Five institutions returned surveys for a total of 170 students (n = 170). The undergraduate ATEPs that were involved were from the following institutions: California University of Pennsylvania, Duquesne University, Indiana University of Pennsylvania, Pennsylvania State University, and Waynesburg College. This produced a return rate of 74%. Student class rank was as follows: 39.4% (n = 67) were sophomores, 21.8% (n = 37) were juniors, and 38.8% (n = 66) were seniors.

<table>
<thead>
<tr>
<th>Year in Program</th>
<th>Frequency</th>
<th>Percent</th>
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<tbody>
<tr>
<td>Sophomore</td>
<td>67</td>
<td>39.4</td>
</tr>
<tr>
<td>Junior</td>
<td>37</td>
<td>21.8</td>
</tr>
<tr>
<td>Senior</td>
<td>66</td>
<td>38.8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>170</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Regarding ethnicity a majority of students, 87.6% (n = 149) were white non-Hispanic, 4.1% (n = 7) were African American, 3.5% (n = 6) were Asian, 2.9% (n = 5) were Hispanic, two people responded ‘other’ and one student did not answer. Females made up 75.9% (n = 129) of the respondents, and males 24.1% (n = 41).
Table 2. Frequency of Ethnicity

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<th>Ethnicity</th>
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<tr>
<td>Asian</td>
<td>6</td>
<td>3.5</td>
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<tr>
<td>White-non Hispanic</td>
<td>149</td>
<td>87.6</td>
</tr>
<tr>
<td>African American</td>
<td>7</td>
<td>4.1</td>
</tr>
<tr>
<td>Hispanic</td>
<td>5</td>
<td>2.9</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
<td>1.2</td>
</tr>
<tr>
<td>Missing</td>
<td>1</td>
<td>.6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>170</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 3. Frequency of Gender

<table>
<thead>
<tr>
<th>Gender</th>
<th>Frequency</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>41</td>
<td>24.1</td>
</tr>
<tr>
<td>Female</td>
<td>129</td>
<td>75.9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>170</td>
<td>100</td>
</tr>
</tbody>
</table>

The age range was between the ages of 19 and 40 (m = 20.8 + 2.28). This population of ATEP students reported working with 21 different sports, the top three were basketball (n = 41), wrestling (n = 19), both of which were in-season, and third were those in a clinical setting (n = 16).

Table 4. Frequency of Students Age

<table>
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<th>Student Age</th>
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<th>Percent</th>
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<td>19</td>
<td>31</td>
<td>18.2</td>
</tr>
<tr>
<td>20</td>
<td>46</td>
<td>27.1</td>
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<tr>
<td>21</td>
<td>51</td>
<td>30.0</td>
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<td>22</td>
<td>26</td>
<td>15.3</td>
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<td>23</td>
<td>3</td>
<td>1.8</td>
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<td>1.8</td>
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<tr>
<td>25</td>
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<td>28</td>
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<td>40</td>
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<td>.6</td>
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<tr>
<td>Missing</td>
<td>6</td>
<td>3.5</td>
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<td><strong>Total</strong></td>
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Table 5. Frequency of Sport Assignment

<table>
<thead>
<tr>
<th>Sport Assignment</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Football</td>
<td>11</td>
<td>6.5</td>
</tr>
<tr>
<td>Mens Lacrosse</td>
<td>6</td>
<td>3.5</td>
</tr>
<tr>
<td>M or W Rugby</td>
<td>2</td>
<td>1.2</td>
</tr>
<tr>
<td>Ice Hockey</td>
<td>6</td>
<td>3.5</td>
</tr>
<tr>
<td>Soccer</td>
<td>6</td>
<td>3.5</td>
</tr>
<tr>
<td>Basketball</td>
<td>41</td>
<td>24.1</td>
</tr>
<tr>
<td>Baseball</td>
<td>8</td>
<td>4.7</td>
</tr>
<tr>
<td>Softball</td>
<td>9</td>
<td>5.3</td>
</tr>
<tr>
<td>Field Hockey</td>
<td>2</td>
<td>1.2</td>
</tr>
<tr>
<td>Womens’ Lacrosse</td>
<td>5</td>
<td>2.9</td>
</tr>
<tr>
<td>Wrestling</td>
<td>19</td>
<td>11.2</td>
</tr>
<tr>
<td>Cross Country</td>
<td>4</td>
<td>2.2</td>
</tr>
<tr>
<td>Swimming</td>
<td>5</td>
<td>2.9</td>
</tr>
<tr>
<td>Volleyball</td>
<td>7</td>
<td>4.1</td>
</tr>
<tr>
<td>Tennis</td>
<td>2</td>
<td>1.2</td>
</tr>
<tr>
<td>Fencing</td>
<td>2</td>
<td>1.2</td>
</tr>
<tr>
<td>Gymnastics</td>
<td>3</td>
<td>1.8</td>
</tr>
<tr>
<td>High School</td>
<td>10</td>
<td>5.9</td>
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<tr>
<td>Clinic</td>
<td>16</td>
<td>9.4</td>
</tr>
<tr>
<td>Professional Sport</td>
<td>2</td>
<td>1.2</td>
</tr>
<tr>
<td>Track and Field</td>
<td>3</td>
<td>1.8</td>
</tr>
<tr>
<td>Missing</td>
<td>1</td>
<td>.6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>170</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

For the question which asked ‘have you engaged in drinking, sex, or smoking to relieve the stress of athletic training or school’ 67% (n = 114) responded yes, and 31.2% (n = 53) responded no. When asked if they ‘have difficulty concentrating’ 77% (n = 131) responded yes, 21% (n = 36) responded no. Only 70 students responded to the question regarding athletic training duties or class during meal times, but 94% (n = 66) responded ‘yes’ they did, and only
5% (n = 4) responded ‘no’. Out of all respondents, 10% (n = 17) listed that they previously had an eating disorder. However, 8% (n = 14) of students posed a ‘risk’ for disordered eating according the EAT-26 score alone.

<table>
<thead>
<tr>
<th>Previous Eating Disorder</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>17</td>
<td>10.0</td>
</tr>
<tr>
<td>No</td>
<td>151</td>
<td>88.8</td>
</tr>
<tr>
<td>Missing</td>
<td>2</td>
<td>1.2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>170</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

Table 7. Frequency of students At Risk According to EAT-26

<table>
<thead>
<tr>
<th>At risk</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>14</td>
<td>8.2</td>
</tr>
<tr>
<td>No</td>
<td>155</td>
<td>91.2</td>
</tr>
<tr>
<td>Missing</td>
<td>1</td>
<td>0.6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>170</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

This percent may have been higher if behavioral responses were combined with the EAT-26 score. This will be addressed in the discussion section. The remaining 91% (n = 155) of students were not ‘at risk’ solely based on their EAT-26 score because it was less than 20. Reported hours of athletic training clinical education per week ranged between 1-40, with 52% (n = 93) of the students working 20 hours or more per week with the mean (m = 18 + 8.5) per week. Working more than 20 hours a week would violate CAATE
guidelines. For number of credits currently taken, the range was 9-19 (m = 15.69 ± 2.17). Among those who were surveyed 43% (n = 74) of students had a meal plan, 55.9% (n = 95) did not have a meal plan. That would mean students are therefore responsible for purchasing and cooking foods on their own. Only 27% (n = 46) of students surveyed lived in dorms and 78% (n = 133) of students lived somewhere other than a dorm. Of those 133 students, 72% (n = 97) live off campus. When asked about nutrition classes, 46.5% (n = 79) said ‘yes’ they have completed a nutrition class and 52.4% (n = 89) said they have not completed a nutrition class.

Hypothesis Testing

The level of significance used for testing the hypotheses was set at an alpha level of .05.

Hypothesis 1: There will be a difference in EAT-26 scores due to year in ATEP; The third year ATS will have a higher risk than first year students.

An ANOVA was calculated for EAT-26 and Year in Program (F (2 , 166)= 2.733, P >.05). Conclusion: There was no difference in EAT-26 score based on the year in program.
Hypothesis 2: There will be a difference in scores on the EAT-26 when individuals undertake a higher course load and/or higher level classes.
For the first part of hypothesis 2, a Pearson Product Moment Correlation calculated the relationship between students’ EAT-26 Score and number of credits (course load). A weak correlation that was not significant was found ($r(2) = .065, P > .05$). Course load is not related to EAT-26 Score. For the second part of hypothesis 2, a one way ANOVA was calculated to evaluate course level and EAT-26 score. No significant relationship was found ($F (2,163) = .762, P > .05$). There was no difference in EAT-26 scores based on course levels of ATS.

Hypothesis 3: There will be differences among EAT-26 scores when the current clinical assignment is in season as opposed to out of season.
An independent $t$ test was used to compare mean scores on the EAT-26 between those students working sports that are ‘in season’ or ‘out of season’. No significant differences were found ($t (164) = -.930, P > .05$). The mean score on the EAT-26 of students in season ($m = 7.99, \pm 9.77$) was not significantly different from the mean of students working out of season ($m = 9.69, \pm 9.47$) sports.
Additional Findings

Additional tests were conducted using other demographic questions along with the EAT-26 scores. The first additional test was a Pearson Product Moment Correlation which was used to calculate a relationship between EAT-26 scores and current weight. A weak positive correlation was found \((r (156) = .158, P = .047)\), indicating a linear relationship between the two. Therefore, the higher the EAT-26 score the higher their current weight was likely to be.

Secondly, a Chi-Square test for independence was calculated comparing the frequency of students who relieve stress by drinking, smoking or having sex, between each category (1-14-low, 15-19-medium, > 20-high) of EAT-26 score. A significant interaction was found \((x^2(2) = 10.722, P (0.005) <.05)\). One hundred percent of students who scored \(> 20\) on the EAT-26 used drinking, smoking or having sex to relieve the stress of school or athletic training responsibilities. However, only 62.7% of students who scored between 1-14, and 86% of students whose scores were between 15-19 used these methods for relieving stress.
Therefore, the score on the EAT-26 was dependent on whether or not the student was more likely to use inappropriate means of coping with life stresses.

There were 14 (8.2%) individuals at risk in this study, according to their score on the EAT-26; and 17 students (10%) who reported previously having an eating disorder. To find out more about this at risk group of students, several case reports were run to find what similarities are present between students in this group.

First, of the 10% who reported a previous eating disorder, the mean EAT-26 score was \( m = 13.35 \pm 11.88 \). Only 3 of those 17 (17%) had scores \( > 20 \) (and those three scores ranged from 34 – 38, which is much higher than the cut off of 20). Those who reported not previously having an eating disorder had a mean score \( m = 7.72 \pm 9.27 \) of about 8.

After several tests to examine the ‘at risk’ group the findings were as follows: 78% (n = 11) who scored \( \geq 20 \) were female, only 21% (n = 3) were male. Of the 14 people who scored \( \geq 20 \), 92% (n = 13) were Caucasian, and only 7% (n = 1) were Hispanic. Of the students at risk, 42% (n = 6) have taken a nutrition class, 57% (n = 8) have not taken a nutrition class. The class breakdown of individuals at risk was 28% (n = 4) sophomores, 14 % (n = 2) juniors, and 57%
(n = 8) seniors. Although the total number of cases were low, this may be important to examine later. Among those students ‘at risk’, 35% travel (n = 5) and, 64% (n = 9) reported an average of more than 20 hours of clinical athletic training responsibilities per week. Only 12 of the 14 students who were at risk according to their score, answered the question ‘do you have difficulty concentrating’; of those 12, 83% (n = 10), answered ‘yes’, and only 16% (n = 2) answered ‘no’. When asked ‘do you have trouble planning or eating balanced meals, 85% (n = 12) answered ‘yes’, and only 14% (n = 2) answered ‘no’. When asked if they had time to cook healthy meals 21% of students at risk said ‘yes’ they did, but 78% (n = 11) said they did not have adequate time to cook healthy meals.

In regards to physical activity, 35% (n = 5) of those at risk, had been or currently were varsity athletes; 2 were football players, 1 ran cross country, 1 played tennis, and the other did not specify what sport he or she was involved in. The same percentage, 35% of at risk individuals, also noted they were involved with intramurals regularly.

Results were split evenly when asked about working a job in addition to school and athletic training; 50% of those at risk did have a job and 50% did not. When it came
to involvement in other activities, only 21% (n = 3) were not involved in any other activities, which left 78% (n = 11) involved in other clubs or organizations which ranged from 1-6 organizations.

In regards to academics, 50% (n = 7) needed to maintain a 3.0 GPA or higher and 35% (n = 5) needed to maintain a 2.5 or higher. Among the overall student population surveyed, the highest GPA needed was a 3.75 and some individuals needed to remain within the top 25% of their college class to keep scholarships. Additionally, 57% (n = 8) of those at risk, were currently working with more than 1 team, therefore only 42% worked with 1 team.

When the EAT-26 score was compared to responses on the additional questionnaire, 85% (n = 12) responded ‘always’, or ‘usually’ when asked if they are terrified of being overweight. When asked if they engaged in dieting behavior, 71% (n = 10) of those at risk responded with always, usually, or often. When asked if they have trouble concentrating, 78% (n = 11) of those whose score put them at risk responded ‘yes’. 
Discussion

Results

The goal of the present study was to determine if scores of the EAT-26 when compared to class status, course load, level of classes or the status of their current sport assignment would affect risk for disordered eating among undergraduate athletic training students. None of the four variables that were tested were found to be significant in relation to risk for disordered eating among undergraduate athletic training students. However, after looking at the over all data and specifically the ‘at risk’ group, this study is similar to a study by Elgin\textsuperscript{27}, and the current information available about disordered eating, and eating disorders.

In the current study a majority of test subjects were between ages 19-25, (12 of 14 students at risk in this study were between the ages of 19-22; however, the missing two students did not report an age); additionally, 87.6\% of students were Caucasian and 75\% female. This is similar to a study with a large population of undergraduate students where 90\% were Caucasian and 65\% female\textsuperscript{27}. Although the previous study did not use healthcare students, it found
that 13.49% of the females in that study were at risk for disordered eating according to their EAT-26 score, and 1.71% of males were at risk. The current study only presented with a total 8% of students surveyed at risk. However, of that 8%, 78% (n = 11) were female and 21% (n = 3) male. It is important to acknowledge that the overall population surveyed was dominantly female and Caucasian and those two groups have typically been considered at highest risk\textsuperscript{27}. The current study had a relatively small sample population; however, these findings need to be recognized because athletic training students are only a small population of an institution’s students. If those individuals have such statistics, the school as a whole may have more students than previously thought with disordered eating patterns. ANRED.com stated that eating disorders primarily affect people in their teens and twenties\textsuperscript{18}, and the students in the present study who were ‘at risk’ were all between the ages of 19-22. Eating disorders are often a long on-going battle and one report shows that up to 86% of cases reported the onset before age 20\textsuperscript{18}. A current poll of college students from NEDA.org, found that 55.3% of respondents knew at least one person with an eating disorder, and 19.6% admitted they had an eating disorder\textsuperscript{28}. 
Eating disorders are difficult to diagnose because one must meet strict DSM-IV diagnostic criteria. However, it is more likely that people will have some but not all traits of an eating disorder, and do not score above 20 on the EAT-26. This may be referred to as a sub-clinical eating disorder or Eating Disorder Not Otherwise Specified. In this study, 24 individuals (14% of total population surveyed) had a score between 11 and 19. If those individuals had any of the five behavioral characteristics at the end of the EAT-26 questionnaire, they could be considered at risk or to have a sub-clinical eating disorder and could be referred to a qualified professional. A 2005 study of college students suggested that 25-40% of female undergraduates suffered from sub-clinical disordered eating. It also needs to be noted that, in the current study only three students who scored above 20 reported a previous eating disorder. The remaining 15 students who reported a previous eating disorder reported scores from 2-17. However, if the behavioral questions were incorporated additional students may have been considered ‘at risk’. It may also show that some of those individuals were unable to recover fully from their eating disorder. On the other hand many individuals, who do have an eating disorder, do not admit to it or give dishonest answers which can make
getting accurate results from a self assigned survey difficult even though the EAT-26 has high rates of reliability.

The results in the additional findings section sheds more light among the population that was surveyed for this study. When EAT-26 scores were compared to the likelihood of someone drinking, smoking or having sex to relieve stress, \( P = .005 \). This was a very significant finding because it showed that students with scores greater than 20 showed a greater tendency to use inefficient means of coping. Therefore the significance of that finding is to recognize one of the underlying causes of disordered eating is an unbalanced life - where the stress of school, work, family and various responsibilities are not appropriately balanced with self-care (meals, physical activity, and sleep)\(^{12}\). All college students who choose an allied health profession will have large time commitments to their class and clinical rotations without factoring in other responsibilities.

The ‘at risk’ group was asked if they had trouble concentrating, and 83% responded ‘yes’. This is significant in the respect that an athletic trainer needs to be highly alert and able to pay attention to detail both in the classroom as a student, and clinically so they do not miss
anything during an evaluation. If there is trouble with concentration among this group, it likely resulted from inadequate fueling of the body and an unbalanced life. Additionally, 78% of ‘at risk’ students reported not having enough time to cook healthy meals which supported the idea that students at risk for disordered eating have not been able to successfully maintain a balanced lifestyle.

When reflecting on which students overall were more likely to be at risk there are many factors to consider such as: ethnicity, gender, those who tend to over commit and have a large number of other responsibilities and perfectionist tendencies. Within the at risk group, 50% needed to maintain a GPA 3.0 or higher, 50% had a job, 78% were involved in greater than one activity excluding athletic training, and a total of 70% were a college athlete or involved in intramurals. Those statistics could be used to assume that most, but not all athletic training students fall into one of the following categories: need to meet high academic standards, work to pay for their schooling, are involved in a wide variety of other activities and are physically active in someway. As a result of extra activities taking up additional time students reportedly can not maintain a healthy balanced life. Therefore time management needs to be addressed to
the overall student population not just athletic training students.

Conclusion

Everyone is potentially at risk for disordered eating, but select sub-groups are believed to be at greater risk\(^\text{18}\). These traditionally include females, Caucasians, and athletes, especially those which focus on weight or appearance related to performance\(^\text{12,18}\). The current study examined a population which has not been significantly tested before, but it is apparent that the statistics from this small group of university students are similar to greater college populations. Students and young adults have some problems keeping a balanced lifestyle and taking care of his/her own health. The diagnosis of eating disorders may be low compared to the reported rates of sub-clinical eating disorders and rates of disordered eating but, both are clearly present in the overall college populations. This affects ATSs' because they take care of others, but can not do so without most efficiently fueling their own body for energy first. Eating disorders can be fatal and the wide range of improper eating habits are partially manifested from psychological imbalances and an inability
to maintain a balanced life and deal with stress without making ones’ body suffer.

Recommendations

Further research on disordered eating habits, and distorted/abnormal thoughts may be useful to understand the athletic training population (including undergraduate, graduate, and those working in clinical settings) in the future. The statistics of this study can be helpful to clinicians for several reasons. It may open their eyes to the fact that even though athletic training is an allied health care profession, college students are under a lot of stress and might not be able to cope well with it. It may be helpful to not schedule classes during meal times, as much as possible especially lunch. Possibly require a nutrition class or general wellness class teaching students the basics of physical and mental health and tips on how to maintain a balanced lifestyle so students are still able to be involved in clubs or activities they enjoy. College is expensive, so the need to work is understood, but there are usually restrictions by work study programs on how much students can work; enforce those if the university has them, if not establish them in the program rules and
guidelines. Also, consider what else the students are
involved in, or if they keep having a high number of
clinical hours per week, work to ensure that the hours they
are doing are quality learning experiences and they are not
sitting around, as well as incorporating days off when
possible. As for those ATCs who are working with students
in an ATEP, recognize these statistics and be aware of
signs and symptoms, attitudes and behaviors which may be
present. It may be advisable to be available to those you
are in charge of or offer tips to help them manage their
time.
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APPENDIX A

Review of the Literature
Athletic trainers are responsible for the care and prevention of athletic injuries or illnesses, and as a result are learning more in their undergraduate athletic training education programs (ATEP) about the role of sports nutrition. This nutrition knowledge can be applied to his or her own life as well. It is essential that athletic training students have gained adequate knowledge and practice good nutritional habits to avoid their own disordered and unhealthy eating so they may be able to communicate/educate athletes about nutrition, as well as any potential possible problems that may arise from malnutrition and disordered eating habits. However, one must first be taking care of his or herself to perform job tasks included in the role of an athletic trainer.

Therefore, the purpose of this review is to outline the components of a healthy diet, the role athletic trainers play in sport nutrition education, and address the disordered eating habits that occur in college students and allied health care professionals and the consequences it has on various aspects of life.
General Dietary Recommendations

Nutrition in athletic training is extremely important to both athletic trainers and athletes. Athletic trainers and athletes alike need to know what a healthy diet is, that following guidelines of the food pyramid, and meeting recommended daily intakes of essential nutrients will help in sports as well as job performance, academically and overall health. Currently, in the United States, poor diets frequently develop into serious diseases and conditions such as malnutrition, iron-deficiency anemia and osteoporosis which affect everyday functions.

Foremost, a healthy diet should be based on three key concepts; variety, moderation, and wholesomeness. Variety, which is defined as not consuming the same 10-15 foods every week, will ensure that different vitamins and minerals which are important to a properly functioning body are consumed. Second is the concept of moderation; often talked about, but seldom followed. A perfect example is portion sizes. Servings today are much larger than an actual serving size and have increased significantly over the past two decades. Foods from all food groups should be consumed. Although still important, foods considered as sweets and fats should be consumed much less than any other
group. Lastly, wholesomeness refers to foods that are lightly processed or whole grain as better choices. Another concept of wholesomeness is to think of foods in the state which they are commonly served and try to consume them in their natural state as opposed to frozen or fried. Fresh fruits or vegetables as opposed to frozen and baked potatoes instead of french fries are good choices. Any consumption of fruits and vegetables is better than none at all.

A healthy diet includes consumption of all six major food groups: grains, vegetables, fruit, milk/dairy, meat/beans, fats/oils and sweets. Knowledge and proper nutritional habits can positively affect performance in multiple ways. Inversely, bad nutrition can have negative effects on the body. It is important to realize food is energy that fuels the body. Without enough fuel, the body will not function to optimum potential, maintain proper function of lean tissue, sustain immunity, and facilitate reproduction.

Carbohydrates and Grains for Energy

Grain products should play the main role in a healthy diet. Items such as bread, whole grain cereal, rice, and pasta all are considered grains; however, most grains and
bread products contain carbohydrates. In general, carbohydrates are good as long as they are consumed in proper amounts and are not processed. The major function of the grain(carbohydrate) group is to help in production of blood glucose and muscle glycogen. Whole grains are a very important source of fiber which is also lacking in the American diet. Reportedly, adolescents only get one serving of whole grain per day.

The response of the carbohydrate is the ability to contribute glucose to the blood stream which can be expressed by the glycemic index (GI), a ranking system of blood glucose response to a specific food as compared to a reference food containing 50g of available carbohydrate. Prior to activity, foods with a low GI should be consumed. However, during activity and periods when a fast recovery is needed (tournaments), higher GI content foods are suggested. Low GI foods are fiber-rich fruits, vegetables and whole grains that are all wholesome. High GI foods tend to include more sugars.

In today’s society, the idea of carbohydrate consumption and importance seems confusing with the variety of options people have for the various low-carbohydrate diets. The fact is, most foods provide some form of carbohydrates, and one should not try to eliminate these
foods from their diet. Carbohydrates are not what cause an individual to become overweight; excess calorie consumption does. However, when there is a consumption of too many calories, carbohydrates are stored as fats. Carbohydrates are necessary for energy during exercise and recovery. It is important to know the best sources of carbohydrates are from wholesome fruits, vegetables, and grains. However, currently there is a much higher prevalence of convenience and fast foods where more sugars and starches are being consumed.

Due to an athlete’s extra energy expenditure, he or she may often consume a greater amount to satisfy the energy needs. Anywhere between 200-300g carbohydrates may be consumed 3-4 hours prior to exercise. During exercise, carbohydrate consumption depends greatly on what an individual has already eaten, and whether there was carbohydrate loading, in addition to the time, length, and next bout of exercise. The amount of grains to be consumed depends on the individual (gender and physical activity), but the daily RDA of carbohydrates should generally make up 45-65% of calories. Athletes or active individuals participating in exercise for longer periods of time need more than individuals who do not exercise.
Fruits and Vegetables

Vegetables contribute important nutrients such as vitamin A, vitamin C, folate, magnesium, and dietary fiber. Fruits and vegetables may be two of the food groups individuals often leave out of their diet, but it is important to realize they may help reduce risks of cancer and coronary heart disease when combined with other aspects of a healthy diet. Vegetables may be consumed in a wide variety of options such as steamed, baked, or grilled.

Along with vegetables, fruits are also important in diets, and are a good source of carbohydrates, vitamin C, and dietary fiber. Although extremely important to a healthy diet, these two food groups are often not consumed in adequate amounts. Incorporating orange juice, bananas, grapefruit, and/or tangerines into breakfast would be an easy way to satisfy the fruit serving rich in fiber at one meal. The Dietary Guidelines for Americans recommends 9 servings of fruit (four and a half cups) daily and 3-5 servings daily of vegetables. Fruits also contain phytochemicals such as lutein, genistein, lignans and beta-carotene which are found naturally in plants and are extremely important to health.
Protein for Biological Work

The protein group contains items such as meat, poultry, beans, eggs, nuts, and soy. The foods in the group may be rich in iron, niacin, vitamin B complex, zinc, and thiamin. As opposed to fruits and vegetables, proteins are currently being consumed in excess of the recommended daily amount (RDA). However, one population where protein consumption may not be adequate are vegetarian individuals. Specifically, they may lack adequate amounts of iron and other amino acids that would be gained by eating meat. However, by following the vegetarian food guide soy is a great protein option because it is the only plant-based complete protein. Proteins consist of two groups; nonessential which are made within the body and essential amino acids that come from another source (usually animal). Today, consumption of animal proteins is much greater than plants. The RDA of proteins is 0.83 kg per body mass.

The recommendations of protein for athletes are still controversial, but the general consensus is for slightly higher rates of proteins (1.2-1.7 g/kg bodyweight depending on the sport) but not exceeding twice the RDA. The functions of proteins are important to understand as well. They include maintaining acid-based balance, fluid and electrolyte regulation, as well as providing energy for the
Insufficient intake of quality protein (protein deficiency—usually in children ages 2-5) is called kwashiorkor. The over consumption of proteins leads to a build up of adipose and dehydration, which imposes other health concerns.

A food group especially important to young individuals who are still growing is the milk/dairy group (where proteins are also found). Foods in this group include yogurt, cheese, and milk which not only include calcium, but complete proteins. The RDA of the milk/dairy group is approximately 2-4 servings depending on the amount of physical activity. Athletes should aim to consume a greater amount.

Calcium is an important major mineral found abundantly in most dairy products and is extremely important for functions of muscle contraction, blood clotting, transmission of nerve impulses and transport fluids across cell membranes. Calcium from the dairy group provides up to 70% of Americans’ consumption of this mineral. However, over time inadequate consumption of calcium combined with insufficient weight bearing activity may lead to osteoporosis. Young females especially have to be sure to consume enough calcium to prevent excessive bone loss when they are older. Reportedly, 55% of college men and 82% of
college women do not meet calcium needs.\textsuperscript{5} In certain situations, a person may not consume any dairy products ranging from religious reasons to food allergies,\textsuperscript{1} so it is still extremely important to get calcium from other sources. Calcium may be found outside the milk/dairy group in items such as calcium-fortified orange juice, sardines, salmon, kidney beans, almonds, and dark green leafy vegetables.\textsuperscript{1,2}

\textbf{Fats and Oils Used Sparingly}

Although fats, as well as oils are often used for energy, and necessary to a healthy diet, they need to be consumed from the right sources. That means decreasing the amount of saturated fat, trans-fat and cholesterol.\textsuperscript{1} Fats should not come from fast food. Fat consumption can come from foods that are consumed from the other food groups (milk, meat and breads) because of the variety of food contents. When looking at food labels to find out how much fat may be in an item, one will have to find out if it contains saturated fatty acids or unsaturated fatty acids. The diets of Americans attribute a major part of their calorie consumption to saturated fats, approximately 15\%.\textsuperscript{3} Oils are often unsaturated and unhealthy for you. However, there are some oils that have recently been suggested to be
healthy such as fish oils and oils from the omega-3 group.\textsuperscript{3} Lipids are a necessary part of a balanced diet and when consumed in moderation they are beneficial. The problem facing today’s society is that people are eating out more, not cooking their own meals; therefore, food content and means of preparation are uncertain. The recommended daily intake of lipids/fats should be between 20-30\% of the diets energy intake (calories). Lipids/fats are important to the body for three reasons: energy reserve, protection of vital organs (heart, liver, kidneys, spleen, brain and spinal cord), thermal insulation, and transport of fat-soluble vitamins.\textsuperscript{3}

**Water**

Another important factor in a healthy diet that is not associated with the food pyramid is hydration. Water is the most essential substance to sustain life by humans; therefore a person may only last a few days without water.\textsuperscript{6} It is extremely important to the athletic populations, but sometimes it is forgotten that every one should be drinking plenty of water, especially in hot humid environments. Consuming 6-8 oz of water throughout the day at meals\textsuperscript{1} is the bare minimum. Sport drinks may be used in addition to water to provide optimal vitamins, minerals and
electrolytes to help the body function in normal populations. Athletes require a greater consumption of fluids that should contain water, electrolytes and minerals.

A longer period of activity or exposure to hot humid environments is directly proportional to the amount of fluid that should be consumed.²,³ It is important to recognize that an individual’s thirst mechanism might not be an accurate predictor of his or her fluid needs, possibly due to increased sodium intake.² Water may also be obtained through various foods such as fruits and vegetables. In order to function, muscles and tissues all contain water (skeletal 65-70%, adipose and bone tissue 10%).⁶

The human body needs water for several reasons including: body temperature regulation, lubrication, transmission of light and sound, transport of nutrients, metabolites and waste products.⁶,⁷ Although water is extremely important, individuals may not realize how important it is and may not consume proper amounts. Inadequate water consumption and expelling water at a fast rate leads to dehydration. Dehydration may be detrimental to athletic performance as well as affecting normal functions in everyday life, with the potential to affect
everyone. Water may be expelled from the body through sweat, urine, respiration and feces.\textsuperscript{6,7} In all individuals, especially athletes in hot humid weather, dehydration can have serious effects on the body and performance. Symptoms of dehydration include lethargy, fatigue, loss of appetite, nervousness,\textsuperscript{7} and decreased performance. Water or available sources of water need to be consumed throughout the day, during and after exercise.

**Energy Requirements**

Energy is defined as the capacity to do work.\textsuperscript{6,7} However, it is important to understand all aspects that affect energy, how foods should be used as energy, and the consequences of a negative energy balance. It is not just important to focus on what an individual eats, but whether enough energy is provided for the daily activities. Adequate energy is essential in maintenance of lean mass, immune and reproductive functions and optimum performance.\textsuperscript{4} In females, expending more energy than is consumed may result in weight loss or menstrual dysfunction,\textsuperscript{4} both of which should be a cause for concern if lasting for any length of time. This inadequate energy intake also decreases performance, and results in higher rates of strength endurance loss.\textsuperscript{4}
Energy in relation to food is measured in calories; carbohydrates and proteins contain 4 cal/g and lipids 9 cal/g.\textsuperscript{6} It is important to maintain energy balance so excessive weight is not gained, but at the same time not suffer physiologic affects that decrease performance or jeopardize their health due to weight loss. According to Dietary Guidelines for Americans to decrease the growing trends of over consumption of calories, food (energy) consumption must be balanced with energy expenditure.\textsuperscript{1,6}

When planning meals, it is important to consider what kind of activities one will be engaged in to determine caloric needs. The calorie or energy requirements of an endurance runner are different from swimmers or basketball players. A male endurance athlete may require 3,000-5,000 calories per day simply because their energy expenditure is so high.\textsuperscript{4} For individuals who are not physically active, or only mildly physically active it is important to know that metabolism affects how foods are processed and used as energy in the body. Planning meals when on road trips or away from home with adequate energy and nutrient density is important to the athletes and athletic trainers.\textsuperscript{7}
Requirements for Nutrition Education in ATEPs

Athletic training students and ATCs play an important role in educating athletes on proper nutrition and possible implications of improper nutrition. The CAATE (Commission on Accreditation of Athletic Training Education) has established requirements (guidelines and standards) for nutrition knowledge and application of tasks for ATEP students. In turn, those guidelines and standards provide a basis for minimum academic requirements and are helping establish continuing quality improvement. The NATA BOC (Board of Certification) with assistance from Castle Worldwide Incorporated has developed a role delineation study that outlines these tasks and education requirements in a specific/detailed format. This delineation should help guide the ATEP as to what is taught. “Athletic trainers must monitor and control the risk imposed by the environment especially for at-risk participants. Established standards and policies and procedures can assist the Athletic Trainer in this task.”

The NATAEC learning objectives and outcomes fall within the six domains of athletic training, which are further broken up identifying each task within a domain, ensuring that a student graduating from the accredited
program possesses the skills necessary to practice and deal with a variety of nutritional situations. Each topic is divided and lists the basic knowledge, skills and tasks that a prudent athletic trainer is responsible for.

**Six Domains Relation to Nutrition Education Knowledge**

Within the prevention domain, an athletic trainer is responsible for knowledge of behavioral risks, preventative measures in nutritional guidelines and effective communication techniques regarding nutritional information and advice (pamphlets, posters, handouts, or oral communication). Equally important is facilitating healthy lifestyle behaviors through means of effective education and explanation of healthy lifestyle behaviors and interventions to promote wellness and reduce risk of injury/illness. Recognition of nutritional (eating disorders/disordered eating habits), and stress-related disorders, as well as education on nutritional disorders falls within the prevention domain.

Within the clinical evaluation and diagnosis domain, an ATS/ATC is especially responsible for recognizing factors that may predispose an individual to injury or health related condition, such as recognizing signs and symptoms of eating disorders or abnormal eating patterns
and being able to differentiate between them. Evaluation and diagnosis of nutritional deficits may occur during the pre-participation exam, on the field, or from daily interactions with athletes; however, whenever it occurs an athletic trainer’s diagnosis and immediate management is critical to rectify the illness or condition. Also within this domain would be recognition of signs and symptoms and predisposing factors which contribute to nutrition related injury and illness.

Within the domain of treatment, rehabilitation and reconditioning, an ATS/ATC is required to possess knowledge of nutrition and health and body function in relation to recovery and how important normal function is to the human body. It is also important to know the process of involving other trained allied health care professionals when the problem exceeds the training of the athletic trainer. However, the athletic trainer is always responsible for guidance and counseling athletes throughout the course of a treatment.

An ATS/ATCs’ duties within the professional responsibility domain are undeniable. One must be aware of issues concerning patient confidentiality and personal information. Knowledge and enforcement of the HIPPA regulations that restrict all allied health care
professionals from disclosing information without the patients consent must be maintained. Athletic trainers are to abide by a code of ethics and should not be discussing personal/medical matters with anyone in accordance with state and national laws.\textsuperscript{10} As an educator to athletes and coaches, the pressures and consequences of dieting and providing proper guidance should be addressed in an ATEP.\textsuperscript{11}

**Accreditation Requirements**

The accreditation process ATEP’s must go through is important in standardizing the educational basis for athletic training.\textsuperscript{9} Especially with the growth of the profession, employers want to be certain that individuals possess the necessary skills that make them competent. Accreditation is a means of standardizing athletic training educational programs that facilitates efforts to promote quality in the athletic training profession as a whole.\textsuperscript{9}

Recently (July 2006) ATEPs switched accreditation to CAATE. Before the 21\textsuperscript{st} century there were two routes to becoming an athletic trainer, through an accredited program (classroom intensive), or an internship route that was clinically intensive requiring no less than 1500 hours of practice in the field and minimal classroom education.\textsuperscript{9,12} However, clinical experiences and acquired knowledge could
not be controlled (everyone had different experiences) in the internship route, so it was dropped. These factors have led to the shift towards accrediting every ATEP, which will ensure that the clinical education of students is controlled. Various clinical or sport settings allows ATSs to work realistically, and prepare them adequately for the health care profession. In section J4 in the CAATE Standards for accreditation it states that it is mandatory to get significant “experience in different patient populations in different athletic or allied health care settings”. Students are only eligible for the Board of Certification test if they go through an accredited program (which is currently the only option), which ensures that they learn the same concepts in every curriculum and that a variety of clinical settings will facilitate their classroom learning. Accreditation is necessary as it will aid in maintaining a higher quality of education, improving uniformity, and promoting continuous improvement.

The Athletic Training Educational Committee (ATEC) has adopted and outlined the educational competencies as a guideline for what should be taught and practiced in the ATEP. It is similar to what the BOC has outlined in the role delineation study (RDS), but it is set up and outlined differently. The nutritional aspects of injuries and
illnesses are outlined by the educational counsel in 20 cognitive competencies, three psychomotor competencies and two clinical proficiencies. This means that the nutrition knowledge should be taught, learned and applied, in several different ways. Methods of testing comprehension and understanding are done through different tasks. It is essential that all competencies are taught and practiced in ways that will "integrate cognitive psychomotor skills/clinical proficiency, and affective competence/core values".8\(^{(p12)}\)

Theses competencies should be incorporated into the ATEP through a logical progression\(^{8}\) so upon graduating from the institution one possesses ability to integrate knowledge, skill, and behavior, and to assume professional responsibility, the entry-level athletic trainer must possess an understanding of the nutritional aspects of injuries and illnesses.\(^{13}\) The objectives set forth by the educational council will work to enable students to expand their professional knowledge, skills, and attitudes.\(^{12}\)
The importance of nutrition knowledge and application for an ATS is important to their job responsibilities in various ways. Although it may be important for anyone in the allied health care profession to have an understanding of nutrition, an ATS (assuming they continue in this field and become certified) has a different role in nutrition. His or her knowledge and practices, habits and attitudes affect everyone they work around. ATCs everywhere possess certain responsibilities not only about nutrition education, but also in recognizing abnormal eating patterns (eating disorders and disordered eating), then taking action to rectify the behaviors and actions.\textsuperscript{10} This will help an ATS in fulfilling the responsibility to assist athletes in maintenance of optimal health.\textsuperscript{14}

Knowledge of Nutrition

First, it may be important to assess if athletic trainers possess adequate nutrition knowledge. Due to the current accreditation standards, ATSs now are required to have formal training/education in nutrition. The form in which it is received may vary; there may be a specific
class designated to every aspect of nutrition or different topics may be addressed in different classes (it does not matter as long as all required material is covered). Reviews suggest that athletic trainers have a greater nutritional background than other individuals (coaches, parents) an athlete may be in contact with.\textsuperscript{15,16}

Surprisingly, it is not likely an athlete will seek nutrition advice.\textsuperscript{16} This supports the idea that certified athletic trainers and students should be taking greater strides to provide athletes, coaches, and parents with the most recent dietary guidelines to the specific needs of the athlete’s sport.\textsuperscript{16}

Professional and collegiate athletes may have easier access to professionals who have an extensive sports nutrition background. However, high school athletes may not be so lucky; many are misinformed and therefore do not meet recommended dietary allowances.\textsuperscript{15} Some high schools do not even have an athletic trainer on staff and therefore rely on peers or self who are not appropriately prepared to give nutritional suggestions,\textsuperscript{15} but will be the person most available to an athlete. Athletic trainers possess a significant knowledge base and practical background related to healthy nutrition and eating habits. It is important for
the ATS to utilize his or her knowledge and seek to educate coaches and athletes they work with on a daily basis.

Issues regarding health, nutrition, eating disorders and improper eating habits are topics that society and allied health care professionals are increasingly emphasizing.

**College Population**

College students as a whole are experiencing many things on their own for the first time. College may become a significant test of coping ability, independence and handling responsibilities without direct supervision from parents or guardians. The transition to college can be a vulnerable time for development; parents have little control or influence on eating behaviors which may allow for continuation of eating disorders.\(^{17}\) College for most individuals is fun and exciting, and at times stressful and hard. Therefore, it is important to observe that the occurrence of eating disorders between high school to college age individuals increased from 4% to 19% in females.\(^{18}\) College students are faced with several nutrition concerns including eating disorders, disordered eating and poor nutrient intake on a daily basis.\(^{5}\) Poor nutrient intake may lead to a variety of deficiencies and chronic diseases
including: anemia, heart disease, cancer, stroke, diabetes and osteoporosis.\textsuperscript{5}

Some students may choose to undertake curriculums in the allied health care (pre-professional) fields where the academic and time requirements are particularly demanding. Medical students (pre-med), nursing applicants, physical therapy and athletic training all fall into this category with a demanding curriculum and time requirements/rotations (obligations outside the classroom). In an athletic training setting, these obligations are referred to as the ‘clinical education experience’ where students are supervised by an approved clinical instructor (ACI) and provided the opportunity to utilize their psychomotor, cognitive, affective skills and clinical proficiencies with direct care to patients.\textsuperscript{19} If students view these responsibilities (rotations, traveling, doctor visits, rehabilitation and treatment, etc) as their ‘job’ it has potential to impose stress on a student. This may be an indicator/reason that the prevalence of eating disorders has risen dramatically in college aged students.\textsuperscript{14} Individuals with an eating disorder possess a decrease in coping ability to everyday stress and family problems in addition to abnormal anxiety over consuming food.\textsuperscript{2,20}
What Affects the Allied Health Care Student

Eating disorders and patterns of disordered eating do not discriminate, and have the potential to affect any individual due to their complexity.\textsuperscript{2,20,21} Students studying within the allied health professions are not immune to developing patterns of disordered eating just because they work within the medical field, particularly females who are not exempt from societies’ pressure to be thin.\textsuperscript{22} Nutrition in relation to disordered eating compromises a student’s physical and mental health as well as negatively affecting social relations and academic performance and retention of material.\textsuperscript{5} The complexity of the causes and predictors of patterns of abnormal eating may be difficult to pinpoint.

College and pre-professional students are increasingly aware of the emphasis society, influenced by the media, has put on youthfulness, thinness, and beauty.\textsuperscript{18,22} Allied health care students have expectations to meet academically (achievement/maintenance of specific GPA’s required to get into/stay in desired program), and professionally (conferences, presentations, research, and being active in professional organizations).

The requirements and expectations vary depending on the institution and field of study. Aside from the academics, daily stresses or responsibilities not related
to school potentially can greatly affect the well-being of the college allied health student. These stresses and responsibilities are compounded by financial obligations (paying for school, rent, bills, etc.), involvement and responsibilities in various organizations or clubs, building resumes, and/or possible family problems and stress (which includes roommates and significant others). Stress and its causes/responses are complex; however, not eating or abnormal eating may be a direct reaction to stress as a comfort or coping strategy. Athletes reported that study time is a large barrier to following a healthy diet, and suggest that juggling school practices and other commitments, they seldom think about what they eat. All aspects are compounding factors. All factors have the ability to enhance tendencies of disordered eating of the allied health care student in a college setting.

**Eating Disorders and Disordered Eating**

Eating disorders and disordered eating are very complex psychological problems that are brought on or developed due to a variety of possible reasons. When looking at the general population the etiology or cause of disordered eating may be speculated to be within three
groups: familial, socio-cultural, and biophysical factors\textsuperscript{18}. Yet there is also research suggesting that personality traits\textsuperscript{27,28} may largely affect disordered eating tendencies. These personality traits include low self-esteem, low self-awareness, a high tendency toward perfectionism and high impulsive tendencies.\textsuperscript{18,20,26,27,29} Due to eating disorders and disordered eating having the ability to affect individuals with a variety of demographic backgrounds, personality traits and genetics\textsuperscript{20,24,27} could play a huge role in better predicting/understanding the complexity. If personality traits or genetics play a role in development of disordered eating the environment,\textsuperscript{20} particularly if it is stressful, is likely to trigger the maladaptive behaviors or symptoms. Additional possible factors with the possibility to develop from disordered eating include: poor body image, high drive to succeed, peer groups' anxiety about food, desire for control, tendency to be hypercritical of self, a decreased ability to cope with daily life stressors, perceived job strain, socio-cultural beliefs and pressures, rigidity, high tendency to take risks, anxiety, mental (psychological) and mood disorders.\textsuperscript{2,5,12,17,18,20,23,24,28-30}

Before all the effects of disordered eating can be addressed, it is important to define and differentiate between disordered eating and eating disorders, then
examine who may be at risk and why. Disordered eating can be viewed as a continuum of eating behaviors that include: fasting, restricting, binge-eating, and purging in an attempt to achieve a lean appearance. Disordered eating may also be defined as a 'spectrum of harmful and ineffective eating habits'. The extremes of the continuum are anorexia nervosa (AN), bulimia nervosa (BN) and binge eating disorder (BED).

AN, BN, and BED are clinically diagnosable conditions which are defined by the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) and outlined in APPENDIX A1. Each eating disorder has its own formal criteria that must be met to qualify for diagnosis. However, 'eating disorder' (ED) is a general term that is used interchangeably and is defined as persistent disturbance of eating behavior or a behavior intended to control weight, which significantly impairs physical health or psychosocial functioning and is not secondary to a general medical condition or another psychiatric disorder.

A term developing greater attention is ‘Disordered Eating’ (DE) (also referred to as sub-clinical eating disorders) which includes symptoms of eating disorders and serious body weight concerns, but fails to reach strict DSM-IV diagnostic criteria. Because diagnostic criteria
for an ED are so strict, the statistical presence is lower than those exhibiting behaviors or attitudes of disordered eating.\textsuperscript{20} Several studies have been done on different specific populations (college aged individuals, females, athletes of different sport categories, nurses and medical students) to see who, why and what affects their eating.\textsuperscript{17,18,21,23,28} As many as 10 million females and 1 million males are struggling with AN/BN and 25 million with BED.\textsuperscript{5}

It is essential to compare the difference in individuals with diagnosable eating disorders to those who were found to exhibit only some, not all signs and symptoms. Not meeting the strict criteria disqualifies a person for official diagnosis of an eating disorder (by DSM-IV standards), yet they still are likely to exhibit abnormal eating patterns and habits that need to be addressed.\textsuperscript{17,23,33} Patterns of abnormal eating habits and subclinical eating disorders are speculated to be much higher than the statistics of diagnosable eating disorders meeting the DSM-IV criteria.\textsuperscript{17,33} If this speculation is accurate, previous studies assessing prevalence of an eating disorder in a specific population may need to re-assess the data for prevalence of these abnormal eating patterns. Individuals not meeting diagnostic criteria for an eating disorder
might possibly be taking part in behaviors and attitudes compromising physical and mental well being.\textsuperscript{11} These behaviors and attitudes not only affect that individual but everyone with which they interact. Individuals suffering from sub-clinical eating disorders are likely to still experience psychological and physical distress.\textsuperscript{27(p.210)}

In a study of college women, only 33\% reported normal eating habits,\textsuperscript{25} indicating that the prevalence of sub-clinical eating disorders in men and women is on the rise\textsuperscript{5(p2)}. Females, particularly youth/late teens and early twenties/young adults, have the highest incident reporting of eating disorders and compromised patterns of eating,\textsuperscript{3,5,20,33} but this does not mean males and those of other ages can’t develop the conditions. Stereotypically, eating disorders and disordered eating are associated largely with the female population,\textsuperscript{20} but approximately 20-30\% of younger anorexic individuals are males.\textsuperscript{20}

Symptoms of disordered eating become significant when some symptoms of AN and BN are present but are lacking one of the required criteria.\textsuperscript{34} Individuals may be diagnosed with ‘eating disorders not otherwise specified’ (ED-NOS) or atypical eating patterns.\textsuperscript{23,34} Each case is different; an individual may have a normal weight,\textsuperscript{34} absence of amenorrhea in females,\textsuperscript{34} and binge purge patterns but possess guilt
about eating and an extreme pre-occupation with body image and weight. The lack of amenorrhea or menstrual dysfunction in females may be the distinction between ED and ED-NOS or disordered eating. An estimated 20-40% of female undergraduate college students suffer from sub-clinical disordered eating. Most people will not meet DSM-IV criteria for eating disorders but their behaviors and attitudes still need to be treated.

**Effects of Abnormal Eating Patterns**

After establishing the diagnostic criteria of eating disorders and disordered eating, it is essential to identify the detrimental effects of these conditions and abnormal practices. These include physiological (physical), social, and psychological problems that can develop with any deviation from USDA guidelines.

Dietary restraint (for any reason) increases the risk of overeating or binge eating. In the general population, signs of disordered eating include anemia, compromised immune function, chronic physical fatigue, loss of muscle, strength and stamina, digestive problems, tachycardia, hypoglycemia, internal bleeding, decreased intake of vitamins, minerals and protein, heartburn, esophageal rupture, tooth decay, mineral and electrolyte imbalances,
dehydration, heart arrhythmias, heartburn, dehydration, constipation, dizziness/fainting upon standing, edema in extremities, dull brittle hair, hair loss, decrease in libido of both genders, insomnia, metabolic alkalosis, and chronic physical fatigue.\textsuperscript{2,6,20,29} These physical symptoms need to be addressed accordingly as abnormal patterns of disordered eating and may progress to become a more severe eating disorder. These physical ailments could in turn produce further complications in the digestive system. In the demanding allied health care settings, compromising physical well being could impact one’s neuropsychological functions such as memory, attention, concentration, and motor speed that are needed to perform every day tasks.\textsuperscript{23} Constant dieting will affect metabolism causing changes and imbalances in hormones and chemicals that regulate appetite.\textsuperscript{5} The most severe physical complication of untreated eating disorders is death/mortality.\textsuperscript{2,29,33} Death occurs in individuals with eating disorders from starvation and depriving the body of the essentials it needs to function properly.\textsuperscript{19,28,33} Up to 20% of individuals with serious eating disorders die if they are never treated.\textsuperscript{33}

Certain physical side effects of disordered eating which are especially detrimental to an individual’s health deserve further explanation. When the amount of water in
the body compared to the water intake and expulsion is not balanced, the result is dehydration. Dehydration increases the risk of potential life-threatening heat injury.\textsuperscript{4} Since water is essential in function, inadequate amounts cause problems. A 5\% water loss results in discomfort, lethargy, fatigue, loss of appetite and nervousness may be present.\textsuperscript{7} A 7\% loss impairs ability to swallow; 10\% impairs the ability to walk and a deficit of greater than 20\% often results in death.\textsuperscript{7} When inadequate means of energy (food) are not being consumed the result is hypoglycemia (low blood sugar). The implications of this can seriously impair daily function because of dizziness, muscle weakness, fatigue, and hunger.\textsuperscript{2,7,20,29} Heart arrhythmias result from a decrease in potassium and electrolytes.\textsuperscript{20} Individuals may not consume adequate amounts of iron because of poor energy intake, or avoidance of meat, poultry and fish and therefore develop iron-deficiency anemia.\textsuperscript{4} This results in the decreased ability of the body to transport and utilize oxygen.\textsuperscript{7} Individuals that should be most concerned with this are females\textsuperscript{4,7} because of menstruation: iron loss during menstruation is between 5-45 mg.\textsuperscript{3} Long distance runners and vegetarians should also be concerned with anemia.\textsuperscript{3,4,7} Physical signs of iron-deficiency anemia are sluggishness,
loss of appetite and a decrease in the ability to perform small amounts of exercise.\textsuperscript{3}

In the female population irregular menstrual dysfunction and amenorrhea are critical diagnostic factors of eating disorders. Amenorrhea is a complete absence of a menstrual cycle as opposed to Oligomenorrhea where there are still menstrual cycles but they are irregular.\textsuperscript{3} Amenorrhea may be present between 2-5\% of females that are of childbearing age; with higher rates up to 40\% in athletes/physically active individuals.\textsuperscript{3} The significance of amenorrhea in relation to disordered eating is that it can produce long term health problems.

In athletic/physically active populations there may be a decrease in performance, increase in injuries that will not heal, weak bones (decreased bone density), a four times higher rate of stress fractures\textsuperscript{2,6} as well as decreases in speed, agility, and concentration.\textsuperscript{29} Rates of disordered eating in athletes are higher than the general population.\textsuperscript{5} All possible physiologic symptoms will combine with some psychological factors of individuals with disordered eating.

The social and mental aspects of disordered eating are just as critical as the physical. Psychological symptoms include: mental anguish, eating reactions to stress,
starvation, irritability, poor concentration, fatigue, and insomnia.\textsuperscript{2,23} Addressing the difference between starvation and hunger is critical. Hunger is a body’s normal request for food\textsuperscript{2} while starvation is a physiologic force that creates a strong desire to eat because the hunger response has been ignored.\textsuperscript{2} Social symptoms of disordered eating may include: being less available to friends, and social avoidance.\textsuperscript{2,18} Additional implications to be aware of when disordered eating is currently present in an individual include depression, shame and guilt, impaired family and social relationships, and mood swings.\textsuperscript{20} Failure of repeated attempts to diet result in the increased risk for undesirable psychological consequences which in turn increases the risk for depression.\textsuperscript{11} Reportedly, with three out of every 100 people eating in a way disordered enough to warrant treatment,\textsuperscript{33} the topic of disordered eating and proper nutrition is extremely significant.

Summary

A healthy diet and adherence to the dietary guidelines are important in prevention of negative effects from poor nutrition, and encouragement of healthy eating patterns. Three concepts to be applied to a healthy diet include
variety, moderation and wholeness. Additionally, consumption of foods from all six major food groups helps create a healthy diet. Six major food groups have been established including grains, vegetables, fruit, milk, meat/beans, and fats/oils/sweets. Food is energy/fuel that the body needs to function properly. Consumption of foods and substances abundant in essential nutrients, vitamins, minerals such as calcium, water (the most essential substance to maintain life) and iron are necessary for the body to function properly. Inadequate amounts of food in relation to energy expenditure results in a negative energy balance which causes a variety of physical and psychological problems.

Athletic trainers possess multiple roles related to nutrition within the six domains of athletic training. Responsibilities include knowledge of behavior risks and preventative measures related to nutritional illnesses and injuries, facilitating (demonstrating) healthy lifestyle behaviors, recognizing predisposing factors (signs and symptoms) of nutritional injuries or illnesses, knowledge of normal body functioning related to a nutrition-related injury or illness, and lastly abiding by the code of ethics and maintaining confidentiality. Together these tasks provide a solid knowledge and background which enables an
ATS/ATC to handle each situation to the best of his or her ability, in a professional manner, with the best interest of an athlete’s health being a priority.

An ATEP must be accredited and therefore uses established standards and expectations set forth by the NATAEC. The purpose of accreditation is to help in maintenance of high quality education, improve uniformity, and promote continuous improvement.\textsuperscript{9,12} A student’s knowledge and skills are enhanced through numerous competencies in a logical progression,\textsuperscript{8} which allows the ATS to “integrate cognitive psychomotor skills/clinical proficiencies, and affective competence core values”.\textsuperscript{8(p.12)} Accreditation standards of nutritional aspects in ATEPs provide athletic training student with the skills and knowledge to educate athletes and coaches they work with and provide the most recent nutrition information as well as ways to deal with nutrition related injuries/illnesses.

The college population is not immune to pressures to be thin and beautiful with additional expectations of exceptional academic and professional development. These pressures can cause stress or maladaptive coping techniques that lead to the development of abnormal patterns of eating.\textsuperscript{18} Differentiation between eating disorders and sub-clinical eating disorders (referred to as disordered
eating) is significant when identifying the strict diagnostic criteria for eating disorders. Even when an individual is not clinically diagnosed with AN or BN he or she may still experience physical symptoms and psychological distress.27

The rate of individuals with a diagnosed eating disorders is low compared to those who posses only some or a combination of symptoms of AN or BN. Most people do not meet diagnostic criteria for ED,20 but still possess and practice behaviors and attitudes that compromise physical and mental well being.31 The prevalence of sub-clinical eating disorders in men and women now is on the rise.5 Eating disorders and disordered eating (sub-clinical eating disorders) are complex psychological disorders producing serious physical, social, and psychological side effects as well as neuropsychological function difficulties.23 Physical side effects of disordered eating vary in severity but may ultimately result in death2,29,33 when not appropriately dealt with, or caught too late. In addition there may be social and psychological symptoms including depression and a decreased ability to deal with social relationships20 which need to be addressed.
APPENDIX A1

DSM-IV Criteria for Anorexia Nervosa and Bulimia Nervosa
1) **Anorexia Nervosa**

   a. Refusal to maintain body weight or above a minimally normal body weight for age and height (weight loss leading to maintenance of body weight less than 85% of that expected or failure to make expected weight gain during period of growth).

   b. Intense fear of gaining weight or becoming fat, even though underweight.

   c. Disturbance in the way in which one’s body weight or shape is experienced, undue influence of body weight or shape on self-evaluation, or denial of the seriousness of the current body weight.

   d. In post menarche females, amenorrhea (absence of at least three consecutive menstrual cycles). Considered to have amenorrhea if cycles occur only after hormone administration (estrogen).

   e. Two specific types:

      i. Restricting type—during current episode person has not regularly engaged in binge-eating or purging behavior.
ii. Binge eating/purging type: during the current episode the person has regularly engaged in binging or purging behaviors (self induced vomiting, laxatives, or diuretics).

2) Bulimia Nervosa
   a. Recurrent episodes of binge eating. An episode is characterized by both of the following:
      i. Eating in a discrete period of time, an amount of food that is definitely larger than most people would eat during a similar period of time under the same circumstances.
      ii. Sense of lack of control over eating during the episode (feels like they can not control it)
   b. Recurrent inappropriate compensatory behavior to prevent weight gain (laxatives, self-induced vomiting, diuretics, enemas or other medications, fasting or excessive exercise)
   c. Binge eating and compensatory behaviors both occur, on average, at least twice a week for three months.
d. Self-evaluation is unduly influenced by body shape and weight.

e. The disturbance does not occur exclusively during episodes of anorexia nervosa.

f. Two specific types:

   i. Purging type: during current episode of BN the person has regularly engaged in self-induced vomiting or the misuse of laxatives, diuretics, or enemas.

   ii. Non-purging type: during the current episode of BN, the person has used other inappropriate compensatory behaviors, such as fasting or excessive exercise, but has not regularly engaged in self-induced vomiting or the misuse of laxatives, diuretics, or enemas.
APPENDIX B

The Problem
Statement of the Problem

The role of the athletic trainer has expanded to now include the study, knowledge, and application of sport nutrition which falls within the prevention and recognition domains of the athletic training education program (ATEP). ATEPs are not only teaching sport nutrition classes, but encouraging proper nutrition habits of ATEP students. It is important that athletic training students (ATS) engage in healthy eating habits to maintain their stamina/energy during busy and rigorous schedules, as well as serve as good role models, and advisors on proper nutrition. Those goals aim to minimize potential injury, recognize behavioral risks, address issues of special nutritional needs, and promote wellness. However, healthy nutritional habits may not be followed by ATEP students. The purpose of this study is to examine the prevalence of disordered eating among students in ATEPs.

Definition of Terms

The following will be used throughout the study and therefore defined in relation to this research.

1. Amenorrhea - complete absence of menstrual periods after previously experiencing them.
2. **Anorexia Nervosa (AN)**—an individual that has a body weight greater than 10-15% lower than normal, possess distorted attitudes towards food and distorted body image. Amenorrhea and menstrual dysfunction are distinct characteristics.\(^6\)

3. **Bulimia Nervosa (BN)**—When an individual eats excessively then uses inappropriate means (vomiting, laxatives or excessive exercise) to attempt to get ride of what they just ate. The behavior must occur repeatedly no less than twice a week for a minimum of three months.\(^6\)

4. **Commission on Accreditation of Athletic Training Education (CAATE);** Governing board on accreditation for an ATEP which sets standards and guidelines to be followed by the program.

5. **Dehydration**—fluid intake fails to meet the level of fluid excretion. Significantly affects the body’s functioning and performance.\(^7\)
6. Dietary Guidelines - An analysis of new scientific information; providing science-based advice to promote health and to reduce risk for major chronic diseases through diet and physical activity. Key recommendations for nutrients are for ages two and older. These guidelines serve as the basis of federal food, nutrition and education and information programs.¹

7. Disordered eating - a range of abnormal eating habits³¹

8. Eating Disorders - not otherwise specified (ED-NOS) - individuals who experience a mix of symptoms of anorexia and/or bulimia but do not meet strict criteria of medical categories.³¹

9. Eating Disorder - persistent disturbance of eating behavior which is intended to control weight, significantly impairing physical health or psychosocial functioning and is not secondary to a general medical condition or another psychiatric disorder.⁷
10. Hypoglycemia - below normal concentration of glucose in the blood. Symptoms include: dizziness, muscle weakness, fatigue and hunger.  

11. Iron-Deficient Anemia - red blood cell concentration function is below normal; caused by low dietary intake of iron and will present with: small, lightly colored red blood cells with low concentrations of hemoglobin. Exists in three stages.  

12. Malnutrition - when one or more nutrients is deficient in the diet or eaten in excess. May produce macronutrient deficiency or toxicity.  

13. Osteoporosis - 'porous bone'; when a bone loses its mineral mass and calcium concentration (bone mineral density) and progressively becomes brittle. Risk factors include: sedentary lifestyle, early menopause, alcohol abuse, smoking, calcium and vitamin D deficiency.  

Basic Assumptions  
The following are assumptions that can be made for this study:
1) The use of a valid and reliable assessment tool (EAT-26) will be a valid and reliable predictor of individuals who currently possess a risk for eating disorders due to symptoms, behaviors and attitudes of disordered eating.

2) The use of additional demographic information will be predictive of predisposing factors or habits that contribute to unhealthy eating.

3) It is assumed students will answer all questions honestly, completely and not receive input from other individuals.

4) It is assumed that ATEP students are currently following the guidelines whereby they should not exceed 20 hours of athletic training duties per week.

Limitation of Study

The data gathered may not be an appropriate predictor of patterns of disordered eating from ATSs in all areas of the United States. It may vary among programs because of expectations and difficulty of the classes.

Significance of the Study

College is a stressful time for any student. The choice of academics, participating in a collegiate sport, and
involvement in a variety of several other organizations all affect students’ eating habits. Practice of good nutrition and proper eating habits and behaviors at a younger age will carry over into adulthood. Therefore, for students in an ATEP it is essential for the students’ own benefit to demonstrate proper eating patterns to avoid malnutrition and disordered eating patterns that may lead to eating disorders. It is important in the athletic training profession to practice healthy habits and set positive examples for the students, athletes and coaches that they will encounter daily.

Practice of proper eating habits will help ATSs and ATCs perform their job task better (especially when physical activity is involved), be more attentive, and avoid other health complications that can develop from disordered eating. It is also essential for athletic trainers to know and recognize the signs and symptoms of disordered eating among their athletes, co-workers and student athletic trainers. Disordered eating may not be as severe as clinically diagnosed eating disorders; however, it can be a precursor and may continue for long periods of time without being recognized. It is essential to educate all athletic training students on the benefits of healthy eating habits and the importance of correcting bad habits, as well as how to prevent nutritional problems and how to go about addressing
them when they do occur. Allied health care professionals should serve as a good model to others; if athletic training students practice proper nutrition it will help his or her daily functioning individually and as a professional.

This study will examine the eating patterns of students in athletic training education programs to determine whether their year in the program (with older individuals possessing more responsibilities and time commitments) or sport assignment (equipment/high risk or contact verses lower risk/no contact) play a role in the risk for disordered eating. Some aspects of athletic training requiring physical activity, as well as being attentive and aware of what is going on can be negatively affected by disordered eating, therefore creating other problems for the ATS/ATC.
APPENDIX C

ADDITIONAL METHODS
APPENDIX C1

EAT-26 Questionnaire
Eating Attitudes Test (EAT-26)®

Instructions: This is a screening measure to help you determine whether you might have an eating disorder that needs professional attention. This screening measure is not designed to make a diagnosis of an eating disorder or take the place of a professional consultation. Please fill out the below form as accurately, honestly and completely as possible. There are no right or wrong answers. All of your responses are confidential.

Part A: Complete the following questions:
1) Birth Date    Month:    Day:    Year:    2) Gender:    Male    Female
3) Height    Feet:    Inches:    
4) Current Weight (lbs.):    
5) Highest Weight (excluding pregnancy):    
6) Lowest Adult Weight:    7) Ideal Weight:

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

Part C: Behavioral Questions: (Never Once a month or less 2-3 times a month Once a week 2-6 times a week Once a day or more)

A. Gone on eating binges where you feel that you may not be able to stop?    
B. Ever made yourself sick (vomited) to control your weight or shape?    
C. Ever used laxatives, diet pills or diuretics (water pills) to control your weight or shape?    
D. Exercised more than 50 minutes a day to lose or to control your weight?    
E. Lost 20 pounds or more in the past 6 months    

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

EAT-26: Garner et al. 1982, Psychological Medicine, 12, 871-878; adapted by D. Garner with permission.
APPENDIX C2

Additional ATS Demographic Questionnaire
Additional Questionnaire

Ethnicity:  Asian              African American
           White Non-Hispanic       Hispanic
           Other__________________

Medical: Do you have any medical conditions that affect/determine what you can/should eat?  Y/N
If Yes please explain: __________________________________________

Current Sport Assignment: Please circle the team you are working with now. If you work with both male and female circle both; otherwise only circle the gender which you specifically work with.

a) Football
b) Mens Lacrosse
c) Mens or Womens Rugby
d) Ice Hockey
e) Mens or Womens Soccer
f) Mens or Womens Basketball
g) Baseball
h) Softball
I) Field Hockey
J) Womens Lacrosse
K) Wrestling
L) Mens or Womens Cross Country
M) Mens or Womans Swimming
N) Mens or Womans Volleyball
O) Mens or Womens Water Polo
P) Tennis
Q) Fencing
R) Gymnastics

High School Setting
    -What sports do you cover?________________
Clinic/ Doctors office ________________________
    -What kind ____________________________
Professional sport__________________________

Is your clinical assignment currently:
In season or Out of Season

This semester will you be working with more than 1 team?
Yes or No
Year in Athletic training Education Program (Excludes freshmen; starting with first full year)
1) Sophomore 2) Junior 3) Senior

Current number of Academic Credit hours: ______
Credit hours previous semester__________

Level for majority of current courses:
200 300 400

Average Number of hours per day spent on Athletic Training Duties (including pre/post treatment and rehab during the day, practice etc.)?__________________________

On AVERAGE how many hours per week for Athletic Training (travel, rehabilitation, practices and games) do you anticipate for this sport assignment:__________

In regards to your current assignment do you travel?
Yes or No
If yes How often:
1) occasionally but never alone
2) most of the time (missed less than 2 events)
2) always

If previous answer is yes please answer the following:

Did coach/team provide meals during trips?
Yes or No
Did you often stop at fast food/buffet style places?
Yes or No
Do you ever have athletic training duties (games, practices or treatments) or class during meal times (5-8am; 11am-2pm; 5-8 pm)? Yes or No

Current varsity college athlete Y / N
What sport_____________________

Were you Ever a college athlete for a full season? Y/N
If so what sport?___________ How many seasons?_____

Participate in intramurals frequently? Y/N

In the past 6 months have you worked a job during the school year? Y / N
If yes how many hours per week?______________

How many other clubs or activities are you involved in? _____

Are you a member of a Fraternity, Sorority, Honor Society or organization; or receive a scholarship where there is a minimum GPA that must be maintained? Y /N 
What is the GPA requirement?_________

What is the minimum GPA to maintain for your ATEP? ______

Have you completed a Nutrition class? Yes No

Do you Live on campus in:
1) Dorm: alone or with roommate/s
2) Apartment: Roommates or no roommates
3) House: Alone or with others

Off campus in:
4) Apartment
5) House with classmates
6) At home with family  7) other__________

Do you have a meal plan that you use daily? Yes or No

Do you have adequate time to cook healthy meals? Yes/ No

Have you previously had an eating disorder? Yes/ No

Have you ever engaged in activities such at drinking, not eating, smoking, or sex to relieve stresses of school and/or athletic training? Yes or No

Do you ever have difficulty concentrating or focusing? Yes or No

Have you ever had trouble balancing class/studying with eating and planning well balanced meals? Yes or No
APPENDIX C3
Permission to use the EAT-26
November 15, 2006

To Whom It May Concern:

This letter is in regards to Katy Margeson's request to use the EAT-26. Although the EAT-26 is protected under copyright, it is our wish for others to have access to the test. Katy has my permission to use and reproduce the EAT-26 as long as the original publication source is identified. The correct citation is as follows:

- 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.

Please feel free to contact me at the River Centre Clinic should you have further questions or concerns regarding this letter.

Sincerely,

David M. Garner, Ph.D.
President/CEO
APPENDIX C4

Informed Consent
Informed Consent

1. "Katy Margeson, who is, a graduate student and candidate for Masters Degree of Athletic training at California University of Pennsylvania has requested my participation in a research study at this institution. The title of the research is ‘Risk of Disordered Eating among Undergraduate students in Athletic Training Education Programs.’"

2. "I have been informed that the purpose of the research is to determine the prevalence of disordered eating patterns in athletic training education programs to identify what if any sub-groups of ATSs are at higher risk for disordered eating than other students in programs. There will be students from different districts in the state of Pennsylvania.

3. "My participation will involve completing two self report questionnaires, the EAT-26 and an additional demographic questionnaire." The duration of participation will not be longer than 15 minutes to complete both questionnaires and once completed my participation will be limited.

4. "There are no foreseeable risks or discomforts by participating in this study”.

5. "There are no feasible alternative procedures available for this study."

6. “I understand that the possible benefits of my participation in this research project will help athletic trainers in the future and that the examination for risk of disordered eating among athletic training students maybe significant because there have not been any previous studies that included examining disordered eating patterns in ATS. This study will benefit the athletic training education programs, the ATS and ATCs who work with students in understanding what affects how an ATS eats. Participation will help identify specific aspects in the life of an ATS which contribute to patterns of disordered eating or unhealthy eating; since athletic trainers are educators on the subjects of nutrition to a wide variety of individuals, examining the prevalence of disordered eating patterns could in the future help with decreasing the factors or predictors of athletic training students to develop disordered eating”.

7. "I understand that the results of the research study may be published but that my name or identity will not be revealed. In order to maintain confidentiality of my records, Katy Margeson will maintain all documents in a secure location in which only the student researcher and research advisor can access." Confidentiality will be maintained by assigning each individual a number instead of asking for their name. No one else will have access to the direct questionnaires or the findings until material is published.

8. "I have been informed that I will not be compensated for my participation."

9. “I have been informed that any questions I have concerning the research study or my participation in it, before or after my consent, will be answered by Katy Margeson,"
10. “I understand that written responses may be used in quotations for publication but my

identity will remain anonymous.”

11. "I have read the above information. The nature, demands, risks, and benefits of the

project have been explained to me. I knowingly assume the risks involved, and
understand that I may withdraw my consent and discontinue participation at any time
without penalty or loss of benefit to myself. In signing this consent form, I am not
waiving any legal claims, rights, or remedies. A copy of this consent form will be
given to me upon request”.

Subject's signature____________________________________  Date _______________

Other signature (if appropriate)__________________________  Date________________

12. "I certify that I have explained to the above individual the nature and purpose, the
potential benefits, and possible risks associated with participation in this research
study, have answered any questions that have been raised, and have witnessed the
above signature."

13. "I have provided the subject/participant a copy of this signed consent document if
requested."

Investigator’s
signature____________________________________  Date________________
APPENDIX C5

Scoring for the EAT-26
1) EAT-26 SCORE
Score the 26 items of the EAT-26 according to the following scoring system. Add the scores for all items.

<table>
<thead>
<tr>
<th>Scoring for the first 25 questions:</th>
<th>Scoring for question # 26:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Always = 3</td>
<td>Always = 0</td>
</tr>
<tr>
<td>Usually = 2</td>
<td>Usually = 0</td>
</tr>
<tr>
<td>Often = 1</td>
<td>Often = 0</td>
</tr>
<tr>
<td>Sometimes = 0</td>
<td>Sometimes = 0</td>
</tr>
<tr>
<td>Rarely = 0</td>
<td>Rarely = 1</td>
</tr>
<tr>
<td>Never = 0</td>
<td>Never = 3</td>
</tr>
</tbody>
</table>

2) Low Body Weight Compared To Age-Matched Norms

The EAT-26 includes specific questions on height and weight that can be used to compute Body Mass Index (BMI) for the purpose of determining if you are “at risk” for an eating disorder because your body weight is extremely underweight according to age-matched population norms. BMI is a formula for estimating body mass that takes both height and weight into account. It is calculated by dividing weight (in kilograms) by height in meters, and then divided again by height in meters (kg/m²). Alternatively, BMI can be calculated as weight (in pounds) divided by height in inches, then divided again by height in inches and multiplied by 703. We recommend that you seek a professional evaluation for a possible eating disorder if your body weight is “extremely underweight” according to age-matched population norms.

<table>
<thead>
<tr>
<th>Table 1:</th>
<th>BMI considered “extremely underweight” according to norms</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGE</td>
<td>Female</td>
</tr>
<tr>
<td>9</td>
<td>14.0</td>
</tr>
<tr>
<td>10</td>
<td>14.5</td>
</tr>
<tr>
<td>11</td>
<td>14.5</td>
</tr>
<tr>
<td>12</td>
<td>15.0</td>
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<tr>
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<tr>
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<td>16.0</td>
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<td>18.0</td>
</tr>
<tr>
<td>20</td>
<td>18.5</td>
</tr>
<tr>
<td>21+</td>
<td>19.0</td>
</tr>
</tbody>
</table>

The National Health and Nutrition Examination Survey III (NHANES III, Kuczmarski, Ogden, et al., 2002) has collected reference data to establish weight and height norms at different ages for girls/women and boys/men from birth to 20 years old. These norms indicate that BMI varies considerably with age and gender with children between 5 to 8 years old having the lowest BMI values followed by a steady increase with age. The expected changes in BMI associated with age and gender must be taken into consideration in screening for those who are “very underweight.” Table 1 provides a BMI value between the 5th and 10th BMI percentiles for girls/women and boys/men from 9 to 20 years old. A BMI cutoff of between the 5th and 10th percentile for different ages and genders should be used to determine if you meet the “extremely underweight” BMI referral criterion for referral. For men and women 21 years old and older, the “underweight” category according to the NHLBI (1998) survey data were used to determine the “underweight” criterion for referral.
You can easily determine if you meet the BMI thresholds in Table 1 by finding your height on the column on the left in Table 2 and the BMI on the bottom and follow the height and the BMI columns to where the intersect. This is the weight that you need to be at or below for the BMI you have selected.

Although BMI is a convenient and useful weight classification tool, it does have limitations. For example, BMI can overestimate fatness for people who are athletic. Also, some races, ethnic groups, and nationalities have different body fat distributions and body compositions; therefore, the NHANES data are not appropriate for all groups (Kuczmarski, Ogden, et al., 2002).

**Interpreting Eating Attitudes Test (Eat-26)© Scores**

The Eating Attitudes Test (EAT-26) is probably the most widely used test used to assess “eating disorder risk” based on attitudes, feelings, and behaviors related to eating and eating disorder symptoms. It was used as a screening instrument in the 1998 National Eating Disorders Screening program and has been used in many other studies to identify individuals with possible eating disorders. However, the EAT-26 does not provide a diagnosis of an eating disorder. A diagnosis can only be provided by a qualified health care professional.

1) **Attitudes and Concerns Common in eating disorders:**

A score at or above 20 on indicates concerns about dieting, body weight or problematic eating behaviors. Because your score is above 20, you should seek an evaluation by a qualified health professional. However, high scores do denote concerns regarding 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 and interfere with your daily functioning you should seek an evaluation from a trained mental health professional.

**Behavioral Symptoms common in eating disorders:**

Answers to the behavioral symptom questions indicate that you are reporting symptoms that are common in those with eating disorders.

**Your score on the EAT-26 indicate that it is unlikely that you have an eating disorder. However, low scores should not be taken to mean that you do not have an eating disorder.** If you are suffering from feelings which are causing you concern and interfere with your daily functioning or if others you trust have expressed serious concerns about you, then it is advisable for you to seek an evaluation from a trained mental health professional.

2) **Low Body Weight Compared To Age-Matched Norms**

The EAT-26 includes specific questions on height and weight that can be used to compute Body Mass Index (BMI) for the purpose of determining if you are “at risk” for an eating disorder because your body weight is extremely underweight according to age-matched population norms. BMI is a formula for estimating body mass that takes both height and weight into account. It is calculated by dividing weight (in kilograms) by height in meters, and then divided again by height in meters (kg/m2). Alternatively, BMI can be calculated as weight (in pounds) divided by height in inches, then divided again by height in inches and multiplied by 703. We recommend that you seek a professional evaluation for a possible eating disorder if your body weight is “extremely underweight” according to age-matched population norms.
Although BMI is a convenient and useful weight classification tool, it does have limitations. For example, BMI can overestimate fatness for people who are athletic. Also, some races, ethnic groups, and nationalities have different body fat distributions and body compositions; therefore, the NHANES data are not appropriate for all groups.

**Body Mass Index (BMI):**

Your BMI indicates that you are either “underweight” or “extremely underweight” compared to age/gender-matched norms. This does not automatically mean that you are unhealthy or have an eating disorder. It simply means that it would be good for you to speak to a qualified health professional.

3) If you answered any of the Behavioral Questions “once a month or less” or more often (for binge eating, if you answered “2-3 times a month” or more often), it is recommended that you seek an evaluation from a qualified professional.
APPENDIX C6

IRB Approval Form
PROTOCOL for Research Involving Human Subjects

Institutional Review Board (IRB) approval is required before beginning any research and/or data collection involving human subjects

(Reference IRB Policies and Procedures for clarification)

Project Title: Risk of Disordered Eating among Undergraduate ATEP Students

Researcher/Project Director: Katy Margeson

Phone #: 717-448-6254, E-mail Address: Mar9433@cup.edu

Faculty Sponsor (if required): Dr. Bruce Barnhart

Department: Sport Science

Project Dates: Fall 2006 to Spring 2007

Sponsoring Agent (if applicable): 

Project to be Conducted at: Colleges and Universities in Pennsylvania

Project Purpose: ☑ Thesis ☐ Research ☐ Class Project ☐ Other

Keep a copy of this form for your records.

Required IRB Training

The training requirement can be satisfied by completing the online training session at http://irb.net.atb.gov. A copy of your certification of training must be attached to this IRB Protocol. If you have completed the training at an earlier date and have already provided documentation to the California University of Pennsylvania Grants Office, please provide the following:

Previous Project Title: 

Date of Previous IRB Protocol: 

Draft, April 7, 2005
Please attach a typed, detailed summary of your project AND complete items 2 through 6.

1. Provide an overview of your project proposal describing what you plan to do and how you will go about doing it. Include any hypothesis(es)/or research questions that might be involved and explain how the information you gather will be analyzed. For a complete list of what should be included in your summary, please refer to Appendix B of the IRB Policies and Procedures Manual.

2. Section 46.11 of the Federal Regulations state that research proposals involving human subjects must satisfy certain requirements before the IRB can grant approval. You should describe in detail how the following requirements will be satisfied. Be sure to address each area separately.
   a. How will you ensure that any risks to subjects are minimized? If there are potential risks, describe what will be done to minimize these risks. If there are risks, describe why the risks to participants are reasonable in relation to the anticipated benefits.
   b. How will you ensure that the selection of subjects is equitable? Take into account your purpose(s). Be sure you address research problems involving vulnerable populations such as children, prisoners, pregnant women, mentally disabled persons, and economically or educationally disadvantaged persons. If this is an in-class project describe how you will minimize the possibility that students will feel coerced.
   c. How will you obtain informed consent from each participant or the subject’s legally authorized representative and ensure that all consent forms are appropriately documented? Be sure to attach a copy of your consent form to the project summary.
   d. Show that the research plan makes provisions to monitor the data collected to insure the safety of all subjects. This includes the privacy of subjects’ responses and provisions for maintaining the security and confidentiality of the data.

3. Check the appropriate box(es) that describe the subjects you plan to use.

| ☐ Adult volunteers | ☐ Mentally Disabled People |
| ☑ C.A.L. University Students | ☐ Economically Disadvantaged People |
| ☑ Other Students | ☐ Educationally Disadvantaged People |
| ☐ Prisoners | ☐ Fetuses or fetal material |
| ☐ Pregnant Women | ☐ Children Under 18 |
| ☐ Physically Handicapped People | ☐ Neonates |

4. Is remuneration involved in your project? ☐ Yes or ☑ No. If yes, explain here.

5. Is this project part of a grant? ☐ Yes or ☑ No. If yes, provide the following information:
   - Title of the Grant Proposal
   - Name of the Funding Agency
   - Dates of the Project Period

6. Does your project involve the debriefing of those who participated? ☐ Yes or ☑ No
   - If yes, explain the debriefing process here.

7. If your project involves a questionnaire interview, ensure that it meets the requirements of Appendix ___ in the Policies and Procedures Manual.

Draft, April 7, 2005
Project Director's Certification
Program Involving HUMAN SUBJECTS

The proposed investigation involves the use of human subjects and I am submitting the complete application form and project description to the Institutional Review Board for Research Involving Human Subjects.

I understand that Institutional Review Board (IRB) approval is required before beginning any research and/or data collection involving human subjects. If the Board grants approval of this application, I agree to:

1. Abide by any conditions or changes in the project required by the Board.
2. Report to the Board any change in the research plan that affects the method of using human subjects before such change is instituted.
3. Report to the Board any problems that arise in connection with the use of human subjects.
4. Seek advice of the Board whenever I believe such advice is necessary or would be helpful.
5. Secure the informed, written consent of all human subjects participating in the project.
6. Cooperate with the Board in its effort to provide a continuing review after investigations have been initiated.

I have reviewed the Federal and State regulations concerning the use of human subjects in research and training programs and the guidelines. I agree to abide by the regulations and guidelines aforementioned and will adhere to policies and procedures described in my application. I understand that changes to the research must be approved by the IRB before they are implemented.

Professional Research

<table>
<thead>
<tr>
<th>Project Director's Signature</th>
<th>Department Chairperson's Signature</th>
</tr>
</thead>
</table>

Student or Class Research

<table>
<thead>
<tr>
<th>Student Researcher's Signature</th>
<th>Supervising Faculty Member's Signature if required</th>
</tr>
</thead>
</table>

ACTION OF REVIEW BOARD (IRB use only)

The Institutional Review Board for Research Involving Human Subjects has reviewed this application to ascertain whether or not the proposed project:

1. provides adequate safeguards of the rights and welfare of human subjects involved in the investigations;
2. uses appropriate methods to obtain informed, written consent;
3. indicates that the potential benefits of the investigation substantially outweigh the risk involved.
4. provides adequate debriefing of human participants.
5. provides adequate follow-up services to participants who may have incurred physical, mental, or emotional harm.

[ ] Approved  [ ] Disapproved

Chairperson, Institutional Review Board  Date

Draft, April 7, 2005
Project Director's Certification  
Program Involving HUMAN SUBJECTS

The proposed investigation involves the use of human subjects and I am submitting the complete application form and project description to the Institutional Review Board for Research Involving Human Subjects.

I understand that Institutional Review Board (IRB) approval is required before beginning any research and/or data collection involving human subjects. If the Board grants approval of this application, I agree to:

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3. Report to the Board any problems that arise in connection with the use of human subjects.
4. Seek advice of the Board whenever I believe such advice is necessary or would be helpful.
5. Secure the informed, written consent of all human subjects participating in the project.
6. Cooperate with the Board in its effort to provide a continuing review after investigations have been initiated.

I have reviewed the Federal and State regulations concerning the use of human subjects in research and training programs and the guidelines. I agree to abide by the regulations and guidelines aforementioned and will adhere to policies and procedures described in my application. I understand that changes to the research must be approved by the IRB before they are implemented.

Professional Research

| Project Director’s Signature | Department Chairperson’s Signature |

Student or Class Research

| States Marionson |  |

Student Researcher’s Signature

| Brady B. Brant |  |

Supervising Faculty Member’s Signature if required

Department Chairperson’s Signature

ACTION OF REVIEW BOARD (IRB use only)

The Institutional Review Board for Research Involving Human Subjects has reviewed this application to ascertain whether or not the proposed project:

1. provides adequate safeguards of the rights and welfare of human subjects involved in the investigations;
2. uses appropriate methods to obtain informed, written consent;
3. indicates that the potential benefits of the investigation substantially outweigh the risk involved.
4. provides adequate debriefing of human participants.
5. provides adequate follow-up services to participants who may have incurred physical, mental, or emotional harm.

☐ Approved ☐ Disapproved

Chairperson, Institutional Review Board Date

Draft, April 7, 2005
1. The purpose of this study is to examine the risk of disordered eating among students in undergraduate athletic training programs. The decision was made to use the EAT-26 and an additional questionnaire for each athletic training student. Undergraduate CAATE accredited programs in western Pennsylvania. The program directors will be contacted by the researcher for approval to use their program and necessary material and instructions will be given to this individual to follow while dispersing and collecting materials to each student. Confidentiality will be maintained and materials will be sent back to the researcher ASAP. The hypotheses are that year in ATEP and heavier course load will be associated with a higher score on the EAT-26; which will be determined by an ANOVA (year in ATEP) and a Pearson Product Moment correlation (course load). The third hypothesis is that current clinical sport assignment (also analyzed by multiple ANOVA tests) will be positively associated with higher risk of disordered eating according to the EAT-26 scores, specifically when the sport is considered an equipment/contact sport or it is considered ‘in-season’ (where there are significant time commitments).

2. a. There are no risks to the students participating in this research.
b. The selection of participants will be from programs which are CAATE accredited in western Pennsylvania. There are no anticipated problems involving vulnerable populations. Students will complete the questionnaires in class or large group meeting to minimize influence of others. Students will be told not to talk while completing questionnaires until the last individual has turned the material in.

c. Consent will be given by signing an informed consent prior to completing forms. They will be collected separately prior to completing the two questionnaires. Therefore each reply is still anonymous to the researcher.

d. The collected research will be monitored and no changes will be made to any documents. The participant’s privacy will be maintained through confidentiality and security of collected data.
Dear Program Director,

My name is Katy Margeson and I am a Graduate student at California University of Pennsylvania. I am contacting you to find out if you would be willing to let me use the students in your ATEP to be student volunteers to collect data for my Masters thesis. Their participation includes filling out two relatively short questionnaires. I am planning on going to as many institutions as possible to administer it myself, but I realize that due to time constraints that I may not be able to go to all institutions. In that case, I would send necessary materials to you, and a pre-addressed envelope to send it back to me.

The purpose of this study is to determine if the year in the ATEP, academic course load, or sport assignment/time constraints will play a role in the risk for disordered eating in the athletic training student (ATS).

The primary reason for this initial contact with you is for two reasons: 1) To see if you would be willing to let me use your students, and 2) If so how many students are currently in your program? Only those who have been formally accepted into your program and are doing their clinical rotations will be used (sophomores-seniors; no freshmen). Data will be collected in January 2007.

Thank you for your help in advance. If you have any questions, please feel free to contact myself or my research advisor, otherwise please let me know the number of students in your program so I can find out if I need to find additional schools. I will be in contact with you again in the future if you are willing to participate.

Sincerely,

Katy Margeson
APPENDIX C8

Oral Directions for Student Administration of Questionnaires
Oral Directions for Students Questionnaire Administration

1) The researcher or the program director will distribute to each of you a packet with the purpose of the study and the two questionnaires.
2) He or she will then read you the purpose and directions to you out loud.
3) *begin reading out loud here* “Before you begin, please read along the purpose as I read it out loud” Any Questions?
4) “You will be given 15 minutes to complete both questionnaires”
5) “Please fill it out completely and honestly to the best of your ability”
6) “When you are finished, you may keep the purpose page for reference or further questions, but please return both questionnaires still stapled together to Katy or___________________ and remain seated/Quietly exit the room.
7) I thank you all for your help and participation in this study! If you have any comments or concerns please feel free to contact me.

*to the program director when Katy is not available*

8) Please collect all materials, and leave them stapled.  
9) Place them back in the pre-addressed and stamped envelope and return to Katy Margeson.
APPENDIX C9

Oral Purpose Statement for Student Administration
**Purpose:** To be read out loud to students prior to filling out questionnaires.

Katy Margeson is a Graduate Student at California University of Pennsylvania. I would like to request your participation in my thesis.

The purpose of this study is to determine the risk for disordered eating among ATEP students, then examine the prevalence of disordered eating patterns in ATEPs to identify what if any sub-groups of ATS are at a higher risk for disordered eating than other students within the program.

Your participation in this study will benefit the field of athletic training in the future by examining for risk of disordered eating among athletic training students. This study will benefit the athletic training education programs, the ATS and ATCs who work with students in understanding what affects how an ATS eats. Participation will help identify specific aspects in the life of an ATS which contribute to patterns of disordered eating or unhealthy eating. Athletic trainers are educators on the subjects of nutrition to a wide variety of individuals. Examination of the risk for disordered eating and patterns of eating could help with decreasing the factors and predictors of athletic training students to develop disordered eating.

Your participation will involve filling out these two questionnaires completely and honestly to the best of your ability. There are no risks that are associated with this study and response is anonymous. Confidentiality will be maintained, you will not be asked for your name and no one else other than the researcher will have access to these questionnaires. The research may be published at a later date but your name will not be associated with anything.

If you have questions or concerns please feel free to contact me or my research advisor:

Katy Margeson  
947 Cross St Apt.#6  
California PA 15419  
Mar9433@cup.edu  
717-448-6254

Bruce Barnhart  
Hamer Hall 114  
California University of PA  
California PA 15419  
724-938-4562  
barnhart@cup.edu
REFERENCES


2. Clark N. Sport Nutrition Guidebook 3rd Ed. Champaign IL. Human Kinetics. 2003.Ch.1,2,6,7,8,11,12


22. Brey RA. Prevalence of eating disorders and eating-disordered behaviors among undergraduate health
education major students in the United States. 


ABSTRACT

Title: RISK FOR DISORDERED EATING AMONG UNDERGRADUATE ATHLETIC TRAINING EDUCATION PROGRAM STUDENTS

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Purpose: The purpose was to determine the risk for disordered eating among undergraduate students in athletic training education programs (ATEP).

Problem: Allied health care professionals need to be attentive and precise in daily care for patients. Jobs may require minimal to strenuous physical activity, and those who practice disordered eating may not be able to perform many of the tasks or skills required in the athletic training profession.

Method: A descriptive study was done using 170 students from accredited ATEPs in western Pennsylvania. The EAT-26 (for eating disorder behaviors) and an additional questionnaire specific to athletic training students were used.

Findings: Year in program, course load/ level of courses and status of current clinical assignment were not significant in predicting the risk for disordered eating tendencies in ATEP students. A total of 10% of students surveyed were at risk for disordered eating according to their score.
Conclusion: Risk for disordered eating in the undergraduate athletic training education students is prevalent, and those who are at risk are similar to those of the general college population.