EATING DISORDERS & ATHLETES

Presented by:
Kaitlin Deason
Jill Latham
Sandra Salute

INTRODUCTION: EATING DISORDERS

- 3rd most common disease affecting females
- Women are 3x’s more likely to develop than men
- Affects ~5% of U.S. population:
  + 0.6% from anorexia nervosa
  + 1.0% from bulimia nervosa
  + 2.8% from binge eating disorder

http://sp.life123.com/bm.pix/bulimia2.s600x600.jpg
**BACKGROUND: ATHLETES**

- Problematic since the early 1980's
- Death of gymnast Christy Henrich from anorexia, eating disorders were not generally documented among athletes
- Many other athletes have revealed their own battles with disordered eating

http://whatever.losito.net/images/henrich.jpg

**EATING DISORDERS AMONG ATHLETES**

- Received worldwide recognition
- Overly *obsessed* with trying to achieve the “ideal body weight”
- Lower body weight will *increase* athletic performance
- Prevalence in: wrestling, dancing, track, rowing, body-building, and gymnastics

http://news.bbc.co.uk/olmedia/295000/images/__299505_running300.jpg
EATING DISORDERS

As defined in the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV):

Meeting the criteria for diagnosis for one of the three clinical conditions: anorexia nervosa, bulimia nervosa, and eating disorders not otherwise specified (EDNOS).

CLINICAL EATING DISORDERS

- Psychiatric conditions
- Accompanied by Psychological conditions:
  - obsessive-compulsive disorder
  - anxiety disorders
  - depression

http://abyteofenews.files.wordpress.com/2009/12/anorexic-view.jpg
DISORDERED EATING

Defined as: Abnormal and dangerous eating behaviors an individual performs to lose weight
  + Behaviors range in severity
  + More common than clinical eating disorders
  + Occur for short periods of time
  + Triggered by stress, illness, preparation for an athletic event, etc

DISORDERED EATING: ATHLETES

◆ Occurs in as high as 62% in female athletes and 57% in male athletes
◆ Health consequences:
  + contraindicated in athletic performance
  + very harmful to athletes

http://sumayse.files.wordpress.com/2008/08/swimming-usa.jpg
ATHLETES WITH EATING DISORDERS

- Boston University track and cross-country runner: David Proctor
- BU 2007 record-holder: broke the infamous four-minute mile barrier
- Suffered from anorexia for >2 years

Freshman year: 130 lbs. @ 6’0
Current: 145 lbs.

http://www.bu.edu/bostonia/web/proctor/proctor.jpg

35-year old female runner: Deena Kastor
- 103 lbs @ 5’5
- Resting Heart Rate: 28 BPM

ANOREXIA NERVOSA

★ Estimated 0.56% of people die yearly
★ Main characteristics:
  + Voluntary starvation
  + Obsessing desire to be thin
  + Fear of gaining weight
  + Emaciation

http://abagond.files.wordpress.com/2008/06/anorexic.jpg

ANOREXIA NERVOSA CONT’D

★ Believe that he/she have self control by controlling food consumption
★ Extraordinary feeling of accomplishment and self-discipline: If weight loss is achieved
★ Unacceptable feeling of disappointment and lack of self-control: If any weight gain

ANOREXIA NERVOSA IN ATHLETES

- Obsess over the desire to be thin just like the non-athletic counterparts, but goals differ:
  + Thinness will actually improve their athletic performance
  + Do not believe that starvation will actually decrease performance
- Hard to identify, Making intervention extremely tough
  + Appear to be like any other athlete
  + Follows strict dietary and training regimens

DSM-IV CRITERIA FOR DIAGNOSIS OF ANOREXIA NERVOSA

- Significant decrease in body weight and/or maintenance of an extremely low body weight
  + (85% of normal weight for height)
- Amenorrhea
- Intense fear of gaining weight
- Severe body dissatisfaction
- Distorted body image
### Two Subtypes of Anorexia Nervosa

<table>
<thead>
<tr>
<th>Restricting type</th>
<th>Binge-eating/purging type</th>
</tr>
</thead>
<tbody>
<tr>
<td>• severe energy restriction</td>
<td>• severe energy restriction</td>
</tr>
<tr>
<td>• excessive exercise</td>
<td>• excessive exercise</td>
</tr>
<tr>
<td></td>
<td>• occasional binge and purge</td>
</tr>
</tbody>
</table>

**Defining Binge Eating**

“eating a large amount of food in a discrete period of time”

(Dunford, 2006, p.337)

**ANOREXIA: PHYSICAL SIGNS & SYMPTOMS**

- Bradycardia
- Orthostatic hypotension (by pulse or BP)
- Hypothermia
- Cardiac murmur (mitral valve prolapse)
- Dull, thinning hair
- Sunken cheeks, sallow skin
- Lanugo
- Atrophic breasts (postpubertal)
- Pitting edema of extremities
- Cold extremities
- Parotid gland enlargement
- GI complaints

**LABORATORY AND BIOCHEMICAL FINDINGS ASSOCIATED WITH ANOREXIA NERVOSA**

- ↓ iron status measures → anemia
- ↑ liver enzymes
- Hypoglycemia
- ↓ serum creatinine
- ↓ BUN
- Low thyroid function (↓ T4)
- Hypophosphatemia
- Hypocholesterolemia (↓ HDL and LDL)
BULIMIA NERVOSA

✗ Affects 2-3% of the population
✗ More common than anorexia nervosa


DSM-IV CRITERIA FOR DIAGNOSIS OF BULIMIA NERVOSA

✗ Periods of bingeing and purging, “that have occurred at least twice a week for three months” (Dunford, 2006, p. 530).

✗ Purging includes:
  + Vomiting
  + Laxative use
  + Diuretic use
### Two Subtypes of Bulimia Nervosa

<table>
<thead>
<tr>
<th>Purging</th>
<th>Non-purging</th>
</tr>
</thead>
<tbody>
<tr>
<td>× Consumption of excessive amounts of food</td>
<td>× Consumption of excessive amounts of food</td>
</tr>
<tr>
<td>× Purging</td>
<td>× Excessive exercise</td>
</tr>
<tr>
<td></td>
<td>× Fasting</td>
</tr>
</tbody>
</table>

More likely to have non-purging bulimia nervosa
- Use excessive exercise to feel better about a binge
- High calorie needs make it easier to explain or disguise binge and purge behaviors

Exercise bulimia
- Newly termed
- Similar to non-purging bulimia
**EXERCISE BULIMIA**

- Bulimia with excessive exercise
- 80% of athletes diagnosed with bulimia used excessive exercise as main method of weight control
- Signs & symptoms:
  - guilt, amenorrhea, anxiety, stress, fatigue, depression, compulsive behaviors, bone loss, and ↓ protein stores
- Codependent disorders often accompany:
  - obsessive compulsive and anxiety
  - related eating disorder (anorexia nervosa or classic bulimia nervosa)

**BULIMIA: PHYSICAL SIGNS & SYMPTOMS**

- Sinus bradycardia
- Orthostatic hypotension (by pulse or BP)
- Hypothermia
- Cardiac arrhythmia
- Dull hair
- Dry skin
- Parotitis
- Russell’s sign (calluses on knuckles)
- Mouth sores
- Palatal scratches
- Dental enamel erosion
- Sore, irritated throat
- GI complaints
LABORATORY AND BIOCHEMICAL FINDINGS ASSOCIATED WITH BULIMIA NERVOSA

- ↓ iron status measures → anemia
- Hyponatremia
- Hypokalemia
- Metabolic alkalosis (self-induced vomiting)
- Metabolic acidosis (laxative abuse; may mask a potassium deficiency)
- Hypomagnesemia
- Hypoglycemia (purging)
- Hyperglycemia (binging)
- Dehydration

http://www.dorchesterhealth.org/Images/bulimia.gif
EATING DISORDERS NOT OTHERWISE SPECIFIED (EDNOS)

- Do not meet requirements for anorexia nervosa or bulimia nervosa
- Exhibit signs indicating an eating disorder
- **Example:** If individual displays all of the criteria for anorexia nervosa except they do not meet the 85% of normal body weight criteria, they would not be classified as having an anorexia nervosa, but as having an EDNOS
- Affect athletes: anorexia athletica and the female athlete triad

ANOREXIA ATHLETICA

- Jorunn Sundgot-Borgen developed criteria
- At risk: Sports where a thin physique is associated with improved performance
- Overwhelming obsession with weight
- Diagnosing criteria:
  - excessive fear of gaining weight
  - restricted caloric intake (<1,200 kcal/d)
  - significant weight loss (>5% of expected body weight)
  - gastrointestinal complaints
- Side effects:
  - dysfunctional menstruation, body image distortion, bingeing, purging, and excessive exercise
**FEMALE ATHLETE TRIAD**

- 1992-American College of Sports Medicine (ACSM)
- Diagnosing Criteria:
  + Disordered eating
  + Menstrual dysfunction
  + Low bone mineral density/osteoporosis

**FEMALE ATHLETE TRIAD CONT’D**

- Occurs when Athlete:
  + deficient in calories, participates in high-intensity training, or exhibits disordered eating resulting in hormone irregularities
- Absence of menstruation ➔ disruption of hormones (estrogen) ➔ low bone mineral density/premature osteoporosis
- ↓ nutrient intake ➔ premature osteoporosis
- Detrimental to young female athletes because low bone mineral density can be permanent.
ETIOLOGY

- Socioculture, demographic, environmental, biological, psychological, & behavioral factors
- Generally associated with Women
- Men increasing → culturally defined desirable man’s body
- Personality traits:
  - high achievers
  - perfectionists
  - goal oriented individuals
  - independent characteristics

http://www.youngandhealthy.ca/caah/Portals/1/img/Illustrations/anorexie1.jpg

THE MEDIA

- Displays thin women & buff men
- ↑ incidence of disordered eating
- ↑ obsession about body appearance

http://www.youtube.com/watch?v=hibyAJOSW8U
DISORDERED EATING IN SPECIFIC SPORTS

- Maintain body size that is believed to achieve optimal performance
- Pressure from others to be a particular size
- Common in sports:
  - where lower weight associated with greater success
  - where the outcome is based on individual rather than team
  - dancing, gymnastics, wrestling, bodybuilding, jockeying, figure skating, and elite running

NEGATIVE EFFECTS ON HEALTH

Low calorie intake:
- nutrient deficiencies
- anemia
- fatigue
- depression
- menstrual irregularities
- increased risk of injury

Purging (vomiting, laxatives, enemas, or diuretics):
- dehydration
- electrolyte imbalances
- gastroesophageal reflux
- ulcers
- erosion of teeth
EFFECTS ON PERFORMANCE

- Surprisingly, performance may temporarily improve
  - Mechanism is unknown
  - May by due to ↑ in hormones causing body to IGNORE fatigue (cortisol, epinephrine & norepinephrine)
  - Placebo effect
    - Psychological impact of feeling lighter

NEGATIVE EFFECTS ON PERFORMANCE

- Performance will inevitably DECLINE
  - intensity of the sport
  - magnitude & length of eating disorder

TAKE HOME MESSAGE:
Regardless of the initial enhancement of performance, disordered eating should never be advised because the health concerns far outweigh any temporary boost in performance
TREATMENT OF DISORDERED EATING

Three pronged approach
+ Psychological – Foundation of treatment
  × behavioral methods
  × cognitive approach
  × what type of setting (private or group, with or without family members)
+ Nutritional – change the disordered eating
  × proper education
  × uncover any nutrient deficiencies
  × discuss food beliefs
  × body image associations
+ Medical – Physician will help with any medical complications

DISCUSSION OF RESEARCH OVERVIEW

1. The Female Triad in college athletes
2. Disordered eating (DE), menstrual irregularity (MI)/menstrual dysfunction (MD) in high school athletes
3. Dietary restraint in conjunction with low bone mass in endurance runners
4. Environment and nationality on the occurrence of eating disorders elite distance runners
5. Excessive exercise on eating disorder patients compared to healthy women
ARTICLE 1

The Female Triad in college athletes


ARTICLE 1: PURPOSE

Assessed the incidence of US collegiate athletes experiencing all three disorders of the Triad and if there was any correlation with the athlete's particular sport (lean-build and non-lean-build)
ARTICLE 1: BACKGROUND

The 3 Disorders of the **Female athlete Triad** (aka Triad):

- disordered eating (DE)
- menstrual dysfunction (MD)
- low bone mineral density/osteoporosis (BMD)

ARTICLE 1: MATERIALS

- 112 Female athletes
- 7 different sports:
  + Lean-build (diving, cross-country, swimming, and track-sprinting events)
  + Non-lean-build (field hockey, softball, tennis, track-field events)
ARTICLE 1: METHODS

- Health history questionnaires:
  + Disordered eating (DE)
  + Menstrual dysfunction (MD)
- X-ray absorptiometry of the spine: BMD

ARTICLE 1: RESULTS

- 2 athletes met the criteria for the Triad
- Individual disorders of the Triad:
  + DE=28
  + MD=29
  + BMD=2
- Higher incidence of MD amongst the lean-build (n=45) than the non-lean-build (n=34) athletes
- Prior diagnosis:
  + anorexia nervosa (n=2)
  + bulimia nervosa (n=1)
ARTICLE 1: PRIOR RESEARCH

✗ No prior study assessed prevalence of athletes experiencing all three disorders of the Triad
✗ 67 good references
✗ Beals, K. A.
  + worked on 4 of the similar studies referenced in this study
  + wrote the chapter on *Disordered Eating in Athletes* in our *Sports Nutrition Manual*
  + Wrote *Disordered Eating Among Athletes* book

ARTICLE 1: STRENGTHS & WEAKNESSES

**Strengths:**
✗ Athletes were blinded to decrease response bias (assessing BMD in female college athletes)
✗ Carefully chosen questionnaires (increase accuracy of the self-reported answers, decrease response bias, and increase content validity)
✗ Separated athletes into sport type

**Weaknesses:**
✗ No Males
✗ Accuracy of self-reported data
✗ Lack of a non-athlete control group to compare the results with
ARTICLE 2

Disordered eating and menstrual irregularity in high school athletes in lean-build and nonlean-build sports


ARTICLE 2: PURPOSE

- Assess the incidence of high school athletes who had both disordered eating (DE) and menstrual irregularity (MI) to see if there was any association amongst sport type.
BACKGROUND: FEMALE ATHLETES

1972
1 in 27 girls participated in high school Varsity sports

2002
1 in 2.5 girls participated in high school Varsity sports

http://mytown.mercurynews.com/archives/campbellreporter/04.03.02/gifs/softball-0214.jpg
http://www.suite101.com/content/eating-disorders-in-athletes-a79264

ARTICLE 2: MATERIALS

- 423 female athletes:
  - 146 lean build athletes (LB)
  - 277 non-lean build athletes (NLB)
- 6 High schools in southern California
- 13-18 yrs. Old
- LB sports:
  - Cross-country running, track (runners only), swimming
- NLB sports:
  - Tennis, volleyball, basketball, softball, soccer, lacrosse, field hockey, track & field (field events)
**ARTICLE 2: METHODS**

- Questionnaires:
  + Eating behaviors
  + Menstrual history
- Statistical analysis calculated for each:
  + Independent variables (sport type: LB/NLB)
  + Dependent variables (eating attitudes, eating behaviors, and menstrual status: eumenorrhea/amenorrhea)

**ARTICLE 2: RESULTS**

- 20.0% had DE
- 20.1% had MI
- LB were shown to have 26.7% MI compared with 16.6% of NLB
- 18.5% of LB were shown to have DE, compared to 20.9% of NLB
- 5.9% of the entire sample (n= 423) had both DE and MI
ARTICLE 2: PRIOR RESEARCH

✗ No previous studies could be found on the prevalence of DE amongst high school athletes in an assortment of sports
✗ Researchers from this study previously worked on 2 similar studies together and cited those studies as references throughout this study.

ARTICLE 2: STRENGTHS & WEAKNESSES

Strengths:
✗ Large sample size
✗ Developed a rapport with the athletes 2 weeks before the study
✗ Ensured information would be kept confidential
✗ All Female research team administered the questionnaires
✗ Separated athletes into sport type

Weaknesses:
✗ No Males
✗ Accuracy of self-reported data
✗ Lack of a non-athlete control group to compare the results with
ARTICLE 1 & 2: DISCUSSION

✶ The prevalence of these disorders are extremely high amongst high school & college athletes
✶ Increase in concern regarding the consequences of eating disorders among these athletes because disordered eating behaviors can proliferate into potential future problems (osteoporosis)
✶ Interrelationship of health concerns should be addressed
✶ Further research should be done to identify, diagnose, prevent, and treat these athletes

ARTICLE 3

Dietary restraint and low bone mass in female adolescent endurance runners

ARTICLE 3: PURPOSE

To examine the effects of dietary restraint in conjunction with low bone mass & menstrual irregularity in female adolescent endurance runners

ARTICLE 3: MATERIALS

× 13-18 year old high school females
× 93 cross-country runners
ARTICLE 3: METHODS

- Eating Disorder Examination Questionnaire
  - Questions geared towards:
    » Shape Concern
    » Weight Concern
    » Eating Concern
    » Dietary Restraint
- Menstrual History Questionnaire
- 2-4 weeks after completing questionnaires, subjects underwent dual-energy X-ray absorptiometric scan to measure bone mass density

ARTICLE 3: RESULTS

- Runners with elevated restraint had significantly lower bone mineral density than runners that were more concerned with weight and shape
- Runners with elevated restraint had lower lumbar BMD, bone mineral content, & total BMD than those with weight & shape concerns
- Menstrual irregularity was not found to be negatively impacted by low BMD with dietary restraint as previous speculated by the research team
ARTICLE 3: PRIOR RESEARCH & FUTURE STUDIES

• Researchers noted that this was the first documented study that established the concomitant effects of dietary restraint on low bone mass in female adolescent runners

• Future studies may want to assess hormone levels, energy availability, ovulation, and cortisol levels to accurately tie in low bone mass & menstrual irregularity with dietary restraint

ARTICLE 3: LIMITATIONS

✖ Small sample size – larger sample size may give way to the relationship between menstrual function and low bone mass

✖ Utilized only female athletes

✖ Runners may have presented inaccurate responses on the EDE-Q
ARTICLE 4

Effect of nationality and running environment on eating disorders


ARTICLE 4: PURPOSE

To determine the effect of running environment and/or nationality on the occurrence of eating disorders, associated psychopathology and menstrual function in elite female distance runners.
ARTICLE 4: MATERIALS AND METHODS

- 85 elite female runners from the UK and 97 control participants from the UK
- 75 elite female runners from Kenya and 101 control participants from Kenya
- 3 questionnaires
  - Eating Disorders Examination Questionnaire (EDE-Q)
  - 12-item version of the General Health Questionnaire (GHQ)
  - General questionnaire: age, height, weight, menstrual cycle, etc.
- All questionnaires self-reported

ARTICLE 4: RESULTS

- Women from the UK had a significantly greater rate of eating disorders than did the Kenyan women
- Runners from the UK specifically had the highest overall incidence of eating disorders.
- Both groups of runners had irregular menstruation compared to the control groups, but this did not vary significantly between nationalities
ARTICLE 4: STRENGTHS & WEAKNESSES

Strengths:
- Large study group
- Subject were well matched with controls
- Translators available for questionnaires

Weaknesses:
- No Males
- Questions could be misinterpreted since they were not culturally designed
- Self reported eating disorders not confirmed
- Author sited a previous study of theirs

ARTICLE 4: DISCUSSION

- Findings show that societal influences effect eating disorder prevalence.
- Important to think about what influences the development of eating disorders so that we as future dietitians can help prevent and treat
- Direct proof that HET is important
ARTICLE 5

Excessive Exercise in Eating Disorder Patients and in Healthy Women


ARTICLE 5: HYPOTHESIS

Researchers suggested that eating disorder patients exercised solely based on body tone, weight, and shape, in addition to displaying intense guilt if exercise was missed, compared to that of healthy women.
ARTICLE 5: MATERIALS

- 102 Eating Disorder Patients (from Australian Capital Territory Eating Disorders Day Program)
  - Anorexia Nervosa – 28
  - Bulimia Nervosa – 41
  - EDNOS – 33
- 184 healthy participants

ARTICLE 5: METHODS

SELF-REPORT QUESTIONNAIRES

- Commitment to Exercise Scale
  + exercise behavior
  + when & why do you exercise
- The Reasons for Exercise Inventory
  + weight control, health, body tone, fitness, mood, enjoyment & physical attractiveness
- Frequency of ‘hard exercise for weight or shape reasons’
ARTICLE 5: RESULTS

• Behaviors related to exercising exclusively for weight, shape or physical attractiveness, in addition to feeling intense guilt if having missed an exercise, was most closely associated with eating disorder patients than healthy patients.

• Eating disorder patients also scored higher on exercising frequently, at maximum intensities, to alter body image than their healthy counterparts.

• Healthy women scored high on “exercise for enjoyment” compared to eating disorder subjects.

• Patients with bulimia nervosa & the purging form of anorexia nervosa scored much higher on all questions than those with diet restricting anorexia nervosa.

ARTICLE 5: DISCUSSION

✗ Excessive exercise is a very common behavior in the eating disorder community and must be monitored upon release, as the researchers found that its’ persistence may result in poor outcomes for the patient and increased medical issues.
ARTICLE 5: LACK OF PRIOR RESEARCH

- Very little published research that suggests the debilitating effects of excessive exercise in patients with eating disorders

ARTICLE 5: LIMITATIONS

- No previous information provided on patients that participated in competitive sports – this fact alone could have a different outcome in the questionnaires
- The comparison of sub-groups warrant further research
- Small sample size
- Only females
HUMAN ECOLOGICAL THEORY

- Putting the athlete front and center of the influences they face on a daily basis and delicately addressing this, sometimes, unnoticed issue (common theme in eating disorder patients is lack of knowing the problem exists and / or denial)
- Internal thoughts, external behaviors, family, media, social networks, teammates, coaches, trainers, & any other factor that could negatively impact the athlete
- Educating family is of utmost importance – this is where the athlete should feel the most safe and secure
- Discussion with coaches and trainers about S & S of ED
- Coaches and trainers commonly approach athletes as a team, rather than individuals, which can foster insecurities
- Work on developing the individual player first and then move towards team building
- Media & Social Networks – desire to be thin, stigmatism of being fat

CONCLUSION

- As Health Educators, we need to:
  + identify, prevent, and treat eating disorders
  + provide information on consuming healthy balanced diet to lose weight & increase performance without harming one’s body
  + Initiate nutrition education at early age
**REFERENCES**