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Eating disorder risk, exercise dependence, and body weight dissatisfaction among female nutrition and exercise science university majors

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Background and Aims: Past research has examined eating disorder risk among college students majoring in Nutrition and has suggested an increased risk, while other studies contradict these results. Exercise Science majors, however, have yet to be fully examined regarding their risk for eating disorders and exercise dependence. Based on pressures to fit the image associated with careers related to these two disciplines, research is warranted to examine the potential risk for both eating disorder and exercise dependence. The purpose of this study is to compare eating disorder risk, exercise dependence, and body weight dissatisfaction (BWD) between Nutrition and Exercise Science majors, compared to students outside of these career pathways. *Methods:* Participants (n = 89) were divided into three groups based on major; Nutrition majors (NUTR; n = 31), Exercise Science majors (EXSC; n = 30), and other majors (CON; n = 28). Participants were given the EAT-26 questionnaire and the Exercise Dependence Scale. BWD was calculated as the discrepancy between actual BMI and ideal BMI. *Results:* The majority of participants expressed a desire to weigh less (83%) and EXSC had significantly (p = .03) greater BWD than NUTR. However, there were no significant differences in eating disorder risk or exercise dependence among majors. *Discussion and Conclusions:* This study suggested there was no significant difference in eating disorder risk or exercise dependence between the three groups (NUTR, EXSC, and CON).

INTRODUCTION

Eating disorders are defined in the Diagnostic and Statistical Manual of Mental Disorders (5th ed.; DSM-5; American Psychiatric Association, 2013) into 4 categories: bulimia nervosa, anorexia nervosa, binge eating disorder and other specified feeding or eating disorders. Although eating disorders only affect a small percentage of the general population, they typically begin between 18–21 years of age, which categorizes college-age students as a high-risk group (Hudson, Hiripi, Popem & Kessler, 2007). Furthermore, college students who are majoring in careers closely related to nutrition and wellness may be at an even greater risk (Drake, 1989; Garman, Hayduk, Crider & Hodel, 2004; Gonidakis, Sigala, Varsou & Papadimitriou, 2009).

Individuals with eating disorders often engage in excessive exercise as a further attempt to control weight. Exercise dependence (EXD) is the term used to describe an unhealthy preoccupation or addiction to exercise, which manifests as uncontrollable excessive exercise, increased tolerance, withdrawal and/or anxiety/depression (Hale, Diehl, Weaver & Briggs, 2013; Hausenblas & Symons Downs, 2002). It may exist on its own, which is referred to as primary exercise dependence. It may also co-exist with an eating disorder, which is referred to as secondary exercise dependence (Bamber, Cockerill, Rodgers & Carrol, 2003; Hausenblas & Fallon, 2002). Individuals at an increased risk for developing EXD include high-performance athletes, young women, former athletes, high achievers and those with body image issues (McGee, 2011). Because of these defining traits, college students majoring in exercise science and nutrition may be at an increased risk for EXD, despite the lack of research to support this theory.

Body weight dissatisfaction (BWD) is a term used to describe the discrepancy between actual weight and perceived ideal weight. BWD has been identified as one of the several behavioral patterns associated with eating disorders. It has been suggested that BWD may be higher in students majoring in nutrition (Arroyo et al., 2010).

Presence of abnormal behaviors related to food and/or exercise may cause detrimental problems in the professional careers of nutrition and/or exercise science students. Literature on EXD and BWD in nutrition students is lacking, and although there is literature available on this group in regards to eating disorder risk, results have been inconsistent. On the contrary, literature regarding eating disorder risk, exercise dependence, and BWD in Exercise Science students is sparse. Therefore, the purpose of this study is to compare eating disorder, exercise dependence, and body weight dissatisfaction risk in nutrition and exercise science majors.

METHODS

Participants

Female college students majoring in Nutrition (NUTR) (n = 31), Exercise Science (EXSC) (n = 30), and majors other than Nutrition and Exercise Science representing a con-

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trol group (CON) (n = 28) at Central Washington University were recruited for this study. Participants in the NUTR group consisted of students studying food science and nutrition either with or without the dietetics specialization. Participants in the EXSC group consisted of students studying either exercise science or clinical physiology. All other majors were included in the control group. Participants were in their junior or senior year of classes.

Measures

Eating Attitudes Test-26. The Eating Attitudes Test (EAT-26) was administered to eligible participants to screen for eating disorder risk (Garner & Garfinkel, 1979). Although not diagnostic, the EAT-26 is often used as a screening tool to identify early characteristics and behaviors indicating the potential presence of an eating disorder (Garner & Garfinkel, 1979; Garner, Olmsted, Bohr & Garfinkel, 1989). The EAT-26 questionnaire includes 26 statements related to dieting, bulimia and food occupation, and oral control in which an individual checks answers; always, usually, often, sometimes, rarely, or never (Garner & Garfinkel, 1979). The questionnaire ends with five behavioral questions. At-risk for an eating disorder according to the EAT-26 includes meeting one of the following criteria; 1) Score of 20 or more on the first 26 statements, 2) Low body weight compared to age-matched norms, or 3) Behavioral questions indicating possible eating disorder symptoms or recent significant weight loss. Participants who scored as at-risk according to the EAT-26 were contacted by the principal investigator and encouraged to seek counseling services (Garner & Garfinkel, 1979).

Exercise Dependence Scale (EDS). Participants also received the EDS, which is a 21-item assessment of exercise dependence symptoms based on the DSM-IV criteria for substance dependence (Hausenblas & Symons Downs, 2002). The seven criteria that are used to assess symptoms include the following; 1) Tolerance, 2) Withdrawal Effects, 3) Continuance, 4) Lack of control, 5) Reduction in other activities, 6) Time, and 7) Intention. The higher score reveals more exercise dependence symptoms (Hausenblas & Fallon, 2002; Hausenblas & Symons Downs, 2002).

Body weight dissatisfaction. To measure body weight dissatisfaction, participants were asked what their ideal body weight is, or ideally what they would like to weigh. BWD adjusted by height was estimated using the discrepancy between actual and ideal BMI. The discrepancy between actual BMI and ideal BMI has previously been validated as a measure of BWD (Thompson & van den Berg, 2002). BWD can be interpreted as a desire to weigh more or as a desire to weigh less. The absolute value of BWD was used to assess overall magnitude of weight discrepancy experienced by those desiring to weigh more and those desiring to weigh less (Arroyo et al., 2010; Sabbah et al., 2009; Neighbors & Sobal, 2007; Bamber, Cockerill & Carroll, 2000).

Statistical analysis

A between groups design was employed to compare basic descriptive characteristics (mean ± SD) for each group (NUTR, EXSC and CON). Data from each population (NUTR, EXSC, and CON) was compared using a one way ANOVA to examine EAT-26 scores, EDS scale scores, BMI, actual weight, ideal weight, the three subscales of the EAT-26, and BWD. A Bonferonni post-hoc was employed when significant differences were found. Prevalence of EAT-26 risk among the three majors were analyzed using a Contingency Chi-square analysis. A two-tailed, two-sample unequal variance t-test was used to compare differences in actual vs. ideal body weight within each group. A correlation analysis was used to compare EAT-26 scores to EDS scores. Data was analyzed using the SPSS (Statistical Package for Social Sciences) version 21 and Microsoft Excel version 2007. An alpha level of $p \leq 0.05$ was used to determine significant difference.

Ethics

Interested participants who were currently undergoing treatment for an eating disorder were advised to participate at their medical providers' discretion. The Institutional Review Board of Central Washington University approved all of the study procedures prior to data collection.

RESULTS

Participants (n = 89) were divided into three groups based on major, NUTR, EXSC, or CON. Descriptive characteristics (mean ± SD) among the three groups are outlined in Table 1. There was a positive relationship between EAT-26 scores and EDS ($p \leq .001$, $r = .622$) for all groups, and within groups; NUTR ($p \leq .001$, $r = .71$), EXSC ($p = .001$, r = .58), and CON ($p = .001$, $r = .61$).

Table 1. Descriptive characteristics, EAT-26 scores and subscale scores, Mean BMI and Body Weight Dissatisfaction

	NUTR (n = *31*)	EXSC (n = *30*)	CON (n = *28*)	P-value
Age (yrs)	21.42 ± 1.48	21.33 ± 1.35	21.61 ± .916	
EAT-26 total score	6.58 ± 7.084	7.13 ± 7.09	8.07 ± 7.20	0.72
Dieting	4.58 ± 5.065	4.60 ± 4.93	5.71 ± 5.2	0.64
Bulimia/Food pre-occ.	.42 ± 1.432	0.50 ± 1.83	0.39 ± 1.37	0.96
Oral control	1.58 ± 2.062	2.03 ± 2.16	1.96 ± 1.64	0.63
Actual BMI (kg/m²)	22.25 ± 2.55	24.78 ± 5.31	23.83 ± 3.96	0.056
Ideal BMI (kg/m²)	20.79 ± 1.67[a]	22.18 ± 2.68[b]	22.44 ± 2.69[b]	0.02
BWD (kg/m2)	1.69 ± 1.44[a]	3.18 ± 3.02[b]	1.87 ± 1.98[a]	0.03

Values expressed as mean ± SD.

Different superscripts within a row indicate significant differences, ANOVA, Bonferroni post hoc test ($p \leq .05$).

EAT-26 scores

Mean ± SD scores and subscale scores are outlined in Table 1. There were no significant differences between majors and EAT-26 subscale scores, supplemental behavioral questions, or eating disorder risk. Results of a chi-squared analysis revealed 19.4% (n = 6) NUTR participants were "at risk" compared to 33.3% (n = 10) in EXSC and 42.9% (n = 12) in the control group (χ^2 = 3.84) (p = 0.15).

Body weight dissatisfaction

All participants except two (CON n = 1, EXSC n = 1) expressed BWD (BWD: actual weight ≠ ideal weight). There was a significant (p = . 03) difference in BWD between NUTR and EXSC, with EXSC expressing the greatest BWD and NUTR expressing the least. Table 1 illustrates the magnitude of BWD among the three groups. NUTR and EXSC displayed a significant difference ($p \leq .05$) between their actual and ideal body weight (NUTR p = .05, EXSC p = .01) (Table 2). Among the three groups, 83% of participants expressed a desire to weigh less.

Table 2. Difference between actual weight and ideal weight (kg) within groups

Major	Actual	Ideal	*P*-value
NUTR (*n = 31*)	60.79 ± 7.62	57.24 ± 6.27	0.05*
EXSC (*n = 30*)	67.71 ± 11.97	58.98 ± 12.66	.01*
CON (*n = 28*)	65.1 ± 13.37	60.37 ± 9.24	0.13

t-Test * indicates significant difference ($p \leq .05$).

Exercise dependence

The mean total EDS score was 47.48 ± 17.76 with no significant difference (p = .33) in total scores between majors (CON 45.96 ± 19.47, NUTR 45.06 ± 15.91, EXSC 51.40 ± 17.82). According to a frequency analysis of the EDS scores, 25% of CON, 16% of NUTR, and 36% of EXSC were identified as "at risk" for exercise dependence. There was a significant difference (p = .01) in the "Time" subscale scores between groups, which indicates a great deal of time spent in activities necessary to obtain exercise. A Bonferroni post-hoc revealed EXSC (9.20 ± 4.10) scored significantly higher (p = .02) than CON (6.50 ± 3.65) for "Time".

DISCUSSION

The purpose of this study was to examine the prevalence of eating disorder risk, exercise dependence, and BWD among Nutrition and Exercise Science students. Based on the pressures to fit "the image" within careers in these two disciplines, research is warranted to examine the relationship between these majors and the potential for eating disorder risk and exercise dependence (Borgen & Corbin, 1987; Kiziltan & Karabudak, 2008).

This study suggested no significant difference in overall risk for developing an eating disorder among groups, which is similar to other findings (Akdevelioglu & Huseyin, 2010; Kiziltan & Karabudak, 2008). Research examining the prevalence of eating disorder risk among Nutrition students have found eating disorder risk among Nutrition majors to be similar to that of the general population (Kiziltan & Karabudak, 2008; Korinth, Schiess & Westenhoefer, 2009), while some have suggested Nutrition students are at an increased risk (Bo et al. 2014; Drake 1989; Fredenberg, Berglund & Dieken, 1996; Gonidakis et al., 2009; Reinstein, Koszewski, Chamberlin & Smith-Johnson, 1992; Worobey & Schoenfeld, 1999). Results from this study suggest less eating disorder risk in NUTR (19.4%) when compared to EXSC (33.3%), and CON (42.9%).

A positive correlation between EAT-26 scores and EDS-21 scores supports the suggestion that excessive exercise commonly co-exists with an eating disorder. Bratland-Sanda et al. (2011) also found a positive correlation between eating disorder symptoms and EDS-21 scores in eating disorder patients.

There were no significant differences in Exercise Dependence total scores between the groups, however; EXSC scored significantly higher on "Time" than CON. These findings may be expected when considering that students chose to major in EXSC due to their interest and enjoyment of exercise. Interestingly, Bratland-Sanda et al. (2011) examined exercise dependence scores in patients with long-standing eating disorders, and suggested comparable total scores on the EDS (55.8 ± 23.4) as EXSC in the current study (51.4 ± 17.82) (Bratland-Sanda et al., 2011). Similar to the current findings, Garman et al. (2004) suggested that 21.8% were at risk for exercise dependence using the Exercise Commitment Survey among a college population, while Meulemans, Pribis, Grajales & Krivak (2014) suggested that 3.3% were at risk for exercise dependence using the EDS-21. Further research is warranted to examine the prevalence of Exercise Dependence in a college population.

Although all groups expressed BWD, the mean ideal BMI, and mean actual BMI were still within a normal BMI range. The findings that EXSC expressed the greatest BWD (3.18 ± 3.02, p = .03) and NUTR expressed the least (1.69 ± 1.44) could be related to the higher mean BMI in EXSC and lower mean BMI in NUTR. Although the majority of participants in NUTR (90%) were at a normal BMI, 84% reported wanting to "weigh less". Similarly, Arroyo et al. (2010) suggested that Nutrition students with a normal BMI would choose a lower ideal body weight and desire to weigh less. Kiziltan and Karabudak (2008) reported "almost all (NUTR) thought they should have the ideal body image and have a healthy balanced diet because of the importance of physical appearances to a dietitian's social successes"(p. 697). These results suggest that despite major, college students may experience similar cultural pressures to weigh less and "fit the image".

CONCLUSIONS

This study suggested there was no significant difference in eating disorder risk using EAT-26 between the three groups (NUTR, EXSC, and CON). However, findings from this study suggest that there is a significant correlation ($p \leq .001$, r = .62) between eating disorder risk and exercise dependence risk.

Eating/exercise disorders have debilitating psychological and physical consequences which may influence a stu-

dents' ability to provide sound and healthy counseling in their career, and may impact their effectiveness with clients and overall professional success. Further research is warranted to examine the relationship between eating disorder risk, and exercise dependence.

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