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Prevalence of Eating Disorders among College Female Cheerleaders and Non-Athletes

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ABSTRACT

Introduction

Eating disorders continue to be a concern due to their impact on health and survival. Athletes who are in sports that require a low body weight, or a lean body shape appear to be at greater risk. This includes males and females; however, females are typically found to be at higher-risk.

Purpose

To measure symptoms of eating disorders that might be present in female undergraduate students from specific disciplines.

Methods

Participants were recruited from the Cheer Team (n=27), the Department of Kinesiology (n=29), and the Department of Psychology (n=30). A total of 86 participants completed the eating disorder inventory-2 (EDI-2). They were all similar in age (20.6±0.21 yrs) and body mass index (body mass index (BMI); 22.7±0.49). Participants reported to a classroom where they were allowed as much time as needed to complete the 91 questions.

Results

Contrary to predictions, the Cheer Team sample (15%) reported equivalent levels of symptoms that classified them as high risk for an eating disorder as compared with the Psychology (17%) and Kinesiology (10%) control groups. However, the most prevalent symptoms were the use of diet pills, binging, and purging, and Cheer Team members who engaged in binging and purging behaviour's reported more eating disorder symptoms than did participants in the Psychology and Kinesiology control groups who also engaged in binging or purging.

Discussion

These results suggest that the members of the Cheer Team were at much less risk than is usually seen with female athletes (33%). However, as this study relied on the willingness of participants to volunteer, it is often the case that those with eating disorders choose not to volunteer or hide their symptoms. Eating disorders continue to be a concern and targeting subthreshold symptoms would be important for early intervention.

Keywords

Eating disorders; Athletes; Cheerleaders.

INTRODUCTION

The sporting world has been aware of disordered eating and eating disorders for some time.[1,2] It has also been determined that sports, where leanness or a specific weight is needed for better sports performance, have a higher risk of developing eating disorders than athletes in team sports and the general population.[3] This appears to be true for both male and female athletes in sports that rely on a lean body shape or low weight.[4] It has also been determined that disordered eating is more prevalent among athletes than non-athletes.[5] The concern for those with eating disorders is that they are "*complex illnesses with profound psychosocial and physical consequences, including high rates or mortality. Despite growing recognition of their prevalence and severity, eating disorders*

remain underdiagnosed and undertreated".[6] Furthermore, eating disorders, like all mental health conditions, exist on a continuum of symptom severity from clinically severe to subthreshold.[7] Subthreshold eating disorders are defined by clinically significant eating disordered behaviors that do not meet diagnostic criteria for clinical eating disorders, however, they often progress and reach the threshold for eating disorders.[8]

Competitive cheerleading is considered comparable to other lean sports such as gymnastics, ballet, swimming, and diving all of which have a long history of increased risk of eating disorders.[9] In the past, the primary responsibility of cheerleaders was to assist in crowd enthusiasm and promote school events during the academic year. Today, cheerleading teams are made up of members from a gym or clubs who compete throughout the year. College cheerleaders generally appear at many events but only have one annual competition judged by a panel of judges.[10] Squads consist of base and back spots who toss, catch, and hold the "flyers". Of necessity, they are larger and stronger while the flyers are generally shorter, lighter, and have lower body mass indexes (BMI) compared to other positions. In a study using the eating attitudes test (EAT-26), the prevalence of those meeting the diagnostic criteria of disordered eating risk was 33%.[11] At our university, the Cheer Team competes at the National Cheerleaders Association (NCA) collegiate National Championships (Small Co-ed Division 1) every year and have won six national championships since 2010. We hypothesized that members of the Cheer Team might exhibit symptoms of eating disorders and were recruited for this study. Unfortunately, we were unable to separate them by position.

College students, in general, are an important population to consider for prevention and early intervention for eating disorders. The traditional college years (age 18 to 25-years) directly coincide with the median age of onset for eating disorders.[12] It has been estimated that 11% to 17% of females and approximately 4% of males on college campuses in the United States of America (U.S.A.) screen positive for clinical eating disorder symptoms.[13] However, participants for control groups were recruited from undergraduate majors who, it was hypothesized, would have lower instances of eating disorders than the estimates.

The American Kinesiology Association (AKA) defines kinesiology as an academic discipline that involves the study of physical activity and its impact on health, society, and quality of life.[14] The emphasis on health and physical activity suggests that few kinesiology students would experience problems with eating disorders. Participants were also recruited from undergraduate psychology majors. It was hypothesized that the education and training received would be reflected in positive mental health.[15]

The purpose of this study was to measure symptoms of eating disorders that might be present in female undergraduate students from specific disciplines.

METHODS

Female participants from the University's Cheerleading squad, an introductory Psychology class, and an introductory Kinesiology course were recruited to participate in this study that was approved by the Institutional Review Board (IRB) for the Protection of Human Subjects. They reported to a classroom in groups of 20 and were given as much time as they needed to complete the eating disorder inventory-2 (EDI-2).[16]

Measures

Age, height, and weight were recorded on the questionnaires and BMI was calculated by dividing self-reported weight in pounds by self-reported height in inches squared and then multiplying by 703.

Eating disorder inventory-2 scales: To assess eating disorder symptoms, the following scales were created by summing their respective items: drive for thinness (Cronbach's α=0.91), bulimia (Cronbach's α=0.42), body dissatisfaction (Cronbach's α=0.87), ineffectiveness (Cronbach's α=0.84), perfectionism (Cronbach's α=0.72), interpersonal distrust (Cronbach's α=0.70), introceptive awareness (Cronbach's α=0.77), maturity fears (Cronbach's α=0.75), asceticism (Cronbach's α=0.47), impulse regulation (Cronbach's α=0.85), and social insecurity (Cronbach's α=0.79).

RESULTS

Data Analyses

The frequency distributions and descriptive statistics for the variables were examined first. Square root transformations were conducted on seven of the 11 EDI-2 scales to correct for positively skewed distributions: drive for thinness, bulimia, ineffectiveness, interpersonal distrust, interoceptive awareness, impulse regulation, and social insecurity. Group differences in age and BMI were examined using analyses of variance (ANOVAs). Mean differences among the groups in the EDI-2 scales were examined using multivariate analyses of covariance (MANCOVAs). Bonferroni adjustments were made to all post-hoc tests. Relationships between group membership and other categorical variables of interest were examined with chi-square tests of independence. A comparison of prevalence rates of high-risk status for eating disorders to college norms was done using chi-square (χ^2) goodness of fit statistics.

Participants

A total of 86 female participants completed the survey. There were 27 university Cheerleaders who were compared to 30 students enrolled in introductory Psychology courses, and 29 students enrolled in introductory Kinesiology courses.

The mean age of the sample was 20.58 years (SD=0.21; range=18-30). The Cheerleader group (M=19.33, SD=0.44) was younger than the Kinesiology control group (M=21.66, SD=0.42), but neither group differed from the Psychology control group (M=20.67, SD=0.42), $F(2, 83)=75.71$, $p=0.001$, $\eta_p^2=0.15$. The Cheerleader (M=21.30, SD=0.51), Psychology (M=21.64, SD=0.49), and Kinesiology groups all had comparable BMI means (M=22.73, SD=0.49), $F(2, 83)=2.23$, $p=0.11$, $\eta_p^2=0.05$. Age and BMI were evaluated as covariates in all of the models presented below.

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EDI-2 Scales

It was expected that Cheerleaders would report higher EDI-2 scale scores than either the Psychology or Kinesiology control groups. To test this, participants' scores on each of the 11 subscales of the EDI-2 were compared across the three groups covarying for age and BMI using a MANCOVA. There was a significant multivariate main effect for group, multi. $F(22, 138)=1.83$, $p=0.02$, $\eta_p^2=0.23$. Raw score means and standard errors were presented in Table 1.

Table 1. *Means, standard errors, and univariate tests for each of the EDI-2 Subscales*

EDI-2 Scale	Cheerleader M (SE)	Psychology M (SE)	Kinesiology M (SE)	F(2,79)	*p*	Partial η2
Drive for Thinness[†]	6.17 (1.18)[a]	6.25 (1.10)	3.35 (1.13)[a]	3.93	0.02	0.09
Bulimia[†]	2.11 (0.35)[a]	1.04 (0.33)	0.69 (0.34)[a]	4.03	0.02	0.09
Body Dissatisfaction	10.47 (1.25)[a]	8.30 (1.16)	5.08 (1.20)[a]	4.55	0.01	0.10
Ineffectiveness[†]	3.06 (0.72)	2.87 (0.67)	0.70 (0.69)	3.62	0.03	0.08
Perfectionism	7.14 (0.89)	6.36 (0.83)	7.95 (0.86)	0.88	0.42	0.02
Interpersonal Distrust[†]	2.20 (0.54)	3.18 (0.50)[a]	1.27 (0.51)[a]	3.09	0.05	0.07
Interoceptive Awareness[†]	3.25 (0.73)	2.83 (0.68)	1.62 (0.70)	2.00	0.14	0.05
Maturity Fears	5.27 (0.73)[a]	4.68 (0.68)[b]	2.02 (0.70)[a,b]	5.54	0.01	0.12
Asceticism	4.28 (0.51)	3.06 (0.48)	3.40 (0.49)	1.55	0.22	0.04
Impulse Regulation[†]	3.98 (0.99)	3.32 (0.92)	1.09 (0.95)	2.91	0.06	0.07
Social Insecurity[†]	3.01 (0.66)	3.52 (0.62)	1.94 (0.64)	1.04	0.36	0.03
Energy intake from supplement (kcal/mice/day)	0.00±0.00	0.08±0.00	0.15±0.01	0.39±0.02	0.39±0.02	0.39±0.02
Water intake (mL/mice/day)	7.0±0.2	7.0±0.2	7.0±0.1	7.0±0.3	7.0±0.3	7.0±0.3

[†]Means and standard errors were for raw data and the F tests were for the square root transformed data.
Note: Means with the same superscript were significantly different using Bonferroni adjustment and controlling for age and body mass index.

As expected, the Cheerleader group scored higher than the Kinesiology control group on the drive for thinness, bulimia, body dissatisfaction, and maturity fears. The psychology control group also scored higher than the Kinesiology control group on the interpersonal distrust and maturity fears scales. Contrary to expectations there were no group differences for ineffectiveness, perfectionism, interoceptive awareness, asceticism, impulse regulation, and social insecurity.

Additionally, the EDI-2 cut-off score for high-risk was created using a score greater than or equal to 14 on the drive for thinness scale.[16] Contrary to expectations, prevalence rates for students who were at high-risk were not associated with group membership, $\chi^2(2, N=85)=0.58$, $p=0.75$. Approximately, 15% (n=4) of the Cheerleader sample, 17% (n=5) of the psychology control group, and 10% (n=3) of the Kinesiology control group were classified as at high-risk for an eating disorder. $\chi^2(1, N=27)=0.69$, $p=0.40$; $\chi^2(1, N=29)=1.69$, $p=0.19$; $\chi^2(1, N=29)=0.004$, $p=0.95$; respectively.

Eating Disorder Behaviors

Participants reported on whether they engaged in a number of behaviors associated with disordered eating during the previous three months (Table 2).

Contrary to expectations, group was not associated with any of these behaviors. The eating disorder behaviors that were the most prevalent were use of diet pills, purging, and binging. To test the hypothesis that Cheerleaders who engaged in these be-

Table 2. *Prevalence of Eating Disorder Behaviors during the Previous Three Months*

Eating Behavior		Cheerleader n (%)	Psychology n (%)	Kinesiology n (%)	N	χ2	*p*
Binge	No	23 (85%)	23 (82%)	24 (83%)	84	0.10	0.95
	Yes	4 (15%)	5 (18%)	5 (17%)			
Purge	No	18 (69%)	24 (89%)	24 (83%)	82	3.14	0.18
	Yes	8 (31%)	3 (11%)	5 (17%)			
Laxatives	No	24 (89%)	28 (97%)	27 (93%)	85	1.25	0.53
	Yes	3 (11%)	1 (3%)	2 (7%)			
Diet Pills	No	18 (69%)	21 (72%)	21 (72%)	84	0.09	0.96
	Yes	8 (31%)	8 (28%)	8 (28%)			
Diuretics	No	26 (96%)	28 (97%)	28 (97%)	85	0.004	1.00
	Yes	1 (4%)	1 (3%)	1 (3%)			

haviors would report more symptoms of disordered eating than control participants who engaged in the same behaviors, MANCOVAs were conducted using each of these three behaviors as a moderating factor of group membership. Use of diet pills did not significantly moderate the effects of group on the EDI-2 scales, multi. $F(22, 128)=1.32$, $p=0.17$, $\eta_p^2=0.18$. However, purging and binging significantly interacted with group, multi. $F(22, 124)=1.74$, $p=0.03$, $\eta_p^2=0.24$ and multi. $F(22, 128)=2.11$, $p=0.005$, $\eta_p^2=0.27$, respectively (Tables 3 and 4).[a]

As expected, among participants who purged in the past three months, Cheerleaders reported more Body Dissatisfaction than the Kinesiology control group and more Impulse Regulation than the Psychology control group. Additionally, among participants who binged in the past three months, Cheerleaders reported greater drive for thinness, bulimia, body dissatisfaction, and impulse regulation than both the Psychology and Kinesiology control groups and greater Interoceptive Awareness than the Kinesiology control group. Among participants who did not binge, Cheerleaders also reported greater body dissatisfaction than the Kinesiology control group.

DISCUSSION

The purpose of this study was to examine symptoms of disordered eating among female college Cheerleaders in comparison to two different college samples (Kinesiology and Psychology) considered controls. These two groups were chosen as it was hypothesized that the curriculum would teach healthy behaviors, both physical and mental, respectively. While the size of the samples was small (n≤30), the results revealed that the current samples were comparable to expected college norms regarding risk status

Table 3. *Means, Standard Errors, and Univariate Tests for the Interaction between Group and Purging for each of the EDI-2 Scales*

EDI-2 Scale	Purge	Cheerleader M (SE)	Psychology M (SE)	Kinesiology M (SE)	F(2,72)	p	Partial η^2
Drive for Thinness†	No	3.87 (1.30)	5.60 (1.14)	2.99 (1.12)	1.18	0.31	0.03
	Yes	12.53 (1.96)	12.06 (3.09)	4.68 (2.45)			
Bulimia†	No	1.68 (0.41)	0.80 (0.36)	0.61 (0.36)	0.58	0.56	0.02
	Yes	3.44 (0.62)	2.45 (0.98)	0.92 (0.78)			
Body Dissatisfaction	No	7.81 (1.35)	7.68 (1.19)	4.78 (1.16)	2.86	0.06	0.07
	Yes	17.69 (2.04)[a]	14.87 (3.21)	5.98 (2.55)[a]			
Ineffectiveness†	No	2.19 (0.82)	2.32 (0.72)	0.65 (0.71)	1.33	0.27	0.04
	Yes	5.75 (1.24)	3.54 (1.96)	0.48 (1.55)			
Perfectionism	No	7.12 (1.08)	5.67 (0.96)	7.92 (0.94)	1.23	0.30	0.03
	Yes	7.38 (1.64)	10.68 (2.58)	7.90 (2.05)			
Interpersonal Distrust†	No	1.57 (0.64)	2.97 (0.56)	1.32 (0.55)	0.89	0.42	0.02
	Yes	3.79 (0.97)	4.10 (1.52)	0.85 (1.21)			
Interoceptive Awareness†	No	2.09 (0.82)	2.28 (0.72)	1.64 (0.71)	2.13	0.13	0.06
	Yes	6.59 (1.24)	4.79 (1.95)	0.92 (1.55)			
Maturity Fears	No	4.67 (0.85)	4.50 (0.75)	2.00 (0.74)	1.13	0.33	0.03
	Yes	7.51 (1.29)	4.20 (2.03)	1.88 (1.61)			
Asceticism	No	4.39 (0.58)	2.72 (0.52)	3.11 (0.51)	0.34	0.71	0.01
	Yes	4.64 (0.89)	3.10 (1.39)	4.63 (1.11)			
Impulse Regulation†	No	2.57 (0.98)	2.79 (0.86)	0.53 (0.84)	3.42	0.04	0.09
	Yes	7.94 (1.48)[a]	0.08 (2.32)[a]	3.16 (1.84)			
Social Insecurity†	No	2.16 (0.72)	3.01 (0.63)	1.54 (0.62)	0.33	0.72	0.01
	Yes	5.12 (1.09)	3.40 (1.71)	3.56 (1.36)			

†Means and standard errors were for raw data and the F tests were for the square root transformed data.
Note: Means with the same superscript were significantly different using Bonferroni adjustment and controlling for age and body mass index.

a. The interaction terms were the main analyses of interest and qualified any of the significant main effects that were observed in these models. However, there was a significant main effect for group, multi. $F(22, 124)=2.06$, $p=0.01$, $\eta_p^2=0.27$, but not a main effect for purging, multi. $F(11, 62)=1.66$, $p=0.10$, $\eta_p^2=0.23$, in the model containing the interaction between group and purging. The pattern of findings for the group main effect matched those presented in Table 1 with the following exceptions: there was an additional univariate effect for Interoceptive Awareness in which Psychology students reported greater awareness than Kinesiology students; Cheerleaders reported more Ineffectiveness than did Kinesiology students; and Psychology students no longer differed from Kinesiology students on Maturity Fears. In the model containing the interaction between group and binging, there were significant main effects for binging, multi. $F(11, 64)=3.22$, $p=0.002$, $\eta_p^2=0.36$, and group, multi. $F(22, 128)=2.97$, $p<0.001$, $\eta_p^2=0.34$. For the main effect of binging, students who binged reported more symptoms associated with Drive for Thinness, Bulimia, Body Dissatisfaction, Ineffectiveness, Interpersonal Distrust, Interoceptive Awareness, Impulse Regulation, and Social Insecurity than did students who did not binge. The pattern of findings for the group main effect was similar to those presented in Table 1. There was an additional univariate effect for Interoceptive Awareness in which Cheerleaders reported more symptoms than did the Kinesiology students. There were also several post-hoc effects that emerged, such as Cheerleaders reported more Body Dissatisfaction, Ineffectiveness, and Impulse Regulation than did the Kinesiology group, Cheerleaders no longer differed from Kinesiology students on Maturity Fears, and Psychology students no longer differed from Kinesiology students on Interpersonal Distrust.

Table 4. *Means, Standard Errors, and Univariate Tests for the Interaction between Group and Binging for each of the EDI-2 Scales*

EDI-2 Scale	Binge	Cheerleader M (SE)	Psychology M (SE)	Kinesiology M (SE)	F(2,72)	*p*	Partial η^2
Drive for Thinness†	No	4.51 (1.09)	5.63 (1.11)	3.05 (1.06)	4.17	0.02	0.10
	Yes	17.20 (2.59)[a,b]	6.69 (2.26)[a]	4.02 (2.38)[b]			
Bulimia†	No	1.45 (0.31)	0.97 (0.32)	0.42 (0.30)	5.20	0.01	0.12
	Yes	6.23 (0.74)[a,b]	1.26 (0.64)[a]	1.80 (0.68)[b]			
Body Dissatisfaction	No	9.11 (1.20)[a]	7.15 (1.22)	4.64 (1.16)[a]	2.68	.07	0.07
	Yes	19.84 (2.84)[a,b]	10.23 (2.48)[a]	6.39 (2.62)[b]			
Ineffectiveness†	No	2.62 (0.75)	2.19 (0.76)	0.65 (0.71)	0.47	0.63	0.01
	Yes	6.10 (1.76)	6.28 (1.54)	1.51 (1.62)			
Perfectionism	No	6.46 (0.91)	5.74 (0.92)	7.92 (0.88)	1.65	0.20	0.04
	Yes	11.75 (2.16)	7.31 (1.88)	7.55 (1.98)			
Interpersonal Distrust†	No	1.91 (0.56)	2.70 (0.56)	1.03 (0.54)	0.16	0.85	0.004
	Yes	4.36 (1.31)	5.10 (1.15)	2.15 (1.21)			
Interoceptive Awareness†	No	1.92 (0.66)	2.74 (0.67)	1.58 (0.64)	6.21	0.003	0.14
	Yes	11.74 (1.56)[a]	3.38 (1.36)	1.11 (1.44)[a]			
Maturity Fears	No	5.41 (0.77)	4.20 (0.78)	2.03 (0.74)	2.14	0.12	0.06
	Yes	4.57 (1.81)	8.27 (1.58)	2.04 (1.67)			
Asceticism	No	3.98 (0.55)	3.07 (0.56)	3.20 (0.53)	0.92	0.40	0.02
	Yes	6.04 (1.30)	2.66 (1.13)	4.32 (1.20)			
Impulse Regulation†	No	2.20 (0.86)	2.64 (0.87)	0.45 (0.84)	4.31	0.02	0.10
	Yes	15.58 (2.04)[a,b]	6.09 (1.78)[a]	3.24 (1.88)[b]			
Social Insecurity†	No	2.28 (0.67)	3.22 (0.68)	1.55 (0.65)	0.70	0.50	0.02
	Yes	7.71 (1.58)	5.11 (1.38)	3.51 (1.46)			

†*Means and standard errors were for raw data and the F tests were for the square root transformed data.*
Note: Means with the same superscript were significantly different using Bonferroni adjustment and controlling for age and body mass index.

for eating disorders. Partial support for the hypothesis that the Cheerleader group would report more symptoms of disordered eating was found. The Cheerleader group reported greater drive for thinness, bulimia, body dissatisfaction, and maturity fears than the Kinesiology control group. Contrary to expectations, the Psychology control group also reported greater interpersonal distrust and maturity fears than the Kinesiology group. Although group membership was not associated with any of the eating disorder behaviors that were measured, the hypothesis that Cheerleaders who engaged in disordered eating behavior would report greater symptoms of eating disorders than the control students who engaged in the same behavior was partially supported for purging and binging. Cheerleaders who purged reported greater body dissatisfaction than the Kinesiology students who purged and greater impulse regulation than psychology students who purged. Cheerleaders who binged in the past three months reported greater drive for thinness, bulimia, body dissatisfaction, and impulse regulation than both the Psychology and Kinesiology students who binged. They also reported greater interoceptive awareness than the Kinesiology control group, and Cheerleaders who did not binge reported greater body dissatisfaction than the Kinesiology students who did not binge. However, members of the Cheer Team may perceive their disordered eating behaviors as part of their sports participation rather than a problem with eating behaviors.

The findings that 17% of the Psychology control group and 10% of the Kinesiology control group had symptoms that classified them as at high-risk for an eating disorder are in line with those of the females on college campuses (11-17%) who screen positive for clinical eating disorder symptoms.[13] However, the Cheer Team sample in this study indicated that 15% had symptoms that put them at risk for an eating disorder which was well-below that found in an earlier study (33%).[11] A limitation in this study was the lack of differentiation as to Cheer Team position (i.e. base, flyer, etc.) that should be investigated in future studies.

CONCLUSION

Eating disorders continue to be of great concern, for children and adolescents through adulthood.[17] Colleges are the last educational institution that most young adults attend before entering college and may represent a place for the recognition of these symptoms and provide appropriate interventions to reduce the symptoms of eating disorders.[18] Unfortunately, individuals with disordered eating habits rarely seek help and those few who do so often do not reveal much information that would be useful. Since most methods for researching eating disorders rely on self-reports and interviews, it is easy for these individuals to hide.[19] The findings of such a low response for symptoms of eating disorders in the Cheer Team may have been due to those who chose not to volunteer. Continued study of subthreshold symptoms that do not meet the diagnostic criteria[8] and identifying non-adaptive stress coping methods may lead to early intervention for both subthreshold and clinical groups.[18] Adding participants from other areas of study in

undergraduate as well as graduate curricula will help expand the understanding of stresses that may contribute to disordered eating behaviour's.

PARTICIPANTS' CONSENT

The informed consent document was approved by the Institutional Review Board for the Protection of Human Subjects at our university.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

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