"A Meta-Analysis of the Frequency of Eating Disorders in Dancers"

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Abstract

With eating disorders being one of the most common forms of chronic illness in adolescents and adults (Mirasol, 2018), the question of whether eating disorders are common in athletes is introduced, particularly with dancers. The present research produces a meta-analysis of the current data found, examining if there is a high probability of eating disorders in dancers. This study examines fifteen articles, selected using specified criteria. Sign-tests were used to measure these studies to show significance. Subsequently, no significant results were found in the conclusion of the study, thus making for stimulating outcomes.

A Meta-Analysis of the Frequency of Eating Disorders in Dancers

Eating disorders are very common in the United States amongst adolescents and adults. Ten to fifteen percent of Americans suffer from some form of eating disorder every year, which include ten million women (Mirasol, 2018). Out of those suffering, adolescents are greatly affected. According to Mirasol (2018), a center for eating disorder recovery, anorexia is the third most common form of chronic illness in adolescents. The most common eating disorders include anorexia nervosa, bulimia nervosa, and eating disorders not otherwise specified, though various behaviors and attitudes factor into these illnesses. This includes how dissatisfied one is with their body, drive to become thin, how uncomfortable one is while eating certain foods (i.e. sweets or fast food), and how often one diets and records weight (APA, 2011). Eating disorders can be caused by many different factors: personality traits, such as low self-esteem, genetics, learning, environmental factors (i.e. abuse, rape, a new experience, or giving birth), and hobbies or sports, such as dancing (APA, 2011).

Professional dancers have a stressful and physically demanding occupation. Dancers rehearse with little breaks and off days, and must follow a strict routine to avoid injury. The most common reason for development of these psychological disorders is essentially the same in males and females: excessively straining their bodies (Fairburn & Harrison, 2003). In respect to the reality of dance, the most aesthetically pleasing body type for female and male ballet dancers is considered long and lean (Pickard, 2012). This body type is also thought to create more graceful body movements, and is idealized throughout the world of dance. Dancers rehearse in front of mirrors to obtain symmetry and perfect lines, which can affect the way they view their body and can cause body

dysmorphic disorder. This illness involves obsessive focus on a perceived flaw in appearance (Veale, et. al., 2016). Defining cases of eating disorders is determined by crucial features, such as conscious efforts to lose weight, amenorrhea, or misinterpreted thoughts of shape and weight (le Grange & Noakes, 1993). Because not every dancer has this body type naturally, aspiring dancers and professional dancers may put their body through some sort of dysfunctional eating regimen to attain it artificially (Taylor & Estanol, 2015). According to the National Eating Disorders Association (NEDA), 20 million females and 10 million males will suffer from an eating disorder at some point in their lives. In reference to dancers, research has shown that 83% of dancers will have some form of eating disorder throughout their career, which on average lasts 15 to 20 years, from the ages of 19 to 35 (Ringham et al., 2006).

The aim of this study was to investigate and analyze the existing research showing diagnoses of eating disorders in dancers over the years to determine whether there is a significant frequency in eating disorders in dancers. When performing the analysis, publication bias was taken into consideration, where non-significant results and results that fail-to-reject the null hypothesis are not as likely to be included in the publication compared to significantly proven results.

Methods

Search Approach

The study was conducted using peer-reviewed journals and by completing a meta-analysis. Data was obtained from studies published between 1985 and 2016. Using California University's library, "one-search" was used to narrow results into correct categories. For each data source, terms regarding disordered eating were searched.

Searches required components such as "Bulimia Nervosa, Anorexia Nervosa, Eating

Disorders, Disordered Eating, Dancers, and Ballet Dancers." Twenty studies were

chosen, with only fifteen suitable for the analysis. For each study, basic descriptive

statistics were recorded along with the following: publication year, type of dancer (if

specified), assessment used to conduct the study, anorexia, nervosa, bulimia nervosa,

body or weight dissatisfaction, and calculated probability. Results of certain studies only

include the perspective of dancers specifically without regarding athlete or control that is

being compared. While the type of instrument used to conduct each study was not a main

focus, assumptions that the assessments were reliable and valid were made. Most studies

used Eating Attitude Tests (EAT), the Eating Disorders Inventory (EDI), and the

Diagnostic and Statistical Manual of Mental Disorders (DSM) to assess the disorders.

Procedure

After gathering studies and examining the criteria of each, basic demographics

were pulled from each study including the average age of the dancers in the study and the

type of dancers involved. Each study was examined for the mean score of the

questionnaires included and the calculated probability values obtained from each

analysis. After observing each study and determining the prevalence of the eating

disorder being examined, groups were broken down into specific types of eating

disorders (i.e. bulimia nervosa (BN), anorexia nervosa (AN) or an eating disorder not

otherwise specified (EDNOS)), perception of one's weight or dieting, body

dissatisfaction, and drive for thinness. The analysis focused on dancers as a whole, rather

than genre-specified dancers (i.e. ballet dancers), although this was noted throughout the

analysis process. The main variable recorded was to determine significant results or non-significant results.

To determine whether the studies showed overall significant results, the sign test was used as a vote counting procedure to test the hypotheses. This assessment is a non-parametric test that compares the sizes between groups. The test is a binomial test with probability $\pi = .5$. The Meta-analysis was implemented using R, a software for statistical computing. The significance level was set at $p<0.05$. The null hypothesis indicates that there is a high frequency of disordered eating in dancers.

Summary of Studies

Fifteen studies using quantitative research were used to conduct the Meta-analysis. Out of the studies included, seven (46.7%) focused on non-genre-specified dancers, while four (26.7%) focused on specifically ballet dancers, and four (26.7%) focused on dancers in relation to non-dancers, other athletes, or active students. One of these studies (6.7%) was established in Taiwan (Tseng, Fang, & Lee, 2014), one (6.7%) in the UK (Nordin-Bates, Walker, & Redding, 2011), and one (6.7%) occurred in Berlin (Neumärker, et al., 1998), and one with (6.7%) Spanish dancers (Jáuregui, et al., 2018). All other studies were conducted in the United States. Four (26.7%) of these studies focused on professional dancers, whether they be unpaid elite dancers or a paid professional dancer. On the other hand, six (40%) of the studies showed emphasis on non-professional dancers, including ballet students, dance students, and pre-professional dancers. The oldest study was completed in 1985 while the newest study was completed in 2016. Five (33.3%) used the EAT-26 or EAT-40 questionnaire, four (26.7%) used the EDI questionnaire, two (13.3%) used the DSM-IV, and just one (6.7%) used the BITE (a

method used in Edinburgh) and the ACSI-28. Each of these questionnaires does not prove

an exact diagnosis, but does provide enough information to make educated assumptions

since these were used in published studies.

Results

The mean age of participants in the studies was 18.54 years, with a range of 12 to

24 y/o. Six studies (40%) presented their research based on eating disorders in general.

These can be eating disorders not-otherwise specified (EDNOS), or specific eating

disorders. Four studies (26.7%) gave results on bulimia nervosa (BN) in dancers, three

(20%) gave results on weight perception and dieting (D), three (20%) showed the

difference between BMI in all dancers compared to the BMI in dancers with anorexia

nervosa (AN), and seven studies (46.7%) showed the drive for thinness (DT) in dancers.

Out of the analyses that showed ED, five of those used non-genre-specific dancers, and

one used ballet dancers. The three studies that showed BN included non-genre-specified

dancers, and one study included ballet dancers. One study showed a non-significance in

bulimia, but showed significance in vomiting; because vomiting as a major characteristic

of bulimia, vomiting was also considered for BN (Thomas, Keel, & Heatherton, 2005).

Two studies including non-genre-specific dancers were included in weight perception and

dieting, while one study used ballet dancers to show dieting. All studies included in AN

were ballet dancers, while all studies for body dissatisfaction were non-genre-specified

dancers. Lastly, two studies included ballet dancers, while the others included non-genre-

specified dancers in the drive for thinness category.

After the sign test was completed, results showed no significance in each

category. As shown in Table 1, the corresponding p-value for ED, was 0.85, thus failing

to reject the null hypothesis of p<0.05. This is also similar to the other results including

BN (p=0.98), weight perception and dieting (p=0.99), BMI correspondence with AN

(p=0.99), BD (p=0.98), and DT (p=0.70). The Meta-analysis shows no significant results.

TABLE
P-VALUES FROM SIGN TEST

TYPE OF DISORDERED EATING	P-values
EDNOS	0.8491
BULIMIA NERVOSA	0.9824
WEIGHT PERCEPTION/DIETING	0.9963
BMI V. ANOREXIA NERVOSA	0.9963
BODY DISSATISFACTION	0.9824
DRIVE FOR THINNESS	0.6964

Discussion

The main focus of this study was to analyze past publications to decide whether dancers have a high prevalence of eating disorders; specifically, the most common forms of eating disorders, such as anorexia nervosa, bulimia nervosa, and eating disorders not otherwise specified. A total of fifteen studies were found to meet the selected criteria for analysis: a focus on dancers specifically, and liable data, including studies that used questionnaires to decide if there was an eating disorder present in the dancers. Resources were limited due to the strict guidelines set when seeking data, such that results found were based predominantly on disordered eating rather than eating disorders, whereas disordered eating is a descriptive, non-diagnosed phrase that consists of abnormal eating behaviors, while eating disorders are chronically defined illnesses. Studies were mostly consistent, meaning that those found were likely to have similar forms of eating disorders and subjects, rather than comparing dancers with non-dancers. There was failure to reject the null hypothesis, which states that there is a high frequency of disordered eating in

dancers. In this way, the analysis did not support that there was a high frequency of disorder eating in dancers.

This study anticipated that there would be remarkable results in the amount of eating disorders in dancers. Each source study returned significant probability values, concluding that dancers did in fact have high amounts of eating disorders, whether it be exclusively anorexia, bulimia, eating disorders not otherwise specified, or other issues, such as body dissatisfaction, drive for thinness, and weight perception and dieting. Although each of these studies show significance, publication bias—also known as the file drawer problem—may have skewed these results. This bias includes a tendency to publish only positive results from an analysis and a reluctance to publish results that are not confirmatory. Results from this meta-analysis show that the majority of studies do not have significant results showing that dancers have a higher rate of ED. Out of the fifteen studies, eating disorders not otherwise specified, along with bulimia nervosa, weight perception and dieting, body dissatisfaction, and drive for thinness, were not shown to be frequent in dancers. One comparison showing the relationship between the BMI in dancers and the BMI in dancers who have anorexia nervosa proved non-frequent. This insignificance may be due to the different categories each report examined. Other aspects, such as specialization of the dancer (i.e. ballet) and age of the dancer, were not taken into consideration due to a lack of the number of studies analyzed.

Although some of the source studies showed significant results, this study was not able to corroborate these findings, stemming from possible limitations in the meta-analysis. This could be due to the lack of studies analyzed and the approach taken to seek out these studies. All of the published articles were found using California University of

Pennsylvania's library, and therefore a number of studies could not be acquired due to the specifications required in each peer-reviewed article. Additionally, because the guidelines to find each article were strict, the findings could not be generalized to a larger population, such as eating disorders in all people, overall. In the future, research could be expanded to genre-specified dancers. Ballet dancers could be compared to dancers in general, or dancers to different types of athletes such as ice-skaters, gymnasts, and runners, or non-dancers. This study could also be expanded into an experimental study, where dancers would be tested to see whether an eating disorder is present. This may be very challenging due to setbacks in testing dancers, such as the time length of the research, due to long observational processes since each dancer may display different characteristics each day and the norms usually acceptable to dancers. Research including disordered eating may also be taken into account in the future. Instead of research determining if dancers have diagnosed eating disorders, disordered eating, such as the abnormal eating behaviors in dancers may be observed.

The results of this research, in general, show that the majority of studies do NOT find a connection between dancers and eating disorders at a high prevalence, which makes for interesting results and a fascinating debate. Due to significance in other primary research, such as experimental or observational studies, lack of significant findings for eating disorders is uncommon. Although uncommon, these results are a positive thing, acknowledging that dancers do not possess a prevalence of eating disorders, and allowing us to focus on factors of disordered eating rather than clinically diagnosed eating disorders. On the other hand, these results indicate that dancers may have some form of disordered eating, which can be common depending on environmental

factors such as teacher and peer pressure (Nordin-Bates, Walker, & Redding, 2011).

Dancers may set high personal standards, promoting perfectionism, which can cause low

self-esteem (Nordin-Bates, Walker, & Redding, 2011). Low self-esteem is closely related

to restrained eating and can cause disordered eating. In conclusion, these symptoms of

disordered eating and perfectionism may be used as a health warning for young and

professional dancers.

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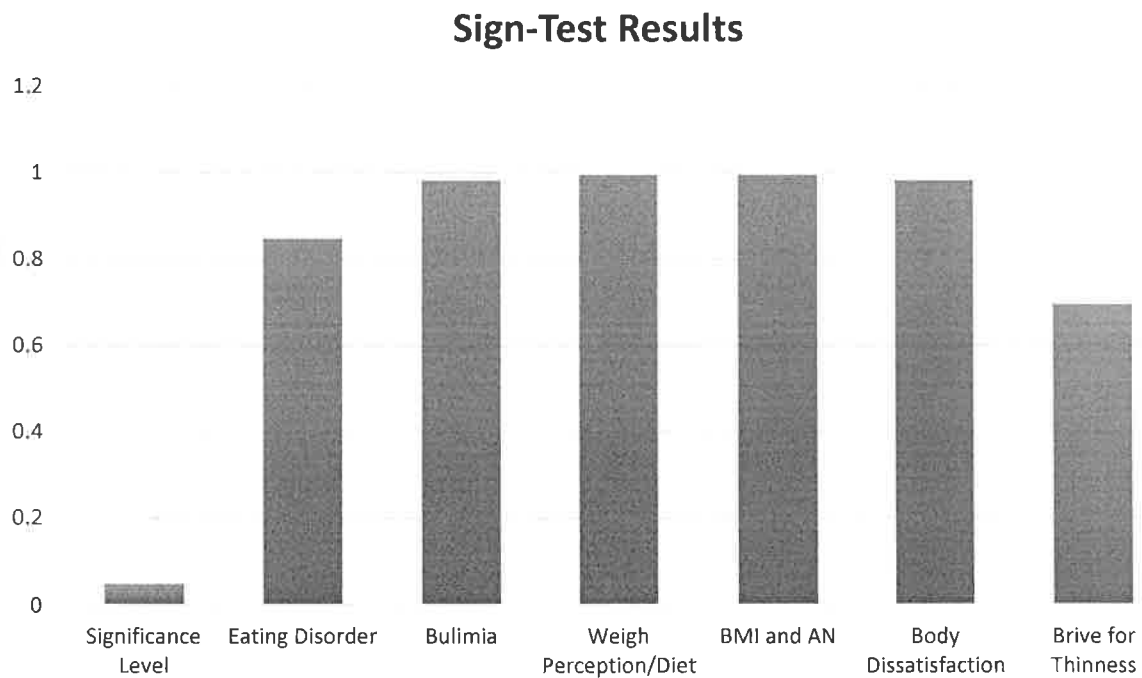*International Journal of Eating Disorders, 47*(1), 105-111. doi:10.1002/eat.22183

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Appendix A

Sign-Test Results

Appendix B

R-Code

```
> pbinom(5,15,.5,lower.tail=FALSE) #EatingDisorders
[1] 0.8491211
> pbinom(3,15,.5,lower.tail=FALSE) #Bulimia
[1] 0.9824219
> pbinom(2,15,.5,lower.tail=FALSE) #WeightPerception/Dieting
[1] 0.9963074
> pbinom(2,15,.5,lower.tail=FALSE) #Dancers BMI with Dancers BMI and Anorexia
[1] 0.9963074
> pbinom(3,15,.5,lower.tail=FALSE) #BodyDissatisfaction
[1] 0.9824219
> pbinom(6,15,.5,lower.tail=FALSE) #DriveforThinness
[1] 0.6963806
```