

PREVALENCE OF DISORDERED EATING AMONG INTERNATIONAL SPORT LEAD ROCK CLIMBERS

Lanae Joubert ⁽¹⁾, Abigail Larson ⁽²⁾, Gina Blunt-Gonzalez ⁽³⁾

⁽¹⁾ Assistant Professor of Nutrition, Northern Michigan University, Marquette, MI, USA; ljoubert@nmu.edu

⁽²⁾ Associate Professor of Kinesiology and Outdoor Recreation, Southern Utah University, Cedar City, UT, USA; abigaillarson@suu.edu

⁽³⁾ Associate Professor of Kinesiology, Morehead State University, Morehead KY, USA; g.gonzalez@moreheadstate.edu

Introduction: The prevalence of disordered eating (DE) is higher in athletes than in controls, higher in female athletes than males, and more common in leanness and weight dependent sports than in other sport types. Elite climbers tend to be strong, small and lean, but the prevalence of DE in rock climbers is unknown. **Purpose:** To assess DE prevalence in rock climbers and to explore the relationship between sport rock climbing ability and DE. **Methods:** A web-based survey assessed both climbing ability and DE (Eating Attitudes Test; score of ≥ 20) and was distributed to international climbing communities; 810 individuals attempted the survey; 604 completed all questions; 498 identified as sport lead climbers. **Results:** The prevalence of DE among sport lead climbers was 9%. Females (n=116) had a significantly higher prevalence (17%) than males (n=382; 6%), $p < 0.001$. Further, DE prevalence was significantly higher in the most advanced female sport lead climbers (9 of 21; 43%) compared to the lower grade/intermediate female sport lead climbers (5 of 69; 7%) $p < 0.0001$. **Conclusion:** These findings suggest rock climbers are not immune to DE and that the risk is elevated in female climbers, particularly at the elite/high elite level.

Keywords: sports, nutrition, climbing, prevalence, anorexia

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Introduction: La prévalence de l'alimentation désordonnée (ED) est plus élevée chez les athlètes que chez les témoins, plus élevée chez les athlètes féminines que chez les hommes, et plus fréquente chez les athlètes dépendant de la minceur et du poids que chez les autres types de sport. Les grimpeurs d'élite ont tendance à être forts, petits et maigres, mais la prévalence de l'ED chez les grimpeurs est inconnue. **Objectif:** Évaluer la prévalence de l'ED chez les grimpeurs et explorer la relation entre la capacité d'escalade sportive et l'ED. **Méthodes:** Une enquête en ligne a évalué à la fois la capacité d'escalade et le manger désordonné (DE) (Eating Attitudes Test, score > 20) et a été distribuée aux communautés d'escalade internationales; 810 personnes ont tenté le sondage; 604 a répondu à toutes les questions; 498 identifié comme grimpeur de plomb de sport. **Résultats:** La prévalence de DE parmi les grimpeurs sportifs de plomb était de 9%. Les femmes (n = 116) avaient une prévalence significativement plus élevée (17%) que les hommes (n = 382; 6%), $p < 0,001$. De plus, la prévalence de l'ED était significativement plus élevée chez les grimpeuses les plus avancées (9 sur 21, 43%) que chez les grimpeuses de sport de niveau inférieur / intermédiaire (5 sur 69, 7%) $p < 0,0001$. Conclusion: Ces résultats suggèrent que les grimpeurs ne sont pas immunisés contre l'ED et que le risque est élevé chez les grimpeuses, en particulier au niveau élite / haute élite.

Mots-clés: sport, nutrition, escalade, prévalence, anorexie

Introduction: Early research by Black and Burckes-Miller (1988) and Burckes-Miller and Black (1988, 1991) postulated that, due to the unique pressures associated with sport (e.g., athletic performances, coaches' expectations), athletes may be more prone to engage in disordered eating (DE) and unwise weight management techniques, which may lead to eating disorders (ED). They hypothesized that an elevated risk may be due pressures associated with sport participation and its environment or subculture. Nearly 15 years later, research by Sundgot-Borgen and Torstveit (2004) provided evidence supporting these previous hypotheses. In their large, well-conducted study among Norwegian elite athletes (n=1,259) and controls (n=1,203), they concluded that the prevalence of EDs was higher in athletes versus controls. In addition, EDs were higher in female athletes than in male athletes and less common in sports that do not focus on leanness or body weight than in sports that do, such as endurance and aesthetic sports. However, rock climbers were not included in their analysis.

Rock climbing, described as an extreme sport that requires intense kinesthetic awareness of the body and its movement, can be highly competitive. Most good climbers have a lean build, are small in stature with low body mass (Watts, Martin & Durtschi, 1993; Watts et al., 2003; Novoa-Vignau et al. 2017). Climbing success is supported by a high strength-to-mass ratio, which diet may strongly influence (Mountjoy et al., 2014), although research regarding the dietary intake patterns of climbers is scarce (Merrells et al., 2008; Zapf et al., 2001). In addition, outdoor climbers require convenient lightweight food that won't spoil during long hours of sun and/or altitude exposure, which also may influence a climber to eat less. There are anecdotal reports regarding DE in rock climbers (Samet, 2004; Taylor & Geldard, 2008) and the medical community has shared concerns (Lutter et al., 2017), but to the authors' knowledge no scientific research has assessed DE prevalence.

From a researcher's perspective, any tool used to detect DE in a sample of rock climbers must meet the following criteria (1) contain relatively few questions to encourage completion; (2) be understood by an international population; (3) have been validated in an athletic population. Although there are a variety of ED assessment tools available, the Eating Attitudes Test with 26 questions (EAT-26) seems to best fit these needs. The EAT-26 is a 26 item inventory, developed by Garner, Olmsted, Bohr & Garfinkel (1982), and used to assess a range of attitudes related to ED. A score of 20 and above is established as a cut-off value to identify individuals with possible DE behavior, and this cutoff is used to help discriminate between clinical patients with ED and nonclinical populations, demonstrating construct validity (Mintz & O'Halloren, 2000).

Climbing ability has been reported in the literature using a variety of different scales (i.e. Yosemite Decimal System, French/Sport Scale, British Technical Grading Scale), which creates challenges when comparing climber abilities within large international groups. The International Rock Climbing Research Association (IRCRA) recommended standards of reporting climber ability in a universal scale for the conversion of climbing grades to a number system for statistical analysis (Draper et al., 2016). In addition, Draper et al. (2016) also suggested to report rock climber characteristics to improve comparability such as primary type of climbing style (i.e. boulder, sport climb, etc.), percent of time devoted to their discipline present and past, experience in the discipline, competitive climbing involvement, and types of ascent (i.e. onsight, redpoint, vertical, overhanging, slab or crack climbing).

Purpose: The primary purpose of this study was to assess DE prevalence among an international, heterogeneous sample of rock climbers of varying abilities, who self-identify as being a sport lead climber and have been actively climbing for at least three months prior to taking the survey. Secondly, we wanted to explore the relationship between sport rock climbing ability and DE.

Methods

Participants: We solicited the IRCRA delegation (45 members) with an email introducing the research project with a web link to the survey. Delegates then distributed the web link survey among their respective international climbing communities. Participants gave their informed consent after reading the first page of the web-based survey, which explained the purpose of the research and described the types of questions to expect on the survey. All surveys were completed anonymously and of the 810 returned, 604 were complete. This study was approved by the IRB of Northern Michigan University (HS17-869).

Survey: The survey was pilot tested by 7 advanced level climbers (IRCRA mean climbing ability score of 18) with ample rock climbing research experience; informal feedback was utilized to reword any confusing questions. There were 42 total questions in 3 main sections. Section 1 included basic demographics (including self-reported age, gender, height, weight, body composition, country). Section 2 asked about climbing characteristics, such as types of preferred climbing styles, quantity and quality of climbing-specific training as well as other training, and competitive experiences at the regional, national and international level. Additionally, participants were asked to

self-rate their climbing ability (best red point within the past year) by selecting the IRCRA score (1-32) that most closely aligned with the rating system they were most familiar. Section 3 included the EAT-26, used with permission (Garner, Olmsted, Bohr, & Garfinkel, 1982). A tallied score greater than or equal to 20 on the EAT-26 is indicative of abnormal eating behavior (Garner et al., 1982), which we refer to as DE. In addition, the very last question on the survey specifically asked if the participant had previously been treated for an ED.

Data Analysis: Of the 604 completed surveys, responders that identified primarily as sport lead climbers were included in the present analyses (n=498). Mean±SD are reported for descriptive data. Body Mass Index (BMI) was calculated from self-reported height and weights in kg/m². EAT-26 question responses were scored and tallied according to <https://www.eat-26.com/scoring/> with scores ≥20 suggesting DE. The frequencies of DE are reported as percent of the total sport lead climber sample and by gender with significant differences identified by independent samples t-tests. To help discern if DE was more frequent among different climbing abilities, climbing ability was transformed to a categorical variable with 3 groups based on IRCRA climbing ability brackets: (1) lower grade + intermediate; (2) advanced; (3) elite + high elite. SPSS software for windows, version 25.0 (IBM Corp. Released 2017, Armonk, NY: IBM Corp.) with a significance level set at p<0.05 for all statistical analyses.

Results: The 498 sport lead climbers were from 33 countries, with the highest frequencies from the United States (63%), Canada (8%) and Spain (6%). There was complete data for 498 self-identified sport lead climbers (382 males; 116 females), and mean age 32±9 yrs. Mean BMI of sport lead male climbers was 22.9±2.6 kg/m² and females, 21.9±2.9 kg/m². Forty-four of the 498 sport lead climbers had an EAT-26 score ≥20, suggesting the overall prevalence of DE among this sample was 9%. The prevalence of DE in males was 6% in contrast to 17% in females. This gender difference was statistically significant (p<0.001). Analyzing the female sport lead climbers further, we compared the number of climbers with DE in the IRCRA lower grade/intermediate ability brackets (n=69) to those in the elite/higher elite brackets (n=21). Climbing ability between these two female groups was significantly different based on the IRCRA climbing ability scale mean scores 12.4±2.2; 23.3±2.5, respectively (p<0.0001). Further, elite/higher elite female sport lead climbers had the highest prevalence of DE (43%; n=9), which was significantly higher than the prevalence of DE in lower grade/intermediate climbers (7%; n=5) (p<0.0001).

Discussion: This study is the first to publish prevalence data of DE in a large sample of international rock climbers with a variety of climbing abilities. The prevalence of DE found in sport rock climbers (9%) was similar to other athletic populations (13.5%) but higher than non-athletic controls (4.6%) (Sundgot-Borgen & Torstveit, 2004). Our female sport lead rock climbers had similar DE prevalence rates (17%) as other studies with female gymnasts and swimmers (16%) (Anderson & Petrie, 2012). In the current study, DE rates found in the elite/high elite female climbers (43%) are also similar to other studies examining DE rates (42%) in elite level female athletes who compete in aesthetic sports (i.e. gymnastics) (Sundgot-Borgen & Torstveit, 2004). Although we had few elite and high elite climbers respond to the survey, we feel the data represents a typical global distribution of climbing abilities. We are aware that using a valid survey to detect DE has limitations and perhaps clinical interviews are needed to obtain accurate prevalence data (Beals & Manore, 1994; Smolack, Murnen & Ruble, 2000; Byrne &

McLean, 2001; Reinking & Alexander, 2005). It is a sincere hope that this study will provoke further research, which includes clinical assessment of ED in climbing groups to help establish whether a problem exists and to further explore treatment options, if necessary.

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