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Health status, physical activity, and orthorexia nervosa: A comparison between exercise science students and business students

Julia Malmborg [a, *], Ann Bremander [a, d, e], M. Charlotte Olsson [a], Stefan Bergman [b, c, d, e]

[a] School of Business, Engineering and Science, Halmstad University, Halmstad, Sweden
[b] School of Health and Welfare, Halmstad University, Halmstad, Sweden
[c] Primary Health Care Unit, Department of Public Health and Community Medicine, Institute of Medicine, The Sahlgrenska Academy, University of Gothenburg, Gothenburg, Sweden
[d] Spenshult Research and Development Center, Halmstad, Sweden
[e] Department of Clinical Sciences, Lund, Section of Rheumatology, Lund University, Lund, Sweden

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ABSTRACT

Orthorexia nervosa is described as an exaggerated fixation on healthy food. It is unclear whether students in health-oriented academic programs, highly focused on physical exercise, are more prone to develop orthorexia nervosa than students in other educational areas. The aim was to compare health status, physical activity, and frequency of orthorexia nervosa between university students enrolled in an exercise science program (n = 118) or a business program (n = 89). The students completed the Short Form-36 Health Survey (SF-36), the International Physical Activity Questionnaire (IPAQ), and ORTO-15, which defines orthorexia nervosa as a sensitive and obsessive behavior towards healthy nutrition. The SF-36 showed that exercise science students scored worse than business students regarding bodily pain (72.8 vs. 82.5; p = 0.001), but better regarding general health (83.1 vs. 77.1; p = 0.006). Of 188 students, 144 (76.6%) had an ORTO-15 score indicating orthorexia nervosa, with a higher proportion in exercise science students than in business students (84.5% vs. 65.4%; p = 0.002). Orthorexia nervosa in combination with a high level of physical activity was most often seen in men in exercise science studies and less often in women in business studies (45.1% vs. 8.3%; p < 0.000). A high degree of self-reporting of pain and orthorexia nervosa in exercise science students may cause problems in the future, since they are expected to coach others in healthy living. Our findings may be valuable in the development of health-oriented academic programs and within student healthcare services.

1. Introduction

Engaging in regular physical activity and maintaining a healthy nutritional intake is constantly emphasized by authorities and health professionals for improvement of health status in a population (Garber et al., 2011; Nordic Council of Ministers, 2014). Regular physical activity has a positive influence on health status by reducing the risk of cardiovascular disease, type-2 diabetes, cerebral vascular accidents, and by increasing well-being (Garber et al., 2011). The international recommendations for physical activity include 30 min of continuous endurance training at a moderate level at least five days a week and strength training twice a week (Garber et al., 2011). High-intensity physical activity gives additional health benefits (Haskell et al., 2007), but high-intensity training also increases the risk of injuries (Garber et al., 2011). Only a low percentage of the Swedish population actually meet the recommendations for physical activity (Ekblom-Bak et al., 2015) and most of the waking hours per day are spent sitting still (Hagströmer, Oja, & Sjöström, 2007). Although sedentary behavior and excessive caloric intake are two major health issues in today's society (Nordic Council of Ministers, 2014), too much exercise and an exaggerated focus on nutrition may also affect health in a

Abbreviations: ON, orthorexia nervosa; SF-36, the Short Form-36 Health Survey; IPAQ, the International Physical Activity Questionnaire; MPA, moderate physical activity; VPA, vigorous physical activity; MET, the metabolic equivalent of task; MET-min/wk, MET-minutes per week; Total PA, total physical activity measured as MET-min/wk for walking, MPA, and VPA; Sit-min, minutes spent sitting still per day; ORTOscore, ORTO-15 score.

* Corresponding author.
E-mail addresses: julia.malmborg@hh.se (J. Malmborg), ann.bremander@hh.se (A. Bremander), charlotte.olsson@hh.se (M.C. Olsson), stefan.bergman@spenshult.se (S. Bergman).

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negative way. This can induce overtraining syndrome (Meeusen et al., 2006) or eating disorders (Bratland-Sanda & Sundgot-Borgen, 2013).

Lately, orthorexia nervosa (ON), a condition characterized by an exaggerated fixation on healthy food (Donini, Marsili, Graziani, Imbriale, & Cannella, 2004), has received much attention in the literature. ON is not yet recognized as a medical diagnosis in international classifications (American Psychiatric Association, 2013), but suggestions for diagnostic criteria has recently been published (Dunn & Bratman, 2015; Moroze, Dunn, Craig Holland, Yager, & Weintraub, 2015). Characteristics for ON include exclusion of nutrients, focus on the quality (not the quantity) of food (Bağci Bosi, Camur, & Güler, 2007), negative impact on the quality of life, and categorization of food into groups of "dangerous" and "healthy" (Donini et al., 2004). The proposed criteria for a diagnosis of ON also highlights the obsessive trait, and the clinical severity with regard to malnutrition and intrapersonal distress or impairment, in persons that define their eating as healthy (Dunn & Bratman, 2015). Whether students enrolled in health-oriented academic programs have a higher frequency of ON has been debated (Bağci Bosi et al., 2007; Bo et al., 2014; Fidan, Ertekin, Işikay, & Kirpinar, 2010; Korinth, Schiess, & Westenhoefer, 2010; Missbach et al., 2015). At least half of the professionals working in health-oriented areas have been found to show ON (Bağci Bosi et al., 2007; Fidan et al., 2010). In dieticians, eight out of ten showed ON whereas three out of ten athletes did (Alvarenga et al., 2012; Segura-Garcia et al., 2012). Students in nutrition sciences have also shown some tendency, but no differences were found compared to students in non-health related disciplines (Korinth et al., 2010; Missbach et al., 2015). Information on the prevalence of ON in the general population is contradictory, ranging from a low percentage to 50% of the population (Donini et al., 2004; Ramacciotti et al., 2011). It is also unclear whether there is a sex difference in the prevalence of ON (Bağci Bosi et al., 2007; Bo et al., 2014; Brytek-Matera, Donini, Krupa, Poggiogalle, & Hay, 2015; Fidan et al., 2010; Ramacciotti et al., 2011), which has mostly been due to the different methodologies used in the studies.

Bundros, Clifford, Silliman, and Neyman Morris (2016) showed that ON could be present in college students, but there was a need for more research on possible risk factors in student populations. It is unclear whether students in health-oriented academic programs are more prone to developing 'unhealthy' behavior patterns regarding diet (Bağci Bosi et al., 2007; Bo et al., 2014; Fidan et al., 2010; Korinth et al., 2010), or how having knowledge about health affects perceived health and physical activity levels (Henning, Krageloh, Hawken, Zhao, & Doherty, 2012; Paro et al., 2010). There has been a lack of studies examining health status and physical activity in relation to ON in students from health-oriented and other academic programs. The aim of this study was to examine differences in health status, in physical activity, and in the frequency of ON in university students enrolled in either an exercise science program or in a business program, and to investigate differences between men and women. A secondary aim was to examine covariation between health status, level of physical activity, and ON.

2. Methods

2.1. Participants

Undergraduate students (n = 327) enrolled in their first, second, or third year of university programs in exercise science or business were asked to participate in two cross-sectional surveys. The study was set in the southwest of Sweden and data were collected in 2013 and 2015. The two programs differed considerably. Exercise science students major in exercise physiology, health, and nutrition, and business students major in finance, marketing, and accounting. The mean age and the distribution between men and women in the two programs were similar. Business students could not select any health-related courses within their academic program. This study was carried out in accordance with the code of ethics of the World Medical Association (Declaration of Helsinki). It was approved by the Regional Ethical Review Board in Lund, Sweden (Dnr: 2015/435), and written informed consent was given by all the participants before entering the study.

2.2. Questionnaires

Health status was measured with the Short Form-36 (SF-36) questionnaire, physical activity was measured with the International Physical Activity Questionnaire (IPAQ) and ON was measured with ORTO-15.

SF-36 (Sullivan, Karlsson, & Ware, 1995; Ware & Sherbourne, 1992) is a standardized and validated questionnaire designed to measure health status. Physical and mental health is assessed by the SF-36 subscales physical functioning, role-physical, bodily pain, general health, vitality, social functioning, role-emotional, and mental health. Each subscale is transformed via algorithms to a score between 0 and 100 where 0 corresponds to the worst health and 100 corresponds to the best health (Sullivan et al., 1995).

The IPAQ short form (IPAQ, 2005) assesses self-reported physical activity during the last 7 days at the intensities of walking, moderate physical activity (MPA), and vigorous physical activity (VPA). It is analyzed either with continuous or categorical scores. In analyses of continuous scores, the metabolic equivalent of task (MET) at each level of intensity is multiplied by reported duration and frequency of the intensity and expressed as MET-minutes per week (MET-min/wk). Total physical activity measured as MET-min/wk (total PA) is calculated by adding the MET-min/wk for walking, MPA, and VPA. In categorical analysis, subjects are placed in a low, moderate, or high category according to the IPAQ scoring manual, depending on the amount of physical activity reported. Sedentary behavior is assessed from subjects' reports of the number of minutes they spend sitting still (sit-min) during a typical day (IPAQ, 2005).

The ORTO-15 (Donini, Marsili, Graziani, Imbriale, & Cannella, 2005) is a 15-item instrument designed to assess ON. Each item has four response options, scored from 1 to 4 points. The total score ranges from 15 to 60 points and a total score of <40 points is considered to indicate ON (Donini et al., 2005). Cut-offs of both <35 and <40 points have been used in the literature (Ramacciotti et al., 2011; Segura-Garcia et al., 2012, 2015), but a cut-off score <40 has shown the best predictive capability (Donini et al., 2005). The English translation of the validated Italian questionnaire, as presented in the original paper (Donini et al., 2005), was used. The English version has also been used for validation in other languages (Alvarenga et al., 2012; Brytek-Matera, Krupa, Poggiogalle, & Donini, 2014; Missbach et al., 2015). The Swedish students were capable of mastering the English language with a few translations of critical wording. In this study, ON refers to the phenomenon of sensitive and obsessive behavior towards healthy nutrition as described and measured by ORTO-15 (Donini et al., 2004).

2.3. Data processing and analysis

An official syntax was used to transcribe the SF-36 according to the manual (Sullivan, Karlsson, Taft, & Ware, 2002), and continuous scores for IPAQ were calculated by a syntax constructed according to guidelines stated in the official scoring grid (IPAQ, 2005). When calculating total PA from IPAQ, missing answers regarding walking,