Stress, Anxiety, and Weight Gain among University and College Students: A Systematic Review

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ABSTRACT

Background Stress and anxiety levels are elevated among university and college students. Although high stress levels can lead to an increase in adiposity, it is not clear whether stress and anxiety experienced when in university or college have an influence on students' weight.

Objective The aim of this systemic review was to investigate whether stress and anxiety levels encountered during university and college enrollment were associated with higher adiposity or weight changes among students.

Method A search strategy was used to identify peer-reviewed studies published between 1985 and March 2017 using the following databases: Medline using Ovid; PubMed, CINAHL using EBSCO, Embase using Ovid, PSYCHINFO, and Open Access Theses and Dissertation. Two reviewers independently assessed the title, abstract, and then the full article of the studies that met the inclusion criteria. Data were extracted and quality assessment was conducted for the included studies.

Results Twenty-five observational studies were identified in this review (23 cross-sectional and two longitudinal); 11 found that there was no association between stress and body mass index or weight change. In addition, five studies did not find a significant association between anxiety and body mass index. A few studies revealed stress and anxiety might be associated with higher or lower weight status, thus there is a possibility that stress can increase or decrease weight, demonstrating that a bidirectional influence on body mass index may exist.

Conclusions The current data in this review are inadequate to draw firm conclusions about the role of stress on weight change in university and college students. The inconsistency of results in the literature reviewed for this article suggest that a focus on longitudinal studies with adequate sample size would better evaluate the relationship between stress or anxiety and its influence on weight status or weight change among college and university students.
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STRESS IS AN UNAVOIDABLE PART OF LIFE AND OCcurs when demands are placed on individuals that exceed their ability to cope[1]; it is also a predictor of anxiety.[2] Unfortunately, high levels of stress and anxiety have been reported among university and college students.[3-6] It is estimated that, globally, at any given time 20% to 25% of students are stressed,[7] and 50% of students may experience stress in the form of anxiety and depression.[8] The reasons for increased stress and anxiety levels among students are numerous and include both academic and nonacademic factors, which include but are not limited to high academic burden, financial strains, colleague competition, need to excel, homesickness, social problems, and disturbed sleep patterns.[7,9,10]

Increased stress levels have negative consequences on both the body and the mind.[1] Some of the psychological problems that can occur secondary to stress include anxiety, depression, and engagement in high-risk behavior.[1,2,7] Furthermore, the physiological health problems that can occur are numerous, as stress, through increased cortisol secretion, promotes increased food intake, especially intake of sweet and nutrient-poor foods.[11,12] Hence, increased stress may increase the risk of obesity and its comorbidities, which include hypertension, metabolic syndrome, heart disease, and diabetes.[13-15] Although there is evidence of high stress

level being a risk factor for an increase in adiposity,[14] the relationship between stress and anxiety encountered during university or college enrollment and weight status is still not well understood, and the evidence is not strong enough to generalize.

Obesity is a global health burden and its rates are on the rise.[16] In the United States, the greatest increase in obesity rates was found among 18- to 29-year-olds and among those with some college education.[17] Levitsky and colleagues[18] investigated whether weight gained by university freshman students was higher than the average weight gain of the general population within the same age range. The findings suggested the weight gain was greater among students than in the general population. The weight gain phenomenon during the freshman year has been coined the "freshman 15"; however, a meta-analysis reported by Vella-Zarb and Elgar[19] found a mean weight gain of 3.86 lb (1.75 kg). Nevertheless, even a modest weight gain occurring during this time increases the risk that weight gain will more likely continue throughout life, putting weight gainers at a higher risk for developing obesity and its comorbidities.[20] Consequently, it is important to identify the determinants of weight gain during university and college enrollment. The findings can serve as building blocks for obesity-prevention programs in the target population.

The aim of this systematic review was to thoroughly assess the literature in order to determine whether there is an association between stress and anxiety encountered during university and college life and weight gain among university and college students.

METHODS

This systematic review was performed using the standard methods for conducting and reporting systematic protocol guidelines.[21] The protocol for this systematic review was registered with the International Prospective Register of Systematic Reviews (PROSPERO, registration number CRD42015029731).

Search Strategy

A literature search was run in September 2015 in the following databases: Medline using Ovid, PubMed, CINAHL using EBSCO, Embase using Ovid, PsycINFO, and Open Access Theses and Dissertation. To facilitate the retrieval of the most relevant studies, the search was run without any filters, using both free text words and controlled vocabulary. An information specialist assisted in composing, revising, and validating the search strategy for all the different databases. A sample query for PubMed is included in Table 1.

All of the articles were exported to Endnote software, version X7,[22] where duplicates were removed manually during screening and by using the "find duplicate" function. All articles were screened first by title and then abstract. Only the articles that were relevant to the topic were fully read. All of the relevant articles' bibliographies were reviewed in order to identify any significant studies that could be included in this review, and those that may have been missed through the electronic search.

Inclusion and Exclusion Criteria

Studies were included in the review if they measured psychological stress and/or anxiety among university or college students at undergraduate or graduate level; using validated stress questionnaire/scale or anxiety scale and examined the relationship between stress and anxiety and weight. The studies had to be original or empirical studies in the languages of English, Arabic, Dutch, or German. The languages were selected for ease of translation by the authors who have a good command of the chosen languages. Articles were included if they were published after the year 1985.

Articles were excluded if they were qualitative studies or if they were dissertations, posters, conference abstracts, commentaries, reviews, letters to editors, or research studies that assessed stress as a consequence of elevated body mass index (BMI; calculated as kg/m^2). All studies addressing eating disorders, disordered eating, body image, body dissatisfaction, and post-traumatic stress disorder were also excluded. In addition, articles were omitted if they were looking specifically at college/university athletes or addressing working populations or students with psychiatric problems or high school students. Studies that aimed to validate instruments and questionnaires or test programs were not used in this review.

Selection Process

Two reviewers screened titles and abstracts independently to identify potential studies that met the inclusion criteria. A calibration exercise, which included the screening of 100 articles, was conducted to clarify the eligibility criteria. Once agreement was achieved, the reviewers identified the relevant articles independently and removed additional duplicates that were not detected with Endnote software. All potentially eligible articles were retrieved and a full-text screening was conducted by two reviewers. The kappa statistic was calculated to measure inter-rater agreement for full text screening, resulting in Kw=0.646 ($P<0.05$), thus indicating a good level of agreement. When the two reviewers were in disagreement, a third reviewer settled the debate.

Data Extraction and Quality Assessment

Two reviewers independently extracted data from the studies that met the inclusion criteria. The extracted data included the place/institution where the study was conducted, the study design, the number of participants, sex, the student population, the stress instruments used in the study and their outcomes, as well as how weight was reported, and the results of the study. When differences were detected, discussions between the reviewers were used to resolve the divergence. The same reviewers also assessed the quality of the studies using the GRADE 4 guidelines, which evaluate observational studies according to four distinct criteria: developing and including eligibility criteria, unflawed measurement of exposure and outcome, controlling for cofounding, and incomplete follow-up.[23]

RESULTS

Study Selection

The PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) flow chart for describing the search process is reported in the Figure. Out of a total of 15,851 records identified, Endnote removed 4,279 duplicates, and 11,572 records were screened by title and then by abstract. There were 11,345 records excluded because 9,672