

Research Articles

Linkage between stress and fruit and vegetable intake among university students: an empirical analysis on Turkish students

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Abstract

The purpose of this study was to examine, in a sample of university students, the relationship between stress and benefits and barriers of fruit and vegetable consumption. Subjects were administered a questionnaire containing demographic profile, benefits and barriers of fruit and vegetable consumption, Brief Symptom Inventory, Stress Scale, and Brief Coping Style Inventory. Frequencies and means were used for descriptive purposes. Spearman (gender) and Pearson product moment correlations, multiple linear regressions, and factor analyses were performed. Stress Symptom Scale, Susceptibility to Stress Scale Stress, and Coping Style Inventory were significantly associated with barriers of fruit and vegetable intake. Results from the questionnaire indicated that the self-reported mean intake was 3.67 ± 1.81 servings of fruit and vegetables per day. The present study revealed a significant influence of fruit and vegetable restraint on eating behavior under stress. The results suggest that increased stress was strongly associated with barriers of fruit and vegetable intake among Turkish university students.

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Keywords:

Stress; Fruit and vegetable intake; University students

1. Introduction

People with identical cultural, economic, and physical traits do not make identical food choices. Generally, the factors that influence food choices are expressed through the medium of the psychosocial traits of the person [1]. It is likely that stress affects health not only through direct psychophysiological processes, but also by modifying behaviors that affect health, such as physical exercise, smoking, and food choices [2–4]. Most studies on stress and eating find that some individuals eat substantially more during a stress period [5], and others eat a good deal less [6]. Stress and diet associations are particularly complex. Stress is associated with biologic changes that could be expected to reduce food intake [7].

There might be individual differences in response to stress. A study showed that students who were high on anxiety and low on social support were likely to show a hyperphagic response [8]. Several studies have shown that

stress was associated with more fatty food intake, less fruit and vegetable intake, more snacking, and reduced likelihood of daily breakfast consumption [9–13].

The eating behaviors and food choices of university students are determined by biologic factors such as changing energy demands and weight change, sociocultural factors such as availability and price, and psychologic factors such as freedom from parental control [14]. It is known that food intake during young adulthood may have long-term health implications and the food intake of young adults is not as nutritionally sound as desired [15]. In university halls of residence, all meals are provided, whereas if students live off campus, they may have to provide their own food. Students may be poorly equipped to prepare their own food and, unless training was given at home, are unlikely to cook [16]. In addition, students are undoubtedly short of money or, as is so often the case, more selective in how they spend their limited money. Alcohol and entertainment comes first, then books and food. If

dietary changes take place at this time, there could be lack of nutrients and this might affect students' stress level.

A few researches have identified the perceived benefits and barriers of fruit and vegetable intake [17,18]. A student's life is subjected to stress, such as the pressure of academics with an obligation to succeed, the uncertainty of the future, and difficulties in integrating with the system [19,20]. Stress resistance can be enhanced by a diet rich in fruit and vegetables. The aim of this study was to gain an insight into the relationship between stress and benefits and barriers of fruit and vegetable consumption in university students. Such information is essential for planning effective nutrition education programs to increase fruit and vegetable consumption to overcome stress and to reduce long-term risk of overweight among university students.

2. Methods

2.1. Subjects and study design

Randomly selected university students aged 17 to 35 years from Selcuk University (n = 88, Konya, state), Ankara University (n = 104, Ankara, state), Bilkent University (n = 84, Ankara, Private), Marmara University (n = 120, Istanbul, state), Cumhuriyet University (n = 107, Sivas, state), and Kültür University (n = 116, Istanbul, private), which are in different regions in Turkey, completed the survey in May 2003. None of the students were food/nutrition majors. Subjects were briefed about the purpose of the study and about right to participate in the study. Eighty-nine percent of the students volunteered to complete the survey. The questionnaire was administered to a class of students and took 20 to 25 minutes to fill in. A total of 713 analyzable questionnaires for students were obtained. Study approval was obtained from the University of Selcuk, Konya. Only instruments of relevance to the article are described here.

2.2. Survey methods

After a pilot testing on 90 students and revision, the survey consisted of the following:

1. Demographic questions that included age and sex;
2. Benefits and barriers for increasing fruit and vegetable consumption (modified from Ling and Horwath's study [17]), section included Likert-type 36 questions (3-point response formats: agree, neither agree nor disagree, disagree);
3. Asking students to rate their own consumption of fruit and vegetables subjectively. Students estimated their daily fruit and vegetable consumption on a 5-point scale ranging from 0 servings to 7 or more servings per day. A description of serving sizes was provided in the questionnaire:
 - 1 medium piece of fresh fruit or vegetable or about ½ cup

- ½ cup of frozen, canned, or cooked fruit or vegetable
 - ½ cup of fruit or vegetable juice (100% juice)
 - ¼ cup dried fruit
4. Brief Symptom Inventory (BSI), Turkish version [21]: It is a 53-item self-report scale used to measure 9 primary symptom dimensions and 3 global indices. The BSI is a shortened version of the Symptom Check List-90, a widely used scale assessing current psychologic distress and symptoms in both patient and nonpatient populations. The BSI measures the experience of symptoms in the past 7 days including the day the BSI was completed. Answers are on a 5-point scale, from 0 = "not at all" to 4 = "extremely." The sum shows the frequency of psychiatric symptoms. The range of achievable scores is 0 to 212. This instrument took about 10 minutes to complete.
 5. Stress Scale: This scale is used to measure 13 primary symptom dimensions and 3 global indices. In the present study, only the Stress Symptoms Scale (total 70 questions, 10 each on muscle system, parasympathetic nervous system, sympathetic nervous system, emotional, cognitive, endocrine system, and immune system; answers are on a 5-point scale, from 0 = "not at all" to 4 = "extremely") and Susceptibility to Stress Scale (20 questions, answers are on a 5-point scale, from 0 = "extremely" to 4 = "not at all") were used [22].
 6. Brief Coping Style Inventory: Styles of coping with stress behavior were evaluated with this self-report scale. This is a shortened Turkish version [23] of the Ways of Coping Inventory. The inventory has 30 items, 5 subscales (self-confident, optimistic, submissive, helpless style, and seeking of social support). Items are scored on a 4-point scale, from 0 = "0%," to 4 = "100%," and each subscale is scored separately.

2.3. Statistical analyses

Analyses were performed using Statistical Package for the Social Sciences (version 13.0, 2001, SPSS Inc, Chicago, Ill). Spearman (gender) and Pearson product moment correlations were computed between benefits and barriers of fruit and vegetable consumption, sex, age, and each of the stress score outcomes. Cronbach α values were determined to assess the interitem reliability of the final scores. Multiple linear regressions with stress scores as the independent variables and benefits and barriers of fruit and vegetable as the dependent variable were calculated. In the multiple regression analyses, effect sizes (F^2) were regarded as small when they were between 0.02 and 0.15; medium, between 0.15 and 0.35; and large, ≥ 0.35 [24]. Effect sizes for multiple regression analyses are based on the total effects the independent variables have on the dependent variable

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