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Abstract

Background: Food craving contributes to the incidence of weight and food-related disorders. Thus, an accurate measurement of food craving is important for clinical and research purposes.

Aims: We aimed to evaluate the psychometric properties of the shortened Farsi version of the Food Craving Questionnaire-Trait (FCQ-T-r), an internationally validated tool.

Methods: For this cross-sectional study, data was collected from 153 students of the University of Tehran between February and March 2019 using the Farsi version of FCQ-T-r; Depression, Anxiety and Stress Scale (DASS-21); and the Quality of Life questionnaire (WHOQOL-BREF). Confirmatory factor analysis using SPSS AMOS (version 21) failed to support the one-factor structure of FCQ-T-r in Farsi, so we conducted an exploratory factor analysis to investigate the factor structure of the questionnaire.

Results: Exploratory factor analysis reflected a 3-factor structure responsible 73.3% of the variance factor 1 “preoccupation with food”, factor 2 “lack of control over eating” and factor 3 “emotional eating” . Internal consistency of the FCQ-T-r was excellent (McDonald’s ω = 0.950). The FCQ-T-r scores were correlated with body mass index, DASS-21, and WHOQOL-BREF values, which supports concurrent validity of the tool.

Conclusion: The Farsi version of FCQ-T-r is a reliable and valid self-administrated tool to measure food craving traits among Iranian university students. Given the unstable factor structure of the questionnaire in different studies, further research should be conducted explore the factor structure of the tool.

Keywords: food craving, self-assessment, psychometrics, Iran , FCQ-T-r, student, university, DASS-21

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Introduction

The rising prevalence of overweight and obesity has been described as a global pandemic (1,2). In 2017, high body mass index (BMI) was estimated to cause 4.72 million deaths, and 148 million disability-adjusted life years globally (3). Obesity has now become a common health problem and its prevalence continues to increase in the developed and developing countries (4,5). Socioeconomic status and demographic factors, such as education, occupation, place of residence, sex, age and marital status have been associated with excess weight (6,7).

Craving is defined as an intense desire, urge or yearning to use a substance, and an important component of the current conceptualization of addictive disorders (8,9). Craving could predict relapse or may negatively affect individuals' decisions for change (10). It has been added as a key symptom to the latest edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) (11). However, the term craving refers not only to substance use but also to impulses to do other addictive behaviours, e.g. gambling, binge-eating, shopping and gaming (12).

Food craving is characterized by a strong desire for eating a particular type of food and is associated with higher levels of weight and eating psychopathologies (13,14). It could predict a lower success rate for weight-loss interventions (15,16) designed to positively change eating behaviours by reducing food craving (17,18). Data on food craving is important in understanding and developing interventions for weight- and eating-related disorders (8).

Several self-reported measures have been developed to assess food craving using a single question or multi-dimensional questionnaires (19). Some questionnaires measure craving for special kinds of foods (e.g. sweet, chocolate, savoury and rich foods) or foods in general as a trait, while others assess craving for foods as a condition (13,20–24).

The food craving questionnaire (FCQ) is one of the most usedtool in assessing cognitive, physiological, emotional and behavioural dimensions of food craving experience, both as a condition and a trait. The trait version of FCQ (FCQ-T) is a 39-item questionnaire that has nine subscales: intentions and plans to consume food, outcome expectancy of positive reinforcement, outcome expectancy of relief from negative states, anticipated lack of overeating control, preoccupation with food, physiological deficits and responses which may elicit craving, emotions experienced during food craving, external and internal cues that trigger cravings, and guilt (21).

Nine-factor structures of the FCQ-T have been replicated in several studies (13,21,25), however, some studies report fewer factors (26,27). The unstable factor structure and the length of the self-report questionnaire have been described as disadvantages of the FCQ-T (19). Thus, a shortened version of the FCQ-T (FCQ-T-r) was developed and validated (23).

The FCQ-T-r consists of 15 items of the German version of the FCQ-T, with the highest item-total correlations measuring craving triggered by emotional cues, intentions to consume food, and loss of control over eating. It was found to have a one-factor structure, high internal consistency, and acceptable 6-month retest reliability (r = 0.74) in the initial validation studies on large samples of German university students (23,26). The one-factor structure of the FCQ-T-r has been replicated in some studies (28,29) and it has been shown that the FCQ-T-r scores are associated with weight and symptoms of eating disorders in a number of studies (22,23,28–30).

Given the increasing trend of obesity in the Islamic Republic of Iran (2,31) and the lack of screening questionnaires for food cravings in Farsi, this study aimed to measure the psychometric properties of the Farsi version of the FCQ-T-r among Iranian university students.

Methods

Participants

This was a cross-sectional study conducted from February to March 2019 among students of technical schools at the University of Tehran.

Inclusion criteria were: being a student of the University of Tehran, male and female, and providing informed consent to participate in the study. The only exclusion criterion was unwillingness to participate in the study. Participants were 153 university students (50.3% female) of technical majors of the University of Tehran studying at associate (5.2%), bachelor (77.1%), and masters or doctoral (17.6%) levels. The response rate was high, 153 out of 160 students (95.6%) approached agreed to participate in the study. The missing responses on the study measures were very low, ranging from 0% to 2.6%. Missing values were replaced with series means.

Measures

The shortened version of Food Craving Questionnaire-Trait (FCQ-T-r) is a self-administrated questionnaire consisting of a 15-item score using a Likert-type scale (1 = never, 2 = rarely, 3 = sometimes, 4 = usually, 6 = always) for possible total scores ranging from 15 to 90. The FCQ-T-r is available in English language and was translated from the original German version

by the questionnaire developers (23). It has shown good reliability and validity (22). The questionnaire was translated into Farsi by one member of the research team, a bilingual expert in the field of addiction research (SS). The Farsi translation was back-translated to English by another bilingual expert in addiction psychiatry (PHA). The back-translation and the English version were compared, and inconsistencies were resolved through discussions between the developer of the questionnaire (Adrian Meule), the translators and the research team.

The Farsi version of the Orientation towards Chocolate Questionnaire (32), measuring participants' attitude towards chocolate during the previous month, and the single-item visual analogue scale assessing the severity of food craving on a range from 0 to 100 were used to test the concurrent validity of FCQ-T-r in Farsi. We developed a checklist to measure craving in general for highly tempting Persian foods. The Craving for Highly Tempting Persian Foods checklist consisted of five items measuring participants' craving for eating five Persian foods: kebab with rice, a creamy sweet, Ghoemeh Sabzi stew (a traditional Persian stew with fried vegetables and meat), Fesenjan stew (a traditional Persian stew with ground walnut, pomegranate sauce and meat) and Kaleh pacheh ("head and hooves" a traditional Persian food with sheep's feet and heads, including the coveted eyes, tongue and brain). Each item was scored from 1 to 6 (1: never, 2: rarely, 3: sometimes, 4: usually, 5: mostly, 6: always). The five items were selected based on a survey among 53 students at the University of Tehran using a list of 21 common palatable Iranian foods.

We used Iranian validated versions of the Depression, Anxiety, Stress Scale (DASS-21) (33) and the World Health Organization's Quality of Life Questionnaire (WHOQOL-BREF) (34) to test the concurrent validity of the Farsi version of FCQ-T-r. The DASS-21 is a set of three self-report scales designed to measure the negative emotional states of depression, anxiety and stress (35). The WHOQoL-BREF is an abbreviated version of the WHOQOL-100 quality of life assessment. It is a self-administered tool with 26 questions, and it produces scores for domains related to quality of life: physical health (PH, seven questions), psychological health (PS, six questions), social relationships (SR, three questions) and environmental health (EH, eight questions). It also includes one facet on overall quality of life and general health (36).

Procedure

Study participants were randomly selected from the list of students studying in technical schools of the University of Tehran. After giving oral consent to participate in the study, the students were asked to self-rate the questionnaires privately. Completion of the study assessments took about 25–30 minutes. To avoid the effect of tiredness on the part of the participants in responding to all questionnaires, we prepared study assessment packages in four different random orders. Each participant received one of four versions of study measures based on a blocked randomization list in which versions of the study assessments (A, B, C or D) were randomly permuted in blocks of four. The first 30 participants were invited to complete FCQ-T-r

after three weeks, to investigate the test–retest reliability of the Farsi version of the questionnaire. Data on height and body weight were gathered through self-report.

The study protocol and questionnaires were approved by the ethics committee of the Vice-Chancellor for Research, Tehran University of Medical Sciences (Approved ID: IR.TUMS.VCR.REC.1398.136).

Data analysis

We used SPSS, version 22, for descriptive analysis. Given that the factor structure of the FCQ-T-r has already been proposed to be unidimensional, we conducted confirmatory factor analysis using SPSS AMOS (version 21). Adequate sample size to conduct psychometric studies is subject to debate. The ratio of 10 for respondents to the questionnaire items was introduced as a rule of thumb for calculating adequate sample sizes for factor analysis studies (37). The FCQ-T-r has 15 items, so the sample size of our study (n = 153) was considered sufficient. Before confirmatory factor analysis, Kaiser–Meyer–Olkin analysis was conducted to measure sampling adequacy. The Kaiser–Meyer–Olkin index of sampling adequacy was 0.906, and Barlett's test of sphericity was statistically significant indicating the suitability of data for factor analysis ($\chi 2 = 1862.663$, P