Developing and Testing a Measurement Tool for Assessing Predictors of Breakfast Consumption Based on a Health Promotion Model

Tahereh Dehdari, PhD[1]; Tahereh Rahimi, MSc[2]; Naheed Aryaeian, PhD[3];
Mahmood Reza Gohari, PhD[4]; Jabiz Modaresi Esfeh, MD, PhD[5]

ABSTRACT

Objective: To develop an instrument for measuring Health Promotion Model constructs in terms of breakfast consumption, and to identify the constructs that were predictors of breakfast consumption among Iranian female students.

Design: A questionnaire on Health Promotion Model variables was developed and potential predictors of breakfast consumption were assessed using this tool.

Participants: One hundred female students, mean age 13 years (SD ± 1.2 years).

Settings: Two middle schools from moderate-income areas in Qom, Iran.

Variables Measured: Health Promotion Model variables were assessed using a 58-item questionnaire. Breakfast consumption was also measured.

Analysis: Internal consistency (Cronbach alpha), content validity index, content validity ratio, multiple linear regression using stepwise method, and Pearson correlation.

Results: Content validity index and content validity ratio scores of the developed scale items were 0.89 and 0.93, respectively. Internal consistencies (range, .74–.91) of subscales were acceptable. Prior related behaviors, perceived barriers, self-efficacy, and competing demand and preferences were 4 constructs that could predict 63% variance of breakfast frequency per week among subjects.

Conclusions and Implications: The instrument developed in this study may be a useful tool for researchers to explore factors affecting breakfast consumption among students. Students with a high level of self-efficacy, more prior related behavior, fewer perceived barriers, and fewer competing demands were most likely to regularly consume breakfast.

Key Words: breakfast, Pender's Health Promotion Model, students, measurement, validity (*J Nutr Educ Behav*. 2014;46:250-258.)

INTRODUCTION

Breakfast is an important component of healthy eating and is particularly vital for health and normal development in children and adolescents.[1] Despite breakfast's positive attributes, it is common for schoolchildren, teenagers, and females to skip this meal.[2-6] Skipping breakfast is associated with insufficient intake of essential nutrients, poorer physical development and cognitive performance, and more behavioral problems among school-aged children.[7] The rate at which Iranian schoolchildren skip breakfast has been reported to be > 20%.[8,9] Breakfast intake is influenced by factors such as socioenvironment variables (eg, sex, race, parents' education level or occupation, poverty, family structure, and community context) and personal beliefs (eg, health concerns and perceived barrier and benefits regarding breakfast).[10-15] However, additional information regarding theoretical constructs and factors that positively or negatively influence breakfast consumption is required to develop tailored and effective interventions aimed at promoting regular breakfast.[16] Behavior change theories and models as conceptual frameworks can help practitioners understand the needs of their clients, and also the determinants of specific behaviors within the dietetic practice.[17] The theories explain why people do or do not engage in certain behaviors.[18,19] Pender's Health Promotion Model

[1]Department of Health Education, School of Health, Iran University of Medical Sciences, Tehran, Iran

[2]Department of Health Education, School of Health, Tehran University of Medical Sciences, Tehran, Iran

[3]Department of Nutrition, School of Health, Iran University of Medical Sciences, Tehran, Iran

[4]Department of Biostatistics, Hospital Management Research Center, School of Management and Medical Information, Iran University of Medical Sciences, Tehran, Iran

[5]Department of Nutrition, School of Health, Alborz University of Medical Sciences, Karaj, Iran

Address for correspondence: Tahereh Rahimi, MSc, Department of Health Education, School of Health, Tehran University of Medical Sciences, PO Box 15875-4199, Tehran, Iran; Phone: 0098218877911; E-mail: t_rahimi20@yahoo.com

(HPM) is a comprehensive theoretical model commonly used to explain health-enhancing behaviors. This model describes reciprocal effects of individuals and their interpersonal and physical environments in pursuing health. Elements of this model include personal factors, prior related behaviors, perceived benefits of action, perceived barriers to action, perceived self-efficacy, situational and interpersonal influences, activity-related affects (positive and negative), commitment to a plan of action, and immediate competing demands and preferences.[20] Although HPM can be used to explain various adolescent health behaviors,[21] few studies have used this model. The majority of these studies have focused on identifying predictors of physical activity among adolescents. For example, Wu and Pender[22] studied determinants of physical activity based on HPM and showed that perceived self-efficacy was the strongest predictor of physical activity among Taiwanese adolescents. Taymoori et al[23] used HPM to predict stages of exercise behavior among Iranian adolescents. Their findings revealed that self-efficacy, perceived barriers and benefits, and exercise behavior were significant predictors of stages of exercise behavior change among adolescents. The current study was designed to develop an instrument to measure HPM constructs associated with breakfast consumption and identify constructs that are predictors of breakfast consumption among Iranian female students.

METHODS
Participants and Settings

This study represents baseline data from an intervention study[24] wherein 2 middle schools were randomly selected from middle-income areas of Qom, Iran. The authors then selected 100 female students studying in the seventh grade from both schools using a simple random sampling method between April and May 2011.

Procedure

Early in the study, a self-report questionnaire was developed and validated to assess the constructs of HPM in terms of breakfast consumption. All students were informed about the study, and written consent was obtained. The students completed the questionnaire in about 10–15 minutes (response rate = 100%). The researchers also calculated the body mass index (BMI) z-score using measured height and weight. The Ethics Committee of the Iran University of Medical Sciences approved this study protocol.

Measures
Demographic and breakfast consumption questionnaire. A demographic variables questionnaire was developed to measure age, BMI, parents' employment status and education, usual sleep time at night, dinner time, and waking time. The BMI z-score (kg/m^2) was calculated as follows. Weight and height were measured in the morning with the adolescent in light dress and without shoes. Using a balanced-beam scale, weight was calculated to the nearest 0.1 kg. Height was also measured to the nearest 0.5 cm while the student was standing up with the head back and the buttock on the vertical plane of the height gauge. Finally, the raw BMI value of each participant was converted to an age- and gender-specific z-score using the Centers for Disease Control and Prevention's BMI for age and gender growth charts.[25] Breakfast consumption, the primary dependent variable, was measured by asking the students, "How many times do you eat breakfast every week, on a scale of 1–8 (never to 7 times)?"

Instrument development for HPM variables. The HPM was selected as the conceptual framework in this study. It logically integrates multiple factors related to breakfast consumption. The researchers developed a 58-item questionnaire to assess HPM variables in terms of breakfast consumption, and assessed its reliability and validity. Questions regarding the HPM items associated with breakfast eating were constructed based on the related literature (especially Pender's HPM manual)[26] and interviews with up to 10 female students. Content validity of the instrument was assessed quantitatively. In this regard, the scale was reviewed by a panel of 10 nutrition and health education experts to examine the necessity and relevance of each item. The necessity of the items was assessed using a 3-point rating scale: E indicated essential; U, useful but not essential; and N, not necessary. The relevance of the items was also assessed using a 4-point rating scale: (N) not relevant, (S) slightly relevant, (R) relevant, and (V) completely relevant. Based on the experts' opinions, the content validity index (CVI) and content validity ratio (CVR) of each item were calculated. Afterward, 20 female students reviewed the clarity, simplicity, and readability of items (face validity).[27] Based on their reflection, the ambiguous questions were edited and some minor wording errors were corrected.

Statistical Analysis

In this study, the authors measured internal consistency using Cronbach alpha. The CVI and CVR were calculated to analyze the content validity and relevancy of the instrument items. Normality of the data was examined and approved by Kolmogorov–Smirnov test. Pearson correlations were used to examine the relationship between breakfast frequency and HPM and quantitative demographic variables. Moreover, the researchers used 1-way ANOVA to assess the differences of the breakfast frequency among different groups with regard to parents' education and occupation. Multiple linear regression using the stepwise method was used to identify demographic and HPM variables associated with breakfast frequency. The data were analyzed using SPSS Statistics (version 17.0, SPSS Inc, Chicago, IL, 2008). $P < .05$ was considered statistically significant.

RESULTS
Content Validity

Items of the scale were modified based on the expert reviews. For example, 1 item ("Eating breakfast is enjoyable") was removed from the perceived benefits scale. The expert panel believed that enjoyment is a positive affect regarding breakfast eating, and not a perceived benefit. Finally, the