Research Brief

Validity and Reliability of a Nutrition Knowledge Questionnaire in an Adult Student Population

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ABSTRACT

Objective: To assess the validity and reliability of the Kuwait Adult Nutrition Knowledge Questionnaire (KANKQ) in adult students as an initial step to validation in the general adult population.

Methods: Participants (n = 253; aged ≥21 years) were categorized based on academic background and designated into groups known to differ in nutrition knowledge. Participants completed the questionnaire twice. Independent-samples *t* test, Pearson correlation coefficients, and Cronbach α were used to assess reliability and validity ($P < .05$).

Results: Participants with health-related (n = 144) and nutrition-training backgrounds (n = 58) scored significantly higher than did those without them (n = 109 and 178, respectively; $P < .001$), indicating good construct validity of the KANKQ. Test-retest reliability ($r = .67$; $P < .001$) and internal consistency ($\alpha = .81$) of the questionnaire were moderate to high.

Conclusions and Implications: Further testing of the KANKQ in workplaces and public areas is required for validation in the general adult population. Applicability to neighboring countries of similar background is warranted.

Key Words: knowledge, Kuwait, nutrition, questionnaire, validity (*J Nutr Educ Behav.* 2018;■■:■■–■■.)

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INTRODUCTION

The etiology of obesity is a multifactorial mixture of genetic, environmental, and physiological factors; however, behavioral determinants remain 1 of the most influential risk factors for obesity onset,[1-3] with recent evidence pointing to the efficacy of knowledge improvement in relation to one's dietary food choices.[4-6] According to the Integrated Theory of Health Behavior Change,[4] knowledge and beliefs about a certain topic can effectually enhance health behavior modification, especially when used in the context of an intervention. It can be assumed, then, that improving nutrition knowledge may contribute to enhancing dietary behavior and refined eating habits in those exposed to an intervention or knowledge enhancement tool.[7,8]

Several questionnaires were previously developed or adapted to assess general nutrition knowledge in an adult population.[9-15] Nutrition-based questionnaires were also used in studies attempting to explore whether good nutrition knowledge may be considered a determinant of improved dietary habits.[13,16,17] Whereas some studies indicated positive associations between nutrition knowledge and dietary intake,[16] others reported weaker associations,[16] possibly owing to the lack of properly validated knowledge assessment tools.[9]

Despite the high prevalence of adult obesity in Kuwait,[18-20] no validated tool is available to assess nutrition knowledge in this population as an initial step to validation in the general adult population. The aim of this study, therefore, was to adapt and validate a nutrition knowledge questionnaire for use by adult students living in Kuwait.

METHODS

Questionnaire Development

The Kuwait Adult Nutrition Knowledge Questionnaire (KANKQ) was developed to assess general nutrition knowledge among adult students in Kuwait. Items were adapted from a validated questionnaire by Zawila et al[10] and are composed of 5-point Likert scale questions. To focus on questions assessing general nutrition knowledge in Kuwait adult students, the questionnaire was reduced to 25 items from the original 76. To do this, items deemed ambiguous and/or inapplicable to the main purpose of the KANKQ were eliminated (n = 51). Three dietitians first individually reviewed the items and then met as a panel to deliberate on questions to be retained. To assess for content validity, the entire multidisciplinary research team reviewed item clarity

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and question interpretability. All questions were translated into Arabic and back-translated to English by a certified translator. For face validity, the questionnaire was administered to 10 Dasman Diabetes Institute (DDI) summer interns from both nutrition and non-nutrition backgrounds to assess the clarity and accuracy of items further in both English and Arabic.

An electronic version of the questionnaire was developed by the information technology department at the DDI and sent to participants using e-mail and text messaging. This ensured that responses at time 1 (T_1) would occur in a timely and convenient manner without the need for an additional meeting at retest. Reminders for electronic T_1 completions were conducted immediately before the 2-week deadline via both telephone and e-mail.

Participants

A total of 282 adult students from 6 different universities and colleges across Kuwait were approached for participation. Kuwaiti university students studying abroad who were in Kuwait for the inter-semester break were also invited to participate. Because the sample size ranged from 48 to 200 participants in similar validation studies,[9,12,21] and a 38% to 48% dropout rate was reported between first and second questionnaire completions,[9,21] the current study required at least 200 participants to provide an 80% chance of detecting a difference between groups at a 95% confidence interval and 5% margin of error, and if an average dropout rate of 43% was to be expected between T_0 and T_1. Furthermore, because an unequal sample size was expected (because the nutrition-based student body in this study was much smaller than students in other academic studies), the sample size was powered to ensure a 5% response rate in each group.

A convenience sample of universities was selected based on educational disciplines offered and willingness to participate in the study. Recruitment was achieved by organizing on-campus booths and visits. Participants were requested to sign an informed consent form upon agreement, after which they were asked to complete the KANKQ at 2 points in time (T_0 and T_1), with an approximate 2-week interval between each administration. Participants were given the choice to fill out a paper or electronic version of the questionnaire through the Research Electronic Data Capture Web application (version 6.15.14, Vanderbilt University, TN, 2016). The study population was divided into 2 groups: those with a health-related academic background such as medicine, pharmacy, nutrition, or dentistry, and those with a non–health academic background such as business, engineering, or computer science. In addition, participants were asked to indicate whether they had taken a previous nutrition-related course in the past year.

Institutional Review Board

The researchers obtained ethical approval from the Ethics Review Committee through the Office of Research Affairs at the DDI for paper and electronic formats of the questionnaire.

Validity and Reliability

Construct validity was measured by comparing the scores of 2 groups of adult students known to have different levels of nutrition knowledge. Participants with health-related academic backgrounds were expected to achieve higher scores than were those with non–health academic backgrounds. Moreover, those who had completed a nutrition course in the previous year were expected to achieve higher scores than were those who had not. Test-retest reliability of the questionnaire was assessed by comparing scores of the same student at T_0 and T_1 with a 2- to 3-week interval between administrations. According to the literature, a 2-week gap is considered long enough for participants to have forgotten their responses and short enough not to have attained additional nutrition knowledge.[9,22] As such, 21 days was considered an effective cutoff point to complete the second questionnaire. Those who completed the questionnaire at T_1 after the 21-day cutoff were excluded from the reliability assessment.

Response Coding and Item Categorization

For the purposes of analysis, items were classified into 5 subcategories based on the following topics: (1) energy and food groups (n = 6), (2) vitamins (n = 5), (3) minerals (n = 4), (4) fiber and vegetables (n = 5), and (5) weight management (n = 5). Responses from the KANKQ were reverse coded using *strongly agree* (1), *agree* (2), *undecided* (3), *disagree* (4), and *strongly disagree* (5) as correct and incorrect responses for analysis in which correct was coded as 1 and incorrect was coded as 0. Based on the nature of each question, answers were assigned to 1 or 0 by combining levels 1–2 or 4–5 of the Likert scale to represent either correct or incorrect responses. Undecided answers (3) were consistently coded as 0 and removed from the analysis. To guarantee accuracy, 2 senior dietitians at the DDI double-checked coded responses.

Statistical Analysis

Validity and reliability were tested in 2 groups known to differ in their levels of nutrition knowledge. A series of 2-sample *t* tests was used to assess construct validity by testing for significant differences in mean item scores at first administration (T_0) between each group. Mean differences in total scores of the KANKQ as well as individual subcategory scores were examined. Test-retest reliabilities of overall KANKQ scores as well as each subcategory score were established using Pearson *r*, with correlation comparisons of scores between the first (T_0) and second (T_1) administrations of the questionnaire. The researchers used Cronbach α to assess the internal consistency of KANKQ item scores for the overall questionnaire and within each of its 5 subcategories; $\alpha \geq .7$ was set as the acceptable cutoff.[22,23] The data were tested for the assumption of normality, as a result of which the population proved to be parametric and showed a normally distributed bell-shaped curve. Additionally, the *t* test was chosen as a primary means by which to assess mean differences in scores in multiple studies of the same nature. In accordance to the Central Limit Theorem, larger datasets of 200 participants or more meet the