Gender related item response patterns for household food security scale in Brazil

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Abstract

Variations in gender related item response rates were explored using a locally adapted household food security scale in the Brazilian National Sampling Household Survey 2004 (PNAD; n=101,355). Rasch Modeling was used to evaluate infit and measurement values separately for adult and children items by gender of the respondent. Adult and child related items presented good fitness. Both female and male respondents presented similar measurement values for adult and children items. For most items, infit values were found to be within adequate range (0.8-1.2), being practically identical when comparing female and male responses. In addition, the frequency of affirmative response to each of the items followed the same pattern independently of the gender of the respondent. The results of this study support the validity of the proposed scale to measure household food insecurity in Brazil.

Introduction

The concept of food security incorporates “access by all people, at all times, to enough food for a healthy life” (1). Hunger is a severe level of food insecurity which results from the involuntary reduction of food intake and a disturbance in normal eating patterns. Governmental and development agencies need valid and reliable household food insecurity indicators to quantify the prevalence of this phenomenon, better target high risk populations, as well as monitor and evaluate the impact of their programs (2,3). Economic indicators of food production and food availability historically have been used to assess food insecurity at national and regional levels. Although broadly used, these methods are expensive, time consuming and not necessarily the most accurate means for measuring food insecurity at the household level (4).

For the last 15 years, questionnaire-based measures of hunger and food insecurity have been developed and validated according to specific parameters (5). The United States Department of Agriculture (USDA) developed the 18-item Household Food Security Survey Module (US-HFSSM) that takes into consideration the overall hunger experience and divides it by the level of food insecurity (6). During the last five years, studies to validate adapted HFSSM versions have been conducted with regional samples in many countries of Latin America (7-11).

Rasch Model Analysis

Rasch is one-parameter logistic item response model that provides a mathematical framework against which the data can be compared to determine the psychometric characteristics of the HFSSM (12). Two outcome statistics of interest are measure and infit values. Measure values demonstrate the relative severity of each of the questions in correspondence to the actual food insecurity status of the interviewee. Infit values demonstrate the relative severity of each of the questions in correspondence to the actual food insecurity status of the interviewee.

Methods

In 2004, the Pesquisa Nacional por Amostra de Domicílios (PNAD) (National Sampling Household Survey) was collected from a nationally representative population (n=101,355). The survey included an adapted HFSSM that consists of 6 child specific items (<18 years old) and 10 adult specific items (8).

Statistical Analysis

All items were classified as “yes”=1 and “no”=0. Percentages of affirmative responses were quantified with STATA for Windows, version 8.2 (StataCorp, College Station, TX). Due to the one-parameter nature of Rasch, the follow-up frequency items were incorporated into the original questions as follows: if the individual responded “yes” to the first question and responded “always” or “sometimes” to the frequency question, they were reclassified as 1. Conversely, if the respondent answered “yes” to the first answer and “rarely” to the frequency question, they were reclassified as 0.

Results

The complete databases were separated into female and male respondents and then modeled with Rasch. Adult and child items historically showed sensitivity to the influence of child items performance on adult items in households with no children. The measure scores for the males were adjusted based on the female responses as follows: (item measure value-total item score mean)/ (total item score standard deviation male-total item score total deviation female)/total item score female). The measure value graphics were derived as follows. Female Line = female over female measure values and Male Adjusted Data Points = adjusted male over female measure values. Differences in gender measure values should not be larger than 0.05. Winsteps 3.6 (Winsteps, Chicago, IL) was used to conduct Rasch Model analysis.

Conclusions

- Percentages of item affirmative responses were similar across gender, with the most variation in the first four adult items.
- The majority of the items have acceptable infit values. Most of specific items outside of the accepted range are still within the larger range used with smaller samples (0.7-1.3).
- Further research is needed to evaluate the importance of including the two extra clustered child items.
- Corresponding measurement values for specific items remained consistent between genders.
- The proposed tool is suitable to measure household food insecurity in Brazil regardless of gender of survey respondent.

References