

10th National Convention on Statistics (NCS)
EDSA Shangri-La Hotel
October 1-2, 2007

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ABSTRACT

Assessment of food insecurity is important to establish validity in development of measures. The construct & criterion –related validity was assessed based on measurements, concepts & methods & items for Radimer/Cornell measures of hunger and food insecurity. This study aims to validate food security measurement tool using the 2003 Food Consumption Survey Data. A total of 786 enumeration areas were covered with a total of 3,568 0-10 year–old children. Data on household demographics, nutritional status and household food security were collected. Food insecurity was assessed using the 10 items adapted from Radimer/Cornell measures. Cronbach's alpha was employed to measure internal consistency, confirming the validity of this measure and criterion-related validity was used using nutrient intake. Cronbach's Alpha shows that the measuring tool shows internal consistency. Likewise, criterion-related validity was shown using the nutrient adequacy of households and nutrition status of children variables. The Radimer/Cornell measure was found to be consistent and valid based on the criterion-related validity and internal consistency tests. A good method of screening for efficient items is to run an exploratory factor analysis on all the items to weed out those variables that failed to show high correlation.

I. Introduction

Identifying hunger and food insecurity as a determinant in assessing an individual nutritional status necessitates the construction and requires validation of measures of these phenomena. The Radimer/Cornell measure of food insecurity was developed from words taken from the in-depth interviews of the women experiencing food insecurity, which contributes to their construct validity.

Before direct measure of hunger and food insecurity can confidently be used to produce estimates of the prevalence of hunger and food insecurity, their validity must be established. Validation is the process of determining whether a method is suitable in providing useful analytical measurement for a given purpose and context.

Food insecurity is assessed using the (13 question items) Radimer/Cornell measure of hunger and food insecurity which have been used in some Asian

¹ Paper to be presented at the 10th National Convention on Statistics, October 1-2, 2007, EDSA Shangrila Hotel, Manila Philippines

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countries, e.g. Malaysia and Thailand. In the Philippines, the Food and Nutrition Research Institute (FNRI) food security studies adopted 10 question items translated into Filipino. The validation of this tool in the Philippine setting will increase the level of confidence in its use.

OBJECTIVES:

General: To validate Food Security Measure Tool in the Philippine setting using the Food Consumption Survey Data of the 6th National Nutrition Survey.

Specific:

1. To assess validity and reliability measures of food security tool being used.
2. To describe levels of food insecurity with their dietary intake, and nutritional characteristics.

Significance:

To contribute to the on-going efforts towards establishing an official methodology for measuring food insecurity and hunger and to assess the progress of the country's programs to address hunger and food insecurity.

II. Methodology

Sampling Design and Coverage

The data used in this study was part of the 6th National Nutrition Survey (6th NNS) and was undertaken in July through December 2003. Except for the province of Batanes, all 17 regions and 79 provinces were covered. The survey used replicate two of the Master Sample developed by NSO for the 2003 Family Income and Expenditure survey (FIES). In this study, a total of 786 enumeration area covered having a total of 3,568 households with 0-10 year-old children. Respondents were the mother of the 0-10 year-old children of all sample household in the enumeration areas.

Data Collection

Food security was assessed using 10 separate items concerning economic fears and experiences related to food supply and hunger during the past 6 months. The item used in the field is based on the Radimer/Cornell measures of hunger and food security. Data were collected by trained local data collectors through face-to-face interview of mother using structured questionnaires. Household's food intake is collected using the food weighing method. Anthropometric measurement such as weight, height and recumbent length were measured for each subject using standard technique.

Data Analysis

Each question/item was answerable by either yes (once for the past six months); yes (at least twice for the past six months); or never. If the answer for a question /item is no, then for such a situation, the identified respondent level (e.g. mother, child) does not experience food insecurity. Otherwise, food insecurity is experienced by the identified respondent level. For the assessment of validity, criterion-related validity was done through the comparison of nutritional status of children and dietary characteristics with the different level of food security status. For the assessment of the internal consistency of the measure, cronbach's alpha, which is the average correlation among the items and the number of items in the measure, was used.

III. Results

Criterion Related Validity

Nutritional Status

Prevalence of undernutrition in children 0-10 years old is lower for the food secure group compared to the food insecure group as shown in table 1. Also, prevalence of underweight children with food secure mothers was 19.42% compared to children with food insecure mothers which were 33.60%. A large discrepancy in the prevalence in stunting was seen between children with food insecure mothers (35.14%) and those with food secure mothers (22.44%). There was also a difference in the prevalence of wasting in children with food insecure mothers at 7.47% and children with food secure mothers at 4.72%.

Table 1. Prevalence of Undernutrition by Food Security Status of mother

Nutrition Status	Food Secure	Food Insecure
Underweight	19.42	33.60
Stunted	22.44	35.14
Wasted	4.72	7.47

Table 2 shows that the prevalence of underweight children from household with food insecure children was 35.54% compared to those from households with food secure children which were at 21.14%. A large discrepancy in the prevalence in stunting was seen between children from households with food insecure children (38.87%) and those from households with food secure children (23.45%). There was also a difference in the prevalence of wasting in children from households with food insecure children at 7.94% and children from households with food secure children at 4.72%.

Table 2. Prevalence of Undernutrition by Food Security Status of child

Nutrition Status	Food Secure	Food Insecure
Underweight	21.14	35.54
Stunted	23.45	38.87
Wasted	5.06	7.94

From table 3 we can see that the prevalence of underweight children from food insecure households was 27.66% compared to children from food secure households which was 12.66%. A large discrepancy in the prevalence in stunting was seen between children from food insecure households (30.10%) and those from food secure households (15.44%). There was also a difference in the prevalence of wasting in children with food insecure mothers at 6.29% and children with food secure mothers at 3.45%.

Table 3. Prevalence of Undernutrition by Food Security Status of households

Nutrition Status	Food Secure	Food Insecure
Underweight	12.66	27.66
Stunted	15.44	30.10
Wasted	3.45	6.29

Nutrient adequacy

Table 4 shows that of the essential nutrients, only niacin met the recommended allowance having 147.4% adequacy, the rest of the nutrients is short of the recommendation in food insecure households. Energy, protein, vitamin A & niacin attained the recommendation with more than 100% mean adequacy among the food secure households. Food secure households appeared adequate for energy and protein, which exceeded the recommended amount, while insecure households were moderately adequate at 93.1% and 92.3% (protein), respectively. Food secure households have higher mean energy and nutrient adequacy level than food insecure households.

Table 4. Comparison of mean nutrient adequacy of household by food security status

Nutrient	Food secure	Food insecure
Energy	103.6	93.1
Protein	108.6	92.4
Calcium	61.8	53.0
Iron	65.8	56.2
Vitamin A	106.6	73.0
Vitamin C	88.3	70.7
Thiamin	99.0	80.4
Riboflavin	85.9	63.5
Niacin	173.6	147.4

From table 5 we can see that household nutrient adequacy of food secured mother are higher than those households whose mothers are food insecure. Most of the nutrients, except for protein and niacin were adequately met, while only niacin in food insecure mothers exceeded the amount and the rest reveals insufficient for most nutrients. Calcium was the least adequately met nutrient in the diet with only 61.2% and 52.9% of recommendation from both food security levels.

**Table 5. Comparison of mean nutrient adequacy of mother
by food security status**

Nutrient	Food secure	Food insecure
Energy	98.6	89.6
Protein	100.9	86.8
Calcium	58.1	49.0
Iron	61.2	52.9
Vitamin A	89.9	64.1
Vitamin C	79.7	65.8
Thiamin	90.0	74.6
Riboflavin	74.4	58.0
Niacin	160.2	140.4

Table 6 shows that energy and nutrient adequacy of households with food secure children fared better than households with food insecure children in most of the essential nutrients considered except energy, calcium, iron and vitamin A. There was a large discrepancy on the energy and nutrient intake of food-secure children compared to that of food-insecure children. Children living in food insecure households revealed gross inadequacies in almost all the essential nutrients except for riboflavin and niacin which is adequately at 101.7% and 103.5%, respectively. Vitamin A is the least adequately met nutrient at 53.2%, followed by iron (54.6%) & calcium (57.8%), respectively in children from insecure household. The other essential nutrient energy, protein, vitamin C and thiamin are noted to have relatively higher but were still far from adequate.

Table 6. Comparison of mean nutrient adequacy of children by food security status

Nutrient	Food secure	Food insecure
Energy	98.1	88.3
Protein	99.8	86.1
Calcium	56.6	49.2
Iron	60.5	50.7
Vitamin A	90.9	61.7
Vitamin C	77.3	59.0
Thiamin	90.3	72.3
Riboflavin	71.4	54.5
Niacin	158.4	139.1

Internal Consistency

Cronbach's Alpha

Table 7 below shows that the cronbach's alpha for the different food insecurity level is at least 0.81 with a high of 0.89 indicating that the tool is consistent. This means that the summated scales used for food insecurity are reliable. This also means that there is agreement in the questions per category in the food security tool used.

Table7. Cronbach's Alpha by Food Insecurity Level

Food Insecurity Level	Cronbach's Alpha
Mother	0.81
Child	0.84
Household	0.89

CONCLUSION AND RECOMMENDATION

This study showed that the food insecurity tool used in the 2003 NNS was found to be reliable based on the Cronbach's alpha which measures the internal consistency of the tool. Also, discrepancies in the nutrient adequacy and nutritional status suggests that the tool is accurate based on the criterion-related validity measure.

This locally validated tool may be used in measuring household food security.