Disaster Food Security Scale (DFSS) - Rural

Lauren Clay
Nadia Koyratty (presenter)
Anna Josephson
Carmen Byker Shanks

Call 3 and Continuation Call: Public Health Disaster Research Award Webinar
Public Health Disaster Research Award Program
August 3, 2023

NATURAL HAZARDS CENTER

Project Overview

Purpose

To validate a Disaster Food Security Scale for rural area residents in the US.

Research Site

Rural areas as operationalized by the National Center for Health Statistics Urban-Rural Classification Scheme for Counties 2013

Timeline

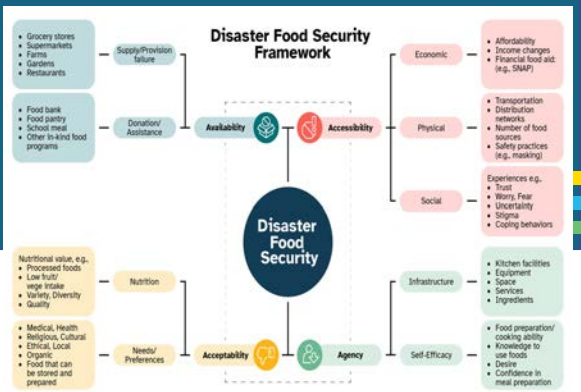
December 2022 to April 2023

Research Questions

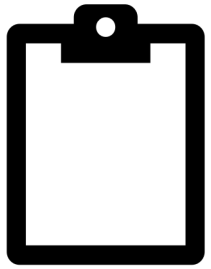
1. Is the DFSS a structurally valid measure of the disaster food security construct?

2. Is there a difference in the structure of the DFSS tool between rural and non-rural areas?

Methods

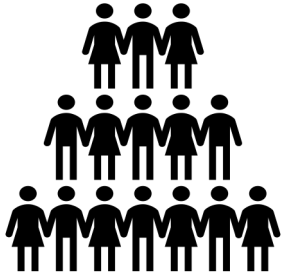


Survey instrument



- Designed based on the Disaster Food Security Framework with 4 domains: Accessibility, Availability, Acceptability and Agency
- Adequacy and face validity of questions tested via mixed methods:
  - Quantitative survey with experts
  - Interviews with participants having previous experience with disasters

Study sample



- Recruited by Qualtrics from 2600 US counties with disaster declaration in the past 5 years
- Geographic quotas were set
- Analysis on respondents who reported remembering disaster event and who answered relevant disaster questions:
  - total N=377
  - rural N=104)

Data a

- Exploratory factor analysis
- Confirmatory factor analysis
- Measurement invariance for structural validity
- Regressions for validity assessments:
  - Predictive
  - Convergent
  - Discriminant
  - Differentiation by known groups

Preliminary Findings

Table 1: Factor loadings of DFSS items stratified by rural vs. non-rural regions

DFSS items	Overall	Rural	Non-rural
Low supply of foods	0.47	0.43	0.49
Limited selection and diversity of foods	0.45	0.37	0.49
Kinds of foods did not meet dietary needs	0.54	0.43	0.59
Inadequate food quality	0.63	0.59	0.64
Unsafe foods	0.61	0.70	0.58
Lack of transportation	0.55	0.61	0.53
Physical barriers to food sources	0.48	0.51	0.47
Health concerns or safety risks in getting to or at food sources	0.51	0.48	0.53
Food was a source of worry	0.61	0.66	0.59
No enjoyment in meals due to lack of company	0.57	0.59	0.57
Inability to cook meals	0.61	0.56	0.63
Lack of equipment	0.60	0.62	0.60
Lack of services	0.45	0.35	0.49
Food budget changes or food price increases	0.53	0.43	0.57
No clean or sanitary area to prepare meals	0.55	0.66	0.51
Eigen Value	**0.30**	**0.28**	**0.30**
Variance (%)	**63.8**	**61.3**	**63.9**

Bolded items indicate variables that were removed in the reduced DFSS model (factor leading <0.50)

- Unidimensional
- All 15 items from the DFSS questionnaire were significant for the scale development
- Valid for rural and non-rural groups (indicated by the factor loadings >0.3 on both rural and non-rural groups)
- Reduced-item scale: removed variables with factor loadings <0.5 (bold), may have implications in the rural setting.
- Validity indicators (CFI, TLI, SRMR, SMR): scale (15- and 11-item) adequate for rural and non-rural disaster food insecurity measurement → indicate structural

Preliminary Findings

Table 2: Regression analysis to test validity of disaster food security scale in rural areas (n=104)

Type of validity	Convergent	Predictive	Discriminant	Differentiation
Food assistance	4.83 (3.06, 6.59)			
Health status		-0.26 (-1.20, 0.68)		
Water insufficiency			**4.97 (2.69, 7.24)**	
Hispanic				0.53 (-3.00, 4.09)

Public Health Implications

1. Monitoring and surveillance of food and nutrition security in disaster-vulnerable and disaster-affected areas

2. Tailoring interventions to address food systems limitations in rural areas

3. Enhancing resilience of disaster-vulnerable communities

Public Health Implication

1

The Disaster Food Security Scale offers a tool for surveillance of food security pre-, peri- and post-disaster event in both rural and non-rural communities. It provides information to help identify households or communities experiencing or likely to experience food insecurity during such events.

Public Health Implication

2

Tailoring interventions to address food systems limitations in rural areas: Individual items in the scale point to specific intervention options to address the barriers and limitations to food security beyond economic/ financial incentives (e.g. physical barriers, acceptability of foods, availability of cooking/ heating equipment, etc.)

Public Health Implication

3

Enhancing resilience of disaster-vulnerable communities

Acknowledgements

The authors would like to acknowledge the team that developed the DFSF: Stephanie Rogus, PhD, Uriyoán Colón-Ramos, ScD, Azmal Hossan, MA, Roni Neff, PhD, Rachel Zack, ScD, and Meredith Niles, PhD.

Development of the Disaster Food Security Framework was supported with a grant from the US Department of Agriculture (USDA) through the Tufts University Food Sec 25 Project (USDA cooperative agreement 59-4000-0-0067) and based upon work supported by the National Science Foundation under Grant No. (2225665).

The Public Health Disaster Research Award Program is based on work supported by the National Science Foundation (NSF Award #1635593) through supplemental funding from the Centers for Disease Control and Prevention. Any opinions, findings, conclusions, or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of NSF, CDC, or the Natural Hazards Center.

Source: https://www.feedingamerica.org/hunger-blog/tornado-response

Supplementary materials