Structural Analysis of the Relationship of Food Insufficiency to Cardiovascular Disease Risk and Outcomes among Adults from the Southern Region of NHANES III

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In 1991, Cathy Campbell at Cornell University proposed a conceptual framework for risk factors and consequences of food insufficiency, which indicated that food insufficiency could be both an outcome as well as a predictor of other outcomes such as poor health. Over the past decade, research has provided evidence for the relationship between food insufficiency and each construct proposed by Campbell, but has not demonstrated inter-relationships among all model components simultaneously. Higher than national average rates of cardiovascular disease (CVD) in the southern region of the U.S. combined with high rates of food insufficiency indicated a need to investigate inter-relationships among food insufficiency, diet quality, health behaviors, CVD risks and outcomes. Therefore the purpose of this study was to develop and test a model for relationships among food insufficiency, diet quality, CVD risks, and outcomes among adults residing in the southern region and participating in the Third National Health and Nutrition Examination Survey (NHANES III). The model was derived from Campbell’s conceptual framework of the risk factors for and consequences of food insufficiency.

The study design was descriptive correlational. Subjects were non-pregnant, non-lactating adults aged 18 and older who participated in NHANES III, had complete data for all study variables, and resided in the southern region of the U.S. Three sets of latent constructs were identified for this study that would most closely correspond to Campbell’s conceptual framework. These latent constructs were (1) health behaviors, (2) CVD risks, and (3) CVD outcomes. Independent variables for food insufficiency and diet quality were included in the structural model as well as socio-demographic variables known to be associated with food insufficiency and diet quality.

Data analysis involved the use of structural equation modeling (SEM) in a two-phase process. The first phase was testing of the measurement models. This involved determining relationships between the indicator variables and the latent constructs. The second phase was testing the structural model using SEM. This involved determining relationships among latent constructs and among predictor variables simultaneously.

Results indicated those with low income, those with low education level, non-white and female would be more likely to report food insufficiency than those of opposite demographic and economic characteristics. Evaluation of the measurement models indicated reasonably good fit of the latent constructs and their indicator variables. However, SEM indicated less than good fit
of the structural model. Correlations among the indicator variables may have caused the misfit observed in the structural model. Future research should focus on assessing correlations among the indicator variables to better define future structural models of relationships of food insufficiency to cardiovascular disease risks and outcomes. In addition, we suggest future research assess the direct and indirect effects of the indicators on the end outcome of CVD. Assessment of these effects may suggest areas of future investigation in cardiovascular disease prevention and/or management.