Research Brief

Assessing the Nutrition Literacy of Parents and Its Relationship With Child Diet Quality

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ABSTRACT

Objective: To estimate the reliability and validity of the Nutrition Literacy Assessment Instrument for Parents (NLit-P) and to investigate relationships among parental nutrition literacy, parental and child body mass index, and child diet quality (Healthy Eating Index).

Methods: Cross-sectional study of 101 parent–child dyads that collected measures of socioeconomic status, nutrition literacy, 2 24-hour child diet recalls, and body mass index. Reliability of NLit-P was assessed by confirmatory factor analysis. Pearson correlation and multiple linear regression were used.

Results: Fair to substantial reliability was seen across 5 NLit-P domains, whereas Pearson correlations support concurrent validity for the NLit-P related to child diet quality and parental income, age, and educational attainment ($P < .001$). For every 1% increase in NLit-P, there was a 0.51 increase in child Healthy Eating Index (multivariate coefficient, 0.174; $P < .001$).

Conclusions and Implications: The NLit-P demonstrates potential for measuring parental nutrition literacy, which may be an important educational target for improving child diet quality.

Key Words: health literacy, patient education, body mass index, pediatrics, food habits (*J Nutr Educ Behav*. 2016;■:1-5.)

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INTRODUCTION

Childhood obesity is a major health concern in the US and 16.9% of children are obese.[1] Whereas childhood obesity has many etiological factors, public health initiatives that provide nutrition education to parents and children fail to demonstrate major improvements in dietary recommendations.[2] This discrepancy highlights an important question regarding whether parents can act upon the nutrition information that is available to them.

Health literacy is "the degree to which individuals have the capacity to obtain, process and understand basic health information and services needed to make appropriate health decisions."[3] A 2003 National Assessment of Adult Literacy found only 15% of parents have proficient health literacy,[4] indicating that to some degree, the majority of parents have difficulty making health decisions. Furthermore, it is not clear whether parental health literacy influences child weight status. In a population of Hispanic children aged <30 months, parental health literacy was not associated with child weight-for-length *Z* score,[5] but a study of children aged 7–11 years found an inverse relationship between parental health literacy and odds of childhood obesity.[6] Other studies of adolescent-age children disputed these findings.[6,7]

These discrepancies may be influenced by differences in instrumentation. Most measured health literacy by the Short Test of Functional Health Literacy[5,7,8] or the Newest Vital Sign.[6,9] However, nutrition-focused health literacy may involve constructs not reflected in general health literacy assessment tools. Some researchers relied on study-specific tools for measuring parental nutrition knowledge[10,11] or nutrition literacy.[12] It is possible that an instrument that combines both nutrition knowledge constructs and health literacy constructs is more sensitive to nutrition literacy-related outcomes.[13]

Given the current childhood obesity epidemic and the complex relationship between parental health literacy and child health outcomes, the development of a nutrition-specific literacy measurement tool is important. The aims of this study were to (1) estimate the reliability and concurrent validity of the Nutrition Literacy Assessment Instrument for Parents (NLit-P), and

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(2) investigate the relationships among parental nutrition literacy, parental and pediatric weight status, and dietary quality.

METHODS

Participants and Procedures

This study used a convenience sample of participants already enrolled in the Kansas University Docosahexaenoic Acid Outcomes Study (KUDOS; NCT-00266825), a longitudinal, randomized, controlled clinical trial investigating the effect of prenatal docosahexaenoic acid (DHA) supplementation on gestation duration and early childhood development.[14] Eligible participants for the longitudinal trial were healthy pregnant women aged 16–36 years who lived in the Kansas City metropolitan area. Additional inclusion and exclusion criteria can be found in a previous publication.[14] For the current ancillary study, eligible parents were English-speaking, had a child aged 4–6 years, and self-identified as the primary food purchaser and/or food preparer in their household. A total of 101 parent–child dyads enrolled. The University of Kansas Institutional Review Board approved this ancillary study (HSC No. 11406) and all participants completed informed consent. Data collection occurred from October, 2013 through May, 2014.

Measures

Child age as well as parental education, maternal age, and socioeconomic status were collected as part of the larger KUDOS trial. When needed, maternal age was used as a proxy for paternal age (n = 15). Parental and child height and weight were measured using clinic standard procedures.[15]

Nutrition literacy was measured using a modified version of the NLit.[13] The NLit was previously content validated by registered dietitians, cancer nutrition experts, and breast cancer survivors, and demonstrated internal and test-retest reliability in breast cancer patients.[13,16] For the purpose of this study, the NLit was shortened to 42 items to reflect content and food items relevant for parents of preschoolers, as determined by 2 research team registered dietitians. The resulting NLit-P consisted of 5 domains that together reflected constructs of health literacy and nutrition knowledge: nutrition and health (literacy), household food measurement (nutrition knowledge), food label and numeracy (literacy and numeracy), food groups (nutrition knowledge), and consumer skills (nutrition knowledge). Parents completed the NLit-P during a prescheduled appointment for the KUDOS. Data were recorded for each item as correct or incorrect, with missing answers coded as incorrect. Weighted percentages (giving each domain equal distribution to the total score) were calculated.

Two 24-hour dietary recalls obtained from parents for each child were entered into Nutrient Data System for Research (University of Minnesota, Minneapolis, MN, version 2014) and the combined total of the recalls was used to calculate a Healthy Eating Index–2010 (HEI-2010) score[17] following established guidelines.[18] The total score of HEI-2010 ranges from 0 to 100. Subjects were excluded if parents were unable to recall ≥1 meals within an individual dietary recall (n = 2).

Statistical Analyses

Instrument reliability was evaluated by confirmatory factor analysis (CFA) to test the relationship between observed variables and each domain. Binary CFA is a generalization of Rasch models.[19] Binary CFA analysis was conducted using the Lavaan package from R2.15.3 (Yves Rosseel, Ghent University, Belgium). Model fit was determined by comparative fit index and root mean square error of approximation. A comparative fit index of ≥0.90 and root mean square error of approximation of ≤0.06 indicate acceptable model fit. Reliability was interpreted as: 0.00–0.10 = virtually none; 0.11–0.40 = slight; 0.41–0.60 = fair; 0.61–0.80 = moderate; and 0.81–1.0 = substantial reliability.[20]

The relationship between independent and dependent factors was evaluated using Pearson correlation and multiple linear regression. Nutrition literacy (NLit-P), income, parental age, and highest reported parental education were treated as independent variables, whereas child diet quality (HEI-2010), child body mass index (BMI) percentile, and parental BMI were dependent variables. Data was further analyzed by domain of the NLit-P using the general linear model to test for relationships between each NLit-P domain and parental BMI or child HEI, while controlling for income, age, and education. Significance was set at $P < .05$. Statistical tests were performed using the Statistical Package for the Social Sciences (SPSS release 20.0.0, IBM Corp, Armonk, NY, 2011) and SAS (SAS 9.4, SAS Institute, Inc, Cary, NC, 2013).

RESULTS

Table 1 lists demographic data. Most participants (65%) did not participate in food assistance programs; however, some participate in the *Supplemental Nutrition Assistance Program* (25%) and the *Special Supplemental Program for Women, Infants, and Children* (15%).

The nutrition and health and food groups domains demonstrated substantial reliability (0.841 and 0.851, respectively), the food label and numeracy domain demonstrated moderate reliability (0.776), and the household food measurement and consumer skill domains demonstrated fair reliability (0.47 and 0.549, respectively). Table 2 reports reliability.

There were significant positive relationships between parental nutrition literacy and child diet quality ($r = .418$; $P < .001$), income ($r = .477$; $P < .001$), parental age ($r = .398$; $P < .001$), and parental education ($r = .595$; $P < .001$). An inverse relationship was found between nutrition literacy and parent BMI ($r = -.306$; $P = .002$). Correlational statistics are provided in Table 3. The linear relationship between parental nutrition literacy and child diet quality demonstrated that for every 1% increase in NLit-P, there was a 0.51 increase in child HEI (multivariate coefficient, 0.174; $P < .001$). With parental nutrition literacy, income, age, and education held constant in the model; only nutrition literacy was a significant predictor of child diet quality ($P = .005$).

Looking at specific NLit-P domains, child HEI demonstrated a significant relationship with parent nutrition literacy for household food measurement ($P = .01$; B = 12.66) and consumer skills ($P = .049$; B = 13.59), whereas education was significantly related to nutrition and health