A Systematic Review of Data Collection Techniques Used to Measure Preschool Children's Knowledge of Food and Nutrition

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ABSTRACT

Objective: To identify and review data collection techniques used to measure preschool children's knowledge of food and nutrition.

Design: A systematic review of published research guided by the Preferred Reported Items for Systematic Reviews and Meta-analyses statement.

Participants: Published journal articles between 1980 and 2013 reporting research involving the measurement of preschool children's (aged 3–5 years) knowledge of food and nutrition.

Results: Twenty studies were eligible for inclusion. The studies reported the use of a range of innovative age-appropriate techniques to assess children's knowledge of food and nutrition. Data collection techniques were grouped under 3 broad approaches: (1) interviews, (2) use of stimulus material and prompts, and (3) structured play-based activities. Only 3 of the reviewed studies tested for both reliability (test-retest and internal consistency) and face and content validity. Only 9 of the reviewed studies reported pilot-testing their instruments before use.

Conclusions and Implications: Results from this review suggest that additional research is needed to develop more valid and reliable measures to assess preschool children's knowledge of food and nutrition. Assessment tools need to be pilot-tested, refined, and adapted to suit both the specific audience and the components of the nutrition knowledge being targeted by an intervention before implementing a nutrition education program.

Key Words: child–preschool, evaluation, food/classification, nutrition knowledge, systematic review (*J Nutr Educ Behav*. 2015;47:345-353.)

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INTRODUCTION

Childhood overweight and obesity is one of the most serious public health challenges of the 21st century, with the prevalence increasing in both developed and developing countries.[1,2] Although the mechanisms responsible for the increasing prevalence of childhood obesity are not completely understood, unhealthy nutritional habits have an important role.[1,3] Early childhood has been identified as a critical life stage in the prevention of overweight and obesity, because the knowledge children gain about food and associated health benefits can influence dietary preferences and food choices in later life.[2,4] Therefore, nutrition education is a crucial tool for shaping children's attitudes toward food, food choices, and eating habits.

In the past 5 years there has been rapid growth in the number of nutrition interventions targeting young children.[5] To determine the need for these interventions and to maximize their effectiveness, a detailed understanding of what and how young children think about food and nutrition is required. This will enable early childhood educators and early-years health promoters to design and implement interventions that are developmentally appropriate.[6,7] As such, measurement of preschool children's knowledge of food and nutrition is an emergent area of research that will grow with the increased interest in lifestyle interventions targeted at this age group.

Over the past few decades, children have become increasingly involved in the various stages of the research process.[8] Historically, research has been conducted on or about children through exploring the views of their caretakers rather than involving children directly.[9] Data obtained from young children were considered unreliable or invalid, because it was believed that children lacked the

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cognitive, verbal, and social skills necessary to provide good-quality responses.[8,9] However, through the emergence of new, age-appropriate research methodologies, children are able to communicate their own thoughts, perceptions, and interests within a research context.[8] A number of innovative research methods have been developed to align with preschool children's competence, knowledge, and interests.

These techniques can be broadly grouped into 3 categories: interviews, use of stimulus materials and prompts, and structured play-based activities. As a technique, interviews include one-on-one and group interviews incorporating the use of open-ended and closed questions.[10] Use of stimulus material and prompts includes the use of a range of prompts and materials to stimulate children's responses, including written prompts (eg, sentence completion, unfinished stories to complete) or material prompts (eg, pictures, objects).[8] Last, structured play-based activities include participatory task-centered activities guided by the researcher, using a set of rules to achieve specific objectives (eg, board games, drawings, doll play).[8,11]

Whatever strategy is employed, it is crucial for the technique to align with the cognitive and communication capabilities specific to preschool children, including brief attention span, limited verbal skills, and lack of fine motor skills.[10]

To date, focusing specifically on the measurement of food and nutrition knowledge in preschool children, a number of methods and techniques have been developed and used. Because interest in improving this population's knowledge of food and nutrition is experiencing considerable growth, it is timely to examine the techniques being used with regard to accepted strategies for assessing preschool children. This will offer researchers and practitioners a useful foundation upon which to select, improve, or develop an effective approach to assess children's knowledge of food and nutrition. Therefore, this article presents a systematic review of the techniques being used to measure 3- to 5-year-old children's knowledge of food and nutrition. The review will examine how these techniques align with accepted methods for assessing young children, including the methodological concerns of validity and reliability, and will provide recommendations for the future use and development of these techniques.

METHODS

This review was conducted in accordance with the Preferred Reported Items for Systematic Reviews and Meta-Analyses statement checklist.[12] For the purpose of this review, *preschool children* were defined as children aged 3–5 years. *Food and nutrition knowledge* was defined as "the ability of children to identify foods particularly high in certain nutrients and relate basic nutrients to their own development toward adulthood."[7,13] Studies that included the evaluation of preschool children's ability to identify foods, food origins, and food transformations were also included.

Search Strategies

Articles for this review were sourced from 7 online databases: CINAHL, MEDLINE, PsycINFO, ScienceDirect, PubMed, ProQuest, and ERIC. This search was undertaken during the first 2 weeks of February, 2014. Searches for MeSH headings and key words were conducted to identify publications for inclusion using combinations of the following terms: *nutrition*, *health**, *knowledge*, *diet*, *food*, *child**, *early childhood*, *preschool**, *3–5 year old*, *health knowledge, attitudes, and practice*, *evaluation*, *intervention*, *techniques*, *assess**, and *methods*. One of the authors (NW) scanned titles and abstracts for relevancy. In addition, forward citation searching was undertaken on the reference lists of articles considered for review.

Study Selection

After removing duplicates and scanning titles and abstracts for relevancy, a list of potentially relevant studies were identified and exported to EndNote, version X5 (Thomson Reuters, Philadelphia, PA, 2011). The remaining articles were read independently by 2 reviewers (NH and NW) to verify whether they met the inclusion criteria. Ineligible articles were removed and the reason for exclusion was noted. Differences in selection were resolved by discussion and consensus between the 2 reviewers. If the reviewers were unable to reach consensus, a third reviewer was asked to look at the article in question. The PRISMA flow diagram (Figure) demonstrates the systematic review search and selection processes of the study.[12]

INCLUSION AND EXCLUSION CRITERIA

All studies were evaluated according to the following inclusion criteria: (1) reported the evaluation of preschool children's knowledge of food and nutrition; (2) described data collection technique used in detail; (3) study participants included preschool children aged 3–5 years without mental health or learning difficulties; (4) if the age range of participants extended beyond 3–5 years, the mean age of the study sample was $\geq$ 3 years and $\leq$ 5.5 years; (5) the year of publication fell between 1980 and 2013; and (6) the publication was available in the English language.

Data Extraction and Analysis

One researcher (NW) extracted key information from included studies using a data extraction table for comparison.[14] Data extracted included author, year of publication, study design, sample size, sample characteristics, evaluation technique used to assess food and nutrition knowledge, whether the instrument used was new or adapted, type of nutrition topics assessed, and information regarding reliability, validity, and pilot-testing (Table).

Methodological Quality Assessment

Two independent researchers (NW and NH) assessed the methodological quality of each study using the Nutrition Evidence Library quality checklist; any variations in quality ratings were discussed and resolved. This checklist includes 10 validity questions based on the Agency for Healthcare Research