

Factors Influencing Efficacy of Nutrition Education Interventions: A Systematic Review

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ABSTRACT

Objective: To examine systematically factors that contribute to the efficacy of nutrition education interventions in promoting behavior change for good health based on their stated objective. In a departure from previous reviews, the researchers investigated factors that lead to success of various types of interventions. Critical analysis of these factors constituted the outcome of this review.

Methods: This study followed Preferred Reporting Items for Systematic Reviews and Meta-analysis criteria. A total of 246 original articles published between 2009 and 2015 in PubMed, Medline, Web of Science, Academic Search Complete, Science Direct, Cochrane Reviews, ERIC, and PsychLIT were initially considered. The number was screened and scaled down to 40 publications for the final analysis. Quality assessment was based on the *Cochrane Handbook for Systematic Reviews of Intervention*. Studies were rated as having low risk of bias, moderate risk, or high risk.

Results: Efficacy of nutrition education interventions depended on major factors: interventions that lasted ≥ 5 months; having ≤ 3 focused objectives; appropriate design and use of theories; fidelity in interventions; and support from policy makers and management for worksite environmental interventions.

Conclusions and Implications: Intervention duration of ≥ 5 months, ≤ 3 focused objectives, randomization, use of theories, and fidelity are factors that enhance success of interventions based on the results of this study.

Key Words: efficacy, interventions, nutrition education, systematic review (*J Nutr Educ Behav.* 2016; ■:1-24.)

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INTRODUCTION

Nutrition education can be viewed as any set of learning experiences designed to facilitate the voluntary adoption of eating and other nutrition-related behaviors conducive to health and well-being.¹ Efficacy describes the ability to yield intended outcome; for the efficacy of an intervention to be evaluated, it must be adequately described.² Efficacy of nutrition education interventions depends on several factors including the duration and frequency of intervention, the number and relat-

edness of the study objectives, study design and theory, and fidelity in intervention.

The specific characteristics of the determinants of success of interventions are still unclear.² However, several studies have been conducted to ascertain determinants of efficacy of nutritional education interventions. For example, another systematic review³ concluded that educational interventions that are sustained for a longer time, > 5 months, and offer personalized feedback on dietary behavior and related health risk factors, are more

likely to be effective than those conducted for a short period, < 5 months, and do not offer personalized feedback. Other studies concluded that expert-led interventions as well as studies that used behavioral theories, social support, and an educational approach to guide dietary interventions were more likely to be successful.⁴ Despite previous studies on the wider area of nutrition education, there is still inadequate literature on the efficacies of the various nutrition education interventions that were implemented in recent years. In a departure from previous reviews that concentrated primarily on a single type of intervention and its related outcome, the current review investigated several factors that led to success of various types of interventions. The purpose of this review was to examine systematically the factors that contribute to the efficacy of nutrition education interventions in promoting behavior change for good health and well-being based on their stated objective. To achieve this purpose, the researchers used population, intervention, comparison, and outcomes criteria to frame the research questions.⁵

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METHODS

Literature Search

This systematic review was conducted in accordance with recommendations and criteria outlined in the Preferred Reporting Items for Systematic Reviews and Meta-analysis statement.^{6,7} Articles on studies that conducted nutrition education interventions on dietary behaviors were identified by performing literature searches in: PubMed, Medline, Web of Science, Academic Search Complete, Science Direct, Cochrane Reviews, ERIC and PsychLIT. The search was limited to articles published between 2009 and 2015. Key search words were nutrition education, nutrition education interventions, dietary behavior, food, and health living. References of all retrieved studies were used to determine the source of information, whether they were primary, secondary, or website based, and to understand better the basis for conclusions of the studies that were reviewed.

All 6 members of the research team were independently involved in reviewing the references. Inclusion and quality measures were determined by the 3 senior researchers who conducted an independent evaluation of each article; afterward, several discussions were held to reach a consensus, hence monitoring bias. A total of 246 original studies published since 2009 and targeting healthy individuals without preexisting medical conditions were reviewed. This initial number was screened and scaled down to 40 publications for the final analysis. Screening criteria for inclusion and elimination are illustrated in the [Figure](#).

Members of the Research Team

The research team was composed of 6 members, 3 of whom held doctoral degree; the others had a master's degree in nutrition. The lead researcher was a full professor of nutrition and a registered dietitian. Two other researchers were faculty members in recognized international universities with wide experience in nutrition, education, and research. Each of the 3 senior researchers paired with 1 junior researcher in each database for article search and retrieval. All 6 members were independently involved in reviewing the articles and initially screening them.

Inclusion/Exclusion Criteria

The authors included in the review research articles published in English that examined nutrition education interventions in adults aged >18 years. Studies were excluded if they were review articles, poster abstracts, or qualitative, cross-sectional studies, or if the target population had special nutritional needs (eating disorders, diabetic, hospitalized, etc). In addition, studies that failed to achieve any of their objectives were excluded. In the cases where multiple studies were conducted on the same data set, only the most recently published study was included. There were 2 reviewers per database. Trained reviewers evaluated whether articles met inclusion criteria and determined the quality of the study. All researchers except the lead researcher went through group training, conducted by a systematic review and meta-analysis expert, which also involved watching a webcast.

Assessment of Study Quality/ Risk of Bias

In the initial part of work of the current review, researchers worked in pairs in which data were extracted by 1 reviewer and verified by a second reviewer. The risk of bias in any reported evidence should be at minimum and evidence that is likely to have high risk of bias serves a negligible purpose and thus should not be included in a systematic review even if there is no better evidence.⁸ In this review, determination of the quality of studies was guided by the Grading of Recommendations Assessment, Development, and Evaluation system of rating quality of evidence.⁹ A thorough assessment of the study's fidelity, perceived conflict of interest regarding outcome owing to sponsorship, study design, imprecision, inconsistency, appropriate use of theories, reasonable duration of intervention, and whether a study achieved the stated objectives formed criteria for quality assessment. Rating scores ranged from 1 to 6. Any discrepancies were discussed until an agreement was reached. Based on these criteria of assessment of study quality, studies were rated as having a low risk of bias (5–6 scores), moderate risk (3–4 scores), or high risk (1–2

scores) ([Tables 1 and 2](#)). Fidelity as a factor in this systematic review was assessed from authors' declaration of limitation in their respective studies.

Reviewers completed a detailed data extraction form. Extracted data were transferred to a spreadsheet ([Tables 1 and 2](#)).

Analysis Approach

The primary analytic goal was to determine the overall effectiveness of nutrition education interventions to modify dietary and exercise behaviors. To determine whether an intervention was successful, the outcome of the study was compared with the stated purpose and/or objectives of the study. Once a study was classified as having achieved its intended purpose, the contributing factors were assessed. Assessed factors included: (1) the design of the study including randomness, (2) the type of intervention and activities implemented, (3) the duration and dosage of the interventions, (4) number of objectives in a study, (5) fidelity in intervention implementation, and (6) the use of theory in directing the studies. These factors were identified through a thorough review of published nutrition education interventions. They were found to be common in almost all published studies. The duration of intervention was categorized as short if it had a cumulative length of >5 months and long if a study lasted for an accumulated period of ≥ 5 months. This classification of duration was deemed appropriate based on the descriptions authors used of the respective original studies. The reviewed studies rarely reported the dosage and frequency of interventions. Therefore it was reasonable to report the total amount of time spent in intervention in months.

Another factor that emerged during the review was worksite environment interventions. Worksite environments differ from one site to another. There are various worksite environment interventions for health living. These include the provision of health messages around cafeterias, the provision of healthy food in cafeterias, encouraging and providing walking space as part of exercise for healthy living, and schedules and amounts regarding eating, among others. The analysis of worksite environment interventions

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