

Methods for Teaching and Evaluating Food-Based Dietary Guidelines

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Introduction

Food-Based Dietary Guidelines (FBDG) are established in several countries around the world to address the nutrition concerns of populations (FAO, 2016). FBDGs inform the public about consuming nutritious foods and living a healthy life (FAO, 2016). However, the methods and strategies to educate the public, especially those living in rural communities, and their evaluation are limited. Therefore, the purpose of this technical note is to two-fold: 1) to assist health professionals and non-health professionals educate the public about understanding and using FBDGs, and 2) to provide organizations an overview of methods to evaluate these teaching strategies for their effectiveness in changing community members' dietary behaviors.

Teaching and Learning Techniques for the FBDGs

Various teaching techniques (e.g., lectures, demonstrations) are used to educate community members about FBDGs with the goal to eat a diverse and well-balanced diet (Clay, 1998; FAO, 2016). However, these strategies may not result in behavior change. Brown and colleagues (2011) conducted a systematic review to identify community members' awareness, understanding, and use of FBDGs. Twenty-eight studies were identified, of which 16 were from the United States. In regards to awareness, participants were aware of the FBDGs as they had seen these FBDGs displayed in schools and clinics. In regards to understanding, participants could not interpret portions of the FBDGs, especially if they were abstract ideas such as 'eat a variety of foods on a daily basis' or 'maintain a healthy weight.' Additionally, they had limited abilities to explain portion and serving sizes. Finally, only a few studies conducted focus groups in an attempt to identify community members' using these FBDGs. The results showed that participants felt many barriers to implementing the FBDGs (e.g., time constraints, disinterest in purchasing different foods, and issues with incorporating these foods into their diets). Moreover, studies indicated that participants would like concrete behavioral examples and specific messages on how to use these FBDGs. Overall, Brown and colleagues (2011) concluded that being knowledgeable or aware of the FBDGs does not directly translate into understanding and using the FBDGs. They recommended prioritizing tailored marketing and education based on community members' needs when implementing these FBDGs.

Similar findings were reported in the studies of Keller and Lang (2008) aimed at determining consumers' knowledge and use of FBDGs in Chile, Germany, New Zealand, and South Africa. In these countries, health professionals receive printed materials to educate community members about FBDGs but their application is still quite limited. In Chile, for instance, although most health professionals received training,

only nutritionists were more knowledgeable on the FBDGs based on a knowledge survey conducted. Similarly, health professionals in South Africa received training about communicating the FBDGs to their communities. Few health professionals, however, were able to effectively communicate about the FBDGs. In New Zealand, despite the wide distribution of written/electronic materials on FBDGs to the public, it was found that most people did not know about these materials, did not use the information indicating confusion with complex messages, or believed the information was outdated. Keller and Lang (2008) recommended that FBDGs require more promotion through the media (including social networks), training should be more frequent and target both health and non-health professionals (e.g., teachers, extension agents), and more monitoring and evaluation on implementation barriers and effectiveness.

A teaching strategy that health professionals and non-health professionals may use to educate consumers about understanding and using the FBDGs to encourage behavioral change is **active learning**. Active learning is an approach used to engage the learner in the learning process (Bonwell & Eison, 1991). This approach combines both critical thinking and performing the skill learned as a means to enhance cognition. The educator is a facilitator to guide the learner rather than teach or lecture her about that material (Bonwell & Eison, 1991). There are several strategies an educator can use to guide learners (e.g., community members in the field) in this process including *role-playing*, *peer-group discussions*, and *game-based learning* (Bonwell & Eison, 1991; FAO, 2014; Stuart & Achterberg, 1997; Zayapragassarazan & Kumar; 2012) (Table 1).

Table 1. Active Learning Strategies to Teach about FBDGs to Community Members			
Approach	Use	Example	Venues
Role Playing	Acting out or performing based on society's expectations to a particular person's behavior	Learners assume a family member's role to address a particular issue or topic at hand	Farmer Field Schools, Community settings, Villages
Peer-Group Discussions	Educator uses a controversial topic, question or dilemma as a forum to pull together peoples' experiences, attitudes and motivations to generate a lengthy, critically-based discussion amongst the learners	After providing a sensitive scenario about nutrition (e.g., lack of food and family member is sick), the educator asks the learners "why and/or how" questions	Farmer Field Schools, Community settings, Villages
Game-based Activities	Bridge subject matter, physical activity and healthy competition and entertainment to reach the lessons' goals	Divide learners into various groups to compete in a cooking challenge in which groups need to incorporate various food groups into their dish	Farmer Field Schools, Community settings, Villages

INGENAES has applied active learning in several workshops aimed at helping extension agents, educators, community leaders, and volunteers educate community members on various nutrition topics such as food groups, food preparation, balancing a meal within a budget, and the role of gender in household nutrition (Table 2).

Regardless of the active-learning technique used to educate the learner, it is critical to identify and define specific, measurable outcomes, and tools to evaluate the effectiveness of these teaching strategies on changing community members' dietary habits.




Table 2. INGENAES Active Learning Strategies used in the Field			
Approach	Purpose	Activity	Sample Venues
Role Playing	Educate community members about the role of gender and nutrition by understanding food distribution equality among family members within the household	<p>Act 1. Assign members a family member role (e.g., father, mother, daughter, and son) and assemble a traditional dish with quantities reflecting that role (e.g., generally participants show that the father has large portions of food, mother has small portions of food).</p>  <p>© Jan Henderson, Nepal 2016</p>	Courtyard meetings, Field days, Farmer Field School sessions, Nutrition Clubs
Peer-Group Discussions	<p>Act 1. Educate community members about the role of gender and nutrition by understanding food distribution equality among family members within the household</p> <p>Act 2. Educate community members on balancing a nutritious meal with <\$1.00 for the entire day.</p>	<p>Act 1. Per the above activity, once the plates have been assembled, a discussion takes place in regards to the unbalanced portions of plates from one family member to another and potential nutritional issues with someone having more or less food than others (e.g., pregnant female, adolescent daughter, young child, infant, elder, ill family member)</p>  <p>© Jan Henderson, Bangladesh 2016</p> <p>Act 2. There are 2 parts to this activity. First, members are instructed on the components of a healthy diet and identify those barriers to consuming a healthy diet with limited resources. Then, members are paired up to complete two tasks. In the first task, pairs will create a nutritionally balanced plate by placing foods (unlimited in type and amount) on</p>	<p>Courtyard meetings, Field days, Farmer Field School sessions, Nutrition Clubs</p> <p>Courtyard meetings, Field days, Farmer Field School sessions, Nutrition Clubs</p>

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		<p>a plate. In the second task, the pairs will have to create a balanced meal on a limited budget, <\$1.00 for the entire day. The pairs shop for food items in the farmer field school. Once these tasks have been completed, the pairs will form a large group to discuss their plates. They will also discuss the challenges with assembling their plate on a limited budget and identify ways to eat healthy while on a limited budget (e.g., consuming underutilized foods, wild foods, undervalued foods), and attitudes towards local and imported foods when creating nutritious meals on a budget.</p>  <p>© Jan Henderson, Bangladesh 2016</p>	
Approach	Purpose	Activity	Venues
Game-based Activities	For children to understand the importance of consuming key micronutrients (e.g., vitamin A, C, iron, iodine, zinc) on a daily basis	The facilitator initially explains about the micronutrients that children tend to be deficient in, the importance of consuming these nutrients, and foods that typically have these nutrients in there. Children are then split into 4 teams. The facilitator describes a particular nutrient and the first team that raises their hand and guesses the nutrient gets 1 point. After this game is complete, the facilitator will then have each group create a meal that is balanced and utilizes each micronutrient. The first team to get this meal correct wins a prize.	Community settings, Nutrition Clubs

Further resources can be found at: <http://ingenaes.illinois.edu/training-materials>

Evaluating the Teaching Effectiveness about FBDGs

Evaluating both the delivery of the education intervention as well as its immediate and long-term impact are critical to building evidence on the value of programs addressing food and nutrition security; even more so in the current development scenario with dwindling financial resources. There are two major methods to evaluate the effectiveness of these teaching strategies on FBDGs: 1) process evaluation and 2) outcome evaluation (FAO, 2016) (Table 3).

Approach	Use	Tools	Timeline
Process	Short-term evaluation - Understand if and how the program was implemented as it was intended	<ul style="list-style-type: none"> • Questionnaire about teaching and materials used • Questionnaire about the conditions of learning • Questionnaire about the characteristics of participants • Questionnaire about factors influencing behavior change (positive or negative) that may include motivation and facilitation of these changes • Questionnaire about sustainable practices and potential limitations 	<ul style="list-style-type: none"> • During and immediately after the program • Shortly after the program ended (no more than 1 month)
Outcome	Short-term evaluation	<ul style="list-style-type: none"> • Validated knowledge questionnaires to assess change in knowledge after a seminar or workshop 	<ul style="list-style-type: none"> • Within a day or a couple of weeks
	Long-term evaluation <ul style="list-style-type: none"> • Determine the impact the program has at its completion 	<ul style="list-style-type: none"> • Assessing the community's knowledge, attitudes, and behaviors after time has passed by interviews, food-logs, extended questionnaires (food logs) • Obtaining data information from shops/markets towards purchasing behaviors 	<ul style="list-style-type: none"> • 6 month or longer program • Assessing the community immediately after the program ended, 3 months after the program ended, etc.

Process evaluations are conducted to understand if and how the program was implemented as it was intended (FAO, 2016; Harris, 2010). Various tools can be used to assess the implementation of the program such as interviews, focus groups, or surveys at specific time points during the program (e.g., beginning, middle, and end). Process evaluations would include tools that allow the program to gauge its implementation (Harris, 2010). For instance, in a given intervention an educator will visit a village once per week for an hour for four consecutive weeks. During this visit, the educator uses any or all of the active learning techniques to discuss aspects of the FBDGs (e.g., food groups, portion sizes, and meal planning) with community members, volunteer trainers, or community leaders. In a process evaluation the

educator will collect after each session, for example, information associated with the delivery of the training (Table 4). In summary, process evaluation seeks efficiency in the delivery of training by assessing whether strategies were implemented as planned and whether the expected outputs were achieved.

Table 4. Key information collected in process evaluation of education programs			
Participants and teacher	Location	Teaching methods	Data collection
<ul style="list-style-type: none"> • Demographic characteristics and number of community members that attended • Self-efficacy of participants • Methods and levels of interaction between teacher and students, and among students • Reflections on the session itself for strengths, weakness, and improvements for the remaining sessions • Gender related limitations 	<ul style="list-style-type: none"> • Dates, times, locations, and characteristics of the conditions more amenable for higher attendance • Transportation issues • Gender related limitations 	<ul style="list-style-type: none"> • Use of training resources • Changes to the curriculum and materials • Limitations in the curriculum and materials • Opportunities to enhance learning 	<ul style="list-style-type: none"> • Methods to collect data on process evaluation and its frequency • Methods of feedback and frequency • Data curation and storage • Privacy and confidentiality issues

Outcome evaluations are used to determine the impact the program has at several key periods and its completion (FAO, 2016; Harris, 2010). In education, most often the evaluations focus on the individual’s change in knowledge (awareness), attitudes (emotions and beliefs), and practices (doing). This type of evaluation is not meant to assess very short-term interventions (e.g., workshops, seminars on the FBDGs) but extended ones (FAO, 2016). In the case of very short-term programs, using validated knowledge, attitudes, and practices (KAP) questionnaires (on nutrition or other content) before or after the intervention along with opportunities for hands-on testing (e.g., to show the action desired) could be useful to assess both change in knowledge and the likelihood of learners’ future use of information or engagement in activities.

Long-term community-based nutrition programs that focus on motivating, supporting, and educating community members on a frequent basis may be able to demonstrate a behavioral change, but effective tools are needed to identify these changes (EUFIC, 2014). Let’s assume that for six months an educator has been working with community members on simple strategies to diversify their diets using staples and indigenous fruit and vegetables in the region as a way to follow the FBDGs present in the country. At the end of this period, within the structure of an outcome evaluation strategy, the facilitator could assess participant’s knowledge, identify issues with implementation, and conduct household visits.

For *participants’ knowledge*, the educator would start by administering a “previous knowledge” questionnaire to establish a baseline. At the end of the intervention, community members would fill out a knowledge questionnaire and a 3-day food diary. These tools are often used to assess change in knowledge and dietary intake and diversity. To *identify issues with implementation*, focus groups with community members could follow within one or two months of the intervention. Focus groups will help gauge current

activities, challenges or struggles associated with diversifying the diet, and strategies used to overcome these challenges. Finally, *households' visits* could complement the previous activities, offering an in-depth view of family dynamics and food allocation. Visits within mealtime periods are more advantageous, which allow examining meal preparation methods, food distribution, and consumption.

These types of evaluation tools can aid the program and its stakeholders in understanding if the intervention not only improved a community's knowledge towards diversifying their diets, but also their attitudes and behaviors towards consuming a more diverse diet.

It is important to emphasize the application of valid questionnaires and techniques to gather quality data. After identification of the type of evaluation to conduct and the tools to use, it is important to validate these tools (Contento, 2015; Lai, 2013). Although many tools exist to collect information from communities, very few are valid to do so. Thus, results might not be reliable or accurate, ultimately leading to over- or underestimation of the effectiveness of the program. Even if a questionnaire (e.g., knowledge questionnaire, household food security, dietary diversity) has been used in several countries among different community members, it does not imply that it is appropriate for the particular country or community, or that it can be used in a different context (Contento, 2015; Lai, 2013). Such instruments require validation of their contents with the target community. Once a tool has been validated, it can be used to measure outcomes (Contento, 2015; Lai, 2013). Accurate and reliable information collected from valid tools can be used to address gaps in a populations' knowledge, modify practices or policies aimed at improving nutrition using the FBDGs (Table 5) (Contento, 2015; Evergreen, Gullickson, Mann, & Welch, 2011).

Table 5. Steps to validate a survey tool

Step 1:	Identify your object of measurement
Step 2:	Item selection and development
*Step 3:	Review of content by experts (n=5-10 experts)
*Step 4:	Pilot test on a small sample (n=50-100 individuals of interest, amount dependent on final sample size)
*Step 5:	Large field validation (n=200 or more)
Step 6:	Finalize and publish the tool
*Note. After each of these steps, the tool should be revised	

Despite the availability of methods to adequately evaluate programs, this is not common knowledge among those implementing recommendations in the communities. Thus, educators and members of organizations need to be trained in evaluation methods using quantitative and/or qualitative techniques (Contento, 2015; EMI, 2004). An evaluator, for instance, needs to judge and select the most appropriate instrument to address program characteristics and outcomes.

Many organizations use structured, quantitative questionnaires to determine the effectiveness of nutrition education programs. One reason is the perception that such instruments are the most efficient mechanism to obtain information from a large sample size. Moreover, depending on the availability and accessibility of technology in the community, quantitative measurements are more amenable for massive data collection via texting, phone, and internet (CDC, 2008). Most quantitative and attitudinal questionnaires,

however, use closed-ended questions on a Likert scale of 1-5 (e.g., strongly disagree, disagree, agree, strongly agree), thus limiting the ability to understand the rationale behind answers (CDC, 2008). Besides the type of questionnaire, there are other critical elements in evaluation. For instance, the time of surveying (e.g., continuous, immediately after, or several months after the program), delivery method (e.g., paper-based, online, or face-to-face interview), the community's literacy level, the statistical method to analyze the data (e.g., t-test, ANOVA, regression), and the in-house ability to interpret the data (Contento, 2015). Moreover, conducting focus groups and personal interviews, especially if using semi-structured questionnaires, is difficult to implement if proper training in qualitative methods of evaluation is limited. In this case, for example, a novice evaluator might only gather participants' first reaction thoughts, which most times are one-word descriptors (e.g., good or bad) and lack explanation. If this is the case, the evaluator should probe for clarification and ask follow-up questions such as which aspects were good or which aspects were bad instead of moving onto the next question (CDC, 2008; Contento, 2015). Continuing education is recommended for facilitators to be abreast of new instruments and methods of evaluating knowledge, attitudes, and practices associated with nutrition among communities.

Summary

Food-based dietary guidelines (FBDGs) are created to address nutrition concerns and support healthy habits of populations in a given country. Evidence continues to mount on its potential to promote healthy nutrition behaviors among the public, especially those living in rural areas. Methods to teach and evaluate the FBDGs are important for any extension staff and field worker to consider when developing and implementing a program about the FBDGs in various countries and communities. The application of these methods will aid in helping community members to consume diverse, well-balanced meals on a daily basis as a means to live a healthier lifestyle.

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