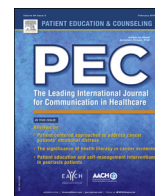




Contents lists available at ScienceDirect

Patient Education and Counseling

journal homepage: www.elsevier.com/locate/pateducou



Lessons learned from two decades of research in nutrition education and obesity prevention: Considerations for alcohol education

Jeanne P. Goldberg*, Catherine M. Wright

Gerald J. and Dorothy R. Friedman School of Nutrition Science and Policy, Tufts University, Boston, MA, USA

ARTICLE INFO

Article history:

Received 29 January 2015

Received in revised form 8 September 2015

Accepted 27 September 2015

Keywords:

Childhood obesity

Nutrition education

Alcohol education

Community nutrition interventions

ABSTRACT

Objective: Effective health interventions involve an understanding of the specific needs and wants of the population to be served. Lessons from more than two decades of obesity prevention can be applied to understanding how to design and implement other behaviorally-focused health interventions, including those for alcohol education.

Methods: Three obesity prevention campaigns were reviewed and evaluated for elements critical to their success in achieving desired outcomes.

Results: Evaluation of the three cases studies revealed six key elements common to successful interventions. These include: specifying the desired outcome at the outset, understanding the target population, identifying a framework for the intervention, creating a campaign “identity”, enlisting champions, and evaluating both outcomes and process.

Conclusion: Successful health interventions should be behaviorally-focused and include multiple components to address the various factors that influence behavior. A clear understanding of how and why desired outcomes were achieved can inform dissemination to a wider audience and improve sustainability.

Practice implications: Lessons learned from obesity prevention provide guidance for development of alcohol education. It must be acknowledged that there is still much to be learned to maximize success in prevention efforts. It is likely that analysis of future efforts in alcohol education can contribute to that understanding.

© 2015 Elsevier Ireland Ltd. All rights reserved.

1. Introduction

Health education was until late in the 20th century almost universally a one-sided communication from experts to the lay public. In the case of both nutrition and alcohol education, it was ineffective. Gradually, enlightened educators recognized that to be more effective behavioral interventions require interaction between experts and the populations they are trying to serve.

Early nutrition guidance was prescriptive, overly detailed, and paid minimal attention to factors which influenced what people actually consumed [1]. In the case of alcohol education, scholars have traced the origins of more nuanced approaches to 19th century educational philosophers like John Dewey who recognized that communication was a continuous, experimental, and interactive process [2]. It can be argued that it was not until the 21st

century that the momentum to understand and influence nutrition behavior required interventions that considered individuals within the context of a many-layered environment [3]. It is now clear that educational approaches to influence long term behavior change require individual skill development to improve decision-making, problem-solving, and self-efficacy [4].

Solutions to nutrition-related problems require multidisciplinary approaches. Effective interventions depend on understanding the target population. Nutrition education over the past three decades has shown a growing appreciation of the critical role of the environment on food choices and consumption. Stakeholders from both public and private sectors have addressed the growing obesity epidemic, which extends from early childhood through the life cycle. The root causes are not fully understood, but the process of approaching the issue has evolved.

Newer definitions of nutrition education account for multiple factors influencing food choice and health. It has recently been defined as “any combination of educational strategies, accompanied by environmental supports, designed to facilitate voluntary adoption of food choices and other food and nutrition-related

* Corresponding author at: Friedman School of Nutrition Science and Policy, Tufts University, 150 Harrison Avenue, Boston, MA 02111, USA. Fax: +1 617 636 3727.
E-mail address: jeanne.goldberg@tufts.edu (J.P. Goldberg).

behaviors conducive to health and well-being; nutrition education is delivered through multiple venues and involves activities at the individual, community, and policy levels” [5]. As that definition has evolved, the conceptualization and implementation of nutrition interventions have expanded. This paper describes current thinking about the design, implementation, and evaluation of successful interventions which include both individuals and their multiple environments. There are obvious differences between food and alcohol consumption—the former is essential and the latter is not. But there are similarities in the factors that impact what and how much we eat and drink. The cases presented here were chosen for their potential to guide behavioral interventions that focus on effective alcohol education.

2. Methods for designing successful nutrition interventions: lessons from three multi-component approaches

Three examples of campaigns that focus on changing behavior to prevent weight gain in different populations illustrate this newer approach. Together they provide insights on particular aspects of nutrition interventions that can be applied to alcohol education.

2.1. *Sisters Together: Move More, Eat Better*

Sisters Together: Move More, Eat Better was a community-based communications campaign launched in 1995. It was designed to prevent obesity through promotion of healthful lifestyles among African American women 18–35 years old in three inner-city communities in Boston, Massachusetts. The campaign focused on increasing physical activity and improving nutrition, and emphasized strengthening community resources to support and sustain these lifestyle changes [6]. Since *Sisters Together* was a pilot communications campaign, not an intervention, outcome data at the individual level were not collected. It is presented here as an example of the value of rigorous, iterative formative research.

The conceptual framework was drawn from the social-ecological model, which views behavior as influenced by factors at multiple levels, from the individual to societal [7]. Understanding the processes at work at each level, and their influences on behavior, allows for development of context-specific communications. Focusing communications at multiple levels of influence increases the likelihood that messages will be received and acted upon. In *Sisters Together*, campaign themes and activities were designed to increase individual knowledge and skills with respect to healthy eating and physical activity, to utilize existing social networks, and to support and promote community resources.

2.1.1. Formative research: identifying and understanding the target population

Campaign development began with identifying and understanding the target audience. A review of published literature documented a higher prevalence of obesity and associated health consequences, including diabetes and cardiovascular disease, in African American women than in the general population [8–12]. The literature review, which included a search of the popular press as well as peer-reviewed publications, helped to define population-specific factors that would affect acceptance of the campaign and its messages [13]. The research also highlighted an opportunity: while previous studies had acknowledged the importance of culturally relevant strategies to address dietary and physical activity behavior change [14–16], few culturally appropriate programs had been designed to promote healthy lifestyles [17,18].

Researchers interviewed nutritionists who provided insight on the target population's knowledge and attitudes about healthy eating and physical activity, and identified barriers to the adoption

of healthy lifestyle behaviors [19]. These included a general acceptance of a higher weight for height and strong perceptions that reducing dietary fat negatively affected taste and increased food costs (when *Sisters Together* was implemented, low-fat diets were generally being recommended for weight control). In addition, nutritionists described environmental barriers, including a lack of supermarkets in many areas and limited access to high quality, affordable food. They emphasized the need for culturally relevant, skill-building messages.

These interviews informed development of focus group discussion guides for use with the target population. Approximately 50 women participated in focus groups intended to further refine researchers' understanding of the population's knowledge, attitudes, and beliefs about healthy behaviors. Findings confirmed some, though not all, information from interviews with nutritionists. Participants said they preferred the taste of fried foods. At home, frying was the common cooking method. Taste, cost, time, and lack of information emerged as barriers to healthful eating. This was consistent with information from the nutritionists. Women confirmed that skill-building information, including recipes, shopping tips, and charts comparing healthful and unhealthful choices, would help them make healthier choices. With respect to physical activity, women did not include exercise and physical activity as leisure activities. They said their mothers who knew their entire health history and were “more concerned” were the most credible source of health information. Physicians, especially women and African-Americans, nutritionists, and other health professionals were considered reliable sources. Women generally rejected African-American celebrities as role models, saying their resources and lifestyles were not relevant.

Direct observation was important to identify barriers to and opportunities for change. Neighborhood tours confirmed reports of limited access to high-quality, affordable food, especially fresh produce. Tours helped researchers identify community programs and leaders, including local chefs, who were already offering nutrition education. Observations identified existing resources and potential partners to support the campaign, and highlighted the need for additional resources.

2.1.2. Refining and sharing the message

Findings from interviews, focus groups, and community observations led to development of campaign themes, messages about healthy eating and physical activity, and ideas for activities and resources to support messages. Qualitative research in *Sisters Together* continued throughout program design and implementation. Themes and messages were rigorously tested with the target population. At all points, campaign branding, materials, and activities were evaluated to determine if they addressed three fundamental questions:

- Do materials address themes, key information, and skills that are needed?
- Does the design reflect the culture and preferences of the target population?
- Are language and style appropriate and understandable?

Recipes were a primary communication element. They addressed women's key concerns, relying on comparatively less expensive ingredients and were easy and quick to prepare. Development required several steps to insure that recipes would be acceptable. Popular dishes were modified, tested with members of the target audience, revised to respond to feedback, and retested before dissemination.

Sisters Together built recognition of and support for campaign themes and activities by establishing a strong community presence. Promotional activities conveyed healthy eating and

physical activity messages. Print and broadcast media, including local radio and television, were used to share these messages. At community events the *Sisters Together* team tested program materials and obtained valuable feedback. Promotional efforts assisted in recruitment of potential partners and additional channels for program dissemination.

2.2. Shape Up Somerville: East Smart, Play Hard

Shape Up Somerville: Eat Smart, Play Hard (SUS) was a community-based environmental intervention to prevent weight gain in children in grades one to three through increased access to physical activity and healthful foods [20]. It was designed to simultaneously target multiple factors that influence children's food and physical activity behaviors. The description presented here highlights development and dissemination of the campaign theme and supporting messages. A fuller presentation is available [20–23]. The intervention took place in Somerville, Massachusetts, an ethnically diverse city outside Boston. It was designed to reach children to influence health-related behaviors, in before-, during-, and after-school settings, as well as in the home and wider community. *SUS* was one of the first interventions designed according to principals of community-based participatory research (CBPR). CBPR relies on collaborative partnership between researchers and community-based organizations and leaders. Collaboration takes place at all phases of the intervention, including identification of the problem; design, implementation, and evaluation; and ongoing decision-making about how to use data to continue to improve community health [24,25].

2.2.1. Formative research

From the outset, the *SUS* team engaged community members in study design and planning. Campaign materials and messages would need to be culturally relevant and written in the four major languages in Somerville (Portuguese, Haitian-Creole, Spanish, and English). Information from community meetings, focus groups, and key informant interviews helped shape design and communications plans. These interactions led to formation of advisory councils that remained active throughout the study. These councils, typical of CBPR, helped ensure that the intervention was implemented most effectively and guided adjustments as needed.

Nutrition communications, which played a key role throughout the project, were based on extensive formative research. Focus groups with children provided insight that shaped branding, including the name “*Shape Up Somerville: Eat Smart Play Hard*”. The logo was designed through an iterative process to reflect physical activity and healthy eating, the two key components necessary to balance the energy equation and prevent weight gain (Fig. 1). The logo was used on all *SUS* communications, including materials sent home to families, promotional items like water bottles and tee-shirts, and window stickers that promoted *Shape Up Somerville*-approved restaurants. Consistent branding was essential to increase community-wide campaign recognition. Communications components of *SUS* are described more fully in another paper in this supplement.



Fig. 1. *Shape Up Somerville* logo.

A particular challenge in child-targeted interventions is finding meaningful ways to engage parents and caregivers, who are powerful influencers, if not the sole arbiters, of what children eat. Focus groups provided guidance for development of family-engagement materials. In response to parent feedback, produce coupons were solicited from a local vendor and included in bi-monthly newsletters. This increased the likelihood that parents would open and read newsletters. Parents indicated they would benefit from skill-building information about how to prepare healthy foods and encourage their children to be physically active. Newsletters included recipes for healthy foods; highlighted local farmers markets where they could be purchased; and provided ideas for healthy family activities, including *SUS* Walk-to-School days.

2.2.2. Implementing the intervention

Many elements of *SUS* took place in and around schools. Before-school elements included both food- and physical activity-focused activities. Taste tests during the breakfast program introduced children to new healthy foods; a walk to school campaign engaged not only participating children and their families but also the surrounding community in physical activity through a “walking school bus”, walking contests, and safe routes to school maps. During school, children were targeted with healthy eating and physical activity messages in the classroom, in the cafeteria, and on the playground. A curriculum was developed for classroom teachers. Thirty-minute lessons were designed to be taught weekly for 6 months, along with 10-minute “cool moves” to promote physical activity in the classroom. Through an enhanced recess program, schools received new play equipment and children were taught new games to encourage more active recess. In the cafeteria, monthly tasting events were organized to allow students to sample the fruit or vegetable of the month. Posters and table tents with nutrition information, motivational messages, and fun facts about healthful foods were displayed. School staff used the public address system to promote the campaign. In several schools, a targeted campaign to increase dried bean consumption was delivered through the PA system. After-school campaign elements included increased physical activity opportunities, promotion of healthy snacks and cooking lessons to build students' skills in preparing them, farm field trips, and a walk-from-school campaign that mirrored the before-school activity.

2.3. EPODE (*Ensemble Prévenons l'Obésité Des Enfants/Together Let's Prevent Childhood Obesity*)

EPODE (*Ensemble Prévenons l'Obésité Des Enfants/Together Let's Prevent Childhood Obesity*) is a large-scale, strategic effort to prevent childhood obesity through nutrition education and promotion of physical activity. The EPODE approach brings together multiple stakeholders from participating communities to identify and implement effective and sustainable strategies to address those objectives. The program and method were formally established in 2004. EPODE began in ten pilot communities in France and has since expanded to 29 countries worldwide. The framework grew out of a long-term school-based nutrition education program, the Fleurbaix Laventie Ville Santé (FLVS) study, implemented and evaluated in three phases over twelve years in four communities (two intervention and two control) in northern France beginning in 1992 [26]. The primary target is children 0–12 years old and their families, to support development of healthy lifestyles. Secondary targets include local stakeholders, such as health professionals, schools, community organizations, and local media outlets. Childhood obesity has held steady in France, while rates continue to climb in other European countries [27].

2.3.1. FLVS and the beginnings of EPODE—an evidence-based campaign

The goal of the initial FLVS study (FLVS I) was to evaluate the impact of a school-based nutrition education program on family dietary habits; it was not specifically focused on obesity prevention [28,29]. The curriculum, taught by classroom teachers trained by dietitians in basic nutrition, aimed to improve children's knowledge about healthy eating habits [30]. It included promotion of healthy, palatable, and affordable foods, tasting opportunities in school cafeterias, cooking classes, visits to farms and food shops, and family-engagement activities like breakfasts in schools.

In the second and third phases of the study, researchers surveyed families of participating children about dietary habits, eating behaviors, and physical activity (FLVS II) and collected blood samples and height and weight information along with dietary and health-behavior information (FLVS III). From the start, researchers regularly communicated with participants through multiple channels. Widespread coverage in a range of media fostered support for and commitment to the program. In each town, dietitians were hired to give classroom presentations and lectures on healthy eating for parents. Town councils raised funds to build new sports facilities and hire educators to promote physical education in schools and in the community. Local stakeholders set up family activities to promote healthy eating and physical activity [30].

2.3.2. EPODE in practice

The blueprint for EPODE is specified in a detailed logic model [31]. Four factors critical to successful obesity prevention emerged from the FLVS studies. They form the pillars of the EPODE methodology: establishment of political commitment, provision and mobilization of sufficient resources, coordination of appropriate support services, and collection and evaluation of sound scientific evidence [26]. Each is supported at the central (national or state) and community levels by organizations and individuals in both public and private sectors.

A Central Coordination Team (CCT) applies the EPODE methodology by training and coaching local project managers who oversee implementation in the community. With support and partnership from local stakeholders, the program is delivered in a range of community settings to engage children and their families. These include schools and pre-schools, after-school sports or cultural organizations, community centers, and social clubs.

The CCT draws on information from multiple sources, including official health-related recommendations, expert consultation, and field experience from local EPODE teams, to plan campaigns. Each six to nine month campaign focuses on a single theme related to food and/or physical activity habits that could then be provided to the target population through appropriate techniques and tools [32].

Primary intervention tools are developed at the central level and disseminated to local communities. Programs and activities are then tailored to the specific target population and designed to be acceptable to the community [33]. They focus on simple, action-oriented messages to raise awareness and motivate behavior change. Messages directed at children about healthy eating, for instance, are experiential rather than knowledge-driven [34]. Materials incorporate bright colors and cartoon characters intended to appeal to children. Capacity-building resources, including guidebooks, roadmaps, and action sheets, are provided to project managers to disseminate the campaign locally.

2.3.3. Evaluating the program

The primary outcome is prevalence of childhood overweight and obesity. Progress in EPODE communities is monitored locally, through both outcome and process evaluation. Data are shared

with the CCT. Height and weight are collected by school health professionals for all children in participating communities; BMI data provide evidence for policy development and local activities.

Process evaluation helps identify successful program elements and informs program modifications. Program success is evaluated centrally and includes community involvement and local commitment (retention and fidelity), project managers' satisfaction with the program and their training, and advocacy and press engagement. Local stakeholders are surveyed to determine their satisfaction with the program. This information is used to mobilize additional stakeholders.

3. Findings from the case studies

Through analysis of these cases, seven elements of effective interventions for obesity prevention have been identified and can be applied to the design and implementation of alcohol education efforts.

3.1. Specify the desired outcome

The first step in designing and implementing successful interventions is to specify a desired and measurable outcome in a defined population. "Effectiveness" may be a specific outcome, such as a drop in the percentage childhood overweight in the target population. Alternatively, it may be a more qualitative outcome, such as the percentage of the target population that participates in healthy lifestyle programs. In either case, it is important to understand the objective and how it will be measured. In *SUS*, success was defined as *prevention of weight gain, measured as change in BMI*, that would, in the absence of the intervention, be expected to occur in the target population of elementary school children over two school years.

3.2. Understand the target population

Successful interventions begin with formative research to understand the problem in the context of the target audience and specific behavior(s) to be modified. Formative research may include searches of public documents for socio-demographic data, reviews of peer-review literature to learn about studies that may inform the intervention, and scans of lay literature to capture relevant cultural insights. How broadly or narrowly the population is defined will depend on the issue being addressed and the context in which the intervention will occur.

Formative research may include both quantitative and qualitative methods. Qualitative approaches often provide insights that allow researchers to design an intervention relevant to the target population [6]. The formative research process is not necessarily, and often should not be, linear. As researchers become more familiar with the target population, they gain new insights that can be important to program design or discovery of gaps in the implementation plan that can be easily addressed. In *Sisters Together*, for example, it was not until the second year that the research team learned from community members that hair care was a major barrier to participation in exercise activities [35]. In response, a hair care brochure specifically designed for African American women was developed. It was received enthusiastically and used widely.

3.3. Choose a theoretical framework to plan the intervention

Once the outcome is specified and early in the process of understanding the target population, it is essential to choose a framework to build an intervention-specific conceptual map. It describes considerations that must be taken into account if the

implementation plan is to succeed. It also allows researchers to consider the scope of the problem and to lay out a structure that addresses how behavior will be changed, by whom, and with what effect. The Social Ecological Model, used in *Sisters Together* and *SUS*, has served as a matrix for understanding the various levels of influence on individual behavior and to help identify where to intervene [7]. From formative research for the *Sisters* campaign, self-efficacy emerged as the most important concept to include in the overall plan. The importance of self-efficacy to behavior change, identified as a critical predictor of success, has been added to several theoretical models, among them the Health Belief Model and the Theory of Planned Behavior. Identifying the importance of self-efficacy in *Sisters* led to development of materials that would facilitate desired behaviors, such as the walking brochure and calendar with healthy and culturally appropriate recipes. To support women in engaging in those behaviors, it was critical to identify and promote existing community resources, such as a culturally-relevant cooking show and dance classes. Buy-in from those providing the resources was achieved because they recognized the benefits to them.

SUS can be viewed as an early effort to take a systems approach to individual behavior change [36]. Formative research included identification of not only safe walking routes but also barriers to safe walking. Intervention components to address the barriers included establishment of walking groups at the inter-personal level and city-allotment of funding for improved street crossings. While modifications to environmental barriers will likely affect a large number of individuals, identification of those barriers and potential solutions to eliminating them requires an extensive and detailed analysis of the problem. That analysis must recognize that many individuals, critical to implementing the solution, may or may not have an interest in the issue. It must be acknowledged that adoption of the desired behavior will be uneven.

3.4. Create a brand identity

With a clear set of goals and objectives and sufficient information about the target population, the next challenge is creation of a theme that captures the intent of the intervention. Researchers can then design relevant messages and materials that address the behavior to be modified. Collectively, these activities create a “brand” that symbolizes a product with a consistent package of benefits. Branding for *Sisters Together* evolved from an observation in the lay literature that African American women commonly refer to themselves as sisters. This observation, along with feedback that fuller figures were quite acceptable in the target community, led to the choice of a logo and tagline with three active women with fuller figures and African American hairdos (Fig. 2). No detail is too small to be tested. For *Sisters Together* a shorter tagline, “*Sisters Move More, Eat Better*” was tested in intercept interviews. Women thought the campaign communicated to familial sisters and that it was not relevant to women who did not have a sister. Careful attention to audience feedback can identify enablers and barriers to behaviors being promoted. Saturation of the environment helps insure that the campaign maximizes reach, and through greater exposure, increases the likelihood of behavior change [37].

3.5. Find or build “champions”

Building brand equity requires more than a logo, tagline, and materials. Community interventions need “champions”, recognized leaders who commit to supporting the intervention. Partnerships with community organizations are also essential. They promote the campaign and provide opportunities necessary for participants to engage in the behaviors promoted. Early



Fig. 2. *Sisters Together* logo.

involvement of partners strengthens bonds among them, identifies mutual benefits to keep them engaged, and helps insure that the intervention will continue once funding for the initial project is over.

In *Sisters Together*, organizations and leaders who could partner with the project team promoted the campaign in target communities. *SUS* was explicitly designed to foster community engagement and participation [38]. Engaging the Somerville mayor as a champion was invaluable. He promoted the campaign and facilitated environmental changes that contributed to ongoing funding and sustainability. The CBPR approach also supported positive outcomes that continued beyond the intervention. With community buy-in from the outset, *SUS* stimulated development of policies to promote and sustain health behavior change over the long term. New school wellness policies were developed. School food service was adapted to support an enhanced meal program. Environmental changes were made to increase physical activity opportunities within the community. *SUS* activities continue today under the oversight of the City of Somerville.

3.6. Insure that the audience hears and understands the message

It is critical to address factors that determine the successful communication of messages for behavior change. Yet this is often left out of intervention models. Consumers are bombarded with messages every day and pay attention to very few. Information provided in nutrition campaigns is typically more complicated than the space allotted to it. Consumers are unlikely to take the time or have the interest to comprehend it. If they do hear and understand a message, their response will depend on how closely the advice aligns with what they want to do. The communications team must develop clear and creative messages and materials that foster self-efficacy and increase motivation to make appropriate choices.

3.7. Evaluate both outcomes and process

It is important to know whether an intervention met its goal, and to what extent it was as a result of fidelity to the plan. Process evaluation allows researchers to understand which intervention elements were delivered. In *SUS*, the desired outcome was

prevention of expected weight gain in elementary school children, documented through repeated weight and height measurements. Over eight-months, *SUS* reduced approximately one pound of expected weight gain for the average 8 year old child [20]. How that goal would be met was specified in the original intervention framework. Weekdays were laid out into four categories: before, during, and after school, and at home. Activities for each time period were designed to bring the energy equation into balance. They included a classroom curriculum, after-school programs, *SUS*-sponsored community events, printed parent materials, and program promotion through local media. It is unreasonable to expect that all components would be fully implemented, but process evaluation allowed researchers to document which elements were implemented, and to what extent, to address barriers that arose during implementation, and to understand what contributed to the positive outcome. Ultimately it enabled the team to identify best practices.

Sisters Together presented a unique set of challenges. The campaign objective was to promote healthy lifestyle behaviors in an at-risk population. It was not designed to demonstrate change in weight or specific dietary and physical activity behaviors of individuals. Using rigorous qualitative methods, the goal was to determine the extent to which environmental changes would enable community members to engage in the healthy behaviors. Researchers also sought to assess the extent to which community members were aware of and took advantage of those opportunities. To understand what changes occurred and with what effect, researchers relied on interviews with three key groups that had provided guidance on the initial program development. These included community nutritionists, members of the advisory group, and individual community members. Community nutritionists reported no improvement in dietary and physical activity behaviors among women in their population. Advisory group members reported increased enrollment and participation in their programs, which had been undersubscribed. Information collected in intercept interviews with the target population was subject to the inherent bias that interviewees tend to want to please the interviewer, but neighborhood women reported recognition of and positive attitudes toward campaign messages. Given that *Sisters Together* was not a weight-loss intervention, with built-in outcome measurement, the success of the campaign can best be seen in the extent to which it saturated the target community and achieved high recognition levels. The campaign fostered strong community engagement, attracting participants and champions beyond the primary target audience. In EPODE, evaluation at the end of the initial phase of FLVS showed a trend towards an increased prevalence of overweight. Assessment of data from the second and third phases of the study showed a decrease in prevalence of overweight for both boys and girls. In addition, the prevalence of childhood overweight in the two study towns was significantly lower in comparison to the nearby control towns. Initial results may have suggested a failure of the school-based education program, but a closer look at data revealed that when the intervention included a formal family component and garnered wide support of community stakeholders, childhood overweight was reduced [30]. Recognition of the importance of community awareness and support for the health promotion strategies led to development and establishment of the EPODE framework.

4. Discussion

Health education interventions present unique challenges. A review of recent attempts to address obesity prevention in children indicates that a number of elements help to insure success [39]. Though the suggestions specifically address school-based interventions, they are applicable to nutrition and obesity

prevention programs delivered in other settings and echo lessons learned from the case studies discussed. Interventions should be behaviorally-focused and include multiple components to address factors that influence health behavior, including personal knowledge and beliefs, family and cultural norms, accessibility of healthful food options, and the social and physical environment. Likewise, interventions to address alcohol education should include representatives of the target population from the initial discussions of program design through every step in implementation and evaluation. They must include buy-in from key stakeholders. They must incorporate acceptable alternatives to the behavior being targeted. Each of the cases described in this paper incorporated creative approaches that resonated with the target population. Developing these approaches is a highly individual process that can be extremely time-consuming and may require expertise not considered in traditional health education programming. Nonetheless, it is essential. Alcohol education campaigns should consider each of these elements if they are to succeed.

5. Conclusion

Health interventions should begin with a clear set of behavioral goals to be addressed and a framework detailing how outcomes will be achieved. Both quantitative and qualitative assessments should be used to measure success. This includes specific outcome measurements as well as ongoing, rigorous formative and process evaluations. Qualitative assessments are critical in understanding both whether and how the targeted outcomes of behavior change were achieved, which in turn informs broader dissemination.

6. Practice implications

While specific intervention activities discussed here were targeted at diet and physical activity behaviors, these case studies were chosen because they provide insight into strategies for health behavior change more broadly. They can serve as background for the discussion of how best to design alcohol education programs.

Conflict of interest

The authors declare there is no conflict of interest.

Funding

Support for preparation of this manuscript was provided by the International Alliance for Responsible Drinking (IARD).

References

- [1] D. Tyack, Health and social services in public schools: historical perspectives, *Future Child*. (1992) 19–31.
- [2] J. Zimmerman, *Distilling Democracy: Alcohol Education in America's Public Schools, 1880–1925*, University Press of Kansas, 1999.
- [3] C.D. Economos, et al., What lessons have been learned from other attempts to guide social change? *Nutr. Rev.* 59 (3) (2001) S40–S56.
- [4] E.E. Bartlett, The contribution of school health education to community health promotion: what can we reasonably expect? *Am. J. Public Health* 71 (12) (1981) 1384–1391.
- [5] I.R. Contento, Nutrition education: linking research, theory, and practice, *Asia Pac. J. Clin. Nutr.* 17 (1) (2008) 176–179.
- [6] R.E. Rudd, J. Goldberg, W. Dietz, A five-stage model for sustaining a community campaign, *J. Health Commun.* 4 (1) (1999) 37–48.
- [7] K.R. McLeroy, et al., An ecological perspective on health promotion programs, *Health Educ. Q.* 15 (4) (1988) 351–377.
- [8] R.J. Kuczmarski, et al., Increasing prevalence of overweight among US adults, *JAMA: J. Am. Med. Assoc.* 272 (3) (1994) 205–211.
- [9] L. Adams-Campbell, et al., Body fat distribution patterns and blood pressure in black and white women, *J. Natl. Med. Assoc.* 82 (8) (1990) 573.

- [10] A. Must, S. Gortmaker, W. Dietz, Risk factors for obesity in young adults: Hispanics, African Americans and Whites in the transition years, age 16–28 years, *Biomed. Pharmacother.* 48 (3) (1994) 143–156.
- [11] G.L. Burke, et al., Differences in weight gain in relation to race, gender, age and education in young adults: the CARDIA study, *Ethn. Health* 1 (4) (1996) 327–335.
- [12] D.B. Allison, L. Edlen-Nezin, G. Clay-Williams, Obesity among African American women: prevalence, consequences, causes, and developing research, *Women's Health* 3 (1997) 243–274.
- [13] J. Goldberg, L. Peterson, Role of communication in changing nutrition behaviors to promote healthy lifestyles, in: J.M. Rippe (Ed.), *Lifestyle Medicine*, CRC Press, Boca Raton, 2013.
- [14] C.O. Airhihenbuwa, et al., Cultural aspects of African American eating patterns, *Ethn. Health* 1 (3) (1996) 245–260.
- [15] S. Kumanyika, C. Morssink, T. Agurs, Models for dietary and weight change in African–American women: identifying cultural components, *Ethn. Dis.* 2 (2) (1992) 166.
- [16] B.M. Popkin, A.M. Siega-Riz, P.S. Haines, A comparison of dietary trends among racial and socioeconomic groups in the United States, *N. Engl. J. Med.* 335 (10) (1996) 716–720.
- [17] S.K. Kumanyika, The impact of obesity on hypertension management in African Americans, *J. Health Care Poor Underserved* 8 (3) (1997) 352–364.
- [18] M.R. Stolley, M.L. Fitzgibbon, Effects of an obesity prevention program on the eating behavior of African American mothers and daughters, *Health Educ. Behav.* 24 (2) (1997) 152–164.
- [19] J. Goldberg, R.E. Rudd, W. Dietz, Using 3 data sources and methods to shape a nutrition campaign, *J. Am. Diet. Assoc.* 99 (6) (1999) 717–722.
- [20] C.D. Economos, et al., A community intervention reduces BMI z-score in children: Shape Up Somerville first year results, *Obesity (Silver Spring)* 15 (5) (2007) 1325–1336.
- [21] C.D. Economos, et al., A community-based restaurant initiative to increase availability of healthy menu options in Somerville, Massachusetts: Shape Up Somerville, *Prev. Chronic Dis.* 6 (3) (2009) A102.
- [22] S.C. Folta, et al., Assessing the use of school public address systems to deliver nutrition messages to children: Shape up Somerville—audio adventures, *J. Sch. Health* 76 (9) (2006) 459–464.
- [23] J. Goldberg, et al., Retooling food service for early elementary school students in Somerville, Massachusetts: the Shape Up Somerville experience, *Prev. Chronic Dis.* 6 (3) (2009) A103.
- [24] M.W. Leung, I.H. Yen, M. Minkler, Community based participatory research: a promising approach for increasing epidemiology's relevance in the 21st century, *Int. J. Epidemiol.* 33 (3) (2004) 499–506.
- [25] M. Minkler, Community-based research partnerships: challenges and opportunities, *J. Urban Health* 82 (2005).
- [26] J.M. Borys, et al., EPODE approach for childhood obesity prevention: methods, progress and international development, *Obes. Rev.* 13 (4) (2012) 299–315.
- [27] Organisation for Economic Co-operation and Development, *Obesity and the Economics of Prevention: Fit Not Fat*, 2012. Available from: <http://www.oecd.org/els/health-systems/49712339.pdf>.
- [28] L. Lafay, et al., Food and nutritional data for a population from northern France: the Fleurbaix Laventie Ville Sante (FLVS) Study, *Rev. Epidemiol. Sante Publique* 46 (4) (1998) 263–275.
- [29] L. Lafay, et al., Does energy intake underreporting involve all kinds of food or only specific food items? Results from the Fleurbaix Laventie Ville Sante (FLVS) study, *Int. J. Obes. Relat. Metab. Disord.* 24 (11) (2000) 1500–1506.
- [30] M. Romon, et al., Downward trends in the prevalence of childhood overweight in the setting of 12-year school- and community-based programmes, *Public Health Nutr.* 12 (10) (2009) 1735–1742.
- [31] T. Van Koperen, et al., Characterizing the EPODE logic model: unravelling the past and informing the future, *Obes. Rev.* 14 (2) (2013) 162–170.
- [32] C. Roy, Preventing childhood obesity, Is Partnership the Key to Addressing Obesity in Young People?, All-Island Obesity Action Forum, 2010.
- [33] H. Westley, Obesity Childhood, Thin living, *BMJ: Br. Med. J.* 335 (7632) (2007) 1236.
- [34] N. Henley, S. Raffin, B. Caemmerer, The application of marketing principles to a social marketing campaign, *Mark. Intell. Plan.* 29 (7) (2011) 697–706.
- [35] W. Dietz, Focus group data pertinent to the prevention of obesity in African Americans, *Am. J. Med. Sci.* 322 (5) (2001) 275–278.
- [36] S.C. Folta, et al., Changes in diet and physical activity resulting from the Shape Up Somerville community intervention, *BMC Pediatr.* 13 (1) (2013) 157.
- [37] T.A. Shimp, *Advertising, Promotion, and Other Aspects of Integrated Marketing Communications*, South-Western Publishing, 2007.
- [38] M. Minkler, N. Wallerstein, *Community-based Participatory Research for Health: From Process to Outcomes*, Jossey-Bass, 2011.
- [39] M.G. Roseman, M.C. Riddell, J.N. Haynes, A content analysis of kindergarten–12th grade school-based nutrition interventions: taking advantage of past learning, *J. Nutr. Educ. Behav.* 43 (1) (2011) 2–18.