

Capacity Building for Health Through Community-Based Participatory Nutrition Intervention Research in Rural Communities

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Since its inception, capacity building has been a stated goal of the Delta Nutrition Intervention Research Initiative, a tri-state collaboration in the Lower Mississippi Delta to address high rates of chronic disease. Textual analysis of project documents identifies and describes strategies carried out to foster capacity building. Strategies to build community capacity include fostering participation, cultivating leadership opportunities, training community members as co-researchers, securing community resources, and implementing the intervention together. Incorporating capacity-building approaches in health promotion and nutrition-intervention programming in rural communities provides a means to enhance potential for sustainability of health outcomes and developed effectiveness. **Key words:** *community-based participatory research, community capacity, intervention, physical activity, sustainability*

PROMOTING co-learning and capacity building among community and re-

search partners is a fundamental principle of community-based participatory research (CBPR).¹ Community capacity building has been described as an essential element for reducing health disparities in communities of color.²⁻⁴ Shediac-Rizkallah and Bone⁵ suggest that measures of capacity building in the community can serve as indicators of health intervention program sustainability. They advocate for a focus on sustainability in health promotion to maintain health

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benefits gained through intervention and to retain community trust. Establishing and maintaining trust are of particular concern for research engaging African American communities, where a legacy of mistrust of research and the healthcare system remains.⁶⁻⁸

Rural communities in particular can benefit from health-promotion programming that targets capacity building and sustainability. Smith and colleagues⁹ note from their perspective as Health Canada professionals in rural Alberta that work on community capacity in rural settings has great potential due to inherent characteristics of rural communities including (1) a lack of agency infrastructure that necessitates collaboration for change among community members, (2) strong community attachments as well as clear geographic boundaries, (3) ability to engage a substantial proportion of the community, and (4) shared commitment to pursue alternatives for survival in the face of the decline of rural communities.

Capacity building for community and academic partners has been a stated goal of the Delta Nutrition Intervention Research Initiative (NIRI) in the context of a CBPR framework.¹⁰ Since the inception of Delta NIRI, staff and community members have given consideration to strategies that would develop a broad-based capacity within participating communities to improve nutrition and health. Developing community capacity was determined as an essential element to sustaining project efforts, thus creating genuine and long-lasting community change. The purpose of this article is to review practical strategies that Delta NIRI undertook to encourage community capacity building. Strategies presented in this article could be applied in other CBPR projects. Capacity-building efforts reviewed in this article align with the CBPR philosophy and dimensions of community capacity described in subsequent sections. Evaluation of outcomes from the community capacity-building strategies described in this article is beyond the scope of this article.

Delta NIRI was established to address the health disparities and high rates of nutrition-

related chronic diseases in the rural region of the Lower Mississippi Delta (LMD) of Arkansas, Louisiana, and Mississippi through nutrition intervention research. The primary goal of Delta NIRI was to design, implement, and evaluate nutrition interventions aimed at addressing the high rates of nutrition-related chronic diseases in the region, using community participatory approaches.¹¹ The LMD is characterized by persistent poverty, low educational achievement, and prevalence rates for obesity, heart disease, and hypertension that are among the highest in the nation.^{11,12}

The tri-state Delta NIRI consortium includes 3 rural Delta communities, 1 each in Mississippi, Louisiana, and Arkansas; the US Department of Agriculture/Agricultural Research Service; 7 university partners; and each state's extension service. The 3 partner communities were each defined at community entry in fall 2002 by an initial coalition comprising community members segmented by community sectors that included government, education, religion, health, voluntary organizations, business, and informal grassroots leadership.^{13,14} The first community, Hollandale, Mississippi, is an incorporated city of approximately 3 440 residents located in Washington County.¹⁵ The second community, Franklin Parish, Louisiana, is a parish (county) unit of approximately 21 000 residents. The third community is the area served by the Marvell Public School District, including Marvell, Arkansas, an incorporated city of about 1 400 in Phillips County. The population of each community is predominantly African American (32%-83%) and White (16%-67%). Poverty rates in these communities are relatively high, ranging from 22% to 28%, compared with 9% in the United States. Among adults 25 years and older, 58% to 65% have a high school education or greater, compared with 80.4% in the United States.¹⁵ The relative lack of agency infrastructure in rural areas noted by Smith and colleagues⁹ is typical of these communities. For example, a community assessment of Hollandale conducted in 2003 found a single school district with an elementary

and high school in town and a middle school in a neighboring community, a city government with an elected mayor and 5 aldermen, 20 churches (most with part-time staff only), and 24 small businesses including 1 grocery store, 1 dollar store, 6 barber/beauty shops, 5 cafes, and 4 gas station/convenience stores.

Each community established its own community participatory research organization to guide and direct nutrition intervention planning and implementation. Groups participating in Delta NIRI are referred to as Hollandale NIRI, Franklin NIRI, and Marvell NIRI.¹³ Among barriers to effectiveness cited by community members active with each NIRI prior to implementation of community interventions was a lack of understanding of and frustration with the community participatory research process.¹³ Thus, capacity building for community members around the research process was recognized as an early need.

CONCEPTUAL FRAMEWORK

Community capacity has been defined as “the cultivation and use of transferable knowledge, skills, systems, and resources that affect community- and individual-level changes consistent with public health-related goals and objectives.”^{3(p259)} Numerous frameworks, describing various dimensions of community capacity, have been presented in the literature. Several frameworks provided guidance to Delta NIRI intervention efforts by identifying key constructs that were important in fostering community capacity. Jackson and colleagues¹⁶ proposed a model of community capacity that includes talents, skills, strengths, and abilities, as well as inside and outside facilitators and barriers. A Centers for Disease Control and Prevention-sponsored consensus-building symposium identified the following dimensions of community capacity relevant to the potential for addressing health issues: participation, leadership, skills, resources, social and interorganizational networks, sense of community, understanding of community history, community power, community values, and critical reflection.³ Labonte and

Laverack¹⁷ noted 9 domains of community capacity, many of which overlap with those identified by the Centers for Disease Control and Prevention. Dimensions of community capacity proposed by these and other researchers are compared in Table 1. Delta NIRI project faculty and staff chose to combine the community capacity frameworks, instead of simply using only 1, in an effort to support or nurture the breadth of strategies that are considered to positively influence a community’s capacity for change. An effort was made to address these dimensions during program planning, implementation, and evaluation.¹⁹ This was done in accordance with Wallerstein’s²⁰ suggestions that the use of empowering strategies and interventions leads to empowerment/capacity outcomes, in turn influencing health outcomes and developed effectiveness.²¹ Other authors highlight the importance of community empowerment- or competence-type approaches to capacity building for their potential to sustain beneficial health outcomes.^{22,23} Freudenberg²⁴ described strategies that healthcare professionals can take to strengthen community capacity in the context of environmental hazards, applying the dimensions of community capacity proposed by Goodman and colleagues³ in considering 4 case histories of community action to improve the environment.

Several of the dimensions provided in Table 1 were deemed important since the onset of the Delta NIRI project. As is the nature of CBPR, other dimensions grew in importance as the project developed and expanded in participating communities.

METHODS

Capacity-building procedures used during Delta NIRI have been captured in numerous data sources, such as the proposals for research submitted to funding agencies, research protocols, and participating groups’ documents. To begin with, the research protocol and periodic project plans developed by

Table 1. Dimensions of community capacity included in current models

Goodman et al ³	Labonte and Laverack ¹⁷	Chaskin ¹⁸	Jackson et al ¹⁶	Bopp et al in Smith et al ⁹
Participation	Participation		Participation and representation	Participation
Leadership Skills	Leadership		Talents, skills, strengths, abilities	Leadership Resources, knowledge, and skills
Resources	Resource mobilization	Access to resources		Resources, knowledge, and skills
Social and interorganizational networks	Organizational structures; links with others			Communication
Sense of community		Sense of community	Welcoming to diversity of community; community celebrates together	Sense of community
Community power			Sense of control and ownership	
Community values				
Critical reflection	Problem assessment	Ability to solve problems	Common purpose	Ongoing learning
		Level of commitment among community members		Shared vision
	Program management			
	Role of outside agents			
Understanding of community history				

each participating community documented what strategies were to be taken in an effort to create capacity for change. Similarly, progress reports documented procedures carried about and described exactly how those processes were executed in each participating community. A review of the projects' documents, as well as community groups' documents, provides insight into the iterative

process of building and sustaining community capacity. Conceptual frameworks of capacity building for health, as previously described, provided project staff with key concepts to consider when reviewing project documents. As project staff reviewed pertinent documents, they identified how these concepts emerged in Delta NIRI processes. Other concepts, not previously identified in

published conceptual frameworks, were also identified in the analysis.

Document analysis has been previously used as a methodology to evaluate participatory processes.²⁵ Such documents provided the “paper trail” needed to weave the historical process that groups go through over time and the information to reconstruct past events that are not observable.²⁶

Although no human participants were involved in the analysis described in this article, it is important to state that research procedures for Delta NIRI were submitted and approved by institutional review boards at each partner institution.

CAPACITY BUILDING APPROACHES IN THE LOWER MISSISSIPPI DELTA

As previously stated, throughout Delta NIRI, project staff created and supported capacity-building strategies and processes implemented in the 3 LMD communities in the context of this community capacity conceptual framework. A review of Delta NIRI project documents identified 5 strategies that directly related to capacity building. These included fostering participation, cultivating leadership opportunities, training community members as co-researchers, securing community resources, and implementing the intervention together. Specific activities in Delta NIRI resulted from these key strategies. Capacity-building strategies and processes categorized by dimensions of community capacity are summarized in Table 2.

Fostering participation

Participation is perhaps the most fundamental dimension of community capacity, as well as being a foundational principle of CBPR. Delta NIRI used a participatory intervention-planning model developed under the direction of the Commission of European Communities called Comprehensive Participatory Planning and Evaluation to guide the initial process of nutrition intervention planning in each community.^{27,28} This inter-

vention planning approach includes identification of problems, elucidation of causes, identification and ranking of intervention approaches, and development of intervention components using group processes and visual models that readily engage community members. The intervention planning process in Hollandale using Comprehensive Participatory Planning and Evaluation, which led to the development of a physical activity intervention,²⁹ is described by Ndirangu and colleagues.²⁸ The Comprehensive Participatory Planning and Evaluation process not only builds community capacity through participation but facilitates critical reflection around problem assessment.

Using the aforementioned planning model, Delta NIRI began to facilitate participation in each of the 3 LMD communities at the time of community entry by forming a community committee to guide its efforts. Each community committee is open to any interested community members and includes intervention participants as well as individuals who represent specific community sectors, among them education, churches, government, health, and lay grassroots representation. Each committee selected a community resident as a committee chairperson and over time developed a regular meeting schedule to facilitate planning and maintain communication. Community committees meet once or twice monthly and include functional subcommittees to guide various aspects of the collaboration, such as research planning, publicity, and future funding. Community committee members’ motivations for and barriers to participation were explored by Ndirangu and colleagues.¹³ Among barriers cited were lack of representation from segments of the community, deriving in part in one community from the perception that the project was intended to serve a particular ethnic group. Lack of adequate publicity and the location of the project office were also perceived as barriers to participation and might have contributed to lower participation by young adults than by middle-aged and older adults.

Table 2. Selected community capacity-building strategies and processes implemented in Lower Mississippi Delta communities with dimensions of community capacity addressed by strategy

Strategy/process	Community capacity dimensions
<u>Fostering participation</u>	
Intervention planning workshops using the Comprehensive Participatory Planning and Evaluation approach	Participation Problem assessment Critical reflection Community power
Formation of community committees Selection of community resident as chair	Participation Leadership Community power
<u>Cultivating leadership opportunities</u>	
Employment and training of community intervention coordinators and liaisons	Participation Leadership Skills
Internship programs for high school students	Resources Participation Leadership Skills Resources Sense of community
Employment and training of community research assistants	Participation Leadership Skills Resources
<u>Training community members as co-researchers</u>	
Human subjects protection training for research assistants and community members	Skills Critical reflection Problem assessment
Focus group training for community members	Participation Leadership Skills Problem assessment Sense of community
"All-Delta" research conference with academic and community presenters	Leadership Skills Critical reflection
<u>Securing community resources</u>	
Establishment of local offices	Resources
<u>Implementing the intervention together</u>	
Involvement of community members in planning and implementing interventions	Participation Leadership Skills Community power, ownership Common purpose, shared vision community values

Cultivating leadership opportunities

Delta NIRI has engaged in a number of strategies to develop leadership and skills for application to current intervention efforts as well as to build capacity for sustaining health priorities and programming. Adult leadership within the community has been critical to the success of intervention implementation and sustainability in the LMD communities. Leadership and skill development among adults has occurred at a number of levels. Community members have been hired and trained as research assistants to interview adult intervention participants using demographic and psychosocial questionnaires; measure anthropometrics, blood pressure, and blood lipids of adults using automated instruments; and coordinate fruit and vegetable tasting trials in school classrooms. Physical activity intervention volunteer leaders were trained to recruit and lead community members in walking groups.²⁹ They received training in motivating group members and in physical activity techniques and safety, as well as in procedures for managing process evaluation data collection within their groups for which they were responsible. Participation in skills development and paid or volunteer leadership experiences may make community residents better qualified for other paid employment opportunities as well as building their self-efficacy for formal learning, thus encouraging them to pursue other education and training opportunities.

A major thrust for development of local capacity for leadership has been the employment of community residents as local intervention coordinators and community liaisons. These individuals have been the real face of the interventions to the communities. In developing interventions collaboratively, all research partners have developed capacity to conduct CBPR research targeting the health and nutrition status of LMD communities. The research teams have participated in intervention development training together and met regularly face-to-face and by conference call to formulate intervention plans, monitor in-

tervention implementation, and evaluate intervention outcomes. Such interaction facilitates the sharing of the complementary skills possessed by community and university partners, enhancing the capacity of each partner to better engage the other in current and future community nutrition and health intervention efforts. One local resident employed by the initiative assumed responsibility for coordinating a new summer soccer league that was initiated as part of a physical activity intervention for children. Soccer was not a sport familiar to this community. High school and college students were recruited as coaches, and local staff arranged coaching clinics, organized recruitment of children and formation of teams, and planned the practice and game schedule, while academic partners managed the evaluation component of the program. In its second year, participation in the program grew to more than 100 children. Another employee of a local NIRI enrolled in online courses offered by the local community college for an associate's degree program.

Developing youth leadership was a high priority of community committee members early in the life of Hollandale NIRI. This priority stemmed in part from recognition of the absence of opportunities for young people in a small rural community and a desire to invest in the community's future. A summer program for high school honor students now in its fourth year has focused on development of general employability skills, healthy lifestyle skills, and awareness of career opportunities in nutrition through experiences with job shadowing, as research assistants, and as peer nutrition educators for younger children participating in a summer nutrition education and soccer program.

Poverty and the lack of economic development and employment opportunities in rural communities are barriers to sustaining the leadership skills developed through projects such as these. Furthermore, rural areas experience out-migration as young people with potential seek education and employment opportunities elsewhere.³⁰

Training community members as co-researchers

Considering the legacy of mistrust surrounding research within the African American community, capacity building focusing on development of an understanding of research goals and processes has been a major focus of Delta NIRI.^{7,8} The need for capacity building around research was further indicated as Delta NIRI community committee members expressed frustration with the slow pace of the research in their communities in contrast to their expectation of seeing benefits from the presence of Delta NIRI in the short term in the form of community programs.¹³ In the context of focus groups conducted as part of an early process evaluation, they also expressed frustration with their role in the participatory research planning process, having been accustomed to outsider agencies and organizations providing service-oriented agency-planned and led programs in the past.¹³

Involving community members in planning and conducting research as described earlier was the primary mode of research capacity development. Youth participants in the summer internship program also conducted community surveys including a survey of food availability in the local grocery store, and made slide presentations of their work to the community committee at the program's conclusion each summer. Training in focus group data collection was provided in 2 NIRI communities. One community wished to use the approach to conduct its own needs assessment, and in the other, interested community committee members participated when training was provided in preparation for qualitative data collection for the physical activity intervention process evaluation. Delta NIRI academic partners provided training in confidentiality and human subject protection to all community residents serving as data collectors. Furthermore, Delta NIRI partners conducted a series of workshops for community residents on the research process, particularly focusing on their rights as human sub-

jects, ethical principles undergirding human subject research, and the informed consent process. Community committee chairpersons and staff attended national research conferences, particularly those focusing on collaborative community participatory research, such as Community Campus Partnerships for Health. Perhaps the most unique research capacity-building activity was a research conference held in the Delta of Mississippi for all Delta NIRI collaborators, termed the "All Delta Conference," and entitled "Collaborating Communities: Creating a Healthy Climate for Change." The conference featured presentations by community and academic partners as well as university undergraduate and graduate students being trained in CBPR models for nutrition intervention and allowed for critical reflection from multiple perspectives on accomplishments and challenges of undertaking nutrition intervention research in the LMD. Attendees included community committee members and research assistants, university faculty and students, and local, state, and national policymakers. The conference followed national models for collaborative conferences in omitting any reference to academic degrees in its program.

While all these activities built research capacity among community members, participation was necessarily limited to relatively small numbers of community members. Those trained were nonetheless better prepared to pursue future opportunities for collaborative research partnerships with universities, a significant accomplishment considering that past attempts at collaboration from universities outside the region had failed in part because of the community's inability to assert its priorities relative to intervention research.

Securing community resources

Resources capacity building in the NIRI communities has occurred both in human resource development, as described earlier, and through investment in nonhuman resources. A Delta NIRI office was established in each

community soon after community entry. Location and accessibility of offices presented some short-term challenges, with 1 office located on the second floor of the school district office building, accessible only after passing through meeting rooms and climbing a steep flight of stairs. Another community office was located in a part of town that was not perceived as welcoming to some residents. Over the 5-year period since initial community entry, more accessible office facilities have been obtained and equipped with computers with Internet access, photocopiers, and fax machines, as well as weight scales and automated blood pressure monitors for community use. In general, access to personal computers in the NIRI communities otherwise seems to be limited, with school district data from 1 community suggesting that only 25% of students have access to computers in the home. The Delta NIRI offices also provide space for community meetings and for intervention and data collection activities. Spaces suitable for group activities in these small communities are also otherwise limited in number and in perceived accessibility to diverse members of the community. To support and promote walking in the 2 communities where physical activity interventions were developed, walking trails were established or upgraded through the collaborative efforts of Delta NIRI, the NIRI community committees, local governments, and local businesses.

Implementing the intervention together

The development of capacity in the domains of social networks, sense of community, and development of community values around health are perhaps best illustrated through community-initiated examples of sustained programming and resources around health and nutrition in the NIRI communities. In 1 community, a physical activity research intervention lasting 6 months and involving more than 100 community residents as participants created interest in physical activity within the broader community over the time course of its implementation. The school dis-

trict increased its capacity related to wellness and a healthy school environment as it successfully competed for a healthy schools grant from a state-based foundation. The elementary school highlighted the top entries in a Black History month poster competition in which students researched and then presented to the NIRI community committee their posters of African American heroes of health, nutrition, and physical activity. A local resident opened a small gymnasium, the first and only such facility in the community. Local NIRI staff and volunteers developed a series of exercise classes led by volunteers that also included cooking demonstrations and nutrition education provided through the Extension partner. These began as weekly sessions held in space provided by the school district. The demand from community members was such that the program expanded to sessions offered 4 days a week. The gymnasium owner provided the use of his facility at no charge for these sessions for a 3-month period, as a community service and to market his facility to potential members. Local healthcare provider staff became involved as participants in the exercise classes and in turn joined the NIRI community committee. A bimonthly newsletter also contributed to capacity building around community networking and valuing of health, featuring "success stories" of participants who increased exercise and experienced weight loss and improvement of other health outcomes.

SUMMARY AND CONCLUSIONS

Rural communities, particularly those experiencing health disparities, present a unique challenge for sustainability of health promotion processes and outcomes, in part because of resource limitations inherent in small communities.⁹ Incorporating capacity-building approaches in health-promotion and nutrition-intervention programming in rural communities appears to provide a means to develop community capacity and in turn enhance potential for sustainability of health outcomes and effectiveness.²¹ There is

substantial agreement on dimensions or components that constitute community capacity,^{3,9,16-18,29} and work such as this and other recent studies provide examples of strategies that strengthen dimensions of com-

munity capacity²⁴ in communities experiencing health disparity. Future studies should address the relationship of capacity-building processes to measures of capacity as well as to sustainability of health-promotion outcomes.

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