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Original Research

Community-based fortified dietary intervention improved health outcomes among low-income African-American women

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ABSTRACT

Poor dietary exposure disproportionately affects African-Americans and contributes to the persistence of disparities in health outcomes. In this study, we hypothesized that fortified dietary intervention (FDI) will improve measured dietary and related health outcomes and will be acceptable among low-income African-American women living in Tampa, FL. These objectives were tested using a prospective experimental study using pretest and posttest design with a control group, using a community-based participatory research approach. The intervention (FDI) was designed by the community through structural modification of a preexisting, diet-based program by the addition of a physical and mental health component. Paired sample *t* tests were used to examine preintervention and postintervention changes in study outcomes. A total of 49 women participated in the study, 26 in the FDI group and 23 controls. Two weeks postintervention, there were significant improvements in waist circumference and health-related quality of life related to physical health ($P < .0001$), physical fitness subscores ($P = .002$), and nutritional subscores ($P = .001$) in the FDI group. Among overweight/obese women, improvement in health-related quality of life related to physical health, a significant decrease in depressive score, and a reduction in waist circumference were noted. In the control group, a decrease in waist circumference was observed. Implementation of the FDI through a community-based participatory research approach is feasible and effective among low-income African-American women in general and overweight/obese women in particular. Social reengineering of a nutritional intervention coupled with community-based approach will enhance health outcomes of low-income women.

Abbreviations: BMI, body mass index; BP, blood pressure; CBPR, community-based participatory research; FDI, fortified dietary intervention; HRQoL, health-related quality of life.

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1. Introduction

Inadequacy of vital nutrient-rich diet coupled with low levels of physical activity is known to have negative impacts on health needs such as maintenance of weight and mitigation of related adverse health conditions. Overweight and obesity typically result from a combination of poor nutrition or consuming too much energy and expending too little through physical activity. Nutrition is cited as a key contributor to health disparities, including preventable chronic diseases [1]. Historically, racial minorities have suffered from suboptimal dietary exposure and nutrition profiles as compared with their white counterparts [1]. Sources of these dietary disparities include the intake of foods with high amounts of saturated fats and a low consumption of fruits, vegetables, calcium, and fiber [2]. It is widely acknowledged that socioeconomic factors play a key role in nutritional disparities among racial minorities and that additional cultural and environmental factors can further exacerbate the gap in dietary quality.

Reducing disparities related to lifestyle including poor diet, low levels of physical activity, and high stress, which are associated adverse health outcomes, can be quite challenging. Community-based participatory research (CBPR), which encompasses involvement of community members in all aspects of decision making and implementation, is a well-suited approach to addressing health disparities, particularly among racial and ethnic minority communities [3,4]. However, the CBPR strategy remains underused in maternal nutritional health research despite its potential benefits [5]. This article attempts to establish an application of the CBPR strategy in nutritional research of women of reproductive age. The potential benefits of the CBPR approach include flexibility in adapting protocol, which supports the likelihood of successful implementation of CBPR in real-world scenarios [5]. Overall, the multicontextual nature of CBPR, along with its principles of community engagement, supports prolonged sustainability and increased effectiveness of health promotion and disease reduction interventions in a nutritionally disadvantaged environment.

In this study, we used a CBPR approach to create an intervention program to address existing health disparities in a low-income, mostly African-American community in Tampa, FL. The objective of this pilot study was to assess the effectiveness of a novel community-based intervention program, which was reengineered through structural modification of an existing purely diet-based program by the addition of physical and mental health components. We tagged the reengineered intervention as fortified dietary intervention (FDI). The FDI was conceived by the Tampa community based on the results of a prior needs-assessment study conducted through focus groups and intercept interviews, the results of which have been published elsewhere [6,7].

We measured effectiveness of FDI both qualitatively and quantitatively. Qualitative assessments were conducted via cognitive interviews (CIs) gauging feasibility and acceptability of the approach, whereas quantitative assessments were made via dietary and health-outcome measures described in Section 2.6. We hypothesize that the FDI will enhance dietary and health-related outcomes among low-income African-American women of reproductive age. We test this hypothesis using a pretest-posttest experimental design using intervention and control groups.

2. Methods and materials

2.1. Study design, setting, and participants

This CBPR study was implemented using collaborative community-academic partnerships among REACHUP, Incorporated (a nonprofit community-rooted organization); the University of South Florida; and Baylor College of Medicine. The project was conducted as a prospective experimental study using a pretest-posttest design. Both the experimental and control groups included subjects from Hillsborough County, Florida, specifically within the following 5 zip codes: 33602, 33603, 33605, 33607, and 33610. Women in the control group were enrolled from the same zip codes as women in the experimental group but from non-neighboring households to avoid contamination. Eligible for the study were women aged 18-49 years who had the capacity to give consent.

Participants were recruited using flyers and "word-of-mouth" transmission among women receiving preconception and perinatal risk reduction services provided by REACHUP. All women enrolled into the study completed a self-administered survey and physical assessment at baseline (preintervention) and at 2 weeks postintervention. The surveys were administered using droidSURVEY software [8] which was installed on Hewlett-Packard Slate 7″ tablet computers running the Android 4.2.2 operating system [9]. The software was modified to be culturally appropriate and user-friendly. The use of tablet-administered surveys allowed for a cheap, portable, and convenient means of data collection. Trained researchers facilitated the data collection process by providing information on informed consent, assisting participants with questions about the study, managing tablet computers to administer the survey, and conducting physical assessments. An appropriate monetary incentive was given to participants at baseline and postintervention. In addition, participants in the intervention group received incentives after each intervention session. Oversight of the study was provided by the Community Advisory Board (CAB), and approval for the study was obtained from the Institutional Review Board of Baylor College of Medicine.

2.2. Intervention: FDI

The FDI arose from a prior needs-assessment study conducted through focus groups and intercept interviews [6,7]. In the needs-assessment study, poor nutritional status, lack of physical activity, and mental health issues (specifically, problems with stress and poor sleep quality) were identified as maternal and child health disparity priority topics within the community. The FDI is based on the premise that a promising dietary intervention can be made more potent by integrating a physical activity and mental health component. Accordingly, the CAB selected the Expanded Food and Nutrition Education