



Enhancing physical and social environments to reduce obesity among public housing residents: Rationale, trial design, and baseline data for the Healthy Families study



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ABSTRACT

Intervention programs that change environments have the potential for greater population impact on obesity compared to individual-level programs. We began a cluster randomized, multi-component multi-level intervention to improve weight, diet, and physical activity among low-socioeconomic status public housing residents. Here we describe the rationale, intervention design, and baseline survey data. After approaching 12 developments, ten were randomized to intervention ($n = 5$) or assessment-only control ($n = 5$). All residents in intervention developments are welcome to attend any intervention component: health screenings, mobile food bus, walking groups, cooking demonstrations, and a social media campaign; all of which are facilitated by community health workers who are residents trained in health outreach. To evaluate weight and behavioral outcomes, a subgroup of female residents and their daughters age 8–15 were recruited into an evaluation cohort. In total, 211 households completed the survey (RR = 46.44%). Respondents were Latino (63%), Black (24%), and had \leq high school education (64%). Respondents reported ≤ 2 servings of fruits & vegetables/day (62%), visiting fast food restaurants 1+ times/week (32%), and drinking soft drinks daily or more (27%). The only difference between randomized groups was race/ethnicity, with more Black residents in the intervention vs. control group (28% vs. 19%, $p=0.0146$). Among low-socioeconomic status urban public housing residents, we successfully recruited and randomized families into a multi-level intervention targeting obesity. If successful, this intervention model could be adopted in other public housing developments or entities that also employ community health workers, such as food assistance programs or hospitals.

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1. Introduction

The prevalence of overweight/obesity in the U.S. is substantial and is considerably higher in women with lower

socio-economic status compared to other women or in men [1–3]. In urban areas, individuals with low socioeconomic status living in subsidized public housing report nearly two times higher levels of obesity compared with other urban residents [4]. Diet and physical activity behaviors related to obesity are clearly important individual-level factors, but efforts to change these factors on a population-wide basis have been largely unrealized. Research points to the role of environmental conditions in the development of obesity, including availability and marketing of low-cost/energy-dense

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foods and prevalence of areas without easy access to healthy options like places to walk and buy healthful foods [5,6]. Intervention programs that aim to change environments may have greater impact on preventing obesity or further weight gain among a population of residents as opposed to individual, one-on-one intervention programs seeking to modify diet and physical activity behaviors [7,8].

Research studies in public housing have targeted a number of health behaviors, including screening for chronic disease risk [9], cancer screening [10], tobacco use and other environmental hazards [11,12], and chronic disease-related risk factors such as diet [13], and physical activity [14,15]. For example, in the pathways to Health trial, residents of public housing were randomized to receive either an individual-level intervention targeting smoking cessation or fruit and vegetable intakes [13]. The diet-related intervention included receiving culturally-appropriate educational materials and motivational interviewing counseling sessions. Ahluwalia and colleagues reported a significant increase in fruit and vegetable intakes among those receiving the fruit and vegetable intervention compared to those receiving the smoking cessation intervention of 1.58 and 0.78 greater servings of fruit and vegetables at 8 week and 6 month follow-up, respectively [13]. For physical activity, a community-based intervention study was conducted to promote walking activity in a public housing site in Seattle through walking groups, improvements to walking routes, and advocacy for pedestrian safety [15]. Results showed that self-reported walking increased among walking group participants, from 65 to 109 min/day [15]. Our own pilot work in Boston public housing developments indicates that although residents consider stress and safety/violence to be the top two health issues (endorsed by 43% and 40% of residents, respectively), 27% of residents also endorsed obesity as a health concern [16]. This body of research, along with other research conducted in homes of low-income families [17], establishes the feasibility and efficacy of conducting health behavior interventions in populations living in public housing in general, yet, there is less literature in public housing for programs targeting obesity and multi-component multi-level programs.

Intervention programs are needed that target multi-level conditions, that are adapted to individuals at-risk for obesity (e.g., low socioeconomic individuals), and that can be sustained after the active intervention period ends. To meet these goals, the primary aim of this cluster randomized trial is to design, implement, and evaluate a multi-component multi-level intervention to improve weight, diet, and physical activity outcomes among residents of public housing developments in Boston. Here we describe the rationale, intervention design, and baseline survey data.

2. Material and methods

2.1. Participants and data collection

Public housing in Boston is administered by the Boston Housing Authority, a public agency that provides subsidized housing to low- and moderate-income individuals and families, disabled individuals, and elderly individuals. There are 64 public housing developments, 37 are designated as elderly/disabled developments and 27 are designated as family developments

[18]. Approximately 27,000 people are housed under the public housing program [18].

Family (vs. elderly) designated housing developments with more than 200 residents that were not undergoing renovations that require residents to move out of the development for a period of time in the city of Boston were eligible to participate ($n = 24$). Our goal was to have 10 developments participate in the Healthy Families study; 5 serving as intervention developments and 5 serving as control developments. Initially study staff sent an email request to meet with development managers and Boston Housing Authority employees at each development. In that email, research staff attached a question and answer document detailing the project, steps managers would need to take, and how the programs would operate. Then study staff met face to face with the managers and received permission to either move forward and bring in the project or was refused. If the project was approved, staff then met with tenant associations and development leaders and went through the same process with them; we called this “community consent” (manuscript under review). Developments were then randomly assigned to either condition, in matched pairs for size of development and existence of health activities in the development. Housing developments randomized to the intervention group received all intervention components (see [Intervention](#) section below) and developments randomized to the control group did not receive any intervention components. All residents in the 5 intervention housing developments are allowed to participate in any intervention activities. The 10 developments are spread fairly evenly throughout the city of Boston, representing 8 neighborhoods. We chose an assessment only control group in place of an attention placebo control group in order to achieve the maximum difference in change in outcomes between the intervention and control groups.

In both intervention and control group housing developments, a subgroup of female residents and their daughters were recruited into an evaluation cohort to examine study outcomes. We selected mothers because in the family developments over 80% of heads of household were women. We selected daughters aged 8–15 because of the development of obesity that occurs during this time period for females, and obesity prevalence is particularly high among African American girls [19]. To be eligible, participants must be female, age 18–72, live in public housing and plan to do so for two years, have responsibility for a girl age 8–15 (also living in public housing), be English or Spanish speaking, and be able to make changes to their diet and physical activity habits if desired. Exclusion criteria are if the adult is not able to complete the survey tools or is not interested in participating. All study materials were available and used in both English and Spanish; materials in Spanish were reviewed by a Health Living Advocate (see [Intervention](#) section for description of Healthy Living Advocates) to check if the content would resonate with residents. Mothers were given a \$10 gift card for their time at baseline.

Survey assistants approached randomly selected apartment units within each of the 10 housing developments. Sequential numbers were assigned to each unit in a development starting with number 1 and a 20% sample of units were then chosen using a random number generator (stattrek.com) until enrollment minimums were reached. Using a standardized protocol, a trained team of two, composed one survey assistant and one

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